The Mobility of English School Children

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Executive Summary

Pupil mobility has become a key issue in recent British policy debates in education. The government is paying more attention to issues surrounding the extent and patterns of pupil mobility because of its potential impact on pupils' academic attainment, on their future contribution to society, on the schools they belong to, and the implications for the evaluation of school performance. However, despite this increasing emphasis, empirical analysis on the determinants of pupil mobility has been thin on the ground, especially in the UK context. This is particularly true at the national level, as most of the existing research focuses on pupils in specific LEAs or considers specific birth cohorts of children.

In this study we offer an empirical analysis of the extent of and patterns in pupil mobility for all state school children in England. We exploit a large administrative longitudinal data source - the Pupil Level Annual School Census (PLASC) - for two academic years, 2001/2002 and 2002/2003. These data offer significant advantages because of their coverage of all state school pupils in every year of compulsory schooling. We measure pupil mobility on the basis of whether there is a change in the school that a pupil attends between two academic years. Another advantage of PLASC is that we are able, for the first time, to look at mobility patterns not only in terms of schooling, but also look at simultaneous changes in home residence.

Our results show that 4.4 percent, or around a quarter of a million, of pupils make non-compulsory moves in the period of study. Our key findings are that: pupils from lower social background are more likely to switch schools than other pupils, and this is true for pupils at all stages of schooling; pupils who change schools are more likely to have a low previous academic attainment record than pupils who do not change schools; pupils placed in schools with high Key Stage performance levels move less than pupils from lower performance schools; pupils who move school and home simultaneously are typically more socially disadvantaged than otherwise; pupil mobility is more marked in London than in other regions of the country; and children who move are more likely to

enter a school with better Key Stage performance than the one they left, although this improvement is significantly more marked for children from better off background.

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1. Introduction

Despite the extent of pupil mobility being discussed in many quarters, it is something we know remarkably little about. This seems very surprising since moving school is often identified as an important potential influence on the educational achievement of pupils and their progression through the school years. Of course, the reasons for changing schools may be different. Some pupils move schools because their parents change jobs, divorce, or because they migrated from other regions of the country or other countries. Others may switch because parents change neighbourhood to be closer to a 'better' school for their children, often paying significant house price premia to do so (Gibbons and Machin, 2003, 2006).

Pupil mobility has been prominent in recent British policy debates on education. The government has set up projects to look at issues to do with pupil mobility, because as the then Secretary of State for Education and Skills Charles Clarke emphasised "it is a challenge to which we must rise if we are to have any impact on individual pupils, on the schools they belong to and on their future contribution to society as a whole" (DfES, 2003). Since January 2000 pupil mobility has been absorbed into the school inspections process (see Ofsted, 2000, 2002). There are at least three policy areas of relevance: first, to do with school funding and whether schools with more mobility need to be compensated; second, the policy agenda on child development and whether mobility (and its correlates) poses a problem in this regard; and, thirdly, the possible impact of mobility on academic achievement.

The extent of differential mobility exposure for school children has potentially important implications for the evaluation of school performance. Increasingly Local Education Authorities (LEAs) are attempting to measure local mobility to assess its possible impact. There are concerns that the integration of new pupils can lead to a diversion of teaching resources away from current pupils that may lead to a negative externality arising from mobility. This is why in a recent report the Association of London Government suggested that schools with high mobility rates get extra funding to deal with mobile pupils (BBC News, 27 June 2005).

Despite rising interest in the issue of mobility and its potential to influence school standards, empirical analysis of mobility in the English educational system has been scarce. This is particularly true on a national level, as most existing work focuses on pupils in specific Local Educational Authorities (Strand, 2002; Strand and Demie, 2005) or on specific birth cohorts of children (Ferri, 1976; Blane, 1985). In this study we offer a (predominantly descriptive) analysis of the extent of and patterns in pupil mobility for all state school children

in England. To do so we use administrative data from two academic years of the Pupil-Level Annual School Census (PLASC). This data offers significant advantages in that it covers all state school pupils in every year of compulsory schooling, from which we can calculate school switches. In this paper we do this for the two academic years, 2001/2002 and 2002/2003.

The main findings of our study are:

- Pupils from lower income families are significantly more likely to change schools than other pupils, and this is true for pupils at all levels of schooling.
- Pupils who move schools are more likely to have a lower previous academic achievement record than pupils who stay at the same school.
- Pupils at schools with higher Key Stage performance levels move less than pupils from lower performance schools.
- Pupil mobility is more marked in London than in other regions of the country.
- When children move school, they are more likely to end up in a school with better Key Stage performance than the one they left, but this improvement is significantly more marked for children from better off backgrounds.

The rest of the paper is structured as follows. In Section 2 we discuss existing research related to the subject matter of this paper. In Section 3 we describe the data and discuss some descriptive statistics derived from them. In Section 4 we present some statistical models on pupil mobility. Section 5 concludes.

2. Related Work

The issue of pupil mobility in the UK has attracted researchers' attention for a long time, with research on the issue dating back at least as early as the 1960s (e.g. Douglas, 1964). Yet on a 'big picture' level, we currently know very little about the extent of mobility, how it differs for different ages of children, and how it is affected when we extract compulsory school shifts (such as from primary to secondary school) from the picture. Our aim in this paper is to rectify this imbalance.

Research documenting the extent of pupil mobility, or its links to pupil achievement, is thin on the ground. This is especially true in the UK context. But what does exist can be divided into two main themes, those which look at the determinants of school switching, and

those that try to answer the more difficult question of whether, and if so in what direction, mobility impacts upon pupil achievement.

Research on the extent of pupil mobility and its determinants

Most empirical research looking at the extent of pupil mobility in England relies on descriptive statistics (often compiled by schools or LEAs) that document the incidence of pupil mobility in specific circumstances (e.g. Alston, 2000; Demie, 2002; DfES, 2003; Dobson and Pooley, 2004; Greater London Authority, 2005). This is mainly a consequence of the lack of data at the national level. Since 2000 the Office for Standards in Education (Ofsted) has started to collect school-level data on pupil mobility as part of its inspection process. The government has also started to take a close interest in aspects of pupil mobility. For example, a recent Department for Education and Skills project (DfES, 2003) looked at 51 schools characterised by high levels of pupil mobility to consider how to best tackle problems related to mobility.

One of the few studies examining the nature and causes of pupil mobility in England is Dobson et al's (2000) work on six LEAs. Their analysis isolates several factors associated with pupils switching schools between 1998 and 1999. The key factors they identify are migration (for several reasons including jobs, for reasons of career progression, and among refugee families) and family break-ups. They also stress that mobile pupils are predominantly from low income families. One of their conclusions is to highlight the need for national data to be able to analyse patterns of pupil mobility in a comprehensive manner.

More recently, the Office for Standards in Education (2002) has analysed mobility in 3300 primary schools and 1000 secondary schools that were under their inspection regime between 2000 and 2001. Although this study does not cover all schools in England, it is the first larger scale research on the patterns of pupil mobility. The study reports huge differences between schools in the extent of pupil mobility, ranging from 0 to 80 percent with a median of 11.1 percent in primary schools, and between 0-35 percent in secondary schools with a median of 5.6 percent. In addition, the findings suggest that pupil mobility in secondary schools was twice as high in London (14 percent) than elsewhere, and schools with high mobility levels tended to be those enrolling pupils from lower income families.

Evidence from other countries shows pupil mobility to be an important phenomenon. For example, it appears to be widespread in the United States, both at the elementary and secondary level, and reports suggest that rates of pupil mobility have increased over time

(Plank et al, 1993). A recent study of 2000 US Census data (US Census Bureau, 2001) showed that around 15 to 18 percent of school age children moved in the previous year.

Yet, in the US, there is also only a very limited amount of research that specifically focuses on patterns of pupil mobility. Astone and McLanahan (1994) utilise High School and beyond data to show that students from single parent families are more likely to change schools between fifth and tenth grade and are less likely to complete high school education, as compared to students coming from two parent families. A national study (US General Accounting Office, 1994) reports pupil mobility between first and third grade to be very high at around 40 percent, and even higher among children coming from low income families. Swanson and Schneider (1999) examine the causes of pupil mobility in the National Education Longitudinal Study (NELS) dataset, concluding that school mobility is almost twice as high in the early high school years (grades 8-10) than the late high school years (grade 10-12). Rumberger and Larson (1998) also employ NELS, finding that a quarter of 8th graders changed schools between 1988 and 1992 and, more importantly, both school and residential mobility were higher among students from relatively lower social backgrounds than other students. Moreover, students who changed schools were more likely to be high school drop outs. Factors such as educational expectations, absenteeism, misbehaviour and grades were all found to contribute to student mobility.

Research on pupil mobility and achievement

The second main strand of research concerns itself with whether pupil mobility matters for pupil achievement. This, of course, is a very difficult question to credibly answer since unravelling the direction of causation between mobility and achievement is a huge challenge. Moreover, this difficulty is heightened when one considers that mobility may occur for differing reasons, either in response to parental actions like job loss, divorce or other similar events, or for Tiebout reasons where parents try to get their children into better schools. Hanushek, Kain and Rivkin (2004) carefully discuss these, stating that the moves for the first reason are likely to impact negatively on pupil achievement due to disruption, whilst the second will impact positively on achievement (if parents are successful in their moves).

Studies focusing on the link between pupil mobility and their academic achievement have found mixed results, either reporting a negative correlation between academic achievement and mobility, or no association at all. Strand (2002) persuasively argues that much of the work that simply looks at the correlation between mobility and achievement

without taking into account other factors is highly misleading. Much of this basic correlation work reports a negative association, but it is evident that there are many possible factors that are correlated with both mobility and achievement that need to be controlled for and, if one does control for them, the negative relationship can be driven away. Indeed, this is exactly what happens in Strand (2002) and Strand and Demie (2005). Of course, controlling for these observable characteristics is necessary, but problems of possible reverse causation are potentially even more serious, as there may exist a whole host of unobservables (e.g. to do with pupil motivation, luck, family resources and so on) which further contaminate the relationship. The bias from these could go either way and so we may still worry that, without a better identification strategy than simply conditioning on other correlated variables that the researcher has available for analysis, research may not be picking up the 'true' relation between achievement and mobility.

Aims of this paper

This paper is firmly grounded in the first of these two areas, namely trying to glean a better understanding of patterns of pupil mobility for state school pupils in England. The reason for this focus is, as already stated, the fact that we know very little about pupil mobility patterns despite their importance. The richness of the data means we are able to consider residential moves alongside changes of school through the availability of home postcode information in the dataset. Also, given the large sample sizes available, we can look in detail at school switches across school years. Importantly, we can also separate compulsory and non-compulsory school switches.

3. Data, Definitions and Descriptive Analysis

Data

The Pupil Level Annual Schools Census (PLASC) data source is derived from an electronic administrative form completed by each school in England to cover all enrolled pupils in January of each year. It is collected nationally by the Department for Education and Skills (DfES) through Local Education Authorities (LEAs). The Census covers pupils in nursery, primary, middle and secondary schools in the maintained sector, special schools and specialist

schools such as City Technology Colleges and Academies.[1] The first available year of PLASC covers the academic year 2001-2002. We study mobility between this year and the subsequent academic year, 2002-2003.

The PLASC form provides details on a range of key pupil level statistics. Measures of social background such as eligibility for Free School Meals (FSM), Special Education Needs (SEN) status, gender, ethnicity and mother tongue language are available. Through the inclusion of a unique pupil identifier we can match the datasets for the two academic years to form a balanced panel of 7.7 million pupils in total. This identifier also enables us to combine measures of pupil background characteristics with pupil educational attainment through allowing matching in of Key Stage records for each pupil. More than one Key Stage record may be available for a pupil depending on their age and educational achievement by the time of PLASC data availability, with the maximum match being across three Key Stages (2, 3, and 4).[2]

Additionally, there is an identifier for the school the pupil attends (which we use to match to other school level data) and the home postcode of the pupil. This provides us with the advantage of being able to look at mobility patterns not only in terms of schooling, but also to look at coincident changes in home residence.

Measuring pupil mobility

We measure pupil mobility on the basis of whether there is a change in the school that a pupil attends between the academic years 2001/2002 and 2002/2003.[3] In particular, we can do this by looking at changes in the Register of Educational Establishments (REE) school code for each pupil across the years. The REE dataset is matched to PLASC and can be used to identify school moves that are a result of normal educational transitions, such as when a student changes from primary to secondary school, and other non-compulsory school moves that are not. For many reasons, we are most likely to be interested in these non-compulsory

[1] Submission of the PLASC form "is a statutory requirement on schools under section 537A of The Education Act 1996.....Pupil Referral Units, General Hospital and Independent schools are still required to complete a paper School Level Annual School Census (SLASC)" – see http://www.teachernet.gov.uk/management/asc/).

[2] Specifically we can attain the following matched Key Stage records for some pupils: Key Stage 2 (aged 10/11) = academic year 1996/97 → Key Stage 3 (aged 13/14) = 1999/00 → Key Stage 4 (aged 15/16) = 2001/02; and KS 2 = 1997/98 → KS 3 = 2000/01 → KS 4 = 2002/03.

[3] Note that this transition based measure of mobility is different from the date of school entry measure used in the Department for Education and Skills and OFSTED work on contextualised value added and its links to mobility.

moves and so need to define pupil mobility accordingly.[4] In our initial descriptive analysis we show results for all school moves and for school moves excluding compulsory transitions, but for the majority of our analysis we look at a mobility definition excluding compulsory educational moves.

Measuring residential mobility

We can also look at residential mobility since PLASC contains home postcodes. Of course, residential moves may occur for a range of different reasons, some of which relate to schools (like parents trying to move closer to 'better' schools), and some of which do not (like occupational mobility or changes in family circumstances). More frequent moves of residence may also relate to particular family types, such as refugee families and travellers (Dobson et al. 2000). Residential mobility is measured by changes in the residential postcode of each pupil between the two academic years. This measure of mobility is adjusted to take into account Royal Mail postcode changes over the two periods and miscoding errors.[5]

Initial descriptive analysis

Table 1 shows the extent of pupil mobility across school years, derived from the two years of PLASC micro-data. It shows two sets of mobility estimates, the first for all types of school movers and the second for school movers excluding compulsory school shifts (such as from primary to secondary school, see the Appendix).

The Table shows just over 900,000 school children switch schools across the 2001/02 and 2002/03 school years. This is about 16 percent of all children. A large proportion of these are, however, compulsory school moves and just over a quarter of a million, or 4.4 percent, make non-compulsory school moves in the year we analyse.

There are interesting differences across the particular year groups. The rate of pupil mobility is at its highest in Key Stage 1 (when pupils are aged 5/6-6/7). In the Key Stage 1 years 6.4 percent of pupils make non-compulsory moves, as compared to 5.0 percent in Key

[4] See the Appendix for details on these compulsory school shifts and how we identify them.
[5] See the Appendix for adjustments we make to residential mobility due to postcode miscoding errors. Using postcode updates covering the years 2001-2003 reduces our number of perceived relative to actual movements of home from around 915,000 to 907,000. Additional corrections for postcode miscoding errors give us overall residential mobility of almost 770,000 households from 2001/2002 to 2002/2003

Stage 2 (aged 6/7-10/11) and 3.4 percent by Key Stage 3 (aged 10/11-13/14). Mobility is therefore higher in the primary as opposed to secondary schooling years.

In terms of individual year groups the highest movement occurs in school years 1-2, at a peak of 7.3 percent. The fact that the majority of change takes place in the early years of a child's education suggests that parents try to minimise potentially disruptive effects of mobility on education progression by switching schools before the child is fully settled into a particular school and the education system itself.

Table 2 shows regional variations in mobility by government office region. It shows that, across all school year groups, mobility ranges from 4.1 percent in the North West, West Midlands and East of England through to 5.1 percent in London. The regional rankings are similar at the primary and secondary stages though, as already shown in the aggregate, mobility is about twice as high in the primary years.

Our next concern is to look at possible differences in mobility patterns that are associated with particular pupil characteristics. In Table 3 we present statistics on a range of background characteristics of those that move (focusing on non-compulsory school movers only) relative to those that stay in the same school, between each school year. The Table reports the proportion of movers and stayers by year group for five different pupil characteristics.

One striking feature of the Table is that pupil mobility is clearly strongly linked to measures of social disadvantage. This is consistently the case across the year groups. First of all, about 30 percent of those who move are eligible for free school meals, a means-tested form of assistance, as compared to around 17 percent of stayers. The gap is relatively constant across each of the year group transitions. Second, in terms of the gender balance there is again only a small difference to suggest that girls are just as likely to move as boys. Third, special educational needs (SEN) status, at an average of 31 percent across the school years, is higher for movers than non-movers (23 percent). Fourth, those transferring between schools are less likely to have English as their first language (11 percent against 9 percent). Finally, movers are more likely to belong to a minority (non-white) ethnic group, though the difference is quite small in this case (15 percent versus 13 percent).

The final descriptive Table, Table 4, combines pupil movement with movement of home, to determine the extent to which school switches are inextricably linked with changes in residence. Again focussing on non-compulsory school movers, we find that in almost all year groups (except for year 6-7 and year 10-11) more than half of those transferring schools combine this with a change of residence. Occupancy changes also predominantly occur in the

early years of primary schooling, reinforcing the point made earlier that parents perceive moving at this time of a child's life to be less disruptive to their educational development. In school years 1-2 and 2-3 nearly 70 percent of those that switch schools also change dwellings. By contrast, housing movement is much smaller amongst those remaining in the same school across the academic years, at less than 10 percent in all year groups.

4. The Determinants of Pupil Mobility

Approach

To determine which factors influence pupil mobility, we sequentially build up statistical models that we estimate separately for different year group transitions. The starting point is estimation of the following pupil mobility equation that controls only for student level characteristics:

$$S_{ijt} = \alpha_1 + \beta_1 X_{ij,t-1} + \delta_1 KS_{ij,t-k} + \varepsilon_{1ijt} \qquad (1)$$

where *i* indexes individual pupils, *j* indexes the school and *t* indexes time. S_{ijt} is a dummy taking the value of 1 if a pupil switches schools between year *t-1* and year *t*, and 0 otherwise. $X_{ij,t-1}$ represents a set of individual characteristics like gender, free school meal entitlement, special educational needs, ethnicity, and English as a first language. $KS_{ij,t-k}$ incorporates pupils' previous Key Stage results (k is the time since pupils took their last Key Stage examination[6]), expressed in standardised units (i.e. with mean zero and a unit standard deviation), and ε_{ijt} is an error term.

We can consider within-school variations in mobility by amending equation (1) to include a set of school fixed effects, α_j, as follows:

$$S_{ijt} = \alpha_j + \beta_2 X_{ij,t-1} + \delta_2 KS_{ij,t-k} + \varepsilon_{2ijt} \qquad (2)$$

Inclusion of the school-specific α's in equation (2) means we are comparing pupil mobility patterns for children in the same school, thereby netting out unobservable time-invariant characteristics of schools.

[6] This means that for pupils enrolled in KS2, KS1 results are used as a previous attainment; for pupils enrolled in KS3, KS2 results, and so on. The KS scores are standardised so as to endure comparability of the magnitudes of the estimated effects for different Key Stages.

Statistical estimates of mobility equations

The mobility equations are estimated separately for year group transitions so as to allow the influence of the factors associated with pupil mobility to vary across year groups. Table 5 thus reports marginal effects from a set of baseline probit models of mobility. The Table shows three sets of estimates. The first, in the upper panel of the Table (Panel A), enters as independent variables various pupil characteristics (FSM eligibility, gender, SEN status, whether the pupil is non-white and whether English is not the first language of the pupil), plus a set of regional dummies. Panel B additionally includes pupil prior (standardised) test score performance in Key Stage examinations. Panel C includes a full set of school fixed effects, so as to look at within-school variations in mobility.

The estimates in Table 5 show a significant and consistent pattern regarding factors affecting pupil mobility between the 2001/2002 and 2002/2003 academic years. Consider first the results in the upper panel of the Table. In all year group transitions, pupil mobility is consistently positively related to free school meal eligibility (FSM). The marginal effect for the FSM variable clearly shows pupils from lower income families (as proxied by FSM status) to be significantly more likely to move than other pupils. Interestingly, the magnitude of the FSM association is larger for primary school children. For example, conditional on the other variables entered into the mobility equation, a pupil entitled to free school meals is almost 6 percent more likely to move school than a non-eligible pupil in the year 1-2 transition. In the later primary school transitions, this falls a little but remains in the 4 to 5 percent range. On the other hand, in the secondary school transition years the marginal effect remains significant and positive, but smaller in the range of 1-3 percent.

In the statistical models, there is not much evidence of gender differences in mobility, where the marginal effects are very small across year groups. Special Educational Needs pupils are significantly more mobile and this holds across primary and secondary phases of the schooling sequence. Similarly, for the most part non-white pupils have higher mobility rates, especially amongst the primary years. Finally, the results associated with whether English is not the child's first language are rather mixed and change signs across year groups.[7]

[7] For space reasons the estimated marginals on the regional dummies are not reported in the Table. However, the earlier finding in the descriptive statistics (in Table 2) of higher mobility rates in London holds in the statistical models.

Turning to the results in the middle panel of Table 5, there are two main points to note, over and above the discussion on the upper panel estimates. First of all, prior pupil academic attainment matters.[8] The results demonstrate that the higher the pupil's previous attainment, the less likely it is that the pupil will change schools. Since the test scores are standardised one can view the estimates as showing the impact of a one standard deviation increase in Key Stage performance.[9] The results show that previous attainment has a more detrimental impact on mobile pupils in primary school years than in secondary ones. But the finding that pupils with better prior Key Stage performance are significantly less likely to move is always in place. In terms of magnitudes, a pupil with a one standard deviation higher prior achievement has a mobility rate of .6 to 1.3 percentage points lower. When compared to the mean mobility rate of around 4-5 percent this is sizable.

The second finding of note is that inclusion of the prior attainment measures tends to dampen down the estimated connections with FSM eligibility, SEN status and the ethnicity variable. In almost all models, these remain significant determinants of mobility, but the magnitude of their association is weakened since students with these characteristics tend to have lower levels of prior achievement.

The inclusion of school fixed effects, in Panel C of the Table, does not amend the overall pattern of results. Some of the magnitudes are further tempered in these within-school models, but the general pattern of results showing that pupils from poorer backgrounds (as proxied by FSM eligibility), pupils who are classified as Special Educational Needs and pupils with lower prior achievement levels are more likely to switch schools remains intact.

Differences between switchers who do and do not move residence

The previous section showed that pupils who switch schools are significantly more likely to come from less advantaged backgrounds and that they, on average, have lower previous achievement levels than non-switchers. In the earlier discussion, we did stress, however, that students may move for different reasons and, in particular, that children who also move residence at the time of school switching may well have different characteristics to those who stay in the same residence.

[8] The pupil previous performance is transformed from levels into point scores using the DFES scoring system and represents a total score (i.e. it includes pupil scores in maths, reading, and writing in KS1 and English, maths, and science in KS2). It is then standardised to have mean zero and a unit standard deviation to allow comparability across different Key Stages.

[9] We need to standardise the impact of different Key Stage results since, as already noted in footnote 7, we used the DfES points scoring system, which has different scales for the different Key Stages.

To analyse whether pupil characteristics have a different impact on the probability of moving schools and home compared to those that move only school, we therefore estimate equation (1) again by restricting the data to pupils that move schools. The equation we estimate is a probit model of moving house conditional upon school switching. For the school fixed effect specification this is:

$$(H_{ijt} = 1 \mid S_{ijt} = 1) = \alpha_j + \beta_3 X_{ij,t-1} + \delta_3 KS_{ij,t-k} + \varepsilon_{3ijt} \quad (3)$$

where the dependent variable equals 1 when a pupil moves home as well as school and 0 when a pupil only moves school.

Two sets of specifications, that respectively do not (Panel A) and do control for school fixed effects (Panel B) are presented in Table 6. For the most part, they show that pupils who move school and home are more socially disadvantaged than pupils who move school only. However, special educational needs pupils are much more likely to only move school, rather than school and home. This effect is stronger for primary than for secondary school pupils, but constitutes a large negative association in both phases of schooling. The results also show that pupils who move both school and home, as compared to school only, do not differ greatly in their previous academic attainment. The estimated marginal effects for the KS measures are all small and in many cases one cannot reject the null hypothesis of no association with moving house and school relative to only switching school.

Inclusion of school fixed effects (in Panel B) amends some of the magnitudes, mostly attenuating the estimated effects since unobserved school-level attributes both matter for mobility and are correlated with the other independent variables, but the qualitative pattern of results remains.

Do pupils move from better or worse schools?

We are also able to look at whether pupils are more likely to move from better or worse performing schools. To do so we add measures of t-1 dated school achievement to the mobility equations. Adding $\overline{KS}_{ij,t-1}$, the prior performance of the school pupils were in during the 2001/2002 academic year, the estimating equation becomes:

$$S_{ijt} = \alpha_4 + \beta_4 X_{ij,t-1} + \delta_4 KS_{ij,t-k} + \theta_4 \overline{KS}_{ij,t-1} + \varepsilon_{4ijt} \quad (4)$$

Of course, the inclusion of the average school performance measure means we cannot include school fixed effects in this model as there is no within-school variation in this variable (put

alternatively, in this model this is the fixed school characteristics in which we are interested[10]).

The results shown in Table 7 reveal that higher prior school performance makes pupils less likely to move. These findings are consistent for Key Stage 1, Key Stage 2 and Key Stage 3, and are of similar magnitudes (around 1 percentage point lower for a one unit standard deviation higher school KS performance). On the whole, the results are supportive of the notion that children are more likely to move if they are in less well performing schools.

Do pupils move to better or worse schools?

As we argued above, parents may make residential moves to take advantage of better schooling in other areas. If they do make such Tiebout related moves, one would expect that pupils move to better schools. If residential moves are associated with other reasons than schooling of their children, then it is not clear whether children end up in better schools or not. To consider this we have looked at the relative performance of schools that mobile pupils move to relative to those that they leave. The previous sub-section already established that, on average and conditional on observable characteristics, mobile pupils switch from less well performing schools.

Table 8 shows the number of school switchers who move to schools that have higher or lower Key Stage test score performance as compared to the school that they moved from. The Table shows that, on average, movers are more likely to end up in a school with better Key Stage performance than the one that they left. Around 57 percent of school switchers move to a school with better Key Stage results than their previous school. Looking at the sub-groups in the four final columns of the Table, there is also some evidence that FSM eligible children and children who move home as well as school are less likely to end up in a better performing school relative to the school they were in.

Table 9 presents statistical estimates exploring which characteristics matter for whether or not pupils move to better performing schools relative to the one they left. The Table presents probit estimates of whether children move to a better performing school. The results make it evident that the gaps between FSM and non-FSM eligible children reported in the descriptives Table, Table 8, are statistically significant. Similarly SEN children are much less likely to move to a higher achievement school. The same is true for non-white pupils and

[10] Essentially this means that, for this particular model, we have parameterised the school fixed effect as $\alpha_j = \alpha_4 + \theta_4 \overline{KS}_{ij,t-1}$

pupils for whom English is not their first language. With respect to prior achievement, it is also pupils with higher prior achievement who are more likely to go to a better performing school. In terms of average school achievement, unsurprisingly, children in higher achieving schools are less likely to move to a better one.

These results therefore show sharp inequalities in the school moving process. Over half of children end up in better schools than the one they left, but going to a better or worse school is systematically linked to pupil characteristics. More advantaged individuals are much more likely to make the move to a better school than are other children from less well off backgrounds.

5. Conclusions

Pupil mobility is a contentious, and highly policy relevant, issue. In this paper we have set out to establish some basic facts about pupil mobility in England using, for the first time, a national database covering all state school children. The results we report aim to fill this large void and offer findings of relevance both to academic debates and to government policy discussions that look at the extent of and inequality in mobility among English school children.

Our results show mobility to be quite prevalent, with just over a quarter of a million, or around 4.4 percent of pupils, making non-compulsory school moves in the period we study. The findings show that mobile pupils are more socially disadvantaged than non-mobile pupils and are less likely to have a good prior education record. Moreover, we find that pupils are less likely to move if the school they attend has good average performance levels. Children do, on average, move to better schools. There is some evidence that making the move to schools with superior test score performance is more likely to be the case for children from better off families. Whether or not this benefits them individually is an interesting and important research question, but one we leave to future research since it requires more post-switch data than we currently possess at the national level to be able to address this question.

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Table 1 School Movers by Year Group and Key Stage: 2001/02 to 2002/03

Year group	*All School Movers* S=1	*All School Movers* Proportion of year group	*Non-Compulsory School Movers* S=1	*Non-Compulsory School Movers* Proportion of year group	Total year group
1-2	41,285	0.073	41,285	0.073	565,521
2-3	45,048	0.079	31,038	0.054	571,726
KS1 average		*0.076*		*0.064*	
3-4	51,103	0.087	40,011	0.068	584,319
4-5	64,322	0.110	37,421	0.064	584,419
5-6	35,736	0.059	32,980	0.054	608,715
6-7	553,433	0.919	8,889	0.015	601,966
KS2 average		*0.294*		*0.050*	
7-8	35,173	0.059	21,176	0.036	594,928
8-9	50,008	0.085	20,941	0.036	586,776
9-10	25,599	0.043	17,705	0.030	598,442
KS3 average		*0.062*		*0.034*	
10-11	9,061	0.016	9,061	0.016	566,862
Overall	910768	0.155	260507	0.044	5,863764

Notes: All school movers incorporates all pupils who change REE school code over the academic period 2001/2002-2002/2003, regardless of whether the move is a normal transition expected for that year group.
For non-compulsory school moves we exclude compulsory transitions (see the Appendix for details). The remaining non-compulsory movers in year 6 (when the move to secondary school occurs) reflect pupils attending middle school who leave later than year 6.

Table 2 Government Office Region Mobility Ranges Between 2001/02-2002/03

Government Office Regions	Average Pupil Mobility	Average Pupil Mobility, Primary School Years	Average Pupil Mobility, Secondary School Years
North East	0.046	0.063	0.030
North West	0.041	0.064	0.020
Yorkshire	0.046	0.066	0.026
East Midlands	0.050	0.067	0.033
West Midlands	0.041	0.059	0.024
East of England	0.041	0.059	0.024
London	0.051	0.069	0.032
South East	0.042	0.057	0.026
South West	0.045	0.062	0.028

Table 3 Background Statistics of Movers and Stayers by Year Group and Key Stage 2001/2002

	FSM eligibility		Gender = Male		SEN		English not first language		Non-White	
Year group	*Movers*	*Stayers*	*Movers*	*Stayers*	*Movers*	*Stayers*	*Movers*	*Stayers*	*Movers*	*Stayers*
1-2	0.31	0.17	0.52	0.51	0.26	0.19	0.14	0.10	0.18	0.14
2-3	0.31	0.18	0.52	0.51	0.31	0.23	0.13	0.10	0.18	0.13
KS1 average	*0.31*	*0.18*	*0.52*	*0.51*	*0.29*	*0.21*	*0.14*	*0.10*	*0.18*	*0.14*
3-4	0.31	0.18	0.51	0.51	0.33	0.25	0.12	0.10	0.17	0.13
4-5	0.31	0.18	0.51	0.51	0.34	0.26	0.12	0.10	0.16	0.13
5-6	0.31	0.18	0.51	0.51	0.34	0.26	0.11	0.09	0.14	0.12
6-7	-	-	-	-	-	-	-	-	-	-
KS2 average	*0.31*	*0.18*	*0.51*	*0.51*	*0.34*	*0.25*	*0.12*	*0.09*	*0.16*	*0.13*
7-8	0.29	0.17	0.52	0.51	0.31	0.22	0.09	0.08	0.13	0.12
8-9	0.28	0.17	0.50	0.51	0.32	0.22	0.08	0.08	0.13	0.12
9-10	0.28	0.16	0.48	0.51	0.32	0.21	0.08	0.08	0.13	0.12
KS3 average	*0.28*	*0.17*	*0.50*	*0.51*	*0.31*	*0.22*	*0.08*	*0.08*	*0.13*	*0.12*
10-11	0.26	0.15	0.47	0.51	0.28	0.20	0.09	0.09	0.13	0.12

Notes: Background statistics of school movers are based on those moving school other than at compulsory times (see the Appendix; here we do not report background data for the relatively small number of pupils not transferring to secondary school in year 6 (mainly middle school pupils)); FSM=Free School Meals; Non-White=Black/Black British, Caribbean; Black/Black British, African; Black/Black British, any other Black background; Asian/Asian British, Indian; Asian/Asian British, Pakistani; Asian/Asian British, Bangladeshi; Asian/Asian British, any other Asian background; Chinese; SEN=Special Educational Needs, refers to those with or without a statement of SEN. First Language is the language to which the child was initially exposed during early development. If the child was exposed to more than one language and these include English, then English is taken to be their mother tongue.

Table 4 Proportion of School Movers and School Stayers Moving Home by Year Group and Key Stage, 2001/02-2002/03

	School Movers, S=1			*School Stayers, S=0*		
Year Group	*H=1*	*Proportion H=1|S=1*	*Total school movers*	*H=1*	*Proportion H=1|S=0*	*Total school stayers*
1-2	27,387	0.670	40,897	42,411	0.081	521,129
2-3	20,527	0.669	30,681	48,391	0.092	523,511
KS1 average		0.669			0.087	
3-4	25,188	0.636	39,606	40,780	0.077	529,790
4-5	22,948	0.620	37,007	38,989	0.075	516,573
5-6	20,984	0.644	32,577	48,132	0.085	568,928
6-7	2,365	0.269	8,808	3,803	0.079	48,165
KS2 average		0.542			0.079	
7-8	11,706	0.560	20,894	43,390	0.078	555,986
8-9	10,688	0.520	20,555	40,931	0.077	532,774
9-10	9,042	0.525	17,225	43,060	0.076	568,241
KS3 average		0.535			0.077	
10-11	4,274	0.485	8,815	41,452	0.075	552,932

Notes: School movers are based on those moving school other than at compulsory times (see the Appendix). The remaining non-compulsory movers in year 6 (when the move to secondary school occurs) reflect pupils attending middle school who leave later than year 6. Columns showing totals are year group numbers when the REE school code and home postcode information is available for both academic years for the pupil.

Table 5 Moving School, Pr(S=1), Probit Marginals

A. Basic Model									
	Primary School Years					Secondary School Years			
Year Group	1-2	2-3	3-4	4-5	5-6	7-8	8-9	9-10	10-11
FSM	0.059	0.039	0.053	0.050	0.045	0.028	0.026	0.025	0.013
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
Female	0.000	0.000	0.000	0.001	0.001	0.000	0.002	0.004	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SEN	0.013	0.048	0.024	0.016	0.022	0.027	0.018	0.016	0.005
	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.001)
Non-white	0.007	0.006	0.004	0.003	-0.001	0.000	0.000	0.003	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
English not first language	0.007	0.002	-0.001	0.000	0.000	-0.003	-0.006	-0.007	-0.003
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Regional dummies (8)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of pupils	555,269	562,312	574,442	574,517	598,441	576,850	569,289	580,836	549,923
Mean of Dependent Variable	0.073	0.054	0.068	0.064	0.054	0.035	0.035	0.029	0.015
B. Controls for Prior Achievement									
		Primary School Years				Secondary School Years			
Year Group	1-2	2-3	3-4	4-5	5-6	7-8	8-9	9-10	10-11
FSM		0.025	0.041	0.039	0.033	0.020	0.019	0.009	0.006
		(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female		0.003	0.002	0.004	0.003	0.001	0.003	0.004	0.002
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SEN		0.012	-0.003	-0.005	0.001	0.005	0.001	-0.003	-0.004
	As Above in	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Non-white	Absence of	0.006	0.002	0.001	-0.003	-0.001	-0.002	0.003	0.000
	Prior	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
English not first	Achievement	-0.003	-0.008	-0.009	-0.011	-0.008	-0.011	-0.007	-0.004
language	Data	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
KS1 (t–k)		-0.012	-0.013	-0.012	-0.011				
		(0.0004)	(0.0004)	(0.0005)	(0.0004)				
KS2 (t–k)						-0.008	-0.008		
						(0.0004)	(0.0004)		
KS3 (t–k)								-0.008	-0.006
								(0.0006)	(0.0005)
Regional dummies (8)	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of pupils	-	555,027	562,216	556,886	571,513	551,058	538,092	532,431	503,454
Mean of Dependent Variable	-	0.052	0.066	0.061	0.051	0.033	0.033	0.023	0.014

Table 5 (Continued)

C. Controls for Prior Achievement and School Fixed Effects									
	Primary School Years					Secondary School Years			
Year Group	1-2	2-3	3-4	4-5	5-6	7-8	8-9	9-10	10-11
FSM	0.036	0.018	0.027	0.026	0.024	0.015	0.014	0.006	0.005
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	0.000	0.002	0.002	0.004	0.003	0.002	0.004	0.004	0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
SEN	0.023	0.039	0.019	0.013	0.020	0.016	0.014	0.004	-0.003
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)
Non-white	-0.003	-0.002	-0.007	-0.009	-0.011	-0.004	-0.004	0.001	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
English not first Language	0.003	-0.004	-0.011	-0.015	-0.012	-0.006	-0.010	-0.004	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
KS1 (t–k)		-0.009	-0.010	-0.010	-0.008				
2		(0.0004)	(0.0004)	(0.0004)	(0.0004)				
KS2 (t–k)						-0.004	-0.005		
						(0.0003)	(0.0003)		
KS3 (t–k)								-0.005	-0.004
								(0.0002)	(0.0002)
School fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of pupils	555,272	555,027	562,216	556,886	571,513	551,058	538,092	532,431	503,454
Mean of Dependent Variable	0.073	0.052	0.066	0.061	0.051	0.033	0.033	0.023	0.014

Note: Marginal effects from probit models; standard errors (clustered on school) in brackets. Dependent variable is a dummy taking the value of 1 when a pupil moves school, and 0 otherwise.

Table 6 Moving School and House, Pr(H=1|S=1), Probit Marginals

A: Controls for Prior Achievement									
	Primary School Years					Secondary School Years			
Year Group	1-2	2-3	3-4	4-5	5-6	7-8	8-9	9-10	10-11
FSM	0.051	0.056	0.060	0.069	0.055	0.020	0.045	-0.030	0.033
	(0.008)	(0.008)	(0.009)	(0.009)	(0.01)	(0.012)	(0.014)	(0.015)	(0.018)
Female	0.004	-0.006	0.002	0.011	0.024	0.009	0.002	-0.020	-0.005
	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)	(0.008)	(0.010)	(0.014)	(0.018)
SEN	-0.287	-0.300	-0.202	-0.189	-0.221	-0.186	-0.128	-0.058	-0.111
	(0.017)	(0.018)	(0.017)	(0.017)	(0.017)	(0.024)	(0.022)	(0.034)	(0.039)
Non-white	-0.029	-0.042	-0.039	-0.044	-0.053	-0.086	-0.079	-0.108	-0.078
	(0.014)	(0.012)	(0.015)	(0.016)	(0.020)	(0.020)	(0.025)	(0.027)	(0.036)
English not first language	0.027	0.062	0.038	0.059	0.030	0.032	0.034	0.083	0.075
	(0.016)	(0.014)	(0.016)	(0.018)	(0.022)	(0.020)	(0.024)	(0.029)	(0.049)
KS1(t–k)		0.004	-0.004	-0.007	-0.005				
		(0.003)	(0.003)	(0.004)	(0.004)				
KS2 (t–k)						-0.005	-0.008		
						(0.005)	(0.006)		
KS3 (t–k)								0.031	-0.008
								(0.008)	(0.010)
Regional dummies (8)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of pupils	40,078	28,297	36,819	33,810	28,720	17,946	17,523	11,942	6,695
Mean of Dependent Variable	0.670	0.667	0.631	0.608	0.630	0.565	0.516	0.532	0.489

Table 6 (Continued)

B: Controls for Prior Achievement and School Fixed Effects									
	Primary School Years					Secondary School Years			
Year Group	1-2	2-3	3-4	4-5	5-6	7-8	8-9	9-10	10-11
FSM	0.042	0.050	0.054	0.061	0.044	0.023	0.033	0.006	0.046
	(0.007)	(0.010)	(0.008)	(0.008)	(0.009)	(0.009)	(0.010)	(0.013)	(0.018)
Female	0.008	-0.005	-0.002	-0.002	0.014	0.004	-0.002	-0.023	-0.029
	(0.006)	(0.008)	(0.007)	(0.007)	(0.007)	(0.008)	(0.009)	(0.011)	(0.015)
SEN	-0.285	-0.261	-0.193	-0.157	-0.187	-0.204	-0.167	-0.088	-0.082
	(0.027)	(0.032)	(0.023)	(0.023)	(0.024)	(0.024)	(0.024)	(0.034)	(0.050)
Non-white	-0.029	-0.040	-0.029	-0.037	-0.031	-0.074	-0.041	-0.047	0.016
	(0.012)	(0.015)	(0.013)	(0.015)	(0.016)	(0.018)	(0.019)	(0.021)	(0.029)
English not first language	0.037	0.049	0.038	0.039	0.009	0.005	-0.022	0.025	0.022
	(0.013)	(0.017)	(0.015)	(0.017)	(0.019)	(0.022)	(0.025)	(0.025)	(0.034)
KS1 (t–k)		0.003	0.001	0.002	0.002				
		(0.004)	(0.003)	(0.004)	(0.004)				
KS2 (t–k)						-0.013	-0.006		
						(0.005)	(0.004)		
KS3 (t–k)								0.007	-0.004
								(0.007)	(0.009)
School fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of pupils	40,081	28,297	36,819	33,810	28,720	17,946	17,523	11,942	6,695
Mean of Dependent Variable	0.670	0.667	0.631	0.608	0.630	0.565	0.516	0.532	0.489

Notes: Marginal effects from probit models; standard errors (clustered on school) in brackets. Dependent variable is a dummy taking the value of 1 when a pupil moves school and house and 0 otherwise for the sample of non-compulsory school movers.

Table 7 Moving School, Pr(S=1), Probit Marginals, Include Average School KS Performance (t-1)

	Primary School Years				Secondary School Years			
Year group	2-3	3-4	4-5	5-6	7-8	8-9	9-10	10-11
School KS1 (t-1)	-0.010 (0.0006)	-0.010 (0.0007)	-0.009 (0.0008)	-0.007 (0.0008)				
School KS2 (t-1)					-0.009 (0.0008)	-0.008 (0.0009)		
School KS3 (t-1)							-0.008 (0.0011)	-0.005 (0.0010)
Pupil characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pupil prior achievement	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies (8)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of pupils	555,027	562,216	556,886	571,513	551,058	538,092	532,431	503,454
Mean of Dependent Variable	0.052	0.066	0.061	0.051	0.033	0.033	0.023	0.014

Notes: Marginal effects from probit models; standard errors (clustered on school) in brackets. Dependent variable is a dummy taking the value of 1 when a pupil moves school and 0 otherwise. Specifications are comparable to those in Panel B of Table 5.

Table 8 The Proportion of Mobile Pupils Moving to a School With Higher Key Stage Performance

Year Group	Overall	FSM=1	FSM=0	H=1	H=0
2-3	0.569	0.546	0.580	0.562	0.585
3-4	0.535	0.519	0.543	0.538	0.531
4-5	0.541	0.523	0.550	0.532	0.557
5-6	0.538	0.525	0.545	0.536	0.543
7-8	0.530	0.501	0.542	0.508	0.559
8-9	0.513	0.516	0.512	0.511	0.516
9-10	0.548	0.565	0.541	0.516	0.586
10-11	0.531	0.548	0.525	0.514	0.548
Overall Number of Pupils Moving to Higher KS Performance School	111,014	32,631	78,383	66,636	44,378
Overall Number of Mobile Pupils	205,484	61,874	143,610	124,999	80,495
Overall Average Proportion Moving to Higher KS Performance School	0.540	0.527	0.546	0.533	0.551

Notes: Calculated on sample with no missing FSM or H data.

Table 9 Models of Moving to a Higher KS Performance School, All School Movers

Pr(Move to Higher KS School), Probit Marginals								
Year Group	2-3	3-4	4-5	5-6	7-8	8-9	9-10	10-11
FSM	-0.135	-0.125	-0.131	-0.097	-0.070	-0.048	-0.038	-0.049
	(0.009)	(0.009)	(0.010)	(0.011)	(0.014)	(0.016)	(0.018)	(0.024)
Female	-0.007	-0.006	0.002	-0.005	0.001	0.004	-0.027	0.024
	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.010)	(0.015)	(0.022)
SEN	-0.408	-0.312	-0.354	-0.292	-0.449	-0.379	-0.321	-0.344
	(0.030)	(0.026)	(0.029)	(0.024)	(0.026)	(0.030)	(0.058)	(0.064)
Non-white	-0.037	-0.043	-0.020	-0.008	0.021	-0.058	-0.040	-0.022
	(0.014)	(0.016)	(0.018)	(0.021)	(0.021)	(0.031)	(0.034)	(0.044)
English not first language	-0.014	-0.012	0.019	-0.043	-0.009	0.047	-0.022	-0.035
	(0.016)	(0.018)	(0.020)	(0.027)	(0.026)	(0.027)	(0.030)	(0.066)
KS1 (t-k)	0.089	0.066	0.064	0.073				
	(0.004)	(0.003)	(0.004)	(0.004)				
KS2 (t-k)					0.081	0.065		
					(0.005)	(0.005)		
KS3 (t-k)							0.099	0.051
							(0.007)	(0.010)
School KS1 (t-1)	-0.286	-0.288	-0.289	-0.241				
	(0.010)	(0.011)	(0.014)	(0.015)				
School KS2 (t-1)					-0.248	-0.259		
					(0.017)	(0.018)		
School KS3 (t-1)							-0.311	-0.265
							(0.021)	(0.027)
Regional dummies (8)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of pupils	28,670	37,234	34,189	29,085	18,182	17,844	12,149	6,803
Mean of Dependent Variable	0.573	0.537	0.543	0.541	0.524	0.504	0.567	0.546

Notes: Marginal effects from probit models; standard errors (clustered on school) in brackets. Dependent variable is a dummy taking the value of 1 when a pupil moves to a school with higher KS performance than the one they left and 0 otherwise for the sample of non-compulsory school movers.

Appendix

In this Appendix we describe issues involved in how we calculate various measures used in the paper.

1). Compulsory school moves

The main pupil mobility measure we use adjusts for normal, or compulsory, school transitions that occur between given year groups. Primary-secondary pupil movement is one form of compulsory school shifting. Other compulsory moves corrected for in the dataset are: infant (aged 5-7 or 5-8) to junior (aged 7-11 or 8-11) school movers (these schools are given separate REE codes in the dataset, though they are usually one unit); end of first school movers (aged 7, 8, 9, 10, or 12); end of middle school movers (aged 12, 13, or 14); and end of comprehensive junior school movers (pupils are aged 11-14 in comprehensive junior and transfer to comprehensive upper or senior at age 14).

2) Deriving the year group

We are able to identify the above stages of expected transition through the use of our derived year group variable, which indicates the school year of the pupil. Though the PLASC dataset includes a national curriculum year group variable (henceforth ncyr), we also generate our own school year for each pupil. The reason that we do this is because there appear to be some inconsistencies in the PLASC ncyr variable that warrant our testing of the accuracy of the variable.[11] As such, we create a year group indicator by estimating the school year of the pupil based on the year in which they attained their Key Stage result. We know the age at which each Key Stage test is taken and can use this to determine the corresponding year group associated with that age. Where a pupil has a history of more than one Key Stage result we are able to check the accuracy of our derived year group variable over time. Where no Key Stage result is available for the pupil we use the PLASC variable for the pupil's age at the start of the academic year to determine year group classification. For a sub-sample of the PLASC dataset[12] we have exact date of birth information, from which we can gain an accurate year group measure. On comparing this exact year group with our derived school year and the

[11] Simple checks of the PLASC ncyr show the following: 139,009 cases where the year group does not change between the two academic years; and 217,057 cases where the ncyr in the academic year 2002/2003 does not equal 1+ncyr in 2001/2002. Repetition of school years is not a feature of the education structure in primary and secondary schools in England.

[12] The sub-sample included pupils mostly in year 6 of primary school.

PLASC school year, we find that our derived version is closer to the actual than the PLASC ncyr variable[13], and that we have more overall year group observations from our derived indicator than the PLASC indicator. Overall, from our accuracy test we find that our derived year group seems a more robust measure of the school year than the PLASC ncyr and we use this derived variable throughout our analysis.

3) *Correcting for postcode miscoding errors*

Miscoding errors that are dropped from the residential mobility measure are listed here. In each of these cases, all remaining characters in the home postcode are unchanged between the 2 academic years: (i) either of the first or last 2 characters only of the postcode changing (ii) the first or last 2 characters only coded in reverse compared to the postcode for the other academic year (iii) changes in the postcode length by one character e.g. AB1 becomes AB01 or B12 becomes CB12 (iv) all postcodes for a particular area recoded in the same way e.g. all home postcodes in 2001/02 beginning with BA36 changing to BA116 in 2002/03.

[13] The PLASC year group match to the actual year group (based on those observations where we have the exact date of birth) is 96.33 percent compared with 99.98 percent from our derived year group variable.