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AN ANALYISIS OF COMPETITION AND ITS IMPACT ON SEONDARY SCHOOL EXAMINATION PERFORMANCE IN ENGLAND

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Abstract. This paper reviews the concept of competiton. It argues that competition is an under-theorised concept, in terms of implicit assumptions: that the degree of competition is determined by market structure in terms of the number of schools in a local market or the degree of concentration; and that there is purely self-interested motivations on the part of school managers and teachers. There is also a black box treatment of the school processes which produce learning outcomes and how these respond to changes in the degree of competition. This paper undertakes a more finely-grained study of the nature of competition and its impact on school performance than would be possible by utilising only secondary data sources. Data on headteachers' perceptions of competition were obtained by means of a postal survey and interviews. First, these data report on the relationships between behavioural and structural indicators of competition and the evidence supports the argument that in the schools market competitive behaviour is determined by other factors than market structure. Second, this paper tests whether competition has an impact on school performance: the results are mixed, being sensitive to the chosen measure of competition used and the measure of performance. Third, the value judgements of head teachers made about different forms of competitive behaviour are discussed. One can conclude from this evidence that schools do respond positively to pressures to improve in relation to a particularly well publicised performance indicator, especially when these are reinforced by the presence of a greater number of perceived competitors. However, this only serves to emphasise the importance of choosing the right indicator in the first place.

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1. INTRODUCTION

The advocacy of parental choice of state school is made on two main grounds. The first being the principal of freedom of choice and the second, the argument that competition between schools as producers of educational outputs results in better performance by schools. This paper is concerned with the second of these propositions.

The English school system provides a particularly interesting test bed for the second hypothesis. The 1988 Education Reform Act brought in a schools quasi-market in which parents can exercise choice of state school, provided there is a place available and, for certain schools, that their child meets selection criteria in terms of religious affiliation or ability. Schools are funded by formula largely according to the number of pupils on roll and are required to manage fully delegated budgets, for almost all resources, including teachers. The Conservative Government, which introduced these policies, believed that competition between schools would contribute to raising educational standards, particularly in terms of examination results.

However, successive governments have not relied solely on market pressures to improve schools' performance. The quasi-market reforms were progressively buttressed by increased 'performance regulation', through the establishment of a national curriculum, national tests at four stages of education, publication of school test and examination performance tables. In 1993 the Office for Standards in Education (OFSTED) was established, which overseas the national inspection at regular intervals of all schools. The election of a Labour Government in 1997 further strengthened performance regulation. Local education authorities (LEAs) were placed firmly in the role of agents of central government in delivering school improvement. LEAs became subject to inspection and their services, if found inadequate, can be replaced by private sector provision. Although

Labour Government policies give greater emphasis to co-operation between schools than did the Conservatives, the structural features that promote competition between schools are largely unchanged and are likely to be strengthened by the expansion of specialist schools (DfEE, 2001).

The purpose of this paper is to examine the nature of competition in the schools sector and to report tests of the hypothesis that a higher degree of competition between schools leads to better school performance in terms of student academic achievement, after controlling for student social background. The study contributes to a relatively new and still small set of studies that seek to relate measures of the degree of competition between schools to school performance (Blair and Stanley, 1995; Borland and Howsen, 1992; Borland and Howsen, 2000; Borland and Howson, 1993; Hoxby, 2000; Johnes et al., 2001; Zanzig, 1997). This group of studies is distinct from those concerned with voucher schemes, the relative effectiveness of state and private schools or factors influencing parental choice of school and they all report that the degree of competition has a positive effect on student performance.

The paper draws on data collected and analysed in a longitudinal study from 1990 to 1998 of over 300 schools which combines both quantitative and qualitative data. The paper is structured as follows.

- Section 2 discusses whether the structure-conduct performance model – the mainstay of industrial economics – applies to the schools market;
- Section 3 endeavours to operationalise the concepts of competitive structure, competitive conduct and performance in relation to schools and apply them empirically to a sample of secondary schools in 6 LEAs by utilising administrative data and data collected from a postal survey of headteachers.
- Section 4 presents evidence on indicators of headteachers' perceptions of competition and their relationship to competitive structural variables, such as the number of schools in a local market.

- Section 5 presents the results of regressions of school performance in terms of GCSE examination results on variables measuring competitive structure and conduct. Evidence of a positive relationship is found for one of the two performance indicators.
- Section 6 briefly considers evidence from interviews with 17 headteachers on competitive behaviour and school policies towards improving academic achievement.

2 WHAT IS COMPETITION?

Once we move away from the neoclassical model of perfect competition, the degree of competition becomes a relevant concept. In understanding what is meant by the 'degree of competition' we need to distinguish between structural competition and competitive conduct or behaviour. According to the structure-conduct-performance (S-C-P) model, better producer performance for consumers depends on the degree and forms of competitive conduct on the part of firms. These, in turn, are related to the features of structural competition, in particular the number of producers in the market and the ease of entry and exit (Mason, 1939; Scherer and Ross, 1989). More producers and greater ease of entry stimulate forms of competitive conduct which improve efficiency and lower prices, thus benefiting consumers. The S-C-P model is not simply uni-directional but also recognises the influence of firms' conduct in changing market structure.

The dual nature in economic analysis of the concept of 'competition' is made clear in a leading textbook on industrial organisation (Scherer and Ross, 1989, p15):

> Two broad conceptions, one emphasising the conduct of buyers and sellers, and the other emphasising structure, can be distinguished. .. On the conduct side (Adam) Smith considered the essence of competition to be an independent striving for patronage by the various sellers in the market. ...

Scherer and Ross distinguish this form of competition, which they call 'rivalry', from the neoclassical concept of structural competition. Structural competition is both more amenable to measurement and more readily subject to manipulation by policy makers

than is competitive conduct. Hence the government's promotion of competition between schools was implemented by making changes to structure. However, it is competition as behaviour that impacts on performance. Much more pertinent to organisational performance is Schumpeter's (Schumpeter, 1954) definition of competition as '*the scheme of motives, decisions, and actions imposed upon a business firm by the necessity of doing things better or at any rate more successfully than the fellow next door*' (p.975).

In applying the theory of competition to non-marketed output, such as education, the hypothesised social welfare losses due to lack of competition is, as Leibenstein (1966) argued, due much more to x-inefficiency than to allocative inefficiency. Leibenstein emphasised the importance of producers' motivation and its effects on producer effort in determining x-inefficiency, which is the difference between what the firm could produce with maximum incentives to be efficient compared what it actually produces with a given amount of inputs. X-inefficiency arises because the link between inputs and outputs is not determinate but variable. This variation is due to a number of factors: incomplete labour contracts; the existence of non-marketed inputs; incompletely specified or known production functions and tacit co-operation between competing firms - all factors prevalent in schools.

> In situations where competitive pressure is light, many people will trade the disutility of greater effort, of search and the control of other people's activities for the utility of feeling less pressure and of better interpersonal relations. But in situations where competitive pressures are high and hence to costs of such trades are also high, they will exchange the less of the disutility of effort for the utility of freedom from pressure. (Leibenstein, 1966: 413).

Leibenstein's use of the term 'competitive pressure', without further elaboration of whether this refers to structural competition or competitive behaviour, is a good illustration of the way that the term 'competition' is often implicitly assumed to be a self-evident concept. However, 'the degree of competitive pressure' faced by a given

producer embraces a complex set of actual, perceived and conjectured actions on the part of rival producers and has no obvious or precise measure. In contrast, structural competition is measured by the degree of producer concentration in the market, such as the Herfindahl index[2] (given that the market has been defined in terms of sufficiently close substitutes for the product in question.) If we look to the general economics literature for guidance on how to operationalise the structure-conduct-performance model, then competition as an observable variable is operationalised and measured as structural competition. It is therefore hypothesised that a greater structural competition results in forms of competitive conduct that have a favourable impact on producer performance.

Not surprisingly, the education economics literature on the relationship between competition and school performance adopts, usually without comment, the above operationalisation of the structure-conduct performance model: schools will exhibit more x-inefficiency the lower the degree of structural competition. In these studies competition is equated with structural competition in terms of market concentration. For example Borland and Howson (1992, 1993, 2000), Zanzig (1997) and Hoxby (2000) measure the degree of competition as a Herfindahl index relating to the number and size of US school districts in a county or market area. Johnes et al. (2001) measure competition in England in structural terms as the number of other secondary schools within fixed radii of each school. Thus measures of the number, size and proximity of schools or school districts are taken to be measures of competition, which is assumed to induce behaviour by head teachers and teachers that leads to better academic attainment

[2] $H = \sum_{i=1}^{n} (S_i)^2$ where S_i is market share of ith provider

by students.

Adopting Leibenstein's hypothesis about producer behaviour and organisational slack, which is reflected in the public choice literature (e.g. Niskanen, 1971), producers (school district administrators, headteachers and teachers) are assumed to be self-interested utility maximisers. For example, Zanzig (1997) argues that with more school districts comparison becomes easier and parental monitoring of administrators more effective, resulting in higher student achievement. Borland and Howsen (1992) posit a model in which administrators' utility depends on student achievement scores and personal satisfaction: they allocate money to both. This equation represents the argument that 'increased competition within the educational process would lead to school administrators being forced to select those teachers who possess the necessary behaviours, for example, to enhance student test scores' (p. 32). The UK study by Johnes et al (2001) assumes that competition is greater, the more schools there are in close proximity. It is argued that the greater the competition the more headteachers have an incentive to keep abreast of developments at other schools, and to innovate in order to gain 'first mover' advantages. Headteachers are motivated by increased school revenues, which bring greater job security and growth of the school and by their enhanced reputations as managers.

However, there are a number of reasons why the S-C-P model may not apply to school education thereby undermining the hypothesis that greater competition leads to better school performance does not hold. Crucial factors are the complex nature of schools' outputs and disagreements over what constitutes 'good performance' by schools. Effective schools produce multiple outputs: cognitive outputs in terms of increased knowledge and skills, as well as affective outputs in terms of attitudes and behaviours

which promote social cohesion, democratic participation in society and contributions to the welfare of others. These all have a public goods dimension in addition to the private benefits of education (Levin, 1990). These outputs may be both jointly produced and be substitutes in production. Different members of society will have different preferences for these outputs, hence what constitutes 'good school performance' is contentious and difficult, if not impossible, to specify in terms of a social welfare function maximised under constraints. Hence, any definition of school performance operationalised in a research study cannot claim to be an undisputed indicator of social welfare.

A further distinctive factor is that education is co-produced (Brown, 1997). Evidence from school effectiveness research suggests a contextual effect (e.g. Feinstein and Symons, 1999; Sammons et al., 1996): a higher social class or higher ability peer group has a positive effect on the attainment of the individual child, after controlling for other factors. Given that it is very difficult for parents to have good information on the educational effectiveness of a school in value-added terms, parents judge a school's academic standards in relation to raw test or examination results. Hence competition between schools may well increase segregation by ability and class. The peer group effect would then exacerbate the poor performance of low ability/low social status children and enhance that of higher ability/higher status children[3].

An important element of Leibenstein's x-inefficiency is failure to search for and apply known efficient techniques, which utilise existing technology. This has an obvious parallel with schools and the findings of UK school effectiveness research (Teddlie et al., 2000) that between 8-15% of the difference between students' academic achievement is

[3] As Feinstein and Symons (1999:304) point out, if there are diminishing returns to the peer group variable then system wide average student attainment is decreased by increased segregation.

due to school effects. This is indicative of differences in school efficiency attributable to failure to use more effective teaching techniques in the less effective schools. One of the few school effectiveness models to include competition and performance regulation as external context variables is that of Scheerens (1997; 1999) (also Scheerens and Bosker, 1997) who develops a comprehensive theoretical framework for school effectiveness which draws on organisational and public choice theories. The framework distinguishes three levels – classroom, school and external context. Both competition (market regulation) and performance regulation form part of the context. An important message from the school effectiveness and school improvement literature is that (a) superior learning technologies have to be discovered: it is not the case that they are already known by schools but just not adopted and (b) school improvement is a complex and uncertain process (Gray et al., 1999; Gray et al., 1996). Hence, it is unlikely to be related to the degree of competition in any straightforward way.

A much more sophisticated account of behaviour within organisations than that assumed in neo-classical theory is provided by the behavioural theory of the firm (Cyert and March, 1963). In this theory, the firm is an internal coalition of interests not as a reified single-minded profit maximizing entity. The coalition reacts to problems by searching for solutions and attempting to diminish uncertainty. The firm pursues one or more independent goals, which are adapted over time in response to organisational learning. An organisational goal in one time period depends on the goals in previous time periods, the experience of the organisation and its perception of the experiences of comparable organisations. The latter variable is affected by the competitive behaviour of other organisations. Organisations need to adopt relatively simple decision rules, prefer a few simple goals and learn to attend to some parts of their competitive environment and not

others. There are clear parallels with English schools, which are subject to performance regulation by state agencies and the great prominence given to a single indicator of secondary school performance – the proportion of students with five or more grade A* to C GCSEs. Clearly, attending to this single goal to the neglect of the attainment of students who cannot achieve these grades, does not imply good school performance for those who attach utility to the educational achievements of the less able students.

How managers and workers in organisations respond to different degrees of competitive pressure depends on their motivations. The direct relationship hypothesised between the degree of competition and x-inefficiency when applied to schools is predicated on the assumption that self-interested behaviour is an equally strong motivator in the public as in the private sector[4]. However, alternative and more complex sets of motivations, than purely self-interested ones by headteachers and teachers, are taken seriously in other disciplines than economics, in particular psychology and human resource management[5]. If school personnel are motivated by professional and ethical values to obtain personal satisfaction from doing a competent job and serving the interests of their students, then one would not expect schools in less competitive areas to perform less well than those in more competitive areas. Particularly in the UK, where schools have been subject to increasingly strong performance regulation - such as the wide publicity given to inspection reports - all schools have felt strong external pressure to perform well.

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[4] 'The basic behavioural postulate of public choice, as for economics, is that man is an egotistic, rational utility maximizer' (Mueller, 1989).

[5] For example both the National Standards for Headteachers and the 'models of excellence' which underpin the Leadership Programme for Serving Headteachers, express official and highly influential expectations of standards for headteachers, in which striving for continuous improvement in pupil performance is given great emphasis. (The LPSH is a programme of professional development for English and Welsh headteachers sponsored by the government. The models of excellence, developed by Hay International consultants, are based on the qualities 30 headteachers, identified as excellent by Ofsted and contain 17 key qualities. These include integrity and personal values.)

Existing studies of the relationship between competition and school performance assume a direct link between measures of structural competition and unobserved conduct by those who work in schools, which results in better performance, as measured by the specific indicators used. However, the preceding discussion of competition theory makes clear that there is no necessary theoretical connection between particular structural configurations and conduct. This connection depends on producer and consumer motivations, which are affected by culture, values, beliefs, expectations and reciprocity to other's behaviour. If producer conduct in schools is determined by 'professional' values, rather than by self-interested utility maximising values, then the hypothesised relationship between competitive structure and school performance would not exist. (See Woods (2000) on different forms of headteacher engagement in response to competitive environments).

3. OPERATIONALISING THE CONCEPTS OF COMPETITIVE STRUCTURE AND COMPETITIVE CONDUCT IN RELATION TO SCHOOLS

Competition is thus a multifaceted concept, defined in terms of structural features and forms of behaviour by producers and consumers. Different forms and combinations of structure and behaviour give rise to different degrees of competition. Given this complexity and variability, 'competition' and the 'degree of competition' are difficult concepts to operationalize empirically. This study attempts to make these concepts operational and measurable, as explained below.

In relation to school education, the main structural conditions for competition are:

S1 the availability to parents of alternative schools, including their number and proximity (equivalent to the number of firms in a market);

S2 regulations governing parental choice of school and admissions policies;

S3 proportion of spare school places, which measures the extent of spare capacity; competition is expected to be more intense the greater the extent of unfilled places;

S4 homogeneity or diversity in types of school and in educational programmes (i.e. product differentiation);

S5 ease with which schools can enter or exit the market (i.e. expand capacity, start up from scratch or close);

S6 rules which determine the allocation of resources to schools, in particular per capita funding by formula (i.e. the equivalent of state regulations governing pricing);

S7 regulations concerning the provision of information to parents.

Important aspects of conduct or behaviour include:

- actions by school managers, designed to make parents, pupils, feeder schools and other stakeholders perceive the school's attractive qualities relative to other schools; these vary from actions to secure substantive change in the quality of education being provided to those which are promotional only (Woods et al., 1998).
- parents *actively* choosing between schools manifested as (a) actual decisions to apply for the child's admission to particular schools and (b) potential decisions to do this if the relative attractions of schools are perceived to change.

As noted in the theoretical discussion on competition, the distinction between structural and behavioural competitive variables is not hard and fast. It will vary depending on the time period of adjustment. Over a period of time schools' conduct can alter structure, for example through exit, entry or expansion/contraction, changes in governance or in admissions policies. In the short run these are structural variables.

Data for the study were collected on over 300[6] schools in 6 LEAs from 1990/91 to 1997/98. The LEAs were selected in order to provide a variety of local contexts. They included two metropolitan and four county (rural and semi-rural) LEAs and hence different social and geographical contexts, and differences in the proportion of selective and grant maintained (GM) schools. Background information on the six LEA areas in which the study was undertaken is shown in Table AI in the Appendix.

[6] Due to school closures, amalgamations and new schools, the exact number varies from year to year.

The data sets collected for the study consisted of the following:

Administrative data set

Data on GCSE examination results, student annual intake and total roll, school budgets, and the percentage of students entitled to free school meals (an indicator of social disadvantage) were collected for 1990/91 to 1997/98 from administrative sources (the LEAs, Department for Education and Employment, Funding Agency for Schools). By 1998 314 schools had been retained in the data set.

Postal survey of headteachers

Headteachers of schools in the administrative database were surveyed in the Autumn term, 1997 and provided responses to questions on their perceptions of competition[7]. A response rate of 72%, 226 in all, was achieved.

Personal interviews with headteachers

Seventeen headteachers, selected from the 314 schools, were interviewed in 1997/98.

The administrative data set provides measures of some of the structural competitive variables listed above. These are:

S1: availability of alternative schools within a local area;
S3: spare places – measured as the proportion of intake year places filled[8].
S4: diversity in educational programmes (as indicated by being GM, selective, denominational, single sex and sixth form provsion);

Structural variables, S2, S6 and S7, such as rules regarding the publication of information

[7] The survey contained other questions which are not used in this paper.

[8] Full capacity was measured as the standard number of pupils or, for GM schools, as the agreed admissions limit

and funding, are set nationally and show much less local variation than the others. No measures of these variables were included.

Variable S1, the number of suppliers in the local market, was measured by grouping schools into 'Approximate Areas of Competition '(AACs). An Approximate Area of Competition is defined here as a discrete and non-overlapping group of schools which appeared to serve relatively distinct communities and were therefore potentially in competition with each other. Although there were no strict criteria for defining AACs, judgements were guided by a rigorous analysis of all available data, which included maps and the use of the software MapInfo to take account of:

- the size and relative location of cities, towns and larger villages (over 3000 inhabitants);
- road links between conurbations.

In the two metropolitan LEAs, where the number and density of schools and populations were high, schools were grouped into the clusters used by the respective LEAs. In this way the sample of schools was grouped into 82 AACs, with an average size of 4.04 schools and ranging in size from 13 schools to just one.

As the study is concerned with competition as a behavioural response, not just as a structural feature, administrative data on structural variables were supplemented by primary data gathered from the postal survey of the headteachers of all secondary schools in the six LEAs. In order to obtain measures of the degree of competition experienced by schools, the survey contained short response items on competition and co-operation. In responding to the questionnaire, head teachers were formed their own judgement of how to assess the degree of competition. Additional interviews of 17 of the headteachers indicated that such perceptions were based on assessments of the

behaviour of other local schools and their own school and that of parents in judging and selecting schools. The questions eliciting headteachers' perceptions of competition and co-operation are reproduced in Table I. The responses provided two measures of the degree of competition:

- ranking the perceived degree of competition as high (3) , fair (2) , little or none (1);
- choosing a range for the number of schools with which their own school was perceived to be in competition.

4 EVIDENCE ON THE NATURE OF COMPETITION

In presenting the data collected both from administrative records and the survey, this section of the paper is concerned with:

- the extent and degree of competition reported;
- the association between measures of competition and co-operation;
- the extent to which perceptions of competition are related to structural factors or to other factors, such as social disadvantage and examination results which parents are likely to use as indicators of product differentiation.

A complete list of the variables with their measurement units and mean value or frequency count is given in Table AII in the Appendix.

The extent of competition and co-operation

The cross tabulations between the perceived degree of competition and the perceived number of competitor schools and also the perceived degree of co-operation are shown in Tables II and III. So reading across the first row of Table II, we see that 61 schools (27% of those returning completed questionnaires) reported both a high degree of

competition (which is coded 3 in the data set) and 5 or more competitors (coded 3). The total number of schools reporting 5 or more competitors was 104 (46% of the sample). This is given in the cell in right hand column under the 'Total' heading. The total number of schools reporting a high degree of competition is 93 (41.2%). Thus the vast majority of schools reported a high or fair degree of competition.

The majority of schools (see Table III) thought the degree of co-operation between local secondary schools was fair, with the rest roughly divided equally between experiencing a high degree of co-operation or little/none. As the cross-tabulations show, high and fair degrees of competition can coexist with high to fair degrees of co-operation – a phenomenon generally occurring between organisations in both the private and public sectors (Alter and Hage, 1993).

Association between measures of competition and co-operation

As would be expected, the two measures of competition are directly associated, as indicated by significant χ^2 and Kendall's tau c statistics shown in Table IV. However, the relationship is not strong, indicating that what headteachers perceive as competitive behaviour emanates from other factors than the number of perceived competitors. The perceived degrees of competition and of co-operation are, as would be expected, inversely related, but again the correlation is modest. The relationship between the number of perceived competitors and the degree of co-operation is again inverse in direction but weaker.

Factors related to indicators of competition

Both the indicators of competition from the headteacher survey reflect behavioural

competition as they are derived from headteachers' perceptions and understanding of competition in relation to their own school. One might well expect that the number of perceived competitors is related to the number of other local secondary schools in the AAC – a structural feature – but it will also depend on the competitive behaviour of these schools. The proposition in this paper - that competitive behaviour rather than structure matters and that the former is not related in a deterministic way to structural variables - needs to be tested against the data.

This is done in two steps. The first is by means of measures of association between the indicators of competition and the structural variable in the data set. The second is by estimating ordinal regressions for the two indicators of competition. These regressions give an estimate of how well we can predict the competition category that a school is in when we know the values of the independent variables and their regression coefficients compared to knowing only the most frequent competitive category for all schools. In the absence of information from the regression equation the most frequency category would be the best guess for each school's competitive category. If the structural variables do not provide good predictors of the degree of competition, this supports the argument that structural measures of competition are inadequate proxies for the 'degree of competition' in a school market.

Some of the variables that are hypothesised to affect the degree of competition are measured on a nominal scale and others on a ratio scale. Measures of association for the former are presented in Table V, indicating the statistical significance of their association with competition and co-operation. They are:

1. whether the school is located in a rural, semi-rural, or rural area. These serve as a rough proxy for the number of schools in the local schools market. As shown in Table V this is related to both measures of competition, but not to co-operation.

2. variables indicating forms of product differentiation – being Grant Maintained[9], selective, denominational, single sex and having a sixth form. As shown in Table V, the degree of competition reported by schools is not affected by indicators of product differentiation, except grant-maintained status, which is positively related to both indicators of competition and negatively associated with co-operation.
3. Many of the LEA dummies (indicating in which of the LEAs the school was located) are statistically significant. Only LEA 3 - a large conurbation with mixed selective and non-selective schools, 23 per cent of which were GM - is associated with greater competition, the others with less.

The other variables in the data set that could affect the degree of competition are measured on a ratio scale, so their association with competition and co-operation, which are ordinal variables, was estimated with Spearman's rank correlation (see Table VI).

1. According to the structure-conduct-performance model, the greater the number of firms (schools) in a market the greater the competition. While the rank correlation coefficient between the number of schools in an Approximate Area of Competition and the indicators of competition and co-operation is significant and in the expected direction, it is rather low.
2. The proportion of GM schools in the AAC is more strongly correlated with the indicators, in particular with the degree of perceived competition.
3. Higher spare capacity is related, as one would expect, to a higher degree of perceived competition but not, as might be expected, to the other two indicators.
4. Competition could also be related to other aspects of the product, signalled to parents by the extent of concentration of socially disadvantaged students in a school or a low level of examination results at GCSE. Hence, one might expect that schools with higher percentages of pupils eligible for free school meals (FSM) and lower percentages of students gaining 5 or more GCSEs at grades A* to C or A* to G would report a higher degree of competition. Only the association between the FSM percentage and the number of perceived competitors was found to be statistically significant.. However, this might be explained by FSM being higher in urban areas where schools are more densely located than by FSM itself. Being in an urban area was associated with reporting higher competition (see Table V). There was no statistically significant association between examination results and the indicators of competition.

The above analysis of bivariate relationships reveals a number of structural variables that have statistically significant associations with the measures of competition. The next section takes the data analysis further by estimating ordinal regressions of the two

[9] GM since 1995/96.

measures of competition on the structural variables.

Ordinal regressions of perceived competition indicators

Ordinal regression is used when the response variable is an ordered category as in this study[10]. The two ordered response variables are:

- the perceived degree of competition;
- the number of perceived competitors.

In each case the response variable is a categorical variable with three rankings, 1 being the lowest degree of competition for both response variables. For each measure of competition, the ordinal regression equation containing statistically significant independent variables and having the highest explanatory power (in terms of the chi square statistic) is reported.

The following variables were found to be statistically significant and to contribute to the ability of the regression model to predict the degree of perceived competition category of the school:

- proportion of GM schools in the Approximate Area of Competition;
- the spare capacity of schools in the AAC
- being located in LEA 3.

[10] The interpretation of an ordinal regression is more complex than that of an ordinary least squares linear regression because the response variable in the former is the log of the odds ratio of the probability of being in categories 2 and 3 compared to category 1 and of being in category 3 compared to category 1, given that in this example the response variable is in three ordered categories. From these estimated odds we can calculate the probability of a school being in a particular competition category, given its values for the independent variables. As an indication of the estimated effect size, we can compare the competitive category predicted for each school with its actual category and count the proportion of correct categories. The predictive power of the regression equation is compared with prediction success we would have without knowledge of the regression equation. If we had no other information than the actual frequencies of the three competitive categories, our best prediction would be to place each school in the most frequent category (in this case category 2 - a fair degree of perceived competition - and 2-4 for the number of perceived competitors).

The higher the values of these variables (1 rather than 0 in the case of LEA3) the greater the probability of a school reporting a high degree of competition. The number of schools in the Approximate Area of Competition did not quite reach statistical significance. Being a GM school or having a high percentage of pupils eligible for free school meals was not significant.

The estimated coefficients for each regression equation are given in Table AIII in the Appendix. From these coefficients can be calculated the probability of a school being in any of three categories, given specific values of the independent variables. The estimated probabilities of being in the high degree of perceived competition for a selection of values for the independent variables is shown in Table VII. The probability is higher in LEA 3 than in the other LEAs. LEA 3 is a major conurbation with a partially selective system in which 23 per cent of schools were GM. The impact of the proportion of GM schools on the perceived degree of competition is more marked than the number of schools in the AAC. This supports the view that behavioural attributes are more important in determining competitive conduct than the number of schools (a key structural feature).

In predicting the number of perceived competitors category that a school reported, the following variables were found to be statistically significant and to contribute to the predictive ability of the model:

- proportion of GM schools in the Approximate Area of Competition;
- the number of schools in the AAC;
- the interaction between the proportion of GM schools and the percentage of pupils eligible for free school meals, which had a negative effect;
- being located in LEA 3.

The percentage of pupils eligible for free school meals on its own was not significant,

neither was being a GM school, nor the spare capacity of the AAC.

Table VIII presents the estimated probabilities of a school perceiving itself to have 5 or more competitors. Increasing the proportion of GM schools has a similar impact on the probability of perceiving 5 or more competitors than increasing the number of schools in the AAC.

The overall predictive power of the estimated ordinal regression model can be ascertained by comparing how accurately it predicts the competitive category of each school compared to the base-line model, which assigns each school to its most probable competitive category using only knowledge of the relative frequencies of each category. For both competition indicators the most frequent category is 2 (i.e. a fair degree of competition and 2-4 competitors). The ordinal regression models while better than the baseline model do not have strong predictive power since:

- fifty six percent of schools are correctly assigned to the reported degree of perceived competition category by the estimated model compared to 46% by the base-line model;
- fifty seven per cent of schools are correctly assigned to their actual of number of perceived competitors category by the estimated model compared to 50% by the base-line model.

The structural variables are, therefore, relatively weak predictors of the degree of competition as perceived by head teachers. This suggests that other factors, such as the competitive behaviour of the players in the local school markets, which reflects their attitudes and values, are more important than structure. I would argue that the proportion of GM schools in a locality, which impacts on perceptions of competition, is not so much a structural variable but is a reflection of individualistic values that place promoting the success of the individual school above that of sustaining collective anti-competitive agreements.

5. THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

The central issue for this paper is whether there is a positive relationship between competition and performance. This hypothesis is tested by regressing indicators of school performance on variables that reflect the degree of competition, taking into account other likely determinants of school performance for which data are available. Of particular interest with respect to the S-C-P model is whether variables indicative of competitive behaviour have a greater impact on school performance than structural competition variables.

School performance

School performance was measured in terms of General Certificate in Secondary Education (GCSE)[11] examination results, using indicators constructed from GCSE examination results from 1991 to 1998. These are:

- GCSE1: the proportion of students[12] gaining 5 or more passes at grades A* - C (i.e. 'good' passes). This has been given the greatest official and media prominence as a single indicator of a school's academic achievements and so is referred to as 'the headline indicator';
- GCSE2: the proportion of students gaining 5 or more passes at grades A* - G (G is the lowest pass grade).

As the survey data on indicators of competition were collected in the autumn term 1997, the conditions reported would have affected GCSE1 and GCSE2 examination

[11] This is an examination taken at the end of Year 11 (at the ages of 15-16) at the end of compulsory schooling. It is externally set and marked. Students normally take between 8 and 10 subjects and almost all students enter. Since 1992 national 'league' tables of examination results at school level have been published for all schools.

[12] The relevant population of students is those aged 15 on August 31 of the year prior to taking the GCSE examinations.

results in both 1997 and 1998.

In addition, improvements in GCSE1 and GCSE2 over time were used as indicators of school performance. Generally, in England, schools have been improving their performance in terms of these indicators. Ninety three percent of the sample schools improved their GCSE1 results over the period and 85 per cent improved the GCSE2 indicator. Improvement was calculated as the mean annual change over the periods 1991-98, 1992-98 and 1993-98 in GCSE1 and GCSE2[13]. Changes over three periods were included because the measured rate of improvement for individual schools can vary depending on the time period considered[14].

Each of the five indicators for GCSE1 and GCSE2 was used as the dependent variable to test for the impact of competition on performance, giving rise to 10 regression equations in all.

Independent variables

The independent variables are presented in four distinct groups. The full list of variables, including units of measurement and mean values, is given in Table AIII in the Appendix.

Group A: Structural differences in governance and admissions policies, which create product differentiation

[13] The average change in terms of percentage points in the GCSE1 and GCSE2 indicators was used, not the percentage rate of change. The former measure is used because it values a 1% percentage point improvement between one year and the next the same if the school had a base year GCSE1 indicator of 25% than if it had one of 60%. The percentage rate of change indicator values a 1% improvement more if it comes from a low base than from a high base, yet there is no reason to suppose that a 1% point improvement is easier to achieve the higher the school's existing GCSE1 indicator. In fact it might be easier to improve from a low base.

[14] The correlation coefficients between the rates of improvement in GCSE1 over the three time periods range between 0.74 and 0.665 and for GCSE2 between 0.74 and 0.775.

- Denominational (i.e. church schools)
- Grant maintained
- Selective
- Single sex
- Sixth form provision

Group B: structural variables likely to affect competitive behaviour

- Number of schools in the Approximate Area of Competition (defined above)
- Percentage of schools in the AAC that is grant maintained
- Spare capacity (in terms of places) in the AAC

Group C: dummy variables used as indicators of competitive conduct constructed from headteachers' responses to the survey

- High degree of perceived competition (= 1, otherwise = 0)
- Little or no perceived competition (= 1, otherwise = 0)
- 0 –1 perceived competitors (= 1, otherwise = 0)
- 5 or more perceived competitors (= 1, otherwise = 0)
- High degree of co-operation (= 1, otherwise = 0)
- Low degree of co-operation (= 1, otherwise = 0)

Group D: factors relating to the school, its students and community that are likely to affect performance

- Size in terms of number of students on roll
- Urban location (= 1 if urban, otherwise = 0)
- Percentage of pupils eligible for free school meals (FSM)
- Change between 1992/1993 and 1997/1998 in the difference between the school's FSM percentage and the LEA average FSM percentage, which indicates whether the school is changing the socio-economic status of its intake relative to the local area
- The percentage of pupils obtaining 5+ A*-C GCSE1 grades (or 5+ A*-G GCSE grades) in the year prior to period over which the average annual improvement in GCSE1 (or GCSE2) is measured is included because it is hypothesised that schools starting from a lower baseline of examination results have more incentive and more scope for improvement.

Results

The estimated coefficients for GCSE 1 are given in Table IX. Variables which are statistically significant are indicated by asterisks (** and *). The pattern of significant and insignificant variables is largely consistent across the five regression equations. However, the change in GCSE1 1992-98 fits poorly.

The variables that have a consistent impact on the GCSE1 performance indicators are:

- being a single sex school (positive);
- school size (positive);
- the percentage of students eligible for free school meals (has the usual negative impact except for GCSE1 change 1992-98, where it is insignificant);
- the change over time in the difference between the school's and LEA's FSM percentage: this has a negative sign meaning that an increase in the school's relative social disadvantage has an adverse effect on examination performance, as one would expect;
- 5 or more perceived competitors has a positive impact on all five indicators while the degree of perceived competition is insignificant.

Variables having an impact on GCSE1 results in 1997 and 1998 but not on GCSE1 improvement are:

- being a selective school which adds over 40 percentage points;
- spare capacity in the AAC (negative);
- urban location (independently of the free school meals variables) has a negative impact.

The significance and negative sign of the percentage of pupils obtaining 5+ A* - C grades in 1991 or 1992 for the GCSE1 change indicators show that starting from a lower base is associated with greater improvement. This may be because it reflects the degree of x-inefficiency (room for improvement) and/or greater incentives to improve.

The most interesting finding is the positive impact of 5 or more perceived competitors on all five indicators of GCSE1 performance at the 0.95 confidence level. Having 5 or more perceived competitors compared to 4 or fewer added 4 and 5.5 percentage points the GCSE indicator in 1998 and 1997 respectively and between 0.36 and 0.57 percentage points to the average annual improvement in GCSE1 over time.

The indicator of structural competition – the number of schools in the AAC – was not significant, while the proportion of GM schools was only significant for GCSE1 change between 1993 and 1998.

The other structural competition variable – spare capacity in the AAC – was significant for the level of GCSE1. However, the sign is negative, indicating that any spur to competition from spare capacity did not raise GCSE1 results. It is more likely that spare capacity is an associated variable rather than a causal factor, indicating poorer school quality as perceived by parents and reflected in their choosing schools in other AACs.

The findings with respect to competition are different for GCSE2. None of the competition indicators from the survey are significant. The proportion of GM schools has a negative impact for one of the GCSE2 change indicators. The estimated coefficients for the five GCSE2 performance indicators are given in the Appendix in Table AIV

There is therefore clear evidence that competition has a positive impact on GCSE1 performance, given that causality does not run from performance to the perceived number of competitors. This is unlikely since, as noted in section 4, the correlation between GCSE1 results and the indicators of competition are insignificant. The possibility that more effective headteachers are more aware of competitor schools is a

possibility that cannot be ruled out but a strong correlation between 5 or more perceived competitors and headteacher effectiveness is implausible. However, the number of perceived competitors only has an impact on the performance indicator that has been accorded headline status by official bodies and the media in judging schools and not on the GCSE2 indicator.

Whether the GCSE1 indicator is the correct one for judging schools or even if a single indicator should be accorded such importance is highly questionable. Leaving aside the problems of using a raw examination indicator, the total average GCSE points score per student is a better indicator than GCSE1 or GCSE2 as it reflects the relative performance of all students. However, data were not available on this indicator for the years covered in this study and so it was not possible to test for the impact of competition on it.

5. HEADTEACHERS' PERCEPTIONS OF COMPETITIVE CONDUCT

The study also collected qualitative data from interviews with 17 headteachers on their views on and experiences of local competition and policies towards school improvement. This section of the paper draws on these data order to:

- illuminate the different ways in which competitive conduct manifests itself, particularly in relation to notions of 'unfair' and 'acceptable' forms of competitive behaviour;
- actions taken in order to improve academic performance, in particular the attention paid to the headline GCSE1 indicator;
- draw from the above evidence to suggest reasons why the degree of perceived competition does not have an impact on the headline indicator, whereas the number of perceived competitors does.

Headteachers from seven AACs, covering all 6 LEAs, were selected for interview[15]. The schools were selected in order to represent high and low degrees of structural competition and low and high performance in terms of examination improvement over time. Two to four schools from the same AAC were selected in order to obtain reciprocal views on a school's competitive conduct, except in the case of a single-school AAC. Each interview lasted about an hour, was taped and transcribed. The analysis of the interview data reported here summarised the interviews for each school under three main headings:

1. the headteacher's conception of competition, the types of competitive behaviour described and the values assigned to this behaviour;
2. school policies with respect to the improving headline GCSE performance;
3. school policies and actions with respect to other aspects of improving the product offered by the school.

The local competitive context

Competitive conditions in the AACs were all markedly different. These differences were related both to structure, in terms of diversity in school type rather than in the numbers and proximity of other secondary schools, and to the values espoused by the headteachers with respect to the forms of competitive conduct that are acceptable practice. These are now summarised with respect to each LEA.

LEA 1 (county: no GM schools); 3 schools in the AAC

The LEA culture reflected strong belief in the value of collaboration between schools and not threatening this by any school becoming grant maintained. Any headteacher

[15] The interviews were conducted in 1997 and a few in 1998 by AN OTHER (to be named if published).

doing this would have been ostracised.

LEA 2 (metropolitan); 3 schools in the AAC

Competition was discouraged by headteachers but the active choice of parents in a city with marked social divisions partially undermined their attempts to avoid competing. The only two GM schools were the two denominational ones.

LEA 3 (metropolitan); 9 schools in the AAC

This city, in contrast to LEA 1, is partially selective and had 23% of its schools GM. The two headteachers interviewed reported a high degree of competition.

LEA 4 (County); 5 schools in the AAC

The AAC (a medium sized town) had 1 City Technical College and 3 GM and an LEA maintained school. There was great awareness of local hierarchy in school quality. The schools of the headteachers interviewed were at the bottom of the hierarchy, one being in special measures. Both considered the situation highly competitive.

LEA 5 (County); 2 AACs represented, one with 9 schools and one with 1 school only

The LEA is mainly selective. The four schools studied were in a selective area. One was a grammar school, the other three upper schools (one denominational). Their experiences of competition were very different. One of the upper schools was about to be closed. It had experienced an increasing concentration of ethnic minority pupils and falling rolls.

LEA 6 (County); 3 schools in the AAC

This LEA had a very large concentration of GM schools (67%). In the AAC studied all three schools had become GM. Competition was the most rife of the 7 AACs. One of the headteachers was particularly enthused by competition and successful in promoting his school. The third objected to competition on principle and constrained his response to what he considered acceptable limits.

Forms of competitive conduct

From an analysis of the interview data the following types of competitive conduct were distinguished:

- rivalrous actions;
- stakeholder attachment activities;
- measures to dampen competition;
- collaboration with respect to product quality.

Rivalry refers to those actions designed to improve the competitive position of one's own school but which directly harm other schools, whether by intention or not. Most of the headteachers regarded these practices as professionally or even morally unacceptable, some more so than others. Particularly disapproved of was 'poaching' pupils from other schools' catchment areas or feeder primary schools, bussing pupils from out of the catchment area and negative comments about rival schools. Covert selection of pupils, through refusing admission to pupils with learning difficulties and excluding pupils which other schools then had to admit, were next on the list of disapproved activities. Conduct which changes structure, in particular becoming GM or specialist, or increasing the school's admissions limit, was also regarded as rivalrous. In some areas this was actively and successfully discouraged.

Stakeholder attachment activities are limited to securing the good will and opinion of those who are regarded as legitimate stakeholders, i.e. headteachers, parents and pupils in feeder primary schools and residents and businesses in the school's local community. These activities include liaison with feeder primary schools, promotional materials, open evenings and tours of the school for prospective parents and students, managing the local media by encouraging good publicity for school; improving the image of pupils in the locality by means of smarter uniforms and better pupil behaviour out of school. Some schools targeted particular types of parent[16] (aspirant middle class) by focusing on exam success, good facilities (especially if GM) and extra-curricular activities. Less academically successful schools opted for marketing themselves as a good community school concerned for the development of the whole child.

Headteacher tacit and explicit agreement to dampen potential competitive conduct was much more important in some areas than others. It was agreed not to poach from other schools' catchment areas (where these were defined), to refrain from negative remarks about other schools and not to apply for GM or specialist status. In LEAs 1 and 2 this was done on a collective scale, in LEAs 3, 4 and 5 it was expressed individually by heads, while in LEA 6 no efforts were made to dampen competition.

Apart from collaboration to ameliorate competition, schools also collaborated in various ways in order to improve or maintain product quality. One of the most common forms of collaboration was over post 16 provision, in order to share courses or promote local schools vis-à-vis further education sector rivals. There was also collaboration in relation to teachers' professional development and, in some cases, over joint purchasing of

[16] Classified by Woods et al. (1998) as 'social targeting'.

inputs. Headteachers engaged in collaborative activities with local schools even in areas with a high degree of competition (e.g. LEA 3). However, the headteacher who was the most enthusiastically competitive of those interviewed, only collaborated with more distant schools which were not local rivals.

The importance of the competitive conduct of the customers in a market was also evident from headteachers' comments. While most of the headteachers maintained that they were primarily concerned with the interests of the child in having the best education possible rather in being motivated by market incentives, they all expressed acute perceptions of school characteristics that repelled and attracted students and parents. A few head teachers thought parents made mistaken judgements about schools based on local gossip but most regarded parents as discerning customers who would not be taken in by mere presentational gloss. Hence, they were concerned with making substantive improvements (discussed below) as well as with those stakeholder attachment activities, which tend to be promotional rather than substantive (Woods et al., 1998).

Those headteachers attempting to suppress rivalrous competition and prevent the development of more marked local hierarchies in school quality were aware that they could not fully modify the effects of active parental choice. Once parents began to act on their perceptions of differences in school quality and chose other schools in preference to their neighbourhood school, it would be impossible for heads to prevent parental choice from widening academic and social differences between local schools. In five of the AACs the headteachers were very aware of the local school hierarchy and the position of their own school in it. Even in the LEA 1 AAC, there was concern that one school was becoming less successful in recruiting than the other two in the town.

Attention to academic performance

Sixteen of the headteachers were concerned to improve examination results[17] and paid considerable attention to the headline indicator of 5 or more A* to C grades at GCSE. Some were also concerned with A level performance. The targeting of pupils at the C/D boundary and measures to improve their chances of a C grade were mentioned by most of the headteachers. Headteachers did this even when their personal values did not accord with favouring some pupils over others.

Monitoring of subject departments' examination performance was also a wide spread practice. Most of the schools were now tracking the individual performance of students, using value added predictions from baseline entry tests, though this was done with varying degrees of sophistication and intensity. The information was used to set students targets and to monitor their progress.

Other tactics used to improve examination performance were careful selection of courses, for example modular and vocational courses. Some heads specifically mentioned better student reward systems. The schools with higher proportions of socially disadvantaged students worked at improving student motivation and attendance.

Some of the headteachers stressed the importance of improving teaching. For example, the headteacher of a school in the LEA 6 AAC,[18] which improved its headline GCSE results by an average of 3 percentage points a year between 1991 and 1998 (compared to

[17] The grammar school head was concerned to maintain the high ability of the pupil intake and thus retain the position of 'best grammar school'.

[18] The school also reduced the percentage of FSM students compared to the LEA average b y 3 per cent and expanded its roll over 6 years by 300.

the average for the sample of 1.5) stated:

> The real factor in improving exam results is consistently good teaching. We have done lots of work on learning styles, monitoring teaching, attention to reviewing and then adhering to schemes of work, recruiting good teachers and moving on the poor ones. It takes years to move on.

Some headteachers commented on the reduction in x-inefficiency in schools, though they did not, of course, use the term. Improvement in exam results had come about by making teachers work harder (e.g. pupil monitoring, teacher monitoring, improved schemes of work, more professional development). Some schools had achieved improved results at a time of budget cuts, while others had secured extra resources by becoming GM. As a headteacher in the LEA 1 AAC observed:

> Well, this is the awful thing: if someone was (sic) doing an impartial study they would say that the less money and the more pressure you put on schools, the better the results get because the results are getting better despite everything.

Performance, the degree of competition and the number of perceived competitors

The statistical analysis in section 5 showed that the headline GCSE1 indicator, but not the GCSE2 indicator, was improved by the presence of 5 or more perceived competitors. The data from this set of headteacher interviews confirm other qualitative research (Gillborn and Youdell, 2000; Woods et al., 1998) on the importance that headteachers and schools have attached to improving the headline indicator relative to other measures of performance, which receive less publicity in making judgements about schools' and system wide performance.

The other key finding of the statistical analysis is that it while five or more competitors had an impact on both the size and rate of improvement in the headline indicator, the perceived degree of competition did not. The question that needs addressing therefore is

what might be the reasons for this apparent inconsistency.

One possibility is that the causal relation is in the other direction: that poorer performing schools perceive a higher degree of competition. To test this proposition Spearman rank correlations between the two indicators of competition and measures of examination performance were estimated. As reported in section 4, these were all statistically insignificant. Furthermore, the variables contributing most to explaining the degree of perceived competition are the proportion of GM schools in the AAC, the amount of spare capacity in the AAC and being in LEA 3. The number of schools in the AAC is not statistically significant (at 0.1 level) in explaining the degree of perceived competition whereas it is for explaining the perceived number of competitors.

In fact, the perceived number of competitors and the perceived degree of competition are not strongly associated, suggesting that they reflect different factors in the local competitive environment. The statistical analysis showed that, while the perceived degree of competition and the number of perceived competitors are directly related, the association is only modest (rank correlation of 0.361). This is reflected in the fact that of the 104 schools reporting 5 or more perceived competitors, 41 per cent perceived fair or low degrees of competition.

The interviews provide some evidence as to why a high degree of perceived competition is not related to high exam performance. This is because it is associated with rivalrous conduct and hence induces schools to divert energy and resources to countervailing rivalrous behaviour leaving less for substantive improvements in teaching and learning[19].

[19] It can be argued that the perceived degree of competition does not have a statistically significant relationship with performance because it is associated to some extent with a higher number of perceived competitors, which

An hypothesis, posed at the beginning of the paper, is that headteachers (and teachers) do not need a competitive stimulus to be x-efficient. As far as improvements in GCSE2 are concerned, the evidence does not refute that hypothesis. However, the impact of 5 or more perceived competitors on the both the level and rate of improvement of GCSE1, refutes the hypothesis for this performance indicator. It may be that a larger number of perceived competitors gives a school more stimulus to maintain or enhance its position in the local hierarchy and a larger number of schools from which to emulate practices that improve the performance indicator. Co-operation more frequently co-exists with a higher number of perceived competitors than with a high degree of perceived competition (see Table VI). If schools are x-inefficient through lack of knowledge of effective management and teaching practices, they will not make good this deficiency without contact with others. Hence, co-operation over product quality is likely to be a factor in better performance.

CONCLUSION

It is argued at the beginning of the paper that competition is an under-theorised concept when used both by advocates of competition between schools and by economists applying their discipline to the study of schools markets. Competition is under-theorised in four main respects:

- the concept of competition and its degree;
- in assuming that the degree of competition is determined by market structure in terms of the number of schools in a local market or the degree of concentration;
- in assuming purely self-interested motivations on the part of school managers and

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has a positive impact on GCSE1 performance. This offsets the negative effects on performance of rivalrous conduct.

teachers;

- the black box treatment of the school processes which produce learning outcomes and how these respond to changes in the degree of competition.

This paper undertakes a more finely-grained study of the nature of competition and its impact on school performance than would be possible by utilising only secondary data sources. Data on headteachers' perceptions of competition were obtained by means of a postal survey in order to supplement data collected from secondary sources. More in-depth data on the nature of competition between schools and school policies with respect to improvement were obtained from interviews with 17 of the head teachers. Using these data, three interrelated investigations were carried out.

The first examined the relationships between two indicators of competition, which since they are derived from headteachers' perceptions of competition, are behavioural rather than structural indicators of the degree of competition. It was shown that structural competitive variables make only a modest contribution to explaining behavioural competition. This evidence supports the argument that in the schools market competitive behaviour is determined by other factors than market structure, in particular the professional values of head teachers and LEA personnel, reflected in long-standing local attitudes and practices.

The second strand of the investigation tested whether competition, measured in terms of both structural variables and the indicators of perceived competition, has an impact on school performance. It was found that one of the indicators of perceived competition - 5 or more perceived competitors – had a consistent and positive impact on both the level of the GCSE1 headline performance indicator in 1997 and 1998 and its change over three overlapping periods. The estimated impact is between 4 and 5.5 percentage points

on the percentage of students obtaining 5 or more grade A* to C at GCSE. The market structure variables, in particular the number of schools in an Approximate Area of Competition and the proportion of schools in the AAC which was GM, are not significant. Competition had no impact on the more inclusive but less publicised GCSE2 indicator.

The third part of the study uses interview data from 17 of the schools' headteachers to examine the nature of competitive behaviour and the value judgements head teachers made about different forms of competitive behaviour. This was classified into different forms; rivalrous conduct, which is generally regarded as unfair competition; stakeholder attachment activities; agreements to dampen competitive conduct; and co-operation with respect to product quality. The headteachers attached considerable importance to maximising the proportion of 5+ A* - C grades, and to focusing efforts on pupils on the C/D borderline, even when this did not accord with their values. The interview evidence suggests that a high perceived degree of competition is associated with rivalrous competitive conduct and this is why it has an insignificant impact on school performance.

In summary, the evidence from this study points to the impact on headteacher behaviour of unremitting official and media attention to the importance of one performance indicator in judging schools. The evidence of a positive impact of competition on the school performance in terms of the headline indicator should be interpreted with care. It is only found with respect to the number of perceived competitors, and not with respect to the degree of perceived competition. The perceived number of competitors is not a pure structural variable as it is only moderately associated with the number of schools in a local market. It is most likely to also be related to the various forms of competitive

behaviour which the headteacher observes among local schools. As in commercial markets, not all forms of competitive conduct stimulate improved performance for the consumer.

However, the major finding is that schools exhibit better performance in terms of the headline indicator when there are more perceived competitors. It is suggested that this is due to both to greater stimulus to improve and maintain the school's position in the local hierarchy and to more opportunities for co-operation and emulation related to product quality.

Finally, one can conclude from this evidence that schools do respond positively to pressures to improve in relation to a particularly well publicised performance indicator, especially when these are reinforced by the presence of a greater number of perceived competitors. This only serves to emphasise the importance of choosing the right indicator in the first place. Putting to one side the problems of a raw examination score as an indicator of school quality, the total average GCSE score per pupil is a better raw exam score indicator than GCSE1. It does not induce schools to concentrate on particular pupils and reflects the achievements of all pupils in a school.

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Table I: Survey questions on perceptions of competition

A1	How would you describe the degree of competition between local secondary schools?	highly competitive fairly competitive little competition no competition
A2	In your judgement how many schools are you in competition with?	0- 1 2-4 5 or more
A3	How would you describe the degree of co-operation between local secondary schools?	highly co-operative fairly co-operative little co-operation no co-operation
A4	Do you perceive that parents in your area have, since 1992, become more aware of the alternative schools available to them?	yes no no alternatives
A5	Indicate whether the area in which your school is located is	urban semi-rural rural

Table II Cross tabulation between degree of competition and number of competitors

	Degree of perceived competition			
Number of perceived competitors	Highly competitive =3	Fairly competitive =2	Little/no competition =1	Total
5 or more = 3	61 (27%)	36 (15.9%)	7 (6.7%)	104 (46%)
2 to 4 = 2	29 (12.8%)	64 (28.3%)	17 (7.5%)	110 (48.7%)
1 or 0 = 1	3 (1.3%)	3 (1.3%)	6 (2.7%)	12 (5.3%)
Total	93 (41.2%)	103 (45.6%)	30 (13.3%)	226 (100%)

Table III Cross tabulation between degree of competition and perceived degree of co-operation

	Degree of perceived competition			
Number of perceived competitors	Highly competitive =3	Fairly competitive =2	Little/no competition =1	Total
5 or more = 3	61 (27%)	36 (15.9%)	7 (6.7%)	104 (46%)
2 to 4 = 2	29 (12.8%)	64 (28.3%)	17 (7.5%)	110 (48.7%)
1 or 0 = 1	3 (1.3%)	3 (1.3%)	6 (2.7%)	12 (5.3%)
Total	93 (41.2%)	103 (45.6%)	30 (13.3%)	226 (100%)

Table IV Measures of association between indicators of competition and co-operation

	Degree of perceived competition		Number of perceived competitors		Degree of perceived co-operation	
	χ^2	Kendall's tau c	χ^2	Kendall's tau c	χ^2	Kendall's tau c
Degree of competition			37.98**	0.283**	31.3**	-0.293**
Number of competitors	37.98**	0.283**			12.3*	-0.174**

Notes: ** indicates significance at 0.05 level, * at 0.10.

Table V Measures of association between indicators of competition and co-operation and structural nominal-scale variables

	Degree of perceived competition (3 = high)		Number of perceived competitors (3 = 5 or more)		Degree of perceived co-operation (3= high)	
	χ^2	Kendall's tau c	χ^2	Kendall's tau c	χ^2	Kendall's tau c
Location (rural, semi-rural, urban)	15.826**	0.140**	16.808**	0.168**	2.800	0.051
GM school	16.279**	0.262**	9.472**	0.192**	13.609**	-0.207**
Sixth form	0.276	0.033	3.415	0.076	0.861	-0.033
Selective	4.183	0.028	1.192	0.043	1.664	-0.032
Denomin-ational	3.913	0.082	4.162	0.081	0.399	0.021
Single sex	6.286*	-0.015	0.345	0.051	0.847	0.004
LEA 1	12.09**	-0.140**	3.978	-0.063	11.223**	0.137**
LEA 2	8.23**	-0.102**	3.818	-0.067	3.449	0.004
LEA 3	6.08*	0.130*	18.934**	0.234**	3.630	0.094
LEA 4	0.768	-0.036	9.119**	-0.127**	5.369*	0.032
LEA 5	5.365*	-0.114**	9.632**	-0.145**	4.447	0.101

Note: ** indicates statistical significance at 0.05 level and * at 0.10.

Table VI Measures of association between indicators of competition and co-operation and structural ratio-scale variables

	Degree of perceived competition 3 = high	Number of perceived competitors 3 = 5 or more	Degree of perceived co-operation 1 = high
No. schools in approximate area of competition (AAC)	0.196**	0.181**	-0.190**
Proportion of GM schools in AAC	0.365**	0.209**	-0.246**
Spare capacity in AAC	0.174**	0.004	0.028
Percentage of pupils eligible for free school meals in 1997	0.073	0.144*	0.076

Note: ** indicates statistical significance at 0.05 level and * at 0.10.

Table VII Estimated probability of a school reporting a high degree of perceived competition

	LEAs 1,2, 4, 5 and 6			LEA 3		
	Number of schools in AAC			Number of schools in AAC		
Proportion of GM schools in AAC	3	6	10	3	6	10
	0.70	0.74	0.79	0.88	0.90	0.92
0.75	0.55	0.60	0.66	0.80	0.82	0.86
0.5	0.39	0.44	0.50	0.67	0.71	0.76
0.25	0.25	0.29	0.35	0.52	0.56	0.63
0	0.15	0.18	0.22	0.36	0.40	0.47

Note 1: in all cases AAC spare capacity was fixed at its mean value of 0.14.
Note 2: including the number of schools in the AAC improved the predictive power of the model, though the null hypothesis of no effect was only rejected at 0.15 probability[20].

[20] The accepted test for statistical significance is that the probability of rejecting the null hypothesis when it is correct is 0.1 or less.

Table VIII Estimated probability of a school reporting 5 or more competitors

	LEAs 1,2, 4, 5 and 6			LEA 3		
	Number of schools in AAC			Number of schools in AAC		
Proportion of GM schools in AAC	3	6	10	3	6	10
1	0.48	0.54	0.62	0.86	0.89	0.92
0.75	0.40	0.46	0.54	0.82	0.85	0.89
0.5	0.33	0.39	0.47	0.77	0.81	0.85
0.25	0.27	0.32	0.39	0.71	0.75	0.81
0	0.21	0.25	0.32	0.64	0.69	0.76

Note: for the interaction term the percentage of free school meals (normalised) was fixed at its mean value of –0.098.

Table IX Summary of regression results for GCSE1 performance indicators

	GCSE1 1998	GCSE1 1997	GCSE1 change 1991-98	GCSE1 change 1992-98	GCSE1 change 1993-98
CONSTANT	35.609*** (11.629)	34.227*** (10.816)	2.027** (6.261)	1.412** (3.023)	1.981** (3.985)
SELECTIVE	41.283*** (14.329)	44.734*** (15.04)	0.378 (0.773)	-1.333** (-2.213)	0.938 (1.464)
DENOMINATIONAL	6.091** (2.268)	2.811 (1.195)	0.211 (0.87)	-0.259 (-0.821)	0.141 (0.421)
SINGLE SEX	10.342*** (4.571)	6.621** 2.866	0.640** (2.354)	1.023** (3.063)	1.081** (3.043)
SIXTH FORM	-2.115 (-1.427)	-2.729* (-1.773)	-0.316* (-1.945)	-0.196 (-0.906)	-0.0437 (-0.190)
GM SCHOOL	-1.029 (-0.515)	-1.566 (-0.755)	-0.0137 (-0.06)	-0.0913 (-0.308)	-0.440 (-1.396)
No. of schools in AAC	-0.120 (-0.534)	0.0224 (0.096)	-0.01085 (-0.455)	-0.0234 (-0.738)	-0.038 (-1.130)
Proportion of GM schools in AAC	3.462 (1.212)	1.251 (0.410)	0.357 (1.129)	0.602 1.442	1.077** (2.425)
AAC spare capacity	-19.16** (-2.783)	-18.20* (-2.563)	insig. omitted	insig. omitted	insig. omitted
Urban location	-5.968** (-3.666)	-4.397** (-2.584)	insig. omitted	insig. omitted	insig. omitted
High degree of perceived competition	-1.187 (-0.98)	-1.542 (-1.229)	-0.161 (-1.19)	-0.277 (-1.54)	-0.132 (-0.691)
Little/no perceived competition	-2.447 (-1.233)	-2.063 (-1.003)	-0.167 (-0.778)	-0.417 (-1.431)	-0.0402 (-0.130)
0-1 perceived competitors	-3.349 (–1.162)	-1.052 (-0.364)	-0.178 (-0.589)	-0.289 (-0.719)	-0.563 (-1.318)
5+ perceived competitors	3.932** (2.830)	5.515** (3.811)	0.36** (2.30)	0.443** (2.13)	0.574** (2.595)
SIZE (total pupils)	0.0105*** (5.03)	0.012** (4.659)	0.0008*** (3.296)	0.00034 (1.054)	0.0009** (2.850)
% pupils entitled to free	-	-	-	-0.07128	-0.511**

school meals (1998, 1997, 1992-98)	9.648** (-10.209)	9.953** (10.22)-	0.603** (-4.795)	(-0.413)	(-2.786)
Change over time between school's and LEAs' FSM %	-0.268 (-1.484)	-0.350* (-1.885)	-0.084** (-4.331)	-0.118** (-4.621)	-0.01** (-3.672)
Percentage of pupils obtaining 5+ A*-C GCSE in 1991/92/93	omitted	omitted	-0.039** (-5.13)	-0.0083 (-0.846)	-0.0531 (-5.091)
Sample size	219	220	216	214	214
Adjusted R Square	0.833	0.823	0.279	0.181	0.203
Normal distribution of residuals	OK	OK	OK	OK	OK

Notes: B coefficient reported with t-statistic in parenthesis; ** indicates significance at 0.05 level, * at 0.10.

APPENDIX ADDITIONAL TABLES

Table AI: Background information on Local Education Authority (LEA) areas

	Authority type	School system	NO. of schools	No. and % of GM schools	% of pupils eligible for free school meals 1997
LEA 1	County	comprehensive	35	0 (0%)	9
LEA 2	Metropolitan	comprehensive	27	2 (7%)	29
LEA 3	Metropolitan	some selection	71	18 (23%)	36
LEA 4	County	comprehensive	39	10 (25%)	13
LEA 5	County	mainly selective	42	9 (21%)	10
LEA 6	County	some selection	100	69 (67%)	13

Table AII Variables used in the statistical analysis

Description	Unit of measurement	Mean value or count
GCSE1: the proportion of students gaining 5 or more passes at grades A* - C in 1997 and 1998	percentage points	1997 = 44.71 1998 = 46.12
GCSE2: the proportion of students gaining 5 or more passes at grades A* - G in 1997 and 1998	percentage points	1997 = 88.69 1998 = 89.53
Average annual percentage point change in GCSE1 1991-1998 (sum of difference in GCSE1 between each pair of years divided by number of years)	percentage points	1.50
Ditto for 1992-1998	percentage points	1.26
Ditto for 1993-1998	percentage points	1.15
Average annual percentage point change in GCSE2 1991-1998	percentage points	0.99
Ditto for 1992-1998	percentage points	0.68
Ditto for 1993-1998	percentage points	0.49
Denominational (i.e voluntary controlled or aided)	1= denominational 0= non-denominational	23
Grant maintained by 1995/96	1= GM	79
Selective (i.e. grammar school)	1= selective; 0= non-selective	23
Single sex	1= boys' or girls only 0= mixed school	39
Sixth form	1= has sixth form 0 = no sixth form	147
Number of schools in the Approximate Area of Competition	school	4.04
Proportion of schools in the AAC that is grant maintained	decimal fraction	0.34
Spare capacity in the AAC: sum of number of intake pupils divided by standard number/agreed admissions limit	decimal fraction	0.134
High degree of perceived competition	high = 1 fair, little or none = 0	1 = 93
Little or no perceived competition	little or none = 1 fair or high = 0	1 = 30
5 or more perceived competitors	5 or more = 1	1 = 104

	0-1 and 2-4 = 0	
0 –1 perceived competitors	0-1 competitors = 1 2-4 and 5 or more = 0.	1 = 12
High degree of co-operation	high = 1 fair, little or none = 0	1 = 47
Low degree of co-operation	little or none = 1 fair or high = 0	1 = 54
Urban location	urban = 1 semi-rural or rural = 0	1 = 140
Size in terms of number of students on roll in 1997, 1998 and average 1991-98	unit = 1	1997 = 930 1998 = 944 average 1991 – 98 = 905
Percentage of pupils eligible for free school meals (FSM) 1997 and 1998	Normalised value of raw data used in order to make the distribution closer to normal.	1997 = -0.098 1998 = -.11
Average percentage of pupils eligible for free school meals 1992-1998	Normalised values	-.11
Change in a school's relative social deprivation between 1992/93 and 1997/98. First, the difference each year between the school's FSM and the LEA average was calculated. The average for the first two years (1992 and 1993) was subtracted from the average for the last two years (1997 and 1998)[21]. A positive value of this statistic indicates an increase over time in relative social disadvantage.	percentage points	0.53
Percentage of pupils obtaining 5+ A*-C GCSE1 grades in 1991 and 1992	percentage points	1991 = 35.25 1992 = 39. 98
Percentage of pupils obtaining 5+ A*-G GCSE grades in 1991 and 1992	percentage points	1991 = 82.23 1992 = 86.58

[21] Two year averages were used in order to prevent atypical values having a predominant influence on the measure of change,

Table AIII Ordinal regression parameter estimates

Response variable: degree of perceived competition					
	Estimate	Standarderror	Wald	degrees of freedom	Signifi-cance
Threshold (intercept):					
Degree of competition: odds of category 1	-1.481**	0.431	11.8	1	.001
Degree of competition: odds of categories 1+2	1.22**	0.427	8.18	1	.004
Location (independent variables)					
No. of schools in AAC	0.06436	0.045	2.09	1	.148
Proportion of GM schools in AAC	2.59**	0.448	33.5	1	.000
Spare capacity in AAC	3.147**	1.277	6.072	1	.014
LEA3 = 0	-1.151**	0.336	11.7	1	.001
Response variable: number of perceived competitors					
Threshold (intercept):					
No. of perceived competitors: odds of category 1	-3.429**	0.425	64.9	1	.000
No. of perceived competitors: odds of categories 1 and 2	-0.729**	0.340	4.56	1	.032
Location (independent variables)					
No. of schools in AAC	0.05655*	0.031	3.26	1	.071
Proportion of GM schools in AAC	0.714**	0.316	5.11	1	.024
LEA3 = 0	-1.39**	0.312	19.8	1	.000
Percentage of pupils eligible for FSM1997*Proportion of GM schools in AAC	-0.713**	0.349	4.18	1	.041

Note: ** indicates significance at 0.05 level, * at 0.10.

Table AIV Summary of regression results for GCSE2 performance indicators

	GCSE2 1998	GCSE2 1997	GCSE2 change 1991-98	GCSE2 change 1992-98	GCSE2 change 1993-98
CONSTANT	86.254*** (45.754)	87.642*** (47.429	9.489** (14.132)	1.085 (0.923)	11.324** (9.649)
SELECTIVE	2.246 (1.29)	2.032 (1.195)	-0.00477 (-0.02)	-0.299 (-1.032)	0.260 (0.837)
DENOMINATIONAL	3.712** (2.809)	2.230* (1.721)	0.353* (1.965)	-0.0427 (-0.184)	0.414* (1.732)
SINGLE SEX	1.439 (1.043)	1.954 (1.464)	0.175 (0.918)	0.183 (0.789)	0.132 (0.541)
SIXTH FORM	-1.727* (-1.92)	-3.282** (-3.706)	-0.281** (-2.95)	-0.105 (-0.673)	-0.232 (-1.417)
GM SCHOOL	0.111 (0.091)	0.783 (0.660)	0.061 (0.364)	-0.499** (-2.351)	-0.019 (-0.091)
No. of schools in AAC	0.146 (1.059)	0.111 (0.817)	0.0133 (0.759)	-0.0049 (-0.223)	0.0093 (0.389)
Proportion of GM schools in AAC	1.87 (1.077)	-0.430 (-0.252)	0.209 (0.894)	0.972** (3.294)	0.490 (1.595)
AAC spare capacity	-7.074* (-1.659)	-11.60** (-2.787)	insig. omitted	insig. omitted	insig. omitted
Urban location	-1.334 (-1.336)	-1.357 (-1.373)	insig. omitted	insig. omitted	insig. omitted
High degree of perceived competition	-0.793 (-1.074)	-1.085 (-1.494)	-0.0405 (-0.442)	-0.092 (-0.733)	-0.087 (-0.664)
Little/no perceived competition	0.549 (0.446)	-1.188 (-1.002)	0.125 (0.765)	0.222 (1.072)	0.233 (1.053)
0-1 perceived competitors	-1.129 (-0.643)	-1.824 (-1.09)	-0.0707 (-0.306)	-0.203 (-0.723)	-0.249 (-0.825)
5+ perceived competitors	-0.385 (-0.455)	1.305 (1.566)	-0.0571 (-0.495)	-0.093 (-0.644)	0.003 (0.019)
SIZE (total pupils)	0.0043*** (3.338)	0.0041*** (3.191)	0-0005** (2.581)	0.0004* (1.949)	0.0007** (2.788)
% pupils entitled to free school meals (1998, 1997 ,1992-98)	-4.531** (-7.66)	-6.032** (-10.711)	-0.378** (-3.183)	0.569** (3.555)	-0.303* (-1.794)

Change over time between school's and LEAs' FSM %	-0.487** (-4.311)	-0.347** (-3.215)	-0.077** (-5.093)	0.0845** (-4.297)	-0.118** (-6.048)
Percentage of pupils obtaining 5+ A*-C GCSE in 1991/92/93	omitted	omitted	-0.107** (-13.14)	-0.0087 (-0.672)	-0.132** (-9.736)
Sample size	216	218	210	210	215
Adjusted R Square	0.576	0644	0.651	0.278	0.543
Normal distribution of residuals	Some heteroskadicity			OK	OK

Notes: B coefficient reported with t-statistic in parenthesis; ** indicates significance