

## School Quality and Staying-On in Northern Ireland: Resources, Peer Groups and Ethos\*

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*Abstract:* The paper examines career choice at age 16 in Northern Ireland using micro data for young people completing compulsory education in 1993. Explanatory variables include resource-related school characteristics, ethos-related characteristics and peer-group factors. The results suggest resources, ethos and peer group effects all play a significant role in career choice at age 16. Some of these factors, including pupil/teacher ratios, act in opposite directions on the probability of entry into Further Education College and of staying-on at school, suggesting studies of school quality on choice at age 16 should disaggregate post-compulsory education where possible.

### I INTRODUCTION

Participation rates in post-compulsory education have increased dramatically in the UK over the last fifteen years and more steadily for the forty years before that. Many factors lie behind this trend, including improvements in qualification levels at age 16, increased payoffs to education in later life and a lack of employment opportunities for young people (e.g. McVicar and Rice, 2001; Whitfield and Wilson, 1991). Another factor that has attracted attention in the literature recently is school quality.

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Other things being equal, attending a good (bad) school might encourage (discourage) a young person to stay-on after completing compulsory education. Such effects have been found in the literature for a number of different measures of school quality, including school type, pupil-teacher ratios, average exam success, attendance rates and the presence or otherwise of a 6th Form. The problem is that different studies of choice at age 16 generally use different sets of school characteristics and consequently find different results. In addition, many of the measures of school quality used are consistent with alternative explanations. The significance of the presence of a 6th Form, for example, in raising the probability of staying-on, might be because of peer group or role model effects or because of teaching quality or funding effects that trickle down to lower forms. Similarly, the significance of average school exam success for career choice might reflect a school performance effect or a spillover/peer group effect. Also, Grant-Maintained schools (state schools independent of local authority control) might encourage staying-on because they are better funded or because they have a different culture to other schools. This paper tries to disentangle resource, peer group and ethos effects by including indicators of all three in a model of career choice at age 16.

Northern Ireland (NI) is a particularly interesting region for which to carry out such a study because of its highly heterogeneous system of secondary education. This is discussed in the following section, along with a brief review of existing literature on school quality and staying-on. Section III presents details of the data set used in the analysis. Section IV sets out the empirical model and discusses the results. Section V concludes with broad implications for policy and further research.

## II BACKGROUND

### *Existing Literature on School Resources, Peer Groups, Ethos and Staying-on*

There can be significant cross-sectional variation in the resources available to schools of different types, with different characteristics and in different areas. In the US, there may be substantial differences between states in expenditure per pupil. In 1996/97, average expenditure per pupil in Utah, for example, was less than two-thirds that of neighbouring Wyoming.<sup>1</sup> In the UK, there may be differences across local education authorities. In 1993/94, expenditure per pupil in Wolverhampton was around half of that in Lambeth, for example.<sup>2</sup> In a given area in Northern Ireland, local authority

<sup>1</sup> Source: US Department of Education, National Centre for Education Statistics.

<sup>2</sup> Source: CIPFA *Handbook of Education Unit Costs*.

controlled schools have traditionally received higher capital funding than some (state) schools outside local authority control (see Teague, 1997). Finally, local school management of budgets implies scope for variation between schools in the proportion of resources spent directly on teaching, or the average experience levels of teachers employed.

Is it the case that the more money spent on schools the better they perform in terms of outcomes for their students? More narrowly, is it the case that the staying-on rate is higher for schools with more resources? There is a considerable literature concerning school resources and outcomes, particularly on the resources relationships with academic attainment and with future earnings, and particularly for the US. The effects of school resources on academic attainment can only be summarised as ambiguous, with some recent studies finding positive effects, others no effects, and some even finding apparent negative effects.<sup>3</sup> The evidence on the school resources/earnings relationship is also mixed. Hanushek (1986); Hanushek (1996); Card and Krueger (1996); Betts (1996) and Vignoles *et al.* (2000) review this literature. The relationship between school resources and staying-on has received less attention, although it is a critical aspect of the study of resources and outcomes.

The literature discussing the joint determination of staying-on and earnings provides us with part of the existing empirical evidence on the staying-on question itself. Card and Krueger (1996) note that some students will attend school longer the higher the quality of the school. This may be because school is more pleasant, or because students know there might be a higher payoff to staying-on at a high quality school. They find a strong negative correlation between pupil/teacher ratios (PTRs) and post-compulsory years of schooling for the North/South Carolina "natural experiment".<sup>4</sup> They also find evidence of such a relationship at aggregate-level (Card and Krueger, 1992). Direct studies of the resources/staying-on question are rare, but Dustmann *et al.* (1998) find a robust negative effect of pupil/teacher ratios on staying-on for a micro-level UK sample (the NCDS). Cheng (1995), on the other hand, finds no significant effect of PTRs on staying-on, using the Youth Cohort Study. It would be unwise to draw any firm conclusions from these few studies. Nonetheless, the *possibility* of a real-world relationship between

<sup>3</sup> A negative relationship between resources and academic attainment is likely to be the result of the endogeneity of class sizes, where less "able" children are put in smaller classes. Given the selective nature of NI's secondary education system, school level resource measures are also likely to be correlated with average academic ability through this mechanism.

<sup>4</sup> Negative in the case of pupil/teacher ratios and therefore positive in the case of teacher/pupil ratios, which should increase with resources.

school resources measures and staying-on is at least suggested. Further empirical research is clearly warranted.

In addition to resource factors, a school may be defined by the nature of its pupils. In other words, the characteristics of one pupil at a given school might affect another pupil's outcomes. For example, a more able student amongst a class of less able students might "hide" his or her ability in order not to stand out. A less able student might be discouraged, or might learn faster in the company of more able students. Similarly, a student in a class with a high staying-on rate may be more likely to stay on. These effects are generally referred to as peer group effects.

Peer group effects, including measures of average academic ability of a class or school, its average socio-economic make-up and any role model effects from older years, are widely seen as significant determinants of academic attainment (e.g. Reynolds and Reid, 1988; Feinstein and Symons, 1999; Bradley and Taylor, 1998). Peer group effects are also studied in the context of staying-on decisions, but often not explicitly. This lack of explicitness may be a result of the difficulty of isolating peer group effects from other effects. For example, measures of class exam registration such as those used by Feinstein and Symons (1999) might be capturing the accumulated effects of school quality. Measures of school average exam success can similarly be interpreted as capturing school performance effects (e.g. Armstrong, 1999). Cheng (1995) finds the proportion of pupils receiving free school meals to be a significant determinant of staying-on decisions. However, the socio-economic make-up of a class or school may be strongly related to school type, which also has the potential to be confused with school culture effects (e.g. McVicar, 1999). The presence of a 6th Form at a school has been found to have significant positive effects on staying-on rates (e.g. Cheng, 1995; Payne, 1998) but this is consistent with school culture or school resources effects as well as role model and peer group effects.

A whole host of other factors can influence the learning environment of a school, including its ethos, which can be loosely termed the culture of the school. Examples are parental involvement, pupil and teacher perceptions and expectations and discipline. Detailed discussion of such school culture factors can be found in the education literature (see, for example, Finlayson, 1973; Rutter *et al.*, 1979; Cohen and Manion, 1981; and Freiberg, 1999). Department of Education for Northern Ireland (DENI) school inspection reports are useful to highlight the existence of differences in culture across schools. A school that has an apparently positive cultural influence on its pupils gets the following description:

*The school is well managed. The principal provides good leadership and is well supported by the senior management team, heads of department and year heads. The ethos of the school is friendly and welcoming. Relationships at all levels are good and based on mutual respect. The pupils are polite and friendly.*

In contrast, one school is noted for its "...frequent use of sanctions (which) is unnecessary and militates against a good learning ethos." Another inspection report notes how "...in many instances the teachers' expectations are low".

The economics literature considering school culture and staying-on is not large, and not always couched in the same terms as used in the present paper. However, information is contained in this literature that can illustrate the culture/staying-on relationship. A GB literature includes Andrews and Bradley (1997) who find staying-on effects of Grant-Maintained status, selective status and co-ed status, over and above measurable peer group effects. Cheng (1995) and Dustman *et al.* (1998), controlling for resource and other factors, also find some significant staying-on effects of various measures of school type. US studies comparing the performance of Catholic schools to public schools have found positive effects on both examination performance and staying-on, controlling for selection (e.g. Evans and Schwab, 1995; Neal, 1997). This may be evidence of an ethos or culture effect, although this is not clear. Once again, further empirical research is clearly warranted.

There are a large number of factors that have been found to influence staying-on decisions other than school quality characteristics, and an extensive literature exists analysing their effects (see, for example, Rice, 1987; Micklewright *et al.*, 1990; Andrews and Bradley, 1997). This literature generally stresses the importance of individual and background factors, such as academic ability, social class and gender and environmental factors such as local unemployment rates and expected returns to staying-on in terms of earnings differentials. In addition, there are other individual and environmental factors particular to NI that have been found to be important determinants of transition decisions, such as religion and sub-regional geography (Armstrong, 1999).

### *Secondary Education in Northern Ireland*

Secondary education in Northern Ireland has a unique structure, largely split along academic ability and religious lines.<sup>5</sup> This strengthens the need for

<sup>5</sup>. It has been suggested that one possible reason why NI persists with a selective system of secondary education is the importance of the church in the management of many of the region's schools (Cormack *et al.*, 1987).

research specific to the region if the Northern Ireland Assembly and Executive are to be able to make knowledge-based policy decisions. Given its size, there are a surprising number of existing studies that examine various aspects of schooling and staying-on in Northern Ireland (e.g. Daly and Shuttleworth, 2000; McVicar, 1999; Armstrong, 1999; Murphy and Shuttleworth, 1997). None of these studies control as extensively as the current paper, however, for school resource, peer group and ethos effects.

Around one-third of pupils in NI receive their secondary education in grammar schools, with the remainder in secondary or special schools. Grammar school places are offered largely on the basis of performance in an academic examination sat at age 11. For recent studies of differences in career choice at age 16 between grammar school pupils and others in Northern Ireland see Daly and Shuttleworth (2000) and McVicar (1999). A common finding of these and earlier studies is that grammar school pupils are more likely than others to stay on at school post-16 years. This is not surprising given that grammar schools select those most likely to continue on to higher education. Grammar school culture, or ethos, however, may reinforce this selection effect, through careers guidance, for example. McWhirter *et al.* (1987) note that grammar schools "...identify their role in terms of preparing young people for entry into higher education."

In addition to the selective system, Northern Ireland has markedly different management arrangements to those in the rest of the UK. Secondary education can be divided into three major categories: Controlled, Voluntary Maintained and Voluntary Grammar (formerly Voluntary Non-Maintained). It is possible, through school ethos or culture or other effects, that these different management arrangements are reflected in different staying-on decisions. Controlled schools, some of which are grammar schools but most of which are not, are under the control of the Education and Library Boards (ELBs) (local authority), and are attended mainly by Protestant pupils. Voluntary schools are independent but state grant-aided and usually run by a Board of Governors. Voluntary Maintained schools are usually Catholic secondary schools, with running costs met by the ELBs.<sup>6</sup> Voluntary grammar schools are spread between the Catholic and Protestant communities. In addition, there are a small but growing number of (predominantly) grant-maintained integrated schools, catering for pupils from all parts of the community, and a small number of comprehensive-style schools up to the age of 14 in the Craigavon area. Table 1 gives pupil numbers in each category of school for 2000/01.

<sup>6</sup> Until recently, these schools received only 85 per cent of capital costs from public funds. See Teague (1997) for a discussion. Some, but not all, now receive 100 per cent of capital costs.

Table 1: *Number of Pupils by School Type and Management Type, 2000/01*

<i>School Type</i>	<i>No. of Pupils</i>	<i>Predominant Religion of Pupils</i>
Controlled Grammar	14,691	Protestant
Voluntary Grammar (under Catholic management)	27,897	Catholic
Voluntary Grammar (under other management)	19,986	Protestant
Controlled Secondary	38,577	Protestant
Catholic Maintained Secondary	45,714	Catholic
Integrated Secondary (Controlled + Grant-Maintained)	8,728	Mixed

*Source:* "Enrolments at Schools and in Funded Pre-school Education in Northern Ireland 2000/01", Department of Education Northern Ireland, 30th April 2001 (Table 6b).

### III THE DATA

The individual level data used in this study are taken from a survey of young people in Northern Ireland who became eligible to leave school for the first time in 1993.<sup>7</sup> The survey was carried out in June 1995, with a total of 980 responses. Information was collected on post school destinations, qualifications gained at age 16, individual and family background characteristics and school attended. These data were supplemented by information at school level from a number of sources. First, the type (e.g. ELB Controlled/Voluntary/Integrated) and selection regime (grammar/secondary) of schools is available from DENI's 1992/93 School Performance Indicators. The same source contains information on the proportion of 5th Formers obtaining five or more GCSE grades A\*-C and on attendance rates. The presence of a 6th Form at the school, the co-education (co-ed) or otherwise status of a school and information on number of teachers and pupils are available from DENI directly. Information on school expenditures is available from the five ELB's of Northern Ireland. Information on teacher numbers and school expenditures is not available for all schools in the sample. Consequently, the sample is reduced to 566 individuals by deletion of observations with key information missing.

<sup>7</sup> The Status 0 Survey (see Armstrong *et al.*, 1997).

The variables used to explain career choice at age 16 are listed in Table 2, with sample means and standard deviations. Where available, these sample statistics are compared to those for the full 980 sample from the survey. Variables display similar sample statistics for the full and the reduced samples, so we assume the missing data are distributed randomly across the sample.

The explanatory variables are divided into groups of individual and family, school and environmental factors. The school factors can be further divided into resource factors, peer group factors and culture factors. In most cases the classification of school measures into these further subdivisions is made possible by the inclusion of all the other school measures, and follows from the discussion in Section II. For example, by controlling for school examination success, we can interpret the grammar school dummy as a school culture rather than a peer group effect. Similarly, by controlling for school resource factors, the school type variable can also be interpreted as a culture effect rather than a resource effect. The classification of the attendance rate variable and the 6th Form dummy as peer group effects is somewhat arbitrary, although arguably the most natural interpretation.

Standard measures of school resources are expenditure per pupil and pupil/teacher ratio. Both these measures are included in the present study. In addition, school expenditure can be divided into expenditure directly on teaching and other non-teaching expenditure (e.g. administrative staff costs and capital costs). Some studies also include measures proxying for the average experience level of teachers at a school (e.g. Bradley and Taylor, 1998). Teaching expenditure divided by number of teachers is used here as a proxy for this effect. All measures are averaged over the years 1991/92 and 1992/93 in constant prices.

The proportion of 5th Formers achieving five or more grades A\*-C at GCSE is included as a peer group factor to reflect the average academic ability of pupils of the school. Similarly, to reflect the commitment of pupils to the school, the attendance rate is categorised as a peer group effect. Both these variables could be interpreted as general measures of school quality (e.g. Armstrong, 1999), but after controlling for other resource factors and culture factors, their residual effect is most likely to be through the peer group mechanism.



Table 2: *Sample Means of Explanatory Variables and Proportions in 6th Form, Further Education and Training/Other*

	<i>Variable</i>	<i>Reduced Sample Mean (n=566)</i>	<i>Full Sample Mean (n=980)</i>
Individual and Family	Catholic (cath)	.44 (.50)	.51 (.50)
	Male	.52 (.50)	.52 (.50)
	GCSEs (quals)	5.34 (3.00)	5.20 (3.04)
	Professional Father (Fpro)	.23 (.42)	.25 (.43)
	Professional Mother (Mpro)	.09 (.28)	.11 (.31)
	Number of Siblings (sibs)	2.74 (1.89)	2.70 (1.91)
	School Resource	PTR	14.84 (1.32)
Expenditure per Pupil (epp)		2131.34 (316.02)	-
Teaching Exp. per Pupil (tepp)		1592.24 (186.24)	-
Av. Teacher Costs (atc)		23425.85 (1546.43)	-
School Peer Group		School Exam Success (gcse5)	31.22 (23.07)
	Attendance Rate (ar)	91.24 (2.84)	91.80 (2.91)
	6th Form (6th)	.39 (.49)	.42 (.49)
School Culture	Grammar (gra)	.10 (.30)	.15 (.36)
	Controlled (cont)	.57 (.50)	.46 (.50)
	Single Sex (ssex)	.32 (.47)	.33 (.47)
Environmental	LGD Unemployment Rate (UR)	14.47 (2.98)	14.20 (2.93)
	TSN Area (tsn)	.61 (.49)	.61 (.49)
	Urban	.22 (.41)	.21 (.41)
	Activity in October 1993	6th Form	.18 (.39)
Further Education		.37 (.48)	.34 (.49)
Training/Other		.45 (.50)	.45 (.49)

*Notes:* Full sample statistics for school resource variables are not available due to missing values. Parentheses give standard deviations.

Pupils may be more likely to stay-on at school where a 6th Form is present (see Cheng, 1995; Payne, 1998). If a school has a 6th Form, then 5th Form pupils are more likely to know some of the teachers and many of the pupils who will be entering the 6th Form in the cohort. Therefore, aversion to uncertainty and peer group effects might reasonably be expected to increase the likelihood of such pupils staying-on at school. Similarly, the role model effects of day to day contact with existing 6th Formers might act to encourage staying-on. Of course, the presence of a 6th Form might also reflect an academic-orientated ethos in the school, which is more a school culture factor. Therefore, the classification of the 6th Form dummy to the peer group effects category should not be treated as clear cut.

A grammar school dummy variable is included to capture any differences in school culture (e.g. academic ethos) between grammar and secondary schools. The inclusion of school resource factors and peer group factors to capture average academic ability allows the grammar school culture effect to be isolated from these other related effects, in theory. Of course, in practice, the school exam success and grammar school variables are likely to be closely correlated. There may also be school culture effects because of school type, perhaps due to the nature of management of the school (distant or local) and the closeness of parental involvement, for example. The religious status of a school, closely bound with its type, may also affect the degree to which parents and school share the same ethos which may be reflected in parental involvement (see Spencer, 1987). A binary dummy is included for ELB-Controlled schools. The Controlled coefficients are therefore expressed relative to Voluntary schools.

Cheng (1995) finds that pupils from single sex schools are more likely to stay on at school beyond compulsory schooling. We control for this with a binary single sex dummy (0 = co-ed). As in the case of the presence of a 6th Form, the co-ed status or otherwise of a school may have both culture effects and peer group effects, and its classification as a culture variable should not be viewed as definitive.

Gender has been shown in numerous studies to effect choice of post-5th Form destination (refer to any of the transition studies reviewed in Section II). Typically, young women are far more likely to remain in full-time education than young men, and this is equally true of Northern Ireland as it is of the UK as a whole. Due to sample size, males and females are not treated separately but gender is included as a binary dummy (1 = male).

Young people with a good portfolio of qualifications tend to stay-on at school whereas those with little or no qualifications are more likely to enter training schemes or unemployment. This may partly reflect entrance

requirements for the various routes, but also young people's aspirations and their raw (academic) ability. Armstrong (1999) points out that qualifications at age 16 are likely to be endogenous in transition models because destinations are often chosen before these examinations are sat and examination effort may depend on the route chosen beforehand. It is also highly likely that many of the factors affecting career choice also affect exam performance more generally. A natural solution to this endogeneity problem would be to find an exogenous variable, correlated with qualifications at age 16, to use as an instrument. However, such instruments (exam success at 11 or 14, for example) are difficult to come by and we do not have any such information in our data set. The qualifications variable is the number of GCSE passes at grades A\*-C.

Parental occupational status can be used both as a measure of social class and of family disposable income. Such measures are intended to pick up factors such as parental aspirations for their children (full-time professional workers may have more demanding academic aspirations for their children than part-time manual workers, for instance) or the family's ability to fund a young adult through years of post-compulsory education. We include binary dummies for father and mother employed in managerial, professional or related occupations.

The number of siblings in the household is sometimes included as an explanatory variable in studies of staying-on (see, for example, Micklewright, 1989; Armstrong, 1999). A large family may cut down the amount of time parents can spend with individual children, which can affect intellectual development. Equally, it may reduce family income per head.

Unemployment rates are often found to be important determinants of staying-on rates (see, for example, Rice, 1987; Micklewright *et al.*, 1990). Two alternative hypotheses are first that high (local) unemployment encourages young people to stay-on at school because job opportunities are limited (low opportunity cost of staying-on). Second, unemployment might discourage young people from staying-on because they believe their future job prospects will be limited which reduces the perceived benefits to staying-on. This theoretical ambiguity is reflected in often contrasting empirical results. We include local unemployment rates for October 1993, based on claimant counts, at Local Government District (LGD) level.

An urban dummy is included to allow for possible effects of living in the urban areas of Belfast or Derry over and above the local labour demand effects captured by the unemployment variable. Armstrong (1999) suggests there may be social factors such as the incidence of crime or other urban cultural factors that have an effect on staying-on rates. Finally, a dummy variable is

included to capture whether an individual lives in a designated Targeting Social Needs (TSN) area. This last variable is intended to capture characteristics other than unemployment rates that make up the social fabric of the local area. This variable may also act to capture some social class effects.

#### IV ESTIMATION OF THE EMPIRICAL MODEL AND RESULTS

Estimation of the empirical model follows the multinomial logit (MNL) approach of Armstrong (1999) and Andrews and Bradley (1997), with multiple categories for the dependent variable (career choice at age 16).<sup>8</sup> This allows for the fact that decisions at age 16 are more complex than a simple binary choice (education or not). School 6th Forms, which exist in most grammar schools and some secondary schools, cater mainly for further academic study. Further education (FE) is provided in separate colleges offering both vocational and academic courses. Training schemes are essentially government supported on-the-job training with a classroom element. The dependent variable is defined as follows:

$$\begin{aligned} Y_i &= 0, \text{ if young person is at school,} \\ Y_i &= 1, \text{ if young person is in full-time FE,} \\ Y_i &= 2, \text{ if young person is employed, unemployed or on a training scheme.} \end{aligned} \tag{1}$$

The identification of these three separate states for the dependent variable is supported by Cramer-Ridder tests of pooling outcomes 0 and 1 (see Cramer and Ridder, 1991).

A young person  $i$  chooses state  $j$  according to the utility she derives from that activity, which is a function of observed individual, environmental and school characteristics ( $X_i$ ), shown in Equation (2). For example, an individual with higher academic ability might derive higher utility from staying-on at school compared to an individual with less academic ability. The error term captures unobserved influences, and is assumed to be drawn from an extreme value distribution. In interpreting the school effects and observed individual effects on choice of destination at age 16, we are implicitly assuming there is

<sup>8</sup> The MNL model has been criticised for its assumption of Independence of Irrelevant Alternatives. The assumption means that adding a further option at sixteen or removing one of the three options specified in (1) does not affect the relative probabilities of the remaining options. In defence of the MNL model in this case, however, note that the options reflect actual institutions – there are no further options to add and existing options cannot be removed.

no unobserved heterogeneity (e.g. unobserved ability) that is correlated with any of the observed explanatory variables. Observed individual effects are controlled for as far as is practicable, but some measure of predetermined ability (e.g. test results at age 11) would strengthen the model. Such a measure is unfortunately not available in the data set.

$$U_{ij} = b_j X_i + \varepsilon_{ij} \quad (2)$$

The original sample was stratified in such a way that a predetermined number of young people were in each category. Thus the probability of being in the sample in the first place is related to the model itself, or the sample is *choice-based*. Fortunately, the population proportions are known, so the Manski-Lerman estimator can be used (see Armstrong (1999), for an earlier application to school performance).

The first model estimated includes all potential RHS variables and is labelled Model 1. The model is estimated on the whole sample, with a dummy variable for gender. Variables for which all marginal effects at sample means are insignificantly different from zero at the 5 per cent level are then dropped from the model.<sup>9</sup> This more parsimonious model is labelled Model 2. Table 2 presents the marginal effects for all three states for both models.

The number of siblings drops out of the model as it is nowhere significant, as does the urban area dummy for those individuals living in Belfast and Derry District Council areas. The two school-level variables that are consistently insignificant are the dummy for single-sex schools and the average expenditure per teacher (proxying for teacher salary and therefore experience). The irrelevance of the co-ed status or otherwise of secondary education for this sample is somewhat surprising, given its significance in a number of previous studies (e.g. Cheng, 1995; McVicar, 1999). Previous evidence suggests that girls in single-sex schools perform better in exams than girls in co-ed schools whereas boys do not (e.g. Bradley and Taylor, 1998). It may be that the labour market effects of boy's schools and girls schools balance each other out when treated together. Replacing the single sex variable with two gender-specific single-sex variables (boy's school and girl's school) lends some support for this explanation. The male interactive dummy is marginally significant and negative for school and significant and positive for FE. The female interactive dummy is marginally negatively significant for

<sup>9</sup> Omission of these variables is supported by a Wald test of the restriction  $\beta=0$ , where  $\beta$  is the vector of coefficients for the siblings, urban, single sex and expenditure per pupil variables. The test statistic is 1.04 distributed chi-square against the 95 per cent critical value of 9.49.

FE. In other words, girl's schools encourage staying-on and discourage alternatives relative to boy's schools.

Having rejected the four variables described above, all other variables prove to have marginal effects at sample means that are significantly different from zero for at least one state of the dependent variable. Assuming we accept the approximate classification of the school level variables into the resources, culture and peer group sub-groups, the results suggest that all three school-level mechanisms (peer groups, culture and resources) influence career choice at age 16. Tests of the joint significance of the resources variables and the peer group variables both strongly reject the hypotheses that the coefficients for these variables are equal to zero. The hypothesis of zero coefficients on the joint school culture variables (grammar and controlled) can also be rejected, but only at a significance level of 86 per cent.

Consider the variables that proxy for school resource effects. Both expenditure per pupil and the PTR have marginal effects that are significantly different from zero. Consider first the marginal effects of the PTR. An increase in the PTR means that class sizes are bigger. If we believe that increased resources will increase staying-on rates, then we would expect a *negative* sign on its marginal effect for staying-on in school. The results from both models suggest precisely the opposite. In other words, increasing the PTR increases staying-on at school. This counter-intuitive result has been found before (see the review in Hanushek, 1996) and is likely to be driven by the fact that funding is skewed towards the less academically able in Northern Ireland.<sup>10</sup>

Interestingly, the PTR has a significant negative effect on FE entry. This is more in line with the predicted effect of resources on opting for continued education. It is particularly interesting in the light of the large body of literature that finds no significant overall relationship between PTRs and remaining in full-time education post-16. By splitting post-compulsory education into FE and schools the model identifies two opposite effects that may be counteracting each other in binary models of career choice.<sup>11</sup> Such binary models, at least in the UK post-16 education institutional context, are likely to be mis-specified. Why the endogeneity of the PTR appears to affect the staying-on at school decision more than it affects the entry to FE decision is not immediately clear. The most plausible explanation is that it could be capturing class size differences between grammar and secondary schools,

<sup>10</sup>. For example, the average PTR in all NI grammar schools was 15.6 compared to 14.5 for non-grammar secondaries in 1997/98 (DENI, 1998).

<sup>11</sup>. This is also true of the 6th Form dummy, expenditure per pupil and the Mpro dummy, which as an anonymous referee has pointed out, strengthens the argument for disaggregating post-compulsory education into its component parts in studies of choice at age 16.

which disproportionately affects the proportion staying-on at school since very few grammar school pupils opt for anything else. This seems an interesting issue for further research.

The marginal effects of expenditure per pupil are more conventional. There is evidence of a significant positive expenditure effect on staying-on at school and a corresponding negative effect for entry into FE, at least for Model 2. This supports the arguments that higher spending on schools encourages staying-on both because of the expected earnings benefits from doing so and because of the nature of school as a consumption good. Dropping PTR from Model 2 causes the expenditure marginal effect on staying-on to become negative, as the PTR marginal effect at the sample mean is bigger than the expenditure per pupil effect. The expenditure per teacher variable also displays a significant, but positive marginal effect on staying-on in this case. Replacing the broad expenditure variable with direct expenditure on teaching per pupil makes little difference to the pattern of effects.

Splitting the sample into secondary and grammar school pupils is one possible way of increasing control over the PTR/academic ability problem. Unfortunately, the grammar school sub-sample is too small for any meaningful analysis. The secondary school sub-sample, however, is large enough. The problem is these schools include a wide range of abilities, including those with special educational needs who tend to be taught in smaller classes. It is therefore not clear that such a sample restriction will alter much. The results from this restricted sample are indeed very similar to those reported in Table 3, although the PTR effect is slightly smaller.

Second, consider school culture effects. Both the grammar school dummy and the Controlled school dummy have significant marginal effects (although they are jointly only marginally significant). McVicar (1999) found a significant positive grammar school culture effect on staying-on and a negative effect on entry to FE. The grammar school culture effect on staying-on is again positive, although not significant at standard levels. The negative effect on entry to FE is significant in the present study, although of smaller magnitude than in the previous study. It may be that the additional school-level variables in the current model are capturing effects attributed to grammar school culture in the McVicar (1999) model.

The Controlled school dummy displays quite large and significant marginal effects on career choice at age 16. Pupils from Controlled schools are more likely to stay-on and less likely to enter FE. This suggests either there is something about the nature of the pupils that are educated in these schools, or something about the schools themselves that influences outcomes. Given the level of control for individual, background and peer group characteristics,

the effect is likely to be capturing a school culture effect. Interestingly, there is a direct contrast with the Catholic dummy variable, which suggests Protestants (by far the majority of Controlled school pupils) are less likely to stay on.<sup>12</sup> The results imply that ELBs are getting something right in the management of schools that is not reflected in the Voluntary sector that encourages pupils to stay on.

Table 3: *Choice at Age 16 - Marginal Effects at Sample Means*

	<i>Model 1</i>			<i>Model 2</i>		
	School	FE	Other	School	FE	Other
Constant	-1.60	-1.16**	2.76*	-1.47	-1.08**	2.55*
Quals	.009	.005**	-.014*	.010*	.005**	-.015*
Catholic	.121	-.063**	-.059	.115	-.064**	-.051
Male	-.210**	.043**	.167**	-.207**	.046**	.161**
Siblings	.003	-.008*	.005			
Fpro	.101**	.027	-.127**	.101**	.030*	-.131**
Mpro	.116**	-.058**	-.059	.112*	-.051**	-.060
Urban	-.026	-.005	.031			
Urate	-.005	.016**	-.011	-.003	.014**	-.011
TSN	-.126**	-.002	.128**	-.134**	-.002	.136**
GCSE5	-.003*	.002**	.001	-.002	.001**	.001
Attend	-.013	.026**	-.012	-.012	.026**	-.014
6th Form	.383**	-.117**	-.266**	.364**	-.108**	-.256**
Grammar	.068	-.102**	.033	.042	-.098**	.056
Controlled	.142*	-.140**	-.002	.146*	-.128**	-.018
Single Sex	-.061	.013	.047			
PTR	.132**	-.051**	-.081	.119**	-.073**	-.046
Exp/pupil	.0004**	-.0001	-.0003	.0004**	-.0002**	-.0002
Exp/teacher	.0000007	-.00002*	.00002			
Log L		-520.8			-522.3	
$\chi^2$ ( $H_0: \beta=0$ )		148.5** (36df)			145.5** (28df)	
Pseudo R <sup>2</sup>		.125			.122	

*Notes:* Figures give marginal effects at sample means. "Other" denotes employment, unemployment and youth training. Significant coefficients at 10 per cent are marked with a single asterisk and at 5 per cent with a double asterisk. The hypothesis that all slopes are equal to zero is strongly rejected in both cases.

<sup>12</sup> Until recently, Catholic schools only received 85 per cent of capital costs from public funds as opposed to 100 per cent for Controlled schools. Having controlled for individual religious community differences in staying-on rates with the Catholic dummy, it may be this effect that is being picked up by the Controlled variable.



Third, consider peer group factors. All three variables classified as peer-group measures play significant roles in career choice at age 16 in Northern Ireland. The most striking factor is the presence or otherwise of a 6th Form at a given school. Pupils attending schools with 6th Forms are more likely to stay-on at school, and less likely to enter FE, employment, training or unemployment. The size of these marginal effects is considerable. For example, Model 2 predicts a 1 per cent increase in the number of schools with their own 6th Forms would raise staying-on rates by 0.36 per cent. This evidence is consistent with the peer group and role model effects outlined in Section III, but could also be reflecting school culture effects, such as academic ethos. Given that all Northern Ireland grammar schools have 6th Forms whereas many secondary schools do not, it is also possible that this variable is picking up some school type or academic ability effects, even though these are controlled for with the grammar dummy and the qualifications variable. Restricting the sample to secondary school pupils only, however, makes little difference to the estimated marginal effects. Further control over academic ability is not possible with the existing data set.

The proportion of the 1993 school 5th Form gaining five or more GCSEs grades A\*-C and the attendance rate are intended to proxy for the average academic ability of the peer group and the average commitment and contentment at school of this peer group. Both variables display a similar and very interesting pattern of marginal effects. An increase in the average ability level or the attendance rate of the peer group leads to an increase in the number of young people choosing to enter FE. These variables seem to have no significant effects on staying-on rates or entry into the labour market. One possible interpretation of this result is that these peer group effects are most strong for those young people on the margins of choosing FE or entry into the labour market, whereas other factors are more important for those at either extreme of the academic ability range.

Finally, the individual, family-background and environmental variables all enter the model with the expected signs. More academically able pupils are more likely to remain in full-time education than enter employment, training or unemployment. Catholics are more likely to stay-on at school. Young women are more likely to stay-on at school than young men. Professional parents encourage staying-on, which is consistent with the expected effects of social class. Higher local unemployment encourages young people to remain in full-time education, although this is only significant for FE. Young people from TSN wards are less likely to stay-on at school and more likely to enter employment, training or unemployment. This suggests the TSN variable is acting to capture social class effects rather than additional local labour market effects.

## V CONCLUDING REMARKS

The paper sets out with the intention of separating resource-related school-level effects from non-resource-related effects for a sample of Northern Ireland 1993 5th Form leavers. In doing so it builds specifically on earlier papers by Armstrong (1999) and McVicar (1999) and argues that their estimates of school culture effects in NI's secondary education system are potentially fragile to the inclusion of further school characteristics. The current paper also attempts to separate school culture from peer group effects, as far as possible with the available data. These issues are of particular interest given Northern Ireland's highly heterogeneous system of secondary education. The paper finds that all three types of factors, after controlling for the usual set of individual, background and environmental factors, influence choice at age 16.

A number of factors, including PTRs, have effects of different signs on the probability of entry to FE College and on the probability of staying-on at school. The paper argues that treating post-compulsory education as a single choice might act to obscure these counteracting effects. In the case of PTRs, this could contribute to the pattern of insignificant PTR effects often found in the literature. This seems an interesting issue for further research.

The consistently most important school-level characteristic is the presence or otherwise of a 6th Form. This is perhaps the most difficult measure to classify, as it may reflect academic ethos, for example, or it may capture certain peer group and role model effects. Nevertheless, schools with 6th Forms encourage staying-on to a far greater extent than those without.

In conclusion, policy makers should be cautious when evaluating the real-world effects of different aspects of school quality. That said, the current paper highlights the importance of 6th Forms in encouraging pupils to stay on at school. By establishing 6th Forms more widely in secondary schools across Northern Ireland, more young people outside the grammar school sector would be likely to stay-on. Finally, despite the many unique aspects of secondary education in Northern Ireland, the curriculum and examination system is very similar to that in England and Wales. In other words, the differences between secondary education in Northern Ireland and in England and Wales are primarily structural, and in this respect, the results presented in this study have implications for education policy beyond Northern Ireland.

## REFERENCES

- ANDREWS, M.J. and S. BRADLEY, 1997. "Modelling the Transition from School and the Demand for Training in the United Kingdom", *Economica*, Vol. 64, pp. 387-413.
- ARMSTRONG, D., 1997 (ed.), *Status 0: A Socio-economic Study of Young People on the Margin*, Belfast: Training and Employment Agency.
- ARMSTRONG, D., 1999. "School Performance and Staying-On: A Micro Analysis for NI", *The Manchester School*, Vol. 67, No. 2, pp. 203-230.
- BETTS, J. R., 1996. "Is There a Link Between School Inputs and Earnings? Fresh Scrutiny of an Old Literature" in G. Burtless (ed.), *Does Money Matter*, Washington D.C.: Brookings Institution.
- BRADLEY, S. and J. TAYLOR, 1998. "The Effects of School Size on Exam Performance in Secondary Schools", *Oxford Bulletin of Economics and Statistics*, Vol. 60, pp. 291-324.
- CARD, D. and A.B. KRUEGER, 1992. "School Quality and Black-White Relative Earnings: A Direct Assessment", *Quarterly Journal of Economics*, Vol. 107, pp. 151-200.
- CARD, D. and A.B. KRUEGER, 1996. "School Resources and Student Outcomes: An Overview of the Literature and New Evidence from North and South Carolina", *Journal of Economic Perspectives*, Vol. 10, No. 4, pp. 31-50.
- CHENG, Y., 1995. "staying-on in Full-Time Education after 16: Do Schools Make A Difference?", *Research Series, Youth Cohort Report, No. 37*, Sheffield: Department for Education and Employment.
- COHEN, L. and L. MANION, 1981. *Perspectives on Classrooms and Schools*, London: Holt, Rinehart and Winston.
- CORMACK, R.J., R.L. MILLER and R.D. OSBORNE (eds.), 1987. *Education and Policy in NI*, Queens University of Belfast: Policy Research Institute.
- CRAMER, J. S. and G. RIDDER, 1991. "Pooling States in the Multinomial Logit model", *Journal of Econometrics*, Vol. 47, pp. 267-272.
- DALY, P. and I. SHUTTLEWORTH, 2000. *The Pattern of Performance at GCSE*, SEL Paper 3.1. Bangor, NI: Department of Education Northern Ireland.
- DENI, 1998. *Compendium of NI Education Statistics*, Bangor, NI: Department of Education Northern Ireland.
- DUSTMAN, C., N. RAJAH and A. VAN SOEST, 1998. "School Quality, Exam Performance and Career Choice", Mimeo, London: Institute for Fiscal Studies.
- EVANS, W.N. and R.M. SCHWAB, 1995. "Finishing High School and Starting College: Do Catholic Schools make a Difference?", *Quarterly Journal of*

- Economics*, Vol. 110, No. 4, pp. 941-74.
- FEINSTEIN, L. and J. SYMONS, 1999. "Attainment in Secondary School", *Oxford Economic Papers*, Vol. 51, No. 2, pp. 300-321.
- FINLAYSON, D.S., 1973. "Measuring School Climate", *Trends in Education*, Vol. 30, pp. 19-27.
- FREIBERG, J., 1999. *School Culture*, London: Falmer Press.
- HANUSHEK, E. A., 1986. "The Economics of Schooling: Production and Efficiency in Public Schools", *Journal of Economic Literature*, Vol. 24, pp. 1141-1177.
- HANUSHEK, E. A., 1996. "School Resources and Student Performance", in G. Burtless (ed.), *Does Money Matter*, Washington D.C.: Brookings Institution.
- McVICAR, D., 1999. "Selective Secondary Education and staying-on", NI Economic Research Centre, Working Paper No. 41, Belfast.
- McVICAR, D. and P.G. RICE, 2001. "Participation in Full Time Further Education in England and Wales: An Analysis of Post War Trends", *Oxford Economic Papers*, Vol. 53, pp. 1-20.
- McWHIRTER, L., U. DUFFY, R. BARRY, and G. McGUINNESS, 1987. "Transition from School to Work: Cohort Evidence", in R.J. Cormack, R.L. Miller and R.D. Osborne (eds.), *Education and Policy in NI*, Queens University of Belfast: Policy Research Institute.
- MICKLEWRIGHT, J., 1989. "Choice at Sixteen," *Economica*, Vol. 56, pp. 25-39.
- MICKLEWRIGHT, J., M. PEARSON and S. SMITH, 1990. "Unemployment and Early School Leaving", *Economic Journal*, Vol. 100 (Conference 1990), pp. 163-169.
- MURPHY, A. and I. SHUTTLEWORTH, 1997. "Education, Religion and the First Destinations of Recent School Leavers in Northern Ireland", *The Economic and Social Review*, Vol. 8, No. 1, pp. 23-42.
- NEAL, D., 1997. "The Effect of Catholic Secondary Schooling on Educational Attainment", *Journal of Labor Economics*, Vol. 15, No. 1, pp. 98-123.
- PAYNE, J., 1998. "Routes at Sixteen: Trends and Choices in the Nineties", *Research Series: Youth Cohort Report, No. 55*, Sheffield: Department for Education and Employment.
- REYNOLDS, D. and K. REID, 1988. "The Second Stage: Towards a Reconceptualization of Theory and Methodology in School Effectiveness Research", in Adam Westoby (ed.), *Culture and Power in Educational Organizations*, Milton Keynes: OUP.
- RICE, P. G., 1987. "The Demand for Post-Compulsory Education and the Effects of Educational Maintenance Allowances", *Economica*, Vol. 54, pp. 465-475.

- RUTTER, M., B. MAUGHAN, P. MORTIMORE and J. ONSLOW, 1979. *Fifteen Thousand Hours*, London: Open Books.
- SPENCER, A.E.C.W., 1987. "Arguments for an Integrated School System" in Cormack *et al.* (eds.), *Education and Policy in NI*, Belfast: Policy Research Institute.
- TEAGUE, P., 1997. "Catholics and Protestants in the NI Labour Market: Why Does One Group Perform Better than the Other?", *Economy and Society*, Vol. 26, No. 4, pp. 560-78.
- VIGNOLES, A., R. LEVACIC, J. WALKER, S. MACHIN and D. REYNOLDS, 2000. *The Relationship between Resource Allocation and Pupil Attainment: A Review*, Centre for the Economics of Education, London School of Economics and Political Science.
- WHITFIELD, K. and R.A. WILSON, 1991. "Staying-On in Full Time Education: The Education Participation Rate of 16 Year Olds", *Economica*, Vol. 58, pp. 391-404.