**Demand for School Quality in the Pre-School Years**

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Abstract

In this paper, we consider the demand for school quality amongst parents with young pre-school children. We undertake two sets of empirical analysis, the first studying house moves amongst families with young children in the UK in the early 2000s, and the second studying house price premia associated with school quality for this cohort of young children before they enter school. We present results showing that education related house moves frequently occur in the pre-school years and that parents are prepared to pay significant sums of money to buy a house located near to better performing primary schools, even before their children reach school starting age. We interpret this as showing that there is evidence of a strong demand for school quality in the early years as parents (especially more educated and well-to-do parents) ‘gear up’ their quest for what they perceive to be better schooling for their children before they start school.

Keywords: House moves; House prices; School quality.

JEL Classifications: C21; I20, H75; R21.

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1. Introduction

 Clear evidence that school quality matters comes from the literature on parental willingness to pay for what they perceive to be higher quality schooling. A by now large literature reaches this conclusion by estimating hedonic price equations relating house prices to observable measures of school quality (see Gibbons and Machin, 2008, or Black and Machin, 2010, for up to date surveys of this literature). A lot of the research in this area finds that school quality is capitalized into significantly higher housing valuations in many different settings across the world.

 In this literature on housing valuations, it is typical to correlate house prices with measures of school quality whilst children are at school. One key issue, that remains completely unexplored to date, is the extent to which the often sizable empirical connections between house prices and school performance could arise from the strategic behaviour of parents moving house into locations where they perceive there to be superior school performance. Highly pertinent to this is the question of whether parents try to move house before their children start their school careers. Existing work has not been able to say much about these important questions, since it is rare to have a data source connecting housing transactions to schools that can be matched to data on the demographic make up of households with children in their early years.

 In this paper, we are able to offer the first evidence on this issue using rich data from the Millennium Cohort Study (MCS), a cohort of around 19,000 children born in the UK at the start of the 2000s. The data contain information on whether parents move house for education related reasons in the pre-school years. We are also able to link house prices to measures of school quality for a sample of young children and their families in the UK. We can therefore address the question of whether parents move house in the pre-school years to get their children into better performing primary schools both by analysing survey data on actual house moves, and on reasons for moving, together with looking at house price transaction data matched to measures of local school quality.

We present results showing that education related house moves do in fact frequently occur in the pre-school years. We also report evidence showing that parents are prepared to pay significant sums of money to buy a house located near to a better performing primary school, even before their children reach school starting age. We interpret this as compelling evidence for the hypothesis of strong demand for school quality in the early years as parents (especially more educated and well-to-do parents) ‘gear up’ their quest for what they perceive to be better schooling for their children before they actually start school.

These are potentially important findings for those who assert that early age outcomes matter strongly for later life as education in the early years are a key predictor of later economic and social success (see, *inter alia*, Blau and Currie, 2006, or Heckman and Masterov, 2007). They also provide some evidence on a mechanism that can explain why children start school with significant differences in measured academic ability (Goodman et al, 2009). The sorting of better resourced parents of school age children into areas with better performing schools in the pre-school years are very likely to be a key determinant of academic surpluses and deficits that different children face at the beginning of their school careers.

The rest of the paper is structured as follows. In Section II we present evidence on the extent to which moving house occurs for families with young children, placing a particular emphasis on documenting the extent to which people move for education related reasons and identifying the characteristics of children and families who are more likely to do so. Section III presents a more formal statistical analysis reporting estimates of equations relating house prices to measures of school performance and other possible aspects of parental demand for schooling. Section IV concludes.

II. Moving House in the Pre-School Years

The first analysis we report upon is based on survey evidence on reasons for house moves drawn from the UK Millennium Cohort Study (MCS). The MCS is a longitudinal survey of around 19,000 children born in the UK over a 12-month period from 2000 to 2001 and living in selected UK wards. The first survey (MCS1) took place when the children were around nine months old. Follow up interviews took place when the children were three (MCS2) and five (MCS3) years old.[[1]](#footnote-1)

*MCS Data on Moving House*

 Information on moving house is captured in the MCS in two ways. Firstly, parents of MCS cohort members were asked whether they moved house between sweeps of the MCS. In addition, we can also work out house moves from postcode changes across sweeps. Both of these show a strong, although not perfect, correspondence.[[2]](#footnote-2) As such, we look at both in our empirical analysis. Reassuringly the messages that emerge about the determinants of house moves – and the reasons for them – are extremely consistent for both mobility measures.

 The residential moves we can define are respectively between survey sweep 1 (MCS1) and sweep 2 (MCS2), and between sweep 2 (MCS2) and sweep 3 (MCS3). The three sweeps of the surveys took place at child ages 9 months, 3 years and 5 years. Given the slight difference in time elapsed between survey sweeps Table 1 shows annualised moving rates between the sweep 1-2 and sweep 2-3 periods. Since – as we discuss in more detail below – our principal focus is on moves for education-related reasons we not only look at the full sample of MCS families, but also focus upon those families where the cohort member is the oldest sibling. The reason for doing so is obvious, namely that house moves for education-related reasons may well have already occurred if there are older siblings in the family.

 Table 1 shows high levels of residential mobility for the MCS cohort. The annualised rate of mobility is 13 percent for all MCS households between sweeps 1 and 2 and 8 percent between sweeps 2 and 3. For the MCS households where the cohort member is the oldest child comparable percentages are 17 and 9 percent respectively.

*Moving House Across the Life Cycle*

 Before looking in detail at reasons for moving, it is necessary to acknowledge that the MCS is a particular cohort of children and parents. In the period we study, the MCS children are young and it is well known that residential mobility is higher amongst families with small children. This is corroborated by Figure 1, which shows mobility rates for different types of households in the British Household Panel Study (BHPS).[[3]](#footnote-3) The Figure (taken from Buck, 2000) shows around 15 percent of families with a child under 5 move compared to less than 10 percent of families with children aged between 5 and 15.

*Reasons For Moving House in the MCS*

 One very nice feature of the MCS is that it contains detailed information on the reasons for moving house. Importantly from our perspective (and this is not the case in many other surveys which contain data on residential moves) one of the possible responses parents can give for moving house is for ‘Children’s education’.

 Table 2 summarises reasons given for moving, for the full sample of movers and for those where the cohort member is the oldest child. Given our focus on families with small children, it is not surprising that the most popular reason given for moving is ‘larger or better home’. Around half of movers state this for both samples in both sweep 1-2 and 2-3 situations. In sweep 1-2 moving for ‘Children’s education’ is the third highest reason (at 11 percent for the full sample and slightly higher at 13 percent for the oldest child sample). In the sweep 2-3 comparison it is the second most popular reason and is cited more frequently, presumably as children get closer to school starting age, at 18 percent for all movers and 20 percent for movers where the cohort member is the oldest child.

 The survey evidence on MCS children thus reveals that quite a sizable number of parents say they move house for education related reasons before their children start school. One natural question that follows is whether the characteristics of people moving for education related reasons are any different from house movers in general and we turn to this next.

*Empirical Models of Moving House*

There is a large micro-data based literature that studies what kinds of people are more likely to move house (see Boheim and Taylor, 2002; Hughes et al., 2007; Boyle et al., 2008; Ketende and MacDonald, 2008). A lot of this estimates descriptive empirical models in an attempt to ascertain the types of people have higher moving probabilities. We also begin in this vein, first to document the characteristics of MCS families who move house for any reason, then studying whether one can see differences between those who move for education-related reasons relative to moving for other reasons.

The probability of moving house for family i can be modelled by means of a simple probit of the form:

|  |  |
| --- | --- |
|  | (1) |

where the binary dependent variable M equals 1 for those who move and 0 for those who do not, Φ(.) denotes the standard normal distribution function, the elements of the X vector are the characteristics of MCS families we study and u is an error term. The X’s we look at here are as follows: gender of child, mother’s age, education and ethnicity, lone parent status, household income and housing tenure.

 Once we have established a set of characteristics of house movers we are then interested in whether these differ between parents moving for education-related reasons and those who move for other reasons. To study this we estimate a conditional probit model of the probability of moving for education related reasons conditional upon moving as follows:

|  |  |
| --- | --- |
|  | (2) |

where E is a binary variable equal to 1 for families moving for education-related reasons and 0 otherwise.

 Table 3 shows marginal effects (and associated standard errors) from probit models of moving house (equation (1)) for the sweep 1-2 and 2-3 time periods. Three specifications are reported for each, with survey and postcode based mobility measures for the full MCS samples and, because these are so similar, just the survey based mobility measure for the oldest child samples. From these descriptive statistical models, one can identify a number of important characteristics of MCS families who have higher probabilities of moving house.

 It is evident across all the specifications in the Table that:

- MCS children with older parents are less likely to move;

- higher income families are more mobile;

- parents with higher educational qualifications are more likely to move;

- families in social housing or rented properties are more likely to move.

 This somewhat heterogeneous set of findings (i.e. individuals with higher and lower economic status characteristics) is in line with other work on the characteristics of people who are more residentially mobile. From our perspective, it is not these results that interest us *per se*, but whether the types of MCS families who move for education-related reasons are similar or different to other movers.

We turn our attention to this in Table 4 which shows the marginal effects from the conditional probability models described in equation (2) above. The results do indeed show that the characteristics of people who move house for education-related reasons relative to other reasons are different. It is very clearly the higher economic status families who are more likely to move for education-related reasons. Indeed, the estimates in the Table show significantly higher probabilities of moving for education related purposes for younger parents, those with more income and higher educational qualifications. Lone parents and those in social housing are significantly less likely to move for education-related reasons, confirming that economic status is a very strong determinant of moving house for education.

*Focussing on Test Scores of Children*

 Given the finding that parents with higher levels of economic status are significantly more likely to move house for education-related reasons it is also interesting to look at whether children of different abilities are more likely to be in households that move for this reason. We can study this because the MCS tests children in their pre-school years.

 At age 3, the MCS contain two cognitive tests that measure slightly different aspects of ability. The first test is the British Ability Scale (BAS), which is a naming vocabulary test where children are asked to identify a range of items. This test assesses the expressive language ability of children. The test is individually administered and asks the child to name a series of pictures of everyday items. The second outcome measure is the School Readiness Composite, which is comprised of six subtests of the Revised Bracken Basic Concept Scale. It measures children’s knowledge of those ‘readiness’ concepts that parents and teachers traditionally teach children in preparation for formal education (Bracken, 1998). The test has been designed for children aged between two years six months and seven years eleven months. The six subtests that make up the assessment are used to test children’s basic concepts of colours, letters, numbers/counting, sizes, comparisons and shapes.

In addition to the cognitive tests, the MCS measures the behavioural development of the children using the Strength and Difficulties Questionnaire (SDQ). The SDQ is a behavioural screening questionnaire for three- to 16-year-olds (Goodman, 1997, 2001; Goodman *et al.*, 1998). It consists of 25 items that generate scores for subscales measuring: conduct problems, hyperactivity, emotional symptoms, peer problems and pro-social behaviour. The items are assessed via parental report, normally by the mother, in the computer-assisted self-completion module of the questionnaire.

 We add these tests to equation (2) to consider whether children with higher test scores are more likely to move for education-related reasons. The results are reported in Table 5. The hypothesis of increased mobility for education for higher test score children is confirmed in two sets of models, namely those that do and do not condition upon the X variables from the earlier models. Children with higher cognitive test scores (there is no significant relation with the behavioural tests) are indeed more likely to move for education-related reasons in their pre-school years.

 The findings of this Section confirm there to be a significant early years demand for education from parents who wish to move house for education-related reasons, and that this is a phenomenon that occurs quite widely for families with pre-school children. Moreover, it is young children from more well-to-do families that are significantly more likely to move house for education-related reasons and the children themselves are higher achievers in tests administered to them in their pre-school years.

III. House Prices and School Performance Before School Starting Age

 Our second piece of empirical research attempts to uncover evidence of a significant demand for education from parents with young pre-school children. In this section we report finding which show parental willingness to pay for education derived from hedonic pricing models applied to the housing market (see Shepperd, 1999, for a review of these methods).

*Linking Land Registry Data to the MCS*

 Whilst we see house moves in the MCS data, we do not observe the monetary values of houses. However, we do have detailed postcode data and so have matched Land Registry house price data (covering all house price transactions that occur in the UK) to these MCS postcodes. Given there are around thirty housing units per household and we know the date of the transaction in the Land Registry data we are confident that we match the actual transactions to the MCS address.

One significant issue that arises is that the coverage of postcodes in the MCS is a very small proportion of all postcodes. This is, first and foremost, because of the ward-based sampling in MCS (where 376 wards out of around 10,700 UK wards formed the sampling frame). Second, we need to focus on England since school performance data is only available to match to the housing transactions data. We thus end up in 2005 with matched transactions/moves in only 3 percent of the total population of postcodes in the Land Registry data. This evidently raises issues of representativeness (or otherwise) of the postcodes with house moves contained in the MCS.

We therefore examine whether the MCS postcodes are a representative sample of postcodes. We do so by studying whether prices and characteristics of houses are different for MCS postcodes compared to others. The way in which we do this is to estimate a log(price) equation relating price to a dummy variable indicating whether or not the transaction occurs in an MCS postcode (or not) and to house characteristics (Z). For transaction i in postcode j in town t this equation can be represented as:

|  |  |
| --- | --- |
|  | (3) |

where ε is an error term. Estimates of θ show whether or not the prices of homes in MCS postcodes are different to those in other non-MCS postcodes and in the reported estimates we consider specifications that respectively include and exclude the Z-vector and that include and exclude a full set of town dummies (around 15,200) to control for disaggregated spatial variations.

 Estimates of θ from the various different specifications of equation (3) are given in Table 6. Their pattern is reassuring for issues to do with the possible systematic selection of MCS postcodes. In fact the estimates show there to be no significant differences in house prices for sales in the postcodes contained in MCS as compared to the much larger sample of postcodes that are not.

*Estimated House Price Equations*

 Given the findings on representativeness in Table 6, we now move on to the MCS linked sample of house prices and survey data to explore the extent to which parents value school quality in terms of their house move behaviour whilst children are of pre-school age. We do so by estimating hedonic valuations of willingness to pay from house price equations for MCS cohort member i in postcode j in time period t of the form:

|  |  |
| --- | --- |
|  | (4) |

where S is a (lagged) measure of primary school quality (of which we consider several – see the discussion below), Z is a set of house characteristics, X is characteristics of the cohort member and their family, f denotes a postcode specific fixed effects and υ is an error term.

 In the literature (began by the seminal work of Rosen, 1974) equations like (4) have been used to infer the implicit price (and therefore the willingness to pay, or household demand) for particular amenities. The one we wish to focus upon is school quality so that, from an empirical perspective, the critical feature of accurately determining π, the implicit price of school quality, is that we are able to isolate the sources of spatial variation in the supply of this particular amenity that is uncorrelated with other determinants of housing prices. This is not necessarily an easy task and the literature has moved in various directions to try to more accurately pin down the implicit price of school quality.

 We are able to take a different approach to most work in the area owing to the fact that, subject to accurate matching, we have detailed survey data on the children and families living in the houses that were bought and sold. All other existing studies, to our knowledge, do not have such rich data and therefore sometimes have to resort to quite complex statistical modelling strategies.[[4]](#footnote-4) Using the MCS data we are able to condition out a large number of observables that may be correlated with school quality and other amenities that affect house prices. We are also able to control for detailed spatial fixed effects as we have multiple transactions within postcodes. Thus, the estimates we report condition on a large number of household, child and family characteristics and, in the more detailed models with postcode fixed effects do so, within postcodes where one would think housing characteristics are reasonably homogenous.

*Basic Empirical Models of House Prices and Primary School Performance*

 We begin with the kind of house price equation which has by now become quite common in the literature (see Gibbons and Machin, 2008 or Black and Machin, 2010). This simply models S as the average end of primary school test score performance for schools. In the context of England we use the 'headline' primary school statistic, the percentage of children achieving level 4 or higher in their key stage 2 exams.[[5]](#footnote-5)

 Table 7 shows estimates of π, the sensitivity of house prices to local school performance, from these models. The reported coefficient on key stage 2 performance (KS2) can be interpreted as the impact of a standard deviation increase in KS2 on log house prices. Column (1) of the upper panel of the Table shows there to be a sizable impact in terms of raw correlations, of the order of .24 of a standard deviation. Once controls and/or postcode fixed effects are included this falls, but remains strongly significant, at .06 of a standard deviation in the most stringent model reported in column (4) of the upper panel. This magnitude is very much in line with the 'consensus' estimates in the broader literature (see Gibbons and Machin, 2008, or Black and Machin, 2010).

 In the house price-school quality literature quite a lot of attention has been placed upon the consequence of possible measurement errors in the school quality variables entered as independent variables. Frequently researchers average measures over several periods in an attempt to ameliorate problems of attenuation bias owing to such measurement errors. We take this approach in the lower panel of the Table. In most of the models the estimated coefficients do rise a little, though not by that much, once two year averages (for 2003 and 2004) are entered in place of the single period (2004) measure. For the detailed model including the full set of controls and postcode fixed effects (specification (8)) the estimate actually falls a little, to .053, but remains statistically significant and is very similar in magnitude to the estimate of .060 from the single period measure (specification (4)).

 Our results support other work on valuing English primary schools. However, they highlight that such house price-school quality connections exist even in the pre-school years. Findings indicate parents are willing to pay quite sizable amounts to move into a house in the catchment are of a primary school with superior key stage 2 performance before their children reach school age.

*Which Aspects of School Performance Matter More?*

 There are exceptions (like Brasington and Haurin, 2006, and Gibbons, Machin and Silva, 2008) but not much work in this area considers different measures of school quality. This is evidently not because authors do not want to do so, but they are often constrained by data limitations. However, this may be a concern especially since inferring school quality house price premia from end of school levels of performance is not what the school effectiveness literature (see, *inter alia*, Mortimore, 1991 or Teddlie and Reynolds, 1999), nor the literature on how to best measure school outputs (see Todd and Wolpin, 2003, or Leckie and Goldstein, 2009), would argue best measures what a school does to children’s education. In fact, many would argue that what parents want to do is get the best value added for their children during their school years (i.e. the best improvement relative to the level of child achievement at school entry).

 In Table 8 we therefore measure school quality by value added in the primary school years.[[6]](#footnote-6) As with the level of key stage 2 there is a positive house price premium associated with higher value added. However, in the most stringent specifications the effects are only borderline significant and are smaller in terms of magnitudes at just over .02 of a standard deviation.

 In Table 9 we enter both school quality variables and it turns out that the premium associated with key stage 2 is empirically more important than the premium associated with value added. Indeed, in the most stringent models only the key stage 2 coefficient is statistically significant. Thus, despite the common sense notion that value added is what parents are most likely to pay for, our results suggest the headline (much higher profile) key stage 2 end of school level of performance is valued by more in the housing market.

IV. Concluding Remarks

In this paper we study the demand for better school quality amongst parents with young children. Our analysis is based on two sets of empirical analysis, the first studying house moves amongst families with young children in the UK in the early 2000s, and the second studying house price premia associated with school quality for this cohort of young children before they enter school.

Our approach contrasts with that taken by most of the literature on valuing school quality in at least two important ways. First, we look at house moves and the relation between house prices and school quality before children enter school. To our knowledge this has not been done in the literature before, even though many people take very seriously the notion that parents (especially more educated and well-to-do parents) do in fact ‘gear up’ their quest for what they perceive to be better schooling for their children when their children are at an early age. Second, we use survey data where we have rich information (that is lacking in almost all hedonic valuations of school quality) on children and their parents, together with detailed housing attribute data. Again, we are not aware of existing work that is able to implement this approach and thus the fact that our reported results display similarities with the research based on very different data is both reassuring and encouraging.

We present results showing that education related house moves do occur in the pre-school years and that parents are prepared to pay significant sums of money to buy a house located near to better performing primary schools before their children reach school starting age. We interpret this as compelling evidence for the hypothesis of strong demand for school quality in the early years. Indeed, it confirms that the phenomenon of 'selection by mortgage' is a very real one, even for families with early years children and this strategic motive for influencing school choice begins even before they actually start school. Finally, these findings matter as they identify a source of the inequality of academic abilities seen amongst children as they start school since children with higher pre-school cognitive abilities are more likely to move house - and their parents more willing to pay more to do so - in the pre-school years.

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**Figure 1. Moving House at Different Stages of the Life Cycle,**

**British Household Panel Survey (from Buck, 2000)**



**Table 1. Proportions in Millennium Cohort Study Moving House,**

**Sweeps 1-2, 2-3**

|  |  |
| --- | --- |
|  | All Cohort Members |
|  | Sweeps 1-2 (2000-2003) | Sweeps 2-3 (2003-2005) |
| Proportion moving house | .30 | .16 |
| Annualised proportion | .13 | .08 |
| Number of households | 14841 | 15438 |
|  | Cohort Member has no Older Siblings |
|  | Sweeps 1-2 (2000-2003) | Sweeps 2-3 (2003-2005) |
| Proportion moving house | .38 | .19 |
| Annualised proportion | .17 | .09 |
| Number of households | 6194 | 6253 |

Notes: Source – Millennium Cohort Study, Sweeps 1-3.

**Table 2. Reasons Given for Moving House in the Millennium Cohort Study,
Sweeps 1-2, 2-3**

|  |  |  |
| --- | --- | --- |
|  | Sweeps 1-2 (2000-2003) | Sweeps 2-3 (2003-2005) |
|  | All | No Older Sibling | All | No Older Sibling |
| Wanted to buy | .05 | .07 | .08 | .09 |
| Larger or better home | .48 | .54 | .52 | .52 |
| Work | .08 | .10 | .11 | .11 |
| Money problems | .03 | .03 | .06 | .05 |
| Relationship | .08 | .08 | .13 | .12 |
| Better area | .20 | .23 | .23 | .24 |
| Children’s education | .11 | .13 | .18 | .20 |

Notes: Source – Millennium Cohort Study, Sweeps 1-3.

**Table 3. Descriptive Statistical Models of the Probability of Moving House: Pr[Moving House]**

|  |  |  |
| --- | --- | --- |
|  | Sweep 1-2 | Sweep 2-3 |
| (t-1) dated independent variables | All, Survey | All, Postcode | No Older Sibling, Survey | All, Survey | All, Postcode | No Older Sibling, Survey |
| Age | -.014 (.001) | -.014 (.001) | -.014(.002) | -.030(.004) | -.010(.001) | -.006 (.001) |
| Teenage mother | -.003 (.021) | .000 (.022) | -.021 (.028) | .061 (.065) | .012 (.018) | .025 (.023) |
| Log(income) | .023 (.009) | .024 (.009) | .018 (.014) | .011 (.006) | .019 (.008) | .016 (.009) |
| Lone parent | .028 (.016) | .024 (.016) | .028 (.026) | .063 (.051) | .024 (.015) | .018 (.019) |
| 5 A\*-C GCSEs | .024 (.014) | .031 (.014) | -.027 (.025) | .015 (.012) | .006 (.014) | .020 (.020) |
| A-levels | .020 (.017) | .032 (.018) | -.023 (.028) | .005 (.013) | .000 (.015) | .011 (.024) |
| Degree + | .046 (.016) | .061 (.016) | .020 (.027) | .023 (.011) | .036 (.014) | .022 (.020) |
| Social housing | .062 (.016) | .066 (.017) | .063 (.029) | .034 (.014) | .037 (.016) | .031 (.023) |
| Private rental | .307 (.020) | .316 (.020) | .319 (.028) | .217 (.024) | .267 (.025) | .239 (.034) |
| Live with parents | .297 (.028) | .299 (.026) | .270 (.035) | .177 (.041) | .217 (.043) | .217 (.053) |
| Controls for gender, ethnicity, region | Yes | Yes | Yes | Yes | Yes | Yes |
| Sample size | 14818 | 15085 | 6185 | 14837 | 14837 | 6242 |

Notes: Marginal effects with associated standard errors in parentheses from probit models.

**Table 4. Conditional Models of the Probability of Moving House for Children’s Education in the Millennium Cohort Study Moving**

|  |  |  |
| --- | --- | --- |
|  | Sweep 1-2 | Sweep 2-3 |
| (t-1) dated independent variables | All, Survey | All, Postcode | No Older Sibling, Survey | All, Survey | All, Postcode | No Older Sibling, Survey |
| Age | .002 (.001) | .002 (.001) | .004(.002) | .003(.002) | .003(.001) | .007 (.003) |
| Teenage mother | -.012 (.023) | -.014 (.020) | -.009 (.025) | -.044 (.030) | -.026 (.022) | -.073 (.034) |
| Log(income) | .015(.010) | .014 (.009) | -.006 (.013) | .030 (.014) | .022 (.010) | .014 (.020) |
| Lone parent | -.054 (.014) | -.048 (.013) | -.043 (.016) | -.030 (.033) | -.030 (.023) | -.052 (.035) |
| 5 A\*-C GCSEs | .049(.020) | .045 (.019) | .018 (.028) | .016 (.029) | .021 (.021) | -.047 (.038) |
| A-levels | .072 (.028) | .066 (.026) | .045 (.036) | .064 (.035) | .050 (.027) | .006 (.044) |
| Degree + | .076 (.021) | .067 (.020) | .037 (.028) | .081 (.030) | .054 (.021) | .023 (.045) |
| Social housing | -.045 (.015) | -.042 (.014) | -.077 (.015) | -.075 (.025) | -.049 (.019) | -.047 (.040) |
| Private rental | -.047 (.013) | -.041 (.013) | -.084 (.012) | -.000 (.034) | .008 (.025) | -.003 (.041) |
| Live with parents | -.035 (.021) | -.031 (.020) | -.062 (.020) | -.028 (.057) | .002 (.049) | -.007 (.070) |
| Controls for gender, ethnicity, region | Yes | Yes | Yes | Yes | Yes | Yes |
| Sample size | 4473 | 4968 | 2335 | 2389 | 3431 | 1222 |

Notes: Marginal effects with associated standard errors in parentheses from conditional probit models.

**Table 5. Test Score Differences in the Probability of Moving House for Children’s Education in the Millennium Cohort Study**

|  |  |
| --- | --- |
|  | Pr[move for child’s education|moving house between sweeps], Sweeps 2-3 |
|  | All | No Older Sibling |
| British Ability Scale | .065 (.016) | .069 (.016) | .078 (.024) | .082 (.025) |
| Bracken School Readiness | .018 (.017) | -.002 (.015) | .023 (.021) | -.016 (.022) |
| SDQ Problem Behaviour | -.013 (.011) | .004 (.012) | -.020 (.019) | .002 (.019) |
| Other Variables in Table 4 Controlled For | No | Yes | No | Yes |
| Sample size | 1587 | 1507 | 784 | 781 |

Notes: As for Table 4.

**Table 6. House Price Differences Between MCS Matched Postcodes and Postcodes in The Land Registry Population of Transactions in 2005**

|  |  |
| --- | --- |
|  | Log(House Price) Equations |
|  | (1) | (2) | (3) | (4) |
|  |  |  |  |  |
| MCS Postcodes | .010 (.015) | .009 (.024) | .026 (.021) | -.003 (.013) |
|  |  |  |  |  |
| Month Dummies | No | Yes | Yes | Yes |
| Controls for House Type | No | No | Yes | Yes |
| Town Fixed Effects | No | No | No | Yes |
|  |  |  |  |  |
| Number of Transactions | 1010052 | 1010052 | 1010052 | 1010052 |
| Number of Posctodes | 508929 | 508929 | 508929 | 508929 |
|  |  |  |  |  |

Notes: Standard errors (clustered on postcode) in parentheses. The house type controls are: whether detached, flat or semi (relative to terrace); whether freehold; whether new build. 15242 town dummies are included in column (4).

**Table 7. House Prices and School Performance**

|  |  |
| --- | --- |
|  | Log(House Price) Equations, MCS 3 (2005), Performance Measured by Key Stage 2 (KS2) |
|  | (1) | (2) | (3) | (4) |
|  | No controls | (1) plus individual, house and area characteristics | (1) plus postcode sector fixed effects | (2) plus postcode sector fixed effects |
| KS2, 2004 | .240 (.012) | .154 (.012) | .091 (.020) | .060 (.018) |
| R-Squared | .18 | .38 | .75 | .81 |
| Sample Size | 1888 | 1885 | 1888 | 1885 |
|  | (5) | (6) | (7) | (8) |
|  | No controls | (5) plus individual, house and area characteristics | (5) plus postcode sector fixed effects | (6) plus postcode sector fixed effects |
| KS2, Averaged (2003, 2004) | .254 (.011) | .171 (.012) | .093 (.020) | .053 (.018) |
| R-Squared | .21 | .40 | .75 | .81 |
| Sample Size | 1864 | 1861 | 1864 | 1861 |

Notes: Standard errors clustered on postcode in parentheses.

**Table 8. House Prices and School Performance Using Value Added Measures**

|  |  |
| --- | --- |
|  | Log(House Price) Equations, MCS 3 (2005), Performance Measured by Key Stage1 to 2 Value Added (VA) |
|  | (1) | (2) | (3) | (4) |
|  | No controls | (1) plus individual, house and area characteristics | (1) plus postcode sector fixed effects | (2) plus postcode sector fixed effects |
| VA, 2004 | .115 (.013) | .085 (.011) | .017 (.019) | .021 (.018) |
| R-Squared | .04 | .34 | .75 | .81 |
| Sample Size | 1888 | 1885 | 1888 | 1885 |
|  | (5) | (6) | (7) | (8) |
|  | No controls | (5) plus individual, house and area characteristics | (5) plus postcode sector fixed effects | (6) plus postcode sector fixed effects |
| VA, Averaged (2003, 2004) | .125 (.013) | .088 (.011) | .031 (.018) | .023 (.017) |
| R-Squared | .05 | .35 | .75 | .81 |
| Sample Size | 1868 | 1865 | 1868 | 1865 |

Notes: Standard errors clustered on postcode in parentheses.

**Table 9. House Prices and School Performance Using Key Stage 2 and Value Added Measures**

|  |  |
| --- | --- |
|  | Log(House Price) Equations, MCS 3 (2005), Performance Measured by Key Stage 2 (KS2) and Key Stage1 to 2 Value Added (VA) |
|  | (1) | (2) | (3) | (4) |
|  | No controls | (1) plus individual, house and area characteristics | (1) plus postcode sector fixed effects | (2) plus postcode sector fixed effects |
| KS2, 2004 | .273 (.015) | .161 (.015) | .125 (.025) | .072 (.023) |
| VA, 2004 | -.056 (.015) | -.010 (.014) | -.047 (.021) | -.016 (.019) |
| R-Squared | .18 | .38 | .75 | .81 |
| Sample Size | 1888 | 1885 | 1888 | 1885 |
|  | (5) | (6) | (7) | (8) |
|  | No controls | (5) plus individual, house and area characteristics | (5) plus postcode sector fixed effects | (6) plus postcode sector fixed effects |
| KS2, Averaged (2003, 2004) | .283 (.014) | .181 (.015) | .119 (.026) | .060 (.023) |
| VA, Averaged (2003, 2004) | -.051 (.015) | -.014 (.014) | -.034 (.021) | -.009 (.019) |
| R-Squared | .21 | .40 | .75 | .81 |
| Sample Size | 1864 | 1861 | 1864 | 1861 |

Notes: Standard errors clustered on postcode in parentheses.

1. For more information on this survey, see Hansen (2006). [↑](#footnote-ref-1)
2. Descriptive statistics on this are available on request from the authors. [↑](#footnote-ref-2)
3. The BHPS is a panel survey that began in 1991 with around 10,300 individuals in 5,500 households in Great Britain. A further 1,500 households in Scotland and Wales were added to the sample and in 2001 2,000 households in Northern Ireland were added. [↑](#footnote-ref-3)
4. Black and Machin's (2010) review article documents the evolution of methods used in empirical work in this area over time. Early work tended to run regressions controlling for whatever characteristics of houses and local amenities were available in the data, whereas more recent work has become increasingly sophisticated in its attempts to separate out the part of housing expenditures accounted for by better local school quality from other observable and unobservable drivers of local housing values. Some of this work exploits discontinuities generated by school admissions rules (the classic initial papers being Bogart and Cromwell, 1997, and Black, 1999) and other influential work takes a more structural modelling approach more grounded in the hedonic pricing literature (for example, Bayer, Ferreira and McMillan, 2007). [↑](#footnote-ref-4)
5. Key stage 2 exams are nationally set and marked exams taken by children in year 6, the final year of primary school, when they are aged 10/11. [↑](#footnote-ref-5)
6. To be precise it is measured as the improvement in the four school years between key stage 1 (the exams taken at age 6/7 in year 2) and key stage 2. [↑](#footnote-ref-6)