Peer Effects and Free School Meals

Jonathan James (European University Institute)*

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Abstract

This paper attempts to identify peer effects in the take up of a welfare programme within a school setting, free school meals, using the Pupil Level Annual School Census (PLASC) which collects data on every child attending a school in England. The nature of the peer effect is explored, I examine three potential channels: stigma, information, and role models. To disentangle the three channels I, firstly, exploit cashless catering systems which removes the stigma associated with claiming the benefit. Data was collected from over 400 secondary schools by telephone interview asking whether and when these have been introduced. Secondly, I test whether information plays a role, by comparing the peer effect for those who have claimed in previous years with those who have not. Finally, using the structure of the data I test a role model hypothesis, within a school setting students in older years may have a greater effect than children in younger years, some evidence is found that this is the case. The results suggest the presence of stigma dampens the peer effect, information makes it larger and there is evidence of role model effects. Furthermore, information is most important for the most deprived and stigma more important for the least deprived.

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*email: jonathan.james@eui.eu

1 Introduction

Do peers influence the decision to register for free school meals? This paper examines the role of peers in the UK's largest food welfare programme. In the US food based social assistance schemes have received considerable attention; Currie (2003)[1], Currie and Grogger (2001), Hinrichs (2010), Bitler, Currie and Scholz (2003), Schanzenbach (2009). In comparison the main food welfare programme in the UK, Free School Meals, has received relatively little consideration. Furthermore, the nature of the peer effect is explored. There are three principal channels that could make up the peer effect: information, stigma, and role models. Using a number of methods, institutional features and a recent technological innovation in schools we investigate the peer effect in different environments to elicit the importance of each of those elements. In addition, the structure of the data allows the hypothesis that role models may also play a function to be tested, particularly salient in a school setting.

This is important for specific reasons related to take up of the programme, but also for more general considerations associated with understanding the barriers to participation in social welfare programmes. The lack of take up is a large problem, we estimate that those who are actually eligible and those who do not claim is around 20%-25%[2] If we consider the gap between those who have registered and those who ate the meals, as measured at the school census day, we find approximately an 80% participation rate. Therefore the take up rate of eating the meal from those eligible is almost 65%. Estimates of take up from the two US based food programmes targeted at children, the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and most closely related to Free School Meals, the National School Lunch Program (NSLP) have similar estimates of participation rates. Not taking up an entitled benefit is equivalent to lost income. A typical meal costs around £1.90, this represents £380 per child per year. At income thresholds as they stood in 2009 this represents approximately 3% of a parent's income, this is a significant proportion of their income[3]

Understanding the role peers play in the decision to register free school meal eligibility

[1]See for a longer list

[2]One way to measure the gap between those who are actually eligible and those who register their eligibility it to examine other benefits. Those not working and claiming child tax credit are eligible for free school meals. It is calculated that approximately 80% of those who are eligible have registered that eligibility. This is based the number of pupils in a Lower Layer super output area who are registered for Free School Meals divided by the count of the number of children in each lower layer super output area who are in families that do not work and claim the child tax credit from the Office of National Statistics. The Child Tax Credit figures are from August 2006 and the FSM numbers are from 2006 Pupil Level Annual Census. Nottinghamshire County Council produce a similar estimate around 20%, see "'Increasing Take-up of Primary School Meals (2009)"'. In a report for the School Food Trust, London Economics using similar methods and a wide range of data sources report that 25% of those who are eligible do not claim.

[3]This example considers the maximum income that would qualify and only a one child family.

can shed light on non-take up of, not only this benefit, but also barriers to participation in general. Typically cited reasons for lack of take up are usually social; in a survey about free school meals[4] 33% of pupils and 40% of parents cited embarrassment as a key driver for not taking a free school meal, and that 11% of eligible parents had not claimed because they were not aware they were entitled or had insufficient information about the programme. Understanding these barriers is important in tackling child poverty, and therefore inequality of provision in government services (Heckman and Smith (2004)). Not only is it important to examine whether each of these has an impact but also the extent to which different groups are affected. This has an implication for the design of policy and the creation of well-designed welfare programmes that are properly targeted. In other areas of related policy intervention such as those aimed at tackling obesity through food education and physical activity, it has been found those from poorer backgrounds are less likely to respond (Summerbell et. al (2009)), if at all, exacerbating the problem of inequality of provision.

In order to test whether peers have a role in free school meal eligibility take up this paper uses a large administrative data set of English school children, the Pupil Level Annual School Census (PLASC). This records information on all children attending school in England and crucially has whether the pupil is registered for free school meals. The benefit of this data is that we are able to directly observe all the peers within the peer group with whom the children may interact at school. Secondly, we identify peers based on their year group, school or small neighbourhoods areas. In addition we use the Longitudinal Survey of Young People in England (LSYPE) that has more detailed family background information. We also use a completely unique data set, constructed by phone survey, on the schools that use cashless catering systems.

The peer group is defined as those within the same ethnic and language group. The assumption we make is that parents and children are more likely to interact with those of the same ethnic background and even more so if they share a common language. The more of those who share the same ethnic language group the greater the contacts available to that individual. This is the contact availability measure suggested by Bertrand et al. (2000). We are able to control for various omitted variables using our data including area characteristics that are typically smaller in size than many other studies that use neighbourhoods to define peers. To summarise the results we find that there is a peer effect that is robust to different sample selections and changing definition of the peer group. The effect of a welfare shock is increased by around 20% due to the presence of peers.

To get a grip on how important the effect of stigma and information are we estimate the effects of welfare shocks when stigma, and subsequently information, is absent. In order to test the specific roles of information, stigma and role models, a number of tests are adopted.

[4]Storey and Chamberlin (2001)

Firstly, in line with Aizer and Currie (2004), information should not be present in the peer group for those who have claimed in the previous two years. Therefore, if information is important, the peer effect should be smaller for this group. Recently many schools have been introducing cashless catering systems, similar to the electronic benefit transfer in the US, these remove the stigma associated with free school meals as they prevent the identification of the student when paying for school meals, as was not the case before its introduction. Therefore the peer effect is examined when stigma is absent, when this is the case the estimated welfare shocks are greater. This implies that stigma dampens any effect of peers. The effect is also examined across different levels of deprivation. Information is found to be more important for the more deprived and stigma is more important for the less deprived. Finally, the structure of the data allows a test of role models. We test whether older children act as role models for younger ones. The results suggest that this could be the case.

The paper proceeds as follows. Section 2 presents the background to the welfare programme, briefly sketching out the history of (free) school meals, section 3 reviews the related literature, section 4 presents the data and descriptive statistics, section 5 sets out the empirical strategy and identification issues, section 6 the results and section 7 concludes.

2 Background: History of Free School Meals

School meals were first introduced in 1906 as a result of the Education (Provision of Meals) Act. This gave Local Education Authorities (LEAs) the ability to provide food for malnourished children whose education was suffering as a result[5][6] Prior to that there had been a number of local schemes in London and Manchester that had introduced meals at school for the very poorest, but the 1906 act was seen as the foundation for the current service. A moderate payment was expected for the meal, free or reduced meals were only allowed for those deemed malnourished, Davies (2005). Where the 1906 act was moderate in only allowing the local authority to provide meals, the 1944 Education act was more radical in stipulating that LEAs make available school meals (and milk) in both primary and secondary schools, for the most deprived this was for free where possible. The obligation to provide a school meal was removed by the 1980 Education Act, however the free school

[5]Curtis (1967)

[6]A further motivation for the introduction of such an arrangement came from the health of the army recruits for the Boer War which ended in 1902. The height requirement for entry was decreased as the working class men were failing to meet it, Davies (2005), (Colquhoun et al 2001). The meals were seen as a way to address this issue. Interestingly the National School Lunch Programme, which was established 40 years later in 1946 in the US, came about as a reaction to the health conditions, due to poor nutrition, of men drafted into the US army for the Second World War.

meal provision remained.

Changes to the programme over the last 25 years have mainly concerned with the quality of the meal. The 1986 Education Act and 1986 Social Security Act saw further changes to the school meals service, they were put out to competitive tendering and the criteria for claiming the meal changed. Family Credit replaced the Family Income Supplement resulting in many children no longer being entitled to free school meals. The criteria have been based on claiming other benefits and an income threshold; the current criteria are discussed in section 4. The 1980 Act also saw the removal of the nutritional standards. Very basic food standards were introduced in 2001 however there was no monitoring process put in place. The decline in quality of the meals was highlighted when in 2004 celebrity chef Jamie Oliver went into the London borough of Greenwich and drastically reformed the school lunches, replacing junk food with healthy alternatives. This was broadcast in a documentary on a major UK TV station, Channel 4. Since then there was an improvement in the quality of the meals across the country with nutritional standards being enforced by a non-governmental agency, The School Food Trust.

3 Related Literature

A number of papers focus on welfare, use of public services and the importance of social interactions that are associated with their take up and use. There is a large range of types of welfare programmes and outcomes that have been examined in the context of peers; welfare benefits and dependency (Betrand et al (2000), Aslund and Fredrickson (2009)), unemployment benefit, Lalive (2003), closely related unemployment transitions, (Cappellari and Tatsiramos (2010), van der Klaauw and van Ours (2003) and health services (Aizer and Currie (2004), Deri (2005), Devillanova (2008). Lalive (2003) finds that those in receipt in unemployment benefit increased among groups not directly affected by a reform that increased the use of unemployment benefit, suggesting that networks have an impact. Cappellari and Tasiramos (2010) use the British Household Panel Survey (BHPS) identifying the peer group from friendship; they find that the probability of employment increases as one has more friends employed.

Bertrand et al (2000), Aslund and Fredrickson (2009) both examine welfare dependency and how social networks can reduce the cost of participation. Bertrand et al (2000) focus of welfare use among women whose first language is not English, they find that welfare use increases the greater the proportion of people in the area who share their language if those co-language groups have high welfare use themselves. They estimate that the presence of peers increases the effect of an exogenous welfare shock by between 15-25%. Aslund and Fredrickson (2009) use an immigrant placement policy that plausibly distribute

immigrants in Sweden exogenously and find that welfare use increases if they are placed in a high welfare using community.

While Bertrand et al (2000), Aslund and Fredrickson (2009) focused just on establishing a network effect, increasingly the literature has moved on from just establishing whether a peer or network effect exists to examining the nature of that effect. Typically, information is a prominent feature of most studies related to networks. One way that has been investigated is through experiments. Duflo and Saez (2002) ran a randomised experiment related to giving information regarding retirement plans. By defining the peer groups as co-workers, they find small but significant effects of providing information through social interactions. In the absence of experimental methods there are other attempts to gauge what encompasses the peer effect. In particular Aizer and Currie (2004) examine the use of pre-natal care. In order to test the importance of information, they compare the network effect between first and second time mothers. They posit that information should not be relevant for second time mothers as they are aware of the services that are available to them. They find that the network effect for second births is of similar magnitude to first time births, suggesting that information is not an important component- the data used in the current study allow for a similar test. Aslund and Fredrickson (2009), although they do not directly test whether information is important, conclude that it does not play a role in their setting as the placement policy introduced all refugee immigrants to welfare benefits upon arrival. This is in contrast to Heckman and Smith (2004), who in examining a job training programme, decompose the participation at different stages, and find that non-whites participation is primarily determined by knowledge of the programme. Devillanova (2008) investigates the use of health care among undocumented immigrants and directly examines the information channel. He finds a large significant impact of information from friends and relatives in reducing the time to a visit by around 30%, although this network effect is smaller for more educated individuals. Therefore the importance of information differs according to the setting, as would be expected as information will be more important in some contexts rather than others. The seeming puzzle for the lack of information effects found by Aizer and Currie (2004) could be due to stable conditions and information being relatively widespread, therefore information is not likely to have an impact. Figlio et al. (2011) test the role of information when the environment is not stable. The welfare reforms in mid-1990's in the US, although not necessarily changing the eligibility criteria for programmes such as the Medicaid and WIC, did cause confusion particularly for immigrant groups. They call this an information shock and exploit it to test the role that networks play when there is a disruption to information. Interestingly, they find in the short run networks have an impact at mitigating any reductions in information that there may have been.

Although information features quite prominently in most papers on networks, with regards to welfare take-up, stigma is also an important factor. Moffitt (1983) has an early paper framing non-participation of benefits in terms of stigma in a means tested welfare programme. Stigma is framed as increasing the cost of participation, such that when it is present it may result in some households not participating in the programme. The food stamp programme in the US now operates though Electronic Benefit Transfer cards, these are similar to a debit card to remove the stigma associated with screening for the food stamps programme. Schanzenbach (2009) conducted an experiment in California, where one third of the tax offices where the food stamps could be claimed were randomly treated with a pamphlet that professionally re-brands the food stamp programme as the Golden State Advantage card, with the control given the standard USDA materials. Individuals were more likely to request information when provided with the de-stigmatised Golden State Advantage card literature relative to the typical Food Stamps paraphernalia.

4 Data, Sample, and Descriptive Statistics

4.1 Data

The data for this study come from a number of sources; firstly the Pupil Level Annual School Census (PLASC), this contains information on all pupils in England and Wales consisting of approximately seven million records per year. In the baseline results, three years of the school census, from 2007 to 2009[7], are used. This data has the advantage of having the all those with whom a pupil interacts and therefore we are able to construct detailed accurate information on the peer group. We supplement this data with test scores from the National Pupil Database, which records all centrally organised key stage test results. The PLASC data includes the following characteristics: gender, ethnicity, age, month of birth, whether English is a first language, a special educational needs (SEN) indicator (including whether a statement[8] is issued, this measures some degree of learning difficulty), the mode of transport taken to get to school[9], a number of location indicators including, lower layer super output

[7]Other specifications later in the paper use data from 2006-2009 for example in section 6.8 to test the role of stigma. The restriction of just three years in the baseline results is primarily for computational reasons, with relevant sample selections described in the main body of the text and including those three years results in approximately 3.8 million observations. The results are indifferent to which 3 years are chosen.

[8]A statement is issued after an assessment is made by the local authority, it describes the need that the pupil has and the help that they should receive. It is typically issue if the child needs a large amount of extra help or they were not progressing under the lesser degrees of special need called school action and school action plus

[9]Available from 2007 onwards. This is an additional reason for restricting the sample from 2007 onwards to include as many controls as possible

area (LSOA) and middle layer super output area (MSOA), an income deprivation affecting children index (IDACI), school attended, and free school meal status.

To supplement the PLASC data we also use the Longitudinal Survey of Young People in England (LSYPE). The LSYPE began in 2004 sampling around 21,000 pupils, 15,000 households, in year 9 (aged 13 and 14, born between 1st September 1989 and 31st August 1990) and followed them up each year. The number of deprived schools was over-sampled by a factor of 1.5.[10] In addition there were sample boosts related to free school meals and ethnicity. Most importantly the LSYPE can be linked to the PLASC data, therefore we are able to use the peer group that is constructed from the entire population, rather than the LSYPE sample which could be quite a big problem, Micklewright, Schnepf and Silva (2010).

Moreover, we have an entirely unique dataset on the schools that operate a cashless catering system equivalent to the Electronic Benefit Transfer (EBT) systems that operate in the US Food Stamps Program, although not all operate through a strictly card system[11]. A phone survey was carried out by the author. 406 schools were contacted in order to collect data on whether they implement a cashless catering system and in which year this was introduced.

The PLASC data has a number of key features that generate our definition of peer group. This is composed of two main parts, the reference group and a measure of location. For the reference group we use the child's language group and ethnicity. Evidence suggests that race or ethnicity are strong predictors of social ties, Mayer and Puller (2008) have recently shown this using data from Facebook. Going beyond just using race or ethnicity as used by Borjas (1995), we define the peer group around the language spoken as in Betrand et al (2000). Language is arguably a better measure of social ties; although all teaching is carried out in English, it seems plausible that there will be greater social ties among those who are more likely to share a common language. Guiso, Sapienza and Zingales (2004) find that two countries who share a common language are more likely to trust each other. Although we do not have data on the exact language that is spoken in the home instead we know whether the child speaks English at home, or more precisely whether or not the language they were exposed in early years at home was English or not.[12] Therefore ethnic language group is defined as the interaction of ethnicity and whether the child's first language is English.

[10] LSYPE user guide, page 6

[11] Section 6.8 examines the different types of system that are currently in use

[12] The definition form the school census is the following: 'The language to which the child was exposed during early development and continues to use this language in the home or in the community. If a child acquires English subsequent to early development, then English is not their first language no matter how proficient in it they become."

The second part of the peer group is based on location. Being agnostic about the spread of peer groups, two broad distinctions of the location of peers are made. The first is at the school level, as we use data from the school census we know which school the pupil attended and in which year group within that school they are in. The second is based on area of residence, the area the child lives is given in some detail. There are two super output areas (SOAs), geographical definition of areas used for the main (not school) census, as our definition of peer group at the regional level that define the peer group. The smallest areas we have available are the Lower Layer SOAs (LSOA) of which there are 34,378 in England and Wales with an average population of 1,500. There are 7,193 Middle Layer SOAs (MSOA); these are therefore somewhat bigger with approximately 7,200 residents. The largest area used in the analysis is the Local Education Authority (LEA), schools[13] are under the jurisdiction of one of the 150 LEAs. Figure 1 shows the percentage of free school meal eligibility in each MSOA (left) and LSOA (right) for one local authority, Essex. The figure indicates the size of the spread of the peer group, and allows comparison between the size of MSOAs and LSOAs. Figure 2 shows the variation across the whole country at the Local Education Authority level.

Given that the vast majority of pupils are white and speak English as a first language using ethnic language group for this section of the population would not be a good proxy for their peer group[14], therefore we exclude these and those from other white backgrounds from the analysis, in addition those with unknown ethnicities or those who refused their ethnicity to be recorded are also dropped from the sample. This leaves 32 ethnic language groups, with approximately 1,300,000 observations each year. In section 6.6 we examine the sensitivity of the results from the exclusion of these different classifications. The dependent variable throughout the paper is free school meal eligibility; this is recorded in the census free school meal eligibility as the following:

> *Pupils should be recorded as eligible (true) only if a claim for free school meals has been made by them or on their behalf by parents and either (a) the relevant authority has confirmed their eligibility and a free school meal is currently being provided for them, or (b) the school or the LEA have seen the necessary documentation (for example, an Income Support order book) that supports their eligibility, and the administration of the free meal is to follow as a matter of process. Conversely, if pupils are in receipt of a free meal but there is confirmation that they are no longer eligible and entitlement will be revoked false should be applied.*

[13]Not all schools are under direct control of the local authority, such as academies

[14]In section 6.6 we relax this assumption and include white british in the sample

Note that this does not require the child to consume the meal every day, or at all. This defines our dependent variable which is a dummy indicating whether their child's eligibility is recorded as true (1) or false(0). The eligibility for Free School Meals is set nationally and administered by the local authority. The criteria that was in place for claiming Free School Meals was as follows:

- Income Support
- Income-based Jobseeker's Allowance
- Support under part VI of the Immigration and Asylum Act 1999
- Child Tax Credit, provided they are not entitled to Working Tax Credit
- An annual income (as assessed by Her Majesty's Revenue and Customs) did not exceed: £13,910 in 2005, £14,155 in 2006, £14,495 in 2007, £15,575 in 2008, and £16,040 in 2009.
- The Guarantee element of State Pension Credit
- An income-related employment and support allowance (introduced in October 2008)

Claims can be made from the local authority in charge of administering free school meals. A form[15] of around two to three pages, depending on the local authority, is required to be completed. There are also three sections: section 1 asking about the parents and pupils details, section 2 asks for financial details, and section 3 is a declaration.

4.2 Descriptive Statistics

Table 1 presents the summary statistics for the main variables used in the analysis. For 2008 the percentage of free school meal pupils for the whole population is 15% compared to 25% in our sample. In addition to gender and age we also have indicators for special educational need, 77% of our sample not requiring any additional help, with 3% requiring a statement of special need. Also presented are the methods of travel to school, 40% of whom walk to school. Table 1 also presents the contact availability measures.

Table 2 presents a summary of each of the ethnic language groups. The largest ethnic group in our sample is Pakistani, the majority do not speak English at home, and also have slightly above the sample average of free meals. Most striking is the African group. Whereas for the English speaking Africans the free school meal split is similar to the overall

[15]An example of a form can be found at the following: http://www.essex.gov.uk/Education-Schools/Schools/Pupil-Parent-Support/Documents/FSM%20app%20form%20Sept%202010.pdf

sample mean, for the African non English speaking group the free school meal eligibility rates are very high at around 50%. The Chinese and Indian groups are the smallest welfare recipients. Typically those who do not speak English have higher welfare use than those who do. This can be seen in the bottom panel, there is a 7 percentage point difference in our sample between non-English speaking groups and English speaking groups. This can be seen within the ethnicities also, with only the Romany group having higher free school meal eligibility rates for the English speaking group.

5 Empirical Strategy

5.1 Identification Issues

Dealing with the identification issues associated with peer effects involves taking into consideration the reflection problem, Manski (1993), Moffitt (2001), Brock and Durlauf (2001). It is difficult to disentangle the actions of the individual and the actions of the peer group. An association between the behaviour of a pupil and pupils in their peer group can be categorised into three main effects. An endogenous effect, where the behaviour of an individual is causally influenced by the behaviour of the other members of the peer group, therefore a pupil decides to register for the free school meal because of the behaviour of their peers. An exogenous or contextual effect is where the individual pupil's behaviour is influenced by the exogenous characteristics that define the membership of that group. The final effects are correlated effects; individuals have similar behaviour because they face the same constraints. There may be some ethnic language groups in some areas which may not like the meals due to cultural or religious[16] reasons or that the perception that the meals do not take into account particular dietary requirements, and failure by the school to take this into account could result in a group not registering for the meal as the parents know the children will not eat it.

Claiming the meal requires contact with the school and or local authority. Therefore if the school, or local authority act in a different way to different groups of children then this would be a an example of a correlated effect, this effect could act either way with some schools encouraging take up and others not - direction from government has emphasised the former. Thus, common access to the benefit forms would be an example of a correlated

[16]Equality impact assessments require the evaluating of any policies or services (including school meals) and the impact that may have on people with respect to disability, gender and racial equality. For more detail on equality impact assessments: (http://www.dwp.gov.uk/publications/impact-assessments/equality-impact-assessments/ This suggests that schools should legally take into account any changes to the meals in relation to ethnicity reducing any potential contextual effect. An example of an equality impact assessment with an example related to school meals can be found here: http://www.newcastle.gov.uk/core.nsf/a/einaguidance7

effect as would common levels of income in the area.

The exogenous effect, how one's behaviour is causally influenced by others, can encompass a number of effects. Three are focused on in this paper. Information is one type of endogenous effect, or indeed lack of information. There are different ways this could manifest, firstly by informing others about the existence of the programme, that free school meals exist- this could be relevant for newcomers to the country who are not aware of the welfare programmes that are available, however this seems less likely for non-immigrants given the historical context of free school meals. Getting information about own eligibility or eligibility criteria, or how to apply is another potential way information can be part of an endogenous effect. For example if a member of the peer's group informs their peers of the criteria and where to go for the forms, these would be examples of information sharing. This would be more salient for the parents than the children however.

A further endogenous effect would be stigma. Stigma would prevent some people from adopting the free school meals. This is probably the most commonly cited reason for not claiming free school meals.[17] A final endogenous effect is that of role models. Some members of a peer group may have more influence than others, this could be direct role model [18] or based on gender[19]. This paper uses age as a potential proxy for role models.

5.2 Definition of Peer Group: Quality and Quantity Measure

The advantage with the PLASC data is that we have the entire population of the potential peers. Also, we have different layers of the peer group measure. We know all the potential contacts within a school, further we know the area in which someone lives, another potenetial avenue of social interaction.

In section 4 we defined the broad peer group as those who share the same ethnicity and whether they speak English at home or not. In this section we set out in more detail the peer group measure we consider. Our baseline method is used in Bertrand et al (2000) and Aslund and Fredriksson (2009). We define the peer group using "quality" and "quantity" of peers. This gives us a measure of the degree of interaction that an individual has (quantity), and also the extent of the welfare use of those individuals (quality).

Peer Group$_{sl}$ = (% ethnic language group l in area s)$_{sl}$ $\times$
(Mean free school meal eligibility of ethnic language group l$_l$)

We define quantity, the first element of the peer group, as contact availability (CA_{sl}) using the following:

[17] two-fifths of parents identified embarrassment as a reason for not claiming free school meals (Storey and Chamberlain (2001)

[18] see Lyle (2007)

[19] Bettinger and Long (2004)

$$ln\frac{C_{sl}/A_s}{L_l/S}$$

where C_{sl} is the number of people in the school or area who belong to the ethnic language group l, A_s is the number of students in school s, therefore the denominator is the percentage in the location of the individuals ethnic language group, L_l is the entire number of students in the population of schools who are in ethnic language group l, and S is the total school population, therefore the numerator is the percentage in of the ethnic language group in the country.

Quality is measured through information and attitude of school welfare of those in the same ethnic language group within the same school or area. We proxy for this using $(\overline{FSM}_{(-i)l} - \overline{FSM})$ the deviation from the global FSM mean of the whole population from the mean FSM use of the ethnic language group, the results do not depend on this distinction of the deviation of the global mean. This measure captures cultural differences to welfare and to the free school meal programme. Groups with higher levels of free school meal eligibility will have more information about the system and are more likely to have information about the eligibilty criteria, they are also less likely to exert negative social pressure such as stigma.

5.3 Estimation

The baseline estimates are from the following:

$$FSM_{islt} = \alpha + \beta_1 \text{Peer Group}_{slt} + \delta X_{it} + \gamma Z_{st} + \lambda V_{lt} + \delta CA_{slt} + \epsilon_{islt} \tag{1}$$

Where FSM is the Free School Meal Status for individual i, in school (or output area) s, where l represents the ethnic language group. Further, X is a vector of observed individual characteristics, Z a vector of observed and unobserved school (or output area) characteristics, V is observed and unobserved ethnic language group characteristics, with ϵ_{islt} being the error term. If peers have an impact then we would expect that $\beta > 0$. The above is also estimated using linear probability models.

We measure peer effects at different levels, both at the school and output area level. In each case we include school (or output area) by year fixed effects in the model. Therefore any effects that we may find will not be due to school (or output area) differences. This allows us to call the estimates we find peer, as opposed to school or neighbourhood effects. In order for this to hold, we assume that unobserved school (output area) variables do not differ according to ethnic language group. The above equation (1) accounts for a number of

omitted variables biases. The previously mentioned location fixed effects (school and area) eliminate any fixed differences in free school meal provision, including quality of the meal. Including ethnic language fixed effects account any cultural differences in relation to the meals and to welfare use in general. We also control for the contact availability directly, this therefore controls for reasons why individuals choose to live in areas when they have large number of their own ethnic language group.

6 Results

6.1 Baseline Estimates

Table 3 presents results from the estimation of equation (1) in each case standard errors are clustered at the school or area level depending on the level of estimation. The top panel A presents the results at the school and year group level. Each regression controls for school by year fixed effects and ethnicity language fixed effects, also included in the controls are age, age squared, month of birth, dummies for different levels of special educational need, and mode of travel to school. Means at the peer group level of the exogenous variables are also included. Although not reported in the tables each of the special educational need variables are positive and significant as we may expect. There is a negative coefficient for those who travel to school by car relative to other forms of transport. Those who get the bus or walk to school are more likely to have registered their free school meal eligibility.

In each of the columns we find a positive and highly significant effect of the peer group measure, the interaction of contact availability and mean of free school meal eligibility of the ethnic language group. Therefore the probability to register for free school meals increases with the number of contacts in the pupil's school, if the mean of free school meal eligibility of that group is high. Column 1 presents estimates for the peer group being defined at the school level. We find a coefficient of 0.107. As in Aizer and Currie (2002), and Deri (2005) to interpret the estimates of the peer effect we follow Bertrand et al (2000). Assume there is an exogenous policy shock, represented by an increase in α in equation (1), that leads to a 1 percentage point increase in free school meal eligibility in the absence of any peer effect. This increase in α has a direct effect through this upward shift and an indirect effect through the peer group. Bertrand et al (2000) show that this policy shock α results in an $1/(1-\beta CA_l)$ effect. Where CA_l is the weighted average over all ethnic language groups, we obtain the effect of the peer group by subtracting the direct effect such that the peer effect is given by $1/(1-\beta CA_l)-1$. These effects are shown in the bottom row of the panels. Taking the school level results in column 1 as an example, a policy shock that would have resulted in a 1 percentage point increase in free school meal eligibility in

the absence of a peer effect would be 19% higher in the presence of peers- through the feedback effect. Examining the welfare shocks, an interesting pattern emerges. When the defined peer group is smaller, for example the year group relative to the peer group defined at the school level, the effect of a welfare shock is greater- suggesting that the frequency of contacts leads to greater feedback through the network. The same can be seen in the panel 2 with the LSOA estimates having a greater welfare shock effect than at the MSOA level.

In Column 2 and 3 we instrument the peer group measure with the peer group measure and the contact availability at the larger geographical regions the MSOA and Local Educational Authority. This is to take account of, and test for, differential selection. We may be concerned that there may be some omitted personal characteristics that are correlated with the peer group, and as such the OLS estimates that we find are driven by differential selection. Indeed it may be a concern with people who live in areas with high contact availability may be different in unobservable characteristics compared to those with low contact availability. If there is differential selection into areas then OLS estimates will be biased upwards due to selection both within and between MSOAs however the IV estimates would only be biased due to between MSOA selection. This is the test used by Evans et al (1992) examining peer effects on teen pregnancy and school dropout rates, it is also used by Bertrand et al. (2000) and Deri (2005). Our OLS and IV estimates do not point to differential selection. In each case in column 2 and 3 the IV estimates are somewhat larger. Column 4 defines the peer group at the year group within the school, arguably a better measure of peers with whom the pupil interacts than at the whole school level. The coefficient at the school level is similar, 0.0996.

Panel B shows the results for the peer group determined at the area level. Column 1 displays the LSOA coefficients, which are larger than the school and year group estimates. The pattern of the estimates is similar to the school level, in column 2 the MSOA is used to instrument for the smaller LSOA level, as in the school results the hypothesis of differential selection is rejected, and the coefficients gets larger when both the MSOA and LEA peer ground and contact availability measures are used as instruments.

Before moving to further results, one concern could be that what are being estimated are correlations of poverty. Firstly, including area or school by year level fixed effects should account for this problem and that as such our estimates can be interpreted as a peer rather than neighbourhood effect. Secondly, although there is an obvious poverty aspect to free school meals, and indeed it is typically used as a proxy for poverty when a better one is not necessarily available, as Hobbs and Vignoles (2007) show that free school meal status is an imperfect proxy for low income or unemployment, and that there is significant bias in using free school meals status as opposed to actual socioeconomic status.

The additional panels in table 3 replicate the analysis above but rather than using

the contemporaneous peer group measure use one and two year lags, Manski (1993) and Brock and Durlauf (2001) suggest that lagged measures of the reference group may get around the reflection problem. In particular Manski posits that social effects may act with a lag, whereas non-social forces act contemporaneously. There is no theoretical reason for the speed at which these effects could take place and therefore test a range of lagged variables. The assumption needed for this to be the case is that the environment should be relatively stable, such that there is not large scale immigration of one particular ethnic language group, and that there shouldn't be large scale changing to the school system. Figure 2 shows the percentage of the main ethnic-language groups. It can be seen that the environment is relatively stable across this measure, and over the period there were no major changes to the school system. The lagged peer group measures remain positive and significant.

Table 4 presents the peer group effect for the combined data. This allows a check on the results from just using the PLASC data; the second benefit is to check the effect of controlling for a number of factors that could be affecting the decision to register for free school meals and to check the robustness of the peer group estimate as a result of these controls. We focus just on the school level analysis and estimate the same equation for the PLASC data. The first column includes just the peer group and contact availability measure. The effect is similar to that in the baseline PLASC results. The second column adds in controls for other benefits that result in qualification of free school meals (as spelled out in section 2.2) and also a dummy for income greater than £15,500. These variables have the expected signs: having an income above the threshold reduces the probability of registering FSM eligibility, if the parent claims job seekers allowance, pension credit, or income support then there is a positive association with claiming free school meals, and claiming tax credits is negatively associated. The effect of these variables remains significant across the various specifications.

Column 3 includes a further set of welfare benefits. Column 4 includes variables related to a conditional cash transfer related to education programme, the educational maintenance allowance (EMA). Being aware of the scheme has no effect; however there is a positive effect of applying, or going to apply for EMA. The inclusion of these sets of controls increases the peer group coefficient. Column 5 then additionally includes three family status variables. Lone parents are more likely to register their eligibility, whereas this is negative for married parents. Having the internet at home could potentially be positive or negative; there is an income effect of having the internet which would reduce the probability of registering. However, the internet could potentially facilitate registration or gathering information about the eligibility criteria. The income effect appears to dominate. Also worth noting is that the inclusion of these controls results in a drop of the main peer

group effect. Column 6 includes controls for bullying as reported by the parents; there is a negative effect, albeit imprecisely measured of being threatened with violence. Column 6 also includes, unreported, ten dummies for the age of the mother and six education dummies for the mother.

The first of these results are interesting as they show that the baseline estimates, just using the administrative data (albeit with limited family background controls), are robust to the inclusion of such controls. Secondly, studies which generate their peer group from survey data (see for example, Ammermller and Pischke (2009), who address this issue, Fertig (2003), and Schneeweis and Winter-Ebmer (2007)) rather than administrative data and may be subject to measurement error.[20]

6.2 Mechanisms

Using the merged PLASC and LSYPE data allows an examination of the mechanisms that may be driving the peer effect. Table 5 analyses some of these potential mechanisms, we replace the dependent variable and replace it with the potential channel. Column 1, 2 and 3 use the three main other benefits that determine qualification for free school meals; the peer group remains the same. We find no effect on the main peer group variable for these three benefits. The main channel through which the peer effect operates appears to be through lone parents, such that for pupils who have many contacts in high-FSM claiming ethnic language group there is a greater probability of being a child from a single parent family. The peer effect that operates through lone parents is around 12%, therefore although this channel is important it is relatively small. This doesn't necessarily give an indication of the nature of the peer effect however, as has been shown the effect works through the lone parent channel, but that could be due to contacts with greater information or indeed less stigma, as is shown from the following quote from the previously mentioned qualitative survey regarding free school meals: "There's no problem with stigma, as there are a lot of single mothers in the area" hence a later section the issue of information and stigma will be examined in more detail.

6.3 Sample Selection & Heterogeneous Effects

The baseline estimates found larger slightly results for the lagged variables in some cases relative to the contemporaneous measures, therefore, to remain on the conservative side of

[20]Micklewright, Schnepf and Silva (2010) tackle this issue directly comparing results from the effect of group level estimates of free school meals on test scores using a sample from the PISA survey with the population of free school meal students from administrative data. They conclude that there is substantial attenuation bias, and this is greater where there is less segregation of pupils.)

the estimates and provide a lower bound of any effects the robustness estimates will use the contemporaneous peer group measure unless stated. The purpose of this section is twofold. Firstly, the sample selections act as robustness checks to make sure it is not one group or another is solely driving the effect. Secondly, they may indicate important heterogeneity of the impact.

Table 6 presents estimates for different samples. In the first panel we split the sample by various ages, below aged 8 and below aged 11 in order to capture effects at primary school, and above aged 11 and aged 14 to capture different effects at secondary school. The decision to register for free school meals would primarily be made by the parent for the younger children and as they become older the decision is more likely to be a joint decision. The estimates are all broadly similar to our main results. The peer effect for the oldest children aged fifteen and above is only slightly smaller than for the other ages. These suggest that peers have an impact over the entire distribution of ages.

Secondly, we again restrict the sample by age but also whether or not English is spoken as a first language. The effects here are stronger, suggesting that the peer effect is stronger for those who do not speak English as a first language- this is tested in the next section. The results in this panel confirm the previous findings that the effects are present across the age spectrum, if only slightly weaker for the older children. The larger effects, albeit marginal, for the younger children, and also those non English speaking, could suggest a playground effect. Where parents for younger children collect their children in the playground and then are more likely to interact with those of the same ethnic language group.

Thirdly, as table 2 showed that there is a wide variety of ethnicities present in the sample, and although one is not vastly bigger than the others, we may be concerned that one of these groups may be driving our results. Therefore the third panel excludes in turn Pakistani, African, Bangladeshi, and Indian ethnicities. Excluding the African ethnic group from the estimation has the most dramatic effect, the coefficient falls by around 40% in the school regression, and 35% in the area regressions, and they do however remain highly significant and positive. Therefore the dropping of these groups does little to the coefficient.

Next, we exclude groups with high free school meal eligibility, and again we find positive and significant results across the different regressions. The results from Africans who do not speak English as a first language are almost the same as to those in panel 3, where we exclude the whole African group, suggesting that it is this group that is driving that fall in the coefficient. When other high free school meal eligible groups are excluded from the estimation, the results are similar.

Finally, the bottom panel presents the estimates separately for each year, in each case the estimates remain similar, positive and statistically significant.

In figure 2, it is shown that there are large variations in free school meal registration. Therefore we examine two aspects of this regional variation. Panel A of Table 7 examines the robustness of the estimates as a result of dropping each of the goverment organisation regions. Other than when the London region is dropped, each of the estimates reduce slightly. However, they all remain positive and significant. In panel B the estimation is run for each region separately. This gives a slightly varied picture from no effect in the North East, to larger than average effects in the South East and East Midlands. Other than the North East, which has a low sample size due to the sample being restricted to non-white pupils, the effects remain positive and significant, albeit varying in magnitude.

6.4 English Proficiency

Table 8 examines how the peer effect differs according to how proficient one is at English. Firstly, we examine the impact on whether the pupil speaks English as a first language. The peer effect is much larger for those who do not speak English as a first language, this is because those who speak a language other than English are probably more reliant on others who share that language for information about the relevant systems for claiming that are in place than for someone who has English as a first language. This is the first indication that information could be an important element of the peer group.

In panels B and C we examine how the actual proficiency of English has an impact on the strength of the peer effect. Proficiency is measured by the level achieved in government set tests in English at ages 11 (Key Stage 2) and 14 (Key Stage 3).[21] In addition to the peer group measure, panel 2 includes two interactions, one interacting the peer group with an indicator for achieving level 4 and above and one for level 5 and above, in order to test the impact of English proficiency. As the English level of the student improves the strength of the peer group is diminished. This also holds for the older children, using the key stage 3 measures in panel 4. The peer effect still remains for those who score well on the tests, but is weaker as the level improves.

Panels D and E examine how English proficiency of contacts has an impact on the peer effect. As Bertrand et al (2000) mention, there are two opposite drivers of this effect. Increased English proficiency could imply that those contacts have more information about the system, and can help in navigating the bureaucracy of benefits, implying a positive effect. Conversely, areas with high English proficiency may be more attached to the labour market and less reliant on benefits so know less about the system. This second effect suggests a negative impact of English proficiency. The interacted terms of the peer group and the percentage in the school or area with level 4 and 5 and above is negative, most

[21] Level 4 is the expected level set by the government for Key Stage 2 and level 5 for Key Stage 3.

strongly for the higher level 5 in the key stage 2 results, almost suggesting no peer effect in the school level regression, albeit not totally for the area level regressions. The key stage 3 results tell a similar story, the effect is weaker in areas with higher percentages of those achieving level 5 and 6.

Panel F to I perform the same exercise replacing the English test levels, with the maths and science scores. The network effect is weaker for those with higher test scores for both key stage tests. The test scores between maths, science and English are not independent so it would be expected that there would be a similar effect for the maths and science scores. However the effect for maths and science are in most cases not as strong as for the English test scores, suggesting a role of information being spread through the network and that being due to ability in English as well as general quality of the pupil/parents.

6.5 Non-Linear Effects

Next we turn to potential non-linear effects. In particular we look at the peer effect for different percentages of free school meals within the school below certain cut offs. The results are shown in figure 4. The four lines represent four different measures of the peer group (year group, school, LSOA, MSOA). The coefficient is estimated for samples below the mean free school meal percentage, at 5% intervals. There is very little peer effect in schools below 5-10% of free school meal eligibility, however this rapidly rises and reaches a plateau at around below 30-35%. Although there is no way to test the different elements in this analysis, one could think at the lower level of free school meals there is greater stigma and less information, as one is in schools where more are eligible then the information would increase and stigma fall, resulting in a greater effect of peers.

6.6 Alternative Specifications

Table 9 presents a range alternative specifications based on different model specifications and changing the definition of the peer group. Rather than estimating linear probability models as we do in the baseline estimation, we estimate non-linear specifications, in row 1 we estimate a logit and row 2 a probit. Across all four locational measures of peer group the effect is positive and significant.

In the baseline specifications, white British, other white groups, refused and not obtained ethnicities were excluded from the sample. Rows 3-5 test the sensitivity of this assumption. In row 3 all ethnicities are included, the largest group being white British over 5,000,000 observations, as such for computational reasons we only estimate this for 2008. Including the additional ethnic groups, the largest of which is the white British group, is likely to generate a large amount of noise into the peer group as there are too

many in this group to be a good measure of the peer group. The estimates are smaller when all ethnic groups are included, as expected. Rows 4 and 5 go back to the baseline specification, then include the other white group, and identifiable ethnicity respectively. In both cases the results remain positive and significant.

Row 6, 7 and 8 check the sensitivity of the estimates to changing the peer group. Again the estimates are robust to these various changes. Row 6 replaces the log contact availability measure in the peer group with its level equivalent, rescaled by dividing by 100. Row 7 replaces the peer group measure with the percentage of free school meal eligibility of one's ethnic language group (excluding the individual). Finally, returning to the baseline peer group measure, we modify it in a number of ways. In the first column, rather than restricting to either an area or school, we define the group over both the school *and* area (LSOA). Column 2 excludes the year group from the school level peer group. Column 3 excludes the area from the school level peer group school and column 4 includes the area (LSOA) but excludes the school. In all these cases the effects remain significant.

6.7 Transition to Secondary School

This section exploits some institutional features of the school system in the UK. At the age of 11 children leave primary school and move to secondary school. When children make this transition they take some of their peers with them whereas others are new to the child. By using the forced move into a new peer group there is likely to be a large change in the contact availability as a result of the move. Therefore we use this transition to determine whether this has an impact on free school meal status. Table 9 presents results of the change in contact availability when a pupil moves from primary to secondary school. The sample includes only school movers and again includes all non-white children. Column 1 presents the estimates for the peer group who the child knew previously, whereas column 2 presents for those peers who are unfamiliar. In both cases we find a positive a significant effect of the peer group. We also run an alternative differential selection test analogous to column 2 in table 3. Again we find positive and significant effects, in both specifications.

6.8 Understanding the Peer Effect

This section tries to uncover the nature of the peer effect in more detail. The question we ask in this section is: How does the peer effect vary in the presence (or absence) of stigma or information? Previous sections have established the presence of a peer effect in free school meal eligibility, and also examined the potential mechanisms through which this may operate; next we try to uncover the nature of the peer effect. There are three main

roles of the peer effect that we examine here; the first is related to stigma (a psychological cost associated with the welfare benefit), secondly information, and lastly role models.

In attempting to measure β it is important to assess what β is actually measuring. Throughout the paper this has been referred to as a peer effect, but what does that encompass. β can be broken down into three component parts: $\beta^* = \beta_i + \beta_s + \beta_z$ where β_i measures the positive element of the peer effect that relates to providing information about the eligibility criteria and β_s measures the negative peer effect related to stigma, and β_z some other unknown elements that could be either positive or negative.

The task in this section goes beyond finding a peer effect and to examine a more general question as to how to separate out the main effects of information and stigma. This is attempted by comparing the peer effect in two states, when stigma (information) is present and when stigma (information) is absent. In the previous sections we have estimated that in the school level contemporary equation $\widehat{\beta} = 0.1$. Then in that case we know that $\widehat{\beta} = \beta_i + \beta_s + \beta_z = 0.1$ the problem is that we only know the combination of these three effects. One way around this would be to find a situation where we can set either β_i or β_s to 0, then estimate what the peer effect is in this case and compare the effects of a welfare shock in either case to see how each has a different effect in different environments.

Stigma Test

In order to do this we use a technological innovation that has been increasingly introduced into schools over the last few years - cashless catering systems. These replace the use of cash in the dining hall with some other payment method. There are a number of different types of cashless catering systems. These include swipe and smart cards[22], pin numbers, touch screen with student pictures displayed on screen, and biometric systems[23], where the pupils are identified using their finger print. We do not distinguish between the different systems in the analysis, however, they all have the key feature of introducing anonymity for those who claim free school meals and as such remove the stigma associated with taking them. Typically, before the introduction of cashless systems those eligible for free school meals would have been given a token in order to claim their meal, this would have made them very visible to the other pupils.

Therefore we are able to set $\beta_s = 0$ by using a subset of the schools and local authorities who have adopted this system. Data was collected by a phone interview from 406 secondary schools, a sample of around 10% of the total schools, in 31 local authorities[24]. The focus is

[22]Cash can be put on them by the parents and this would be automatic for those claiming free school meals

[23]The biometric system are less popular than other methods, this is due to ethical issues surrounding the collection of pupils' fingerprints

[24]The local authorities that were contacted were: Barking and Dagenham, Barnet, Barnsley, Bath and

on secondary schools, primarily because the cashless catering systems are far more likely to be used in secondary schools, given the cost involved and the gains in economies of scale that can be achieved are greater in a secondary school relative to primary. Secondly, it could be assumed that there is greater stigma in secondary schools, as children get older they are more likely to be aware of these issues. Finally, a practical reason is that calling one secondary school covers around 1000-1500 pupils compared to 100-300 pupils in a primary school.

The schools were asked whether they have introduced a cashless catering system. If the answer was positive, then a further question was asked as to when this was introduced. Figure 5 presents the coverage of cashless catering in schools in our sample. Coverage is measured in two ways, firstly by the number of pupils affected by the introduction of cashless system, and secondly by the number of schools. Around 10% of those contacted did not give a sufficient answer; of those for which it could be established whether or not they have a cashless system and in which year, around 60% of the schools contacted either operate some form of cashless system, 14.5% of schools had a cashless system before the analysis period (pre-2006), and 15.7% had introduced a system in 2010, 2011, or were planning to in the next academic year (2011/2012) beginning in September 2011. To determine whether this is a representative sample, we compare to two other surveys of cashless catering systems, the School Food Trust (2009) surveyed 98 secondary schools and found 53% have a cashless system, with 16.3% considering introducing a system in the near future. Nelson et al. (2010) in a survey conducted in 2009/2010 found around 45% of schools with catering in local authority control have a cashless system, compared to 20% not in local authority control. Therefore, although the two surveys and this current study ask slightly different questions regarding the use of cashless system, the results of the survey in the current study seem reasonable and not out of line with other surveys.

The School Food Trust (2009) and Nelson et al (2010) also directly asked reasons why the systems were introduced. Both surveys cite removal of stigma related to the identification of free school meals students as the primary reason for the introduction of cashless system. The School Food Trust (2009) cite the removal of stigma as the main reason for 77% of the schools that are considering using a cashless system, with faster transactions and ensuring money is spent on school meals with 66% being the second most popular answer. What these surveys show is that the primary reason for the introduction of these systems is the removal of stigma. In addition it is important to know why these are not introduced. The primary reason given is cost. These systems are quite costly between

North Somerset, Bedford, Bexley, Birmingham, Bradford, Bury, Derby, Ealing, Enfield, Hartlepool, Lambeth, Leicester, Newham, Nottingham, Nottinghamshire, Plymouth, Poole, Portsmouth, Richmond upon Thames, Southampton, Southend, Staffordshire, Tower Hamlets, Trafford, Waltham Forest, Wandsworth, Warrington, Warwickshire

£6000-25,000 depending upon the system and the size of the school, 70% of those surveyed cited budget constraints as the main reason for not introducing the system. Therefore, there may be differences between the schools who adopt the system and those who do not, although as we have seen from the surveys this is mainly due to the budgets of the schools. As there may be differences in unobservable characteristics between the schools which adopt this technology, we also restrict the estimation to those which have cashless systems and identify the effect through the variation in timing of the changes.

To determine the peer effect when stigma is removed we estimate the following:

$$\begin{aligned} FSM_{islt} = \alpha + \beta_1 \text{Peer Group}_{slt} + \beta_2 \text{Peer Group*Post Cashless}_{slt} + \\ + \beta_3 \text{Post Cashless}_{slt} + \delta X_{it} + \gamma Z_{st} + \lambda V_l + \delta CA_{slt} + \epsilon_{islt} \end{aligned} \tag{2}$$

This is the same equation as estimated in the previous sections; however we include the interaction of the peer group with a dummy variable that takes a value 1 for the year after the introduction of the cashless catering system. Therefore when Post Cashless = 1, the assumption we make is that there is no stigma such that $\beta_s = 0$, hence $\beta = \beta_i + \beta_z = \beta_1 + \beta_2$. When Post Cashless = 0 then $\beta = \beta_i + \beta_z + \beta_s = \beta_1$ so we can compare the peer effect when stigma is present and when it is absent. Given information and stigma come through the peers, we focus on how the peer effect changes with the introduction of a cashless system. Note that the Post Cashless$_{slt}$ variable is subsumed by the school by year fixed effects.

Table 11 presents the results of this estimation using the PLASC data from 2006 to 2009. Column 1 presents the peer group effect and the interaction for all schools in our sample that were called without any controls. Column 2 includes the controls from the baseline regressions, the coefficients remain similar. The interaction term is positive, suggesting that the removal of stigma has positive differential impact on the peer effect, i.e. removing stigma increases the peer effect. Alternatively, the results show that when a peer effect has stigma present, it is lower than when it has been removed. To interpret the effects, the same thought experiment is carried out as in the interpretation of the baseline results; hence we convert the effects into welfare shocks, and show the welfare shock with and without stigma. Hence from the coefficients from column 2, we find a welfare shock is 17% higher when peers with stigma are present, however this increases to 30% in the absence of stigma, a 45% increase in the welfare shock. In column 3 we restrict our sample to only those who have adopted the cashless system. In this case identification comes from variation within only those schools with cashless system and hence these schools should be more comparable on fixed unobservable characteristics. Here the removal of stigma has a greater effect. Column 3 to 5 adds additional controls, this has the effect of reducing the coefficient on the peer group, but the interaction term remains broadly similar. Column 4

and 5 include the white British ethnic group, the overall size of the welfare shocks decrease, however the presence of stigma has a larger effect reducing a positive welfare shock by 56% and 73% for all schools and cashless schools.

Information Test

Table 12 tests for the role that information may play in the peer effect. Aizer and Currie (2004), in examining the use of pre-natal medical care, assume that for second births mothers should know more about publicly funded pre-natal care programmes than those who are on their first birth. Therefore, they expect that if the role of peer groups is to pass on information, then for this group of second mothers the peer effect should be smaller. This section performs a similar test. The peer group is examined in a situation where the information element is less important for certain groups. Section 6.4 that examined proficiency in English is in similar vein. For groups where information from the peer is less important, such those who have high English Test scores, the less important the differential effect of the peer group. The results of this test are shown in column 1 and 2, at the school and LSOA level. The assumption we make is that there should be no information to be gained for those who have claimed in either of the previous two years. The sample is restricted to 2009, therefore a previous claimant is defined as someone who claimed in either 2008 and or 2007 [25]. We find that these estimates are significantly lower than was estimated in the baseline samples, therefore suggesting that information is an important component of the peer effect, this is in contrast to Aizer and Currie (2004) who do not find that information plays a role, but similar to Figlio et al. (2011) who in a less stable informational environment find information is important.

The claim form for free school meals, as described, showed that the free school meals had to be applied for each year, and also that the criteria changes from year to year, therefore, there are changes to the information that one need in order to register eligibility. Therefore, we can strengthen this test by using a second group - those who have claimed in the two previous years. Given the changes that occur to the criteria over time, the previous group's network effect may still have some residual information if we consider a longer timeframe. We estimate the following equation:

$$\begin{aligned} FSM_{islt} = \alpha + \beta_1 \text{Peer Group}_{slt} + \beta_2 \text{Peer Group*Previous FSM}_{slt} + \\ \beta_2 \text{Previous FSM}_{slt} + \delta X_i + \gamma Z_{st} + \lambda V_l + \delta CA_{lst} + \epsilon_{islt} \end{aligned} \tag{3}$$

Analogous to equation (2) this is the same equation as estimated in the baseline estimates with an added interaction of the peer group a dummy variable that takes a value 1 if the pupil has previously claimed free school meals in the previous two year. Therefore

[25] Various definitions of previous claimants were tested and each produced similar results

when Previous FSM = 1, the assumption we make is that there is no information for this group such that $\beta_i = 0$, hence $\beta^* = \beta_s + \beta_z = \beta_1 + \beta_2$. When Previous FSM = 0 then $\beta^* = \beta_i + \beta_s + \beta_z = \beta_1$ so we can compare the peer effect when information is present and when it is absent. Column 3 and 4 present the results of the above interaction test. When the peer effect contains little or no information, a welfare shock raises the response to a welfare shock by around 5% this increases to 9% when information is included; therefore, we find that the presence of information raises the response to a welfare shock by around 39% at the school level, and 18% for the LSOA level.

Next we examine how stigma and information vary according to both education and income. As the PLASC data does not have family background measures we utilise neighbourhood level information on employment and education deprivation[26]. We cut the sample into 4 quartiles and re-estimate the tests carried out in column 3 of table 13 for each of those quartiles. The presence of stigma has the greatest impact for those who are least deprived as seen in table 13; for the most deprived quartile the presence of stigma has less of an effect over the distribution of employment deprivation. A similar pattern is found for education where the decline of stigma has a more uniform fall. Similarly, table 14 replicates the two information tests for the quartiles of employment and education. For the least deprived there is no decline in the coefficient for the specific sample of previous claimants, there is a significant decline for the higher quartiles. Using the interaction test for employment, information is most important for the two most deprived income quartiles, however for education the only significant difference occurs for the most deprived quartile, suggesting that it is only for those with the lowest education that information is an important part of the network effect.

Role Model Test

The data allow a further test of the nature of the peer effect - that peers provide role models. A number of studies have shown that young children are influenced and imitate other and older children, (Brody and Stoneman (1981), Birch (1980)). Although we cannot identify the status of children, such as who are the leaders, within the peer group the school setting gives us an institutional framework to test for the presence of a role model effect.

[26]Deprivation measures come from the Office of National Statistics, Index of Multiple Deprivation Index. The two domains used here are defined as the following: Employment Deprivation - defined as involuntary exclusion of the working age population from work and includes elements of the 'hidden unemployed' such as those out of work due to illness and disability. Education, Skills and Training Deprivation - the extent of deprivation in education, skills and training in an area. The indicators grouped into two sub-domains: one relating to children and young people and one relating to adult skills. These two sub-domains are designed to reflect the 'flow' and 'stock' of educational disadvantage within an area respectively. For more information on indicies of deprivation see http://www.communities.gov.uk/communities/research/indicesdeprivation/ http://www.communities.gov.uk/communities/research/indicesdeprivation/

Given we are able to identify the year group of the child; this allows us to identify which pupils within a school are older and which are younger. Therefore if older children provide a role model, then, when that element of the peer group is given a greater weight, it would be expected that the peer effect would be greater. Table 15 presents the results of this test. Column 1 replicates the results from the baseline school regressions for comparison. Column 2 presents the first weighting scheme. The peer group is define as before, however, in this case we give a zero weight to younger children, with the assumption that the child only looks up to the older children, and weight the older children as before. Column 3 reverses this weighting scheme. When we compare column 2 and 3 for all children in the first panel, we find evidence in support of a role model hypothesis, with a stronger peer effect when we consider just older children. Alternative weighting schemes also reveal this pattern. Further, we might expect that role models are more salient for older children in secondary school, and children in primary school are less aware, therefore we split the sample by age. For the younger children the peer effect is invariant to weighting scheme, the estimates in column 2 and 3 are virtually identical. These estimates suggest that the peer effect may also reflect some role model element in relation to age.

7 Conclusion

This paper has examined the role of peer effects in the UK's largest food welfare programme, costing the government around £270 million pounds a year. We employ a large administrative data set. Defining the peer group as the interaction of a quality and quantity as proposed by Bertrand et al (2000), it is found that a pupil is more likely to be registered for free school meals when they are surrounded by more of their peers who share a common ethnicity and language, if that ethnic language group is a high free school meal using group at the national level. These effects are robust to a range of specifications and the controlling for unobserved characteristics using school/small area level by year fixed effects. The magnitude of the effect is such that the presence of peers increases a welfare shock by around 20-30%. However the effects are distributed differently throughout the country.

In addition the larger contribution of this paper is to be able to examine the nature of the peer effect. It is widely thought that peers provide information, stigma and social norms such as acting as role models. We propose a range of tests to gauge the extent to which each of these elements has an impact. We examine how the peer effect differs when stigma and information is present and when it is not. Recently, more and more schools have adopted a technological innovation that removes the stigma associated with free school meals; cashless catering systems remove the identification of those claiming.

We find that stigma dampens welfare shocks by around 40-60%. Similarly, we perform a similar test for information, assuming that the peer group should not provide information to those who have previously claimed. This test also shows that information is important. We examine how stigma and information vary according to income and education. For the most deprived, in terms of both income and education, stigma is less important and information is a more important component. Finally, using the structure of the data and that schools are seemingly formed into hierarchies of year groups, we examine role model effects through different weighting schemes and find that older peers are a greater influence than younger peers.

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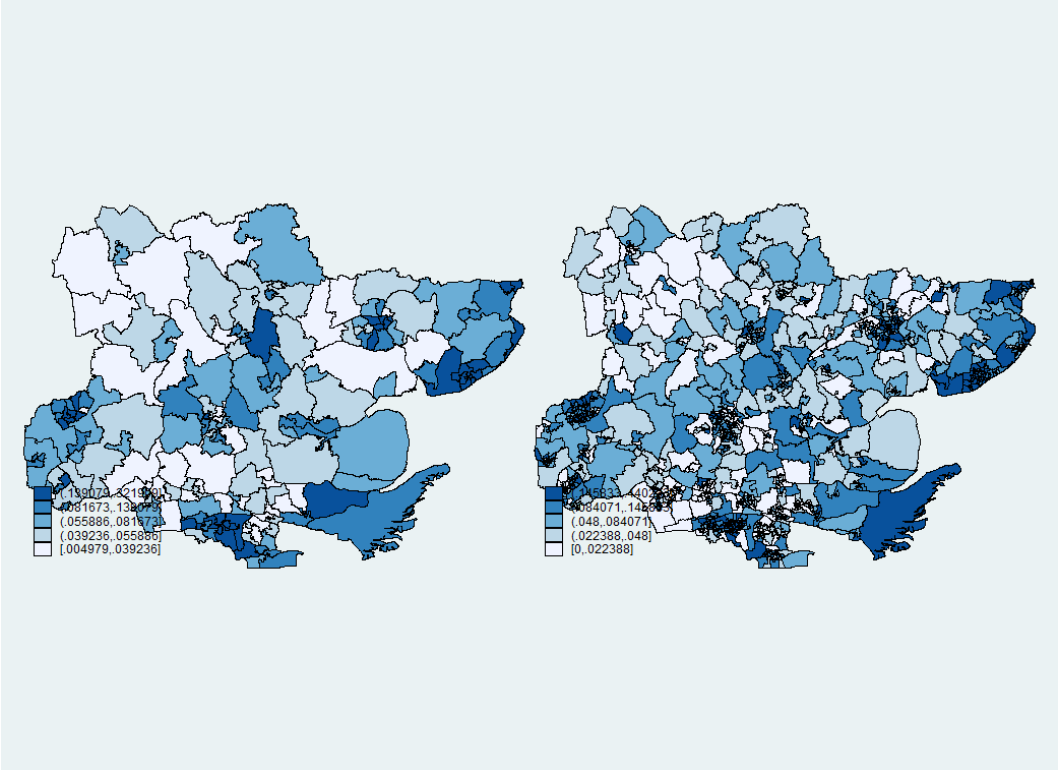
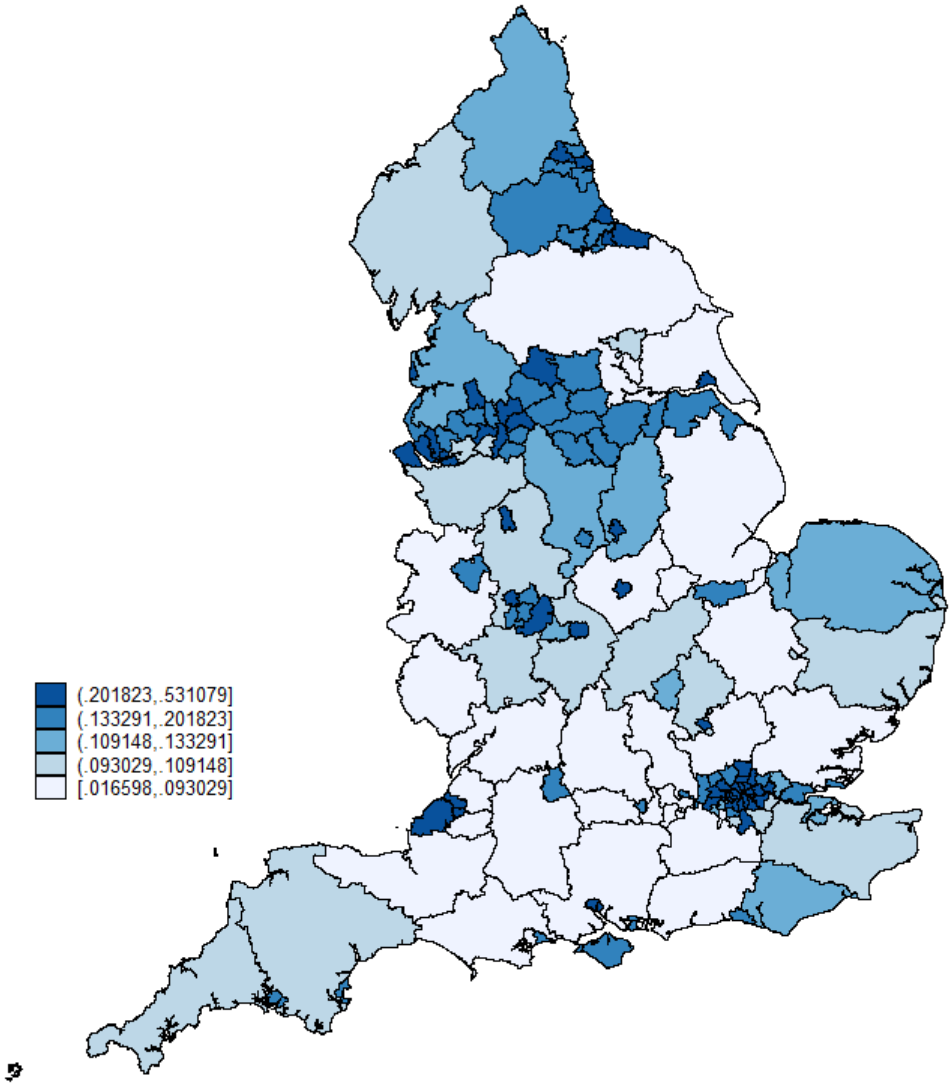
8 Tables and Figures

Figure 1: LSOA & MSOA Essex Map of Free School Meal Eligibility (Essex)



source: Based on 2008 PLASC data

Figure 2: Local Education Authority Map of Free School Meal Eligibility percentage in each



source: Based on 2008 PLASC data

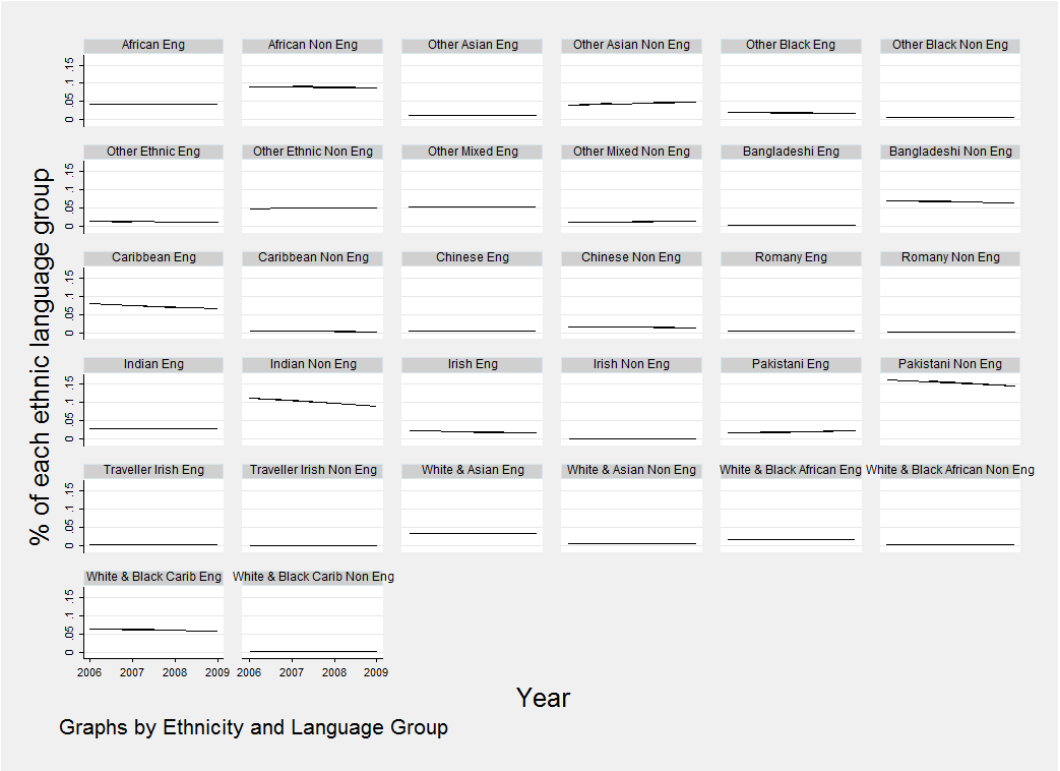


Figure 3: Trends of Ethnic Language Groups

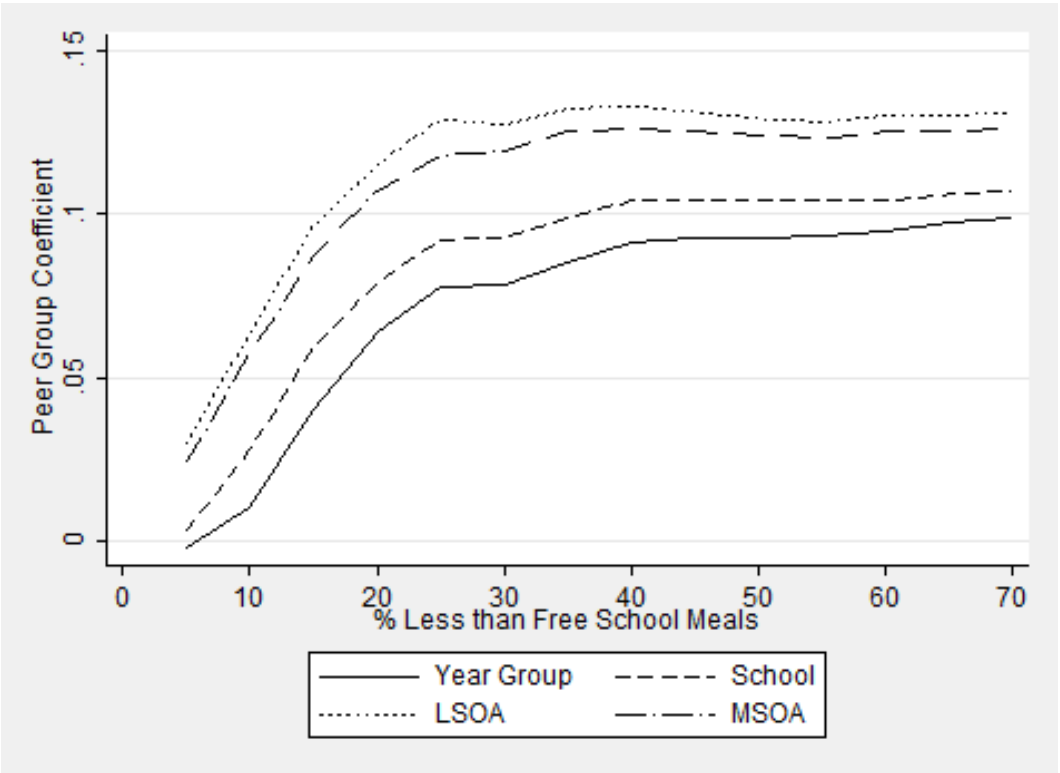


Figure 4: Peer Effects at different school levels percentages of Free School Meals

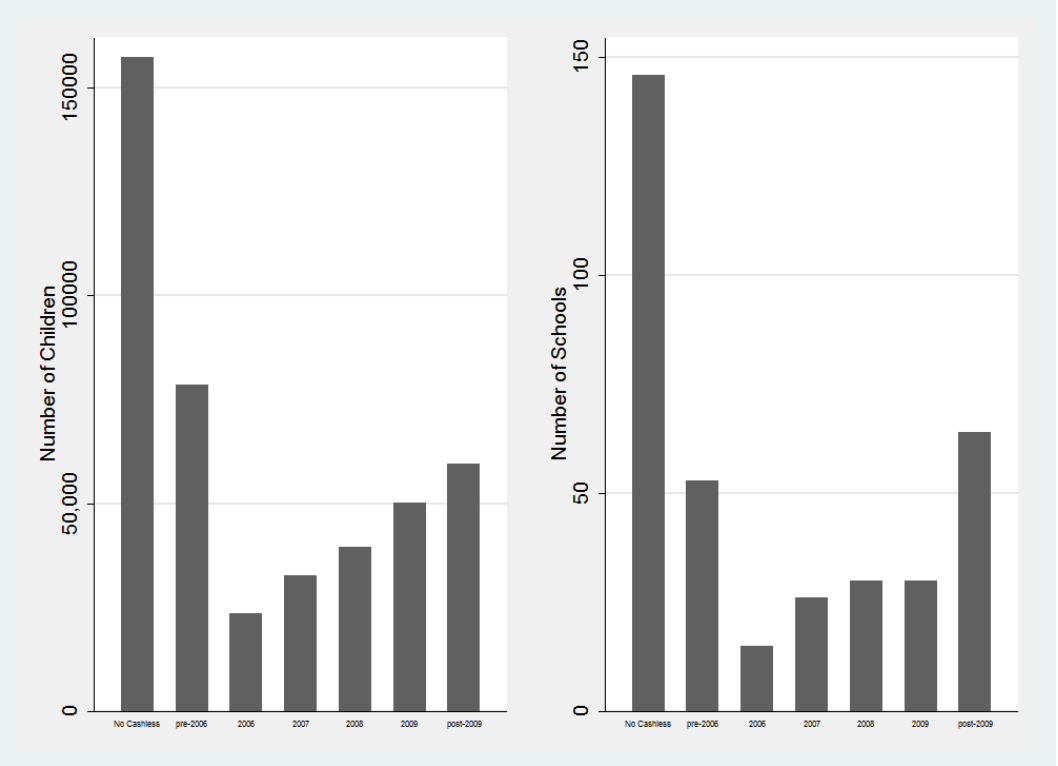


Figure 5: Cashless Catering Coverage: Children and Schools

Table 1: Summary Statistics

	PLASC Sample		LSYPE Sample	
	mean	sd	mean	sd
Free School Meal Eligible	0.260	0.439	0.241	0.428
Contact Availability and Peer Groups				
Year Group Contact Availability	13.48	51.60	12.04	15.73
Ln Year Group Contact Availability	1.920	1.155	1.795	1.248
Year Group Peer Group	0.216	0.310	0.189	0.327
School Contact Availability	10.39	30.03	10.36	14.39
Ln School Contact Availability	1.556	1.308	1.537	1.385
School Peer Group	0.185	0.300	0.170	0.323
LSOA Contact Availability	9.327	20.32	11.85	14.07
Ln LSOA Contact Availability	1.615	1.163	1.819	1.237
LSOA Peer Group	0.188	0.287	0.209	0.335
MSOA Contact Availability	7.411	10.05	9.966	12.73
Ln MSOA Contact Availability	1.318	1.281	1.561	1.342
MSOA Peer Group	0.161	0.274	0.184	0.325
Age	9.693	3.722	15.62	0.794
Male	0.509	0.500	0.469	0.499
Special Educational Need				
School Action	0.138	0.345	0.0847	0.278
School Action Plus	0.0612	0.240	0.0281	0.165
Statement	0.0275	0.163	0.0204	0.141
Mode of Transport				
Car	0.225	0.418		
Bus	0.130	0.337		
Walk	0.398	0.489		
Train	0.00692	0.0829		
Bullied				
Called Names			0.0502	0.218
Excluded from Friends			0.0239	0.153
Hand over money			0.00285	0.0533
Threatened with violence			0.0176	0.131
Experienced violence			0.0177	0.132
Other Background Characteristics				
Health of Main Parent Fairly or Very Good			0.784	0.412
Child Benefit			0.939	0.240
Guardian Allowence			0.00201	0.0448
Invalid Care Allowence			0.0219	0.146
Severe Disability Allowence			0.00736	0.0855
Disability Living Allowence			0.0800	0.271
Attendance Allowence			0.00569	0.0752
Income greater than 15,500			0.349	0.477
Disabled Mother			0.134	0.341
Disabled Father			0.122	0.327
Job Seekers Allowance			0.0196	0.139
Lone parent			0.216	0.411
Married Main Parent			0.726	0.446
Step Family			0.0382	0.192
Number of Siblings			2.070	1.483
Internet Access in the home			0.797	0.402
Main parent change to not working			0.0981	0.297
Income Source: pension			0.0385	0.192
Income Source: income support			0.202	0.402
Income Source: tax credits			0.419	0.493
Aware of EMA			0.630	0.483
Applied for EMA			0.107	0.309
Will apply for EMA			0.544	0.498
Number of observations	3,881,969		5975	

Notes: Summary statistics based on baseline sample from table 1.3 column 1 for PLASC sample, and table 1.4 for LSYPE sample

Table 2: Summary Statistics of Ethnicity Language Group by Free School Meal Eligibility

	PLASC Sample						LSYPE-PLASC Combined Sample					
	Non-FSM		FSM		Total		Non-FSM		FSM		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Ethnicity and Language Group												
African Eng	141,275	80.6%	34,019	19.4%	175,294	100.0%	414	85.2%	72	14.8%	486	100.0%
African Non Eng	185,613	50.7%	180,519	49.3%	366,132	100.0%	453	54.8%	373	45.2%	826	100.0%
Other Asian Eng	42,818	87.7%	5,986	12.3%	48,804	100.0%	49	87.5%	7	12.5%	56	100.0%
Other Asian Non Eng	158,684	83.7%	30,938	16.3%	189,622	100.0%	128	81.5%	29	18.5%	157	100.0%
Other Black Eng	53,736	70.7%	22,274	29.3%	76,010	100.0%	68	90.7%	7	9.3%	75	100.0%
Other Black Non Eng	18,793	59.9%	12,590	40.1%	31,383	100.0%	19	61.3%	12	38.7%	31	100.0%
Other Ethnic Eng	38,180	80.9%	9,017	19.1%	47,197	100.0%	39	88.6%	5	11.4%	44	100.0%
Other Ethnic Non Eng	133,788	64.9%	72,214	35.1%	206,002	100.0%	96	65.8%	50	34.2%	146	100.0%
Other Mixed Eng	168,664	78.7%	45,570	21.3%	214,234	100.0%	319	85.1%	56	14.9%	375	100.0%
Other Mixed Non Eng	39,790	77.1%	11,839	22.9%	51,629	100.0%	52	76.5%	16	23.5%	68	100.0%
Bangladeshi Eng	9,370	73.4%	3,387	26.6%	12,757	100.0%	42	76.4%	13	23.6%	55	100.0%
Bangladeshi Non Eng	166,410	61.9%	102,384	38.1%	268,794	100.0%	607	50.2%	602	49.8%	1,209	100.0%
Caribbean Eng	204,434	72.8%	76,442	27.2%	280,876	100.0%	815	79.7%	208	20.3%	1,023	100.0%
Caribbean Non Eng	10,164	69.4%	4,472	30.6%	14,636	100.0%	40	65.6%	21	34.4%	61	100.0%
Chinese Eng	16,959	93.8%	1,114	6.2%	18,073	100.0%	18	100.0%	0	0.0%	18	100.0%
Chinese Non Eng	53,981	89.7%	6,182	10.3%	60,163	100.0%	56	90.3%	6	9.7%	62	100.0%
Romany Eng	12,804	57.0%	9,667	43.0%	22,471	100.0%	2	100.0%	0	0.0%	2	100.0%
Romany Non Eng	4,373	66.5%	2,202	33.5%	6,575	100.0%	0	0%	0	0.0%	0	0%
Indian Eng	109,200	93.1%	8,108	6.9%	117,308	100.0%	369	95.8%	16	4.2%	385	100.0%
Indian Non Eng	361,554	90.2%	39,240	9.8%	400,794	100.0%	1,447	90.2%	157	9.8%	1,604	100.0%
Irish Eng	62,198	83.4%	12,369	16.6%	74,567	100.0%	40	75.5%	13	24.5%	53	100.0%
Irish Non Eng	600	78.0%	169	22.0%	769	100.0%	0	0%	0	0.0%	0	0%
Pakistani Eng	62,195	77.2%	18,363	22.8%	80,558	100.0%	158	74.9%	53	25.1%	211	100.0%
Pakistani Non Eng	446,662	72.4%	170,209	27.6%	616,871	100.0%	1,008	65.7%	527	34.3%	1,535	100.0%
Traveller Irish Eng	5,571	42.7%	7,477	57.3%	13,048	100.0%	1	100.0%	0	0.0%	1	100.0%
Traveller Irish Non Eng	73	29.9%	171	70.1%	244	100.0%	0	0%	0	0.0%	0	0%
White & Asian Eng	112,652	83.6%	22,035	16.4%	134,687	100.0%	252	93.3%	18	6.7%	270	100.0%
White & Asian Non Eng	17,496	78.9%	4,674	21.1%	22,170	100.0%	32	80.0%	8	20.0%	40	100.0%
White & Black African Eng	48,813	76.4%	15,103	23.6%	63,916	100.0%	92	85.2%	16	14.8%	108	100.0%
White & Black African Non Eng	10,592	66.1%	5,430	33.9%	16,022	100.0%	7	36.8%	12	63.2%	19	100.0%
White & Black Carib Eng	172,365	70.2%	73,099	29.8%	245,464	100.0%	344	76.4%	106	23.6%	450	100.0%
White & Black Carib Non Eng	3,433	70.0%	1,471	30.0%	4,904	100.0%	7	70.0%	3	30.0%	10	100.0%
Total	2,873,240	74.0%	1,008,734	26.0%	3,881,974	100.0%	6,974	74.3%	2,406	25.7%	9,380	100.0%

Table 3: Baseline: PLASC

	(1) OLS	(2) IV	(3) IV	(4) OLS	(5) IV
	Panel A: School Level				
	School	School	School	Year Group	Year Group
Peer Group	0.107***	0.207***	0.190***	0.0996***	0.138***
	(0.00549)	(0.00696)	(0.00825)	(0.00257)	(0.00282)
Contact Availability	-0.0127***	-0.0235***	-0.0217***	-0.0133***	-0.0174***
	(0.000732)	(0.000872)	(0.000971)	(0.000395)	(0.000417)
Observations	3881969	3858263	3878419	3881969	3816367
R-squared	0.048	0.047	0.047	0.045	0.045
Welfare Shock	19.9%	47.2%	41.7%	23.6%	36.0%
Peer Group$_{t-1}$	0.112***	0.179***	0.169***	0.107***	0.132***
	(0.00440)	(0.00576)	(0.00705)	(0.00216)	(0.00237)
Contact Availability$_{t-1}$	-0.0134***	-0.0213***	-0.0201***	-0.0142***	-0.0170***
	(0.000680)	(0.000795)	(0.000909)	(0.000382)	(0.000398)
Observations	3348754	3326100	3344468	3348754	3290105
R-squared	0.048	0.048	0.048	0.047	0.047
Welfare Shock	22.1%	40.8%	37.7%	26.8%	35.3%
Peer Group$_{t-2}$	0.114***	0.163***	0.156***	0.109***	0.128***
	(0.004)	(0.005)	(0.007)	(0.002)	(0.003)
Contact Availability$_{t-2}$	-0.014***	-0.020***	-0.019***	-0.015***	-0.017***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Observations	1971079	1956485	1967620	1971079	1937508
R-squared	0.049	0.049	0.049	0.047	0.047
Welfare Shock	23.5%	37.3%	35.2%	28.4%	35.0%
School (Year Group) x Year FE	Yes	Yes	Yes	Yes	Yes
Ethnic Language FE	Yes	Yes	Yes	Yes	Yes
Instrument	-	MSOA	LEA	-	LEA
	Panel B: Area Level				
	LSOA	LSOA	LSOA	MSOA	MSOA
Peer Group	0.130***	0.154***	0.242***	0.124***	0.187***
	(0.00506)	(0.00564)	(0.00770)	(0.00583)	(0.00777)
Contact Availability	-0.0141***	-0.0168***	-0.0264***	-0.0148***	-0.0219***
	(0.000680)	(0.000733)	(0.000926)	(0.000677)	(0.000831)
Observations	3,861,867	3,858,355	3,858,391	3,861,831	3,861,792
R-squared	0.050	0.050	0.049	0.056	0.056
Welfare Shock	26.6%	33.1%	64.2%	19.4%	32.4%
Peer Group$_{t-1}$	0.133***	0.149***	0.206***	0.130***	0.173***
	(0.00273)	(0.00305)	(0.00416)	(0.00381)	(0.00497)
Contact Availability$_{t-1}$	-0.0152***	-0.0170***	-0.0239***	-0.0160***	-0.0213***
	(0.000444)	(0.000472)	(0.000580)	(0.000552)	(0.000658)
Observations	3324153	3319510	3319539	3324122	3324091
R-squared	0.051	0.051	0.051	0.058	0.057
Welfare Shock	28.4%	32.9%	52.1%	21.5%	30.9%
Peer Group$_{t-2}$	0.133***	0.142***	0.185***	0.130***	0.162***
	(0.004)	(0.004)	(0.006)	(0.005)	(0.006)
Contact Availability$_{t-2}$	-0.017***	-0.018***	-0.023***	-0.017***	-0.021***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	1954766	1950999	1951013	1954750	1954731
R-squared	0.052	0.052	0.052	0.058	0.058
Welfare Shock	29.1%	31.6%	45.6%	22.1%	29.2%
Area x Year FE	Yes	Yes	Yes	Yes	Yes
Ethnic Language FE	Yes	Yes	Yes	Yes	Yes
Instrument	-	MSOA	LEA	-	LEA

notes: standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. Additional controls include: age, age squared, month of birth, special educational need dummies, mode of transport dummies, peer group means of the additional controls are also included

Table 4: Baseline: PLASC & LSYPE

	(1) School OLS	(2) School OLS	(3) School OLS	(4) School OLS	(5) School OLS	(6) School OLS	(7) School IV
Peer Group	0.110**	0.131***	0.127***	0.132***	0.113**	0.122***	0.162**
	(0.0508)	(0.0471)	(0.0466)	(0.0464)	(0.0449)	(0.0441)	(0.0637)
Contact Availability	0.0296***	0.0133**	0.0141**	0.0128**	0.00933	0.00879	0.00536
	(0.00721)	(0.00627)	(0.00628)	(0.00627)	(0.00621)	(0.00612)	(0.00770)
Income $\geq >$ 15500		-0.0797***	-0.0811***	-0.0751***	-0.0503***	-0.0457***	-0.0448***
		(0.00942)	(0.00939)	(0.00945)	(0.00887)	(0.00888)	(0.00982)
Job Seekers Allowance (w2)		0.233***	0.238***	0.233***	0.242***	0.241***	0.242***
		(0.0415)	(0.0414)	(0.0415)	(0.0417)	(0.0420)	(0.0445)
Income Source: pension		0.160***	0.168***	0.164***	0.152***	0.157***	0.157***
		(0.0302)	(0.0300)	(0.0300)	(0.0295)	(0.0312)	(0.0312)
Income Source: income support		0.475***	0.463***	0.459***	0.393***	0.386***	0.386***
		(0.0183)	(0.0191)	(0.0192)	(0.0195)	(0.0196)	(0.0177)
Income Source: tax credits		0.00120	0.00114	-0.00497	-0.00865	-0.00862	-0.00883
		(0.0109)	(0.0109)	(0.0110)	(0.0107)	(0.0108)	(0.0102)
Child Benefit			0.0517**	0.0496**	0.0539**	0.0551**	0.0542**
			(0.0243)	(0.0244)	(0.0236)	(0.0237)	(0.0234)
Guardian Allowence			0.0826	0.0627	0.0457	0.0647	0.0842
			(0.0807)	(0.0827)	(0.0895)	(0.0907)	(0.0949)
Invalid Care Allowence			-0.0186	-0.0217	0.0247	0.0251	0.0265
			(0.0389)	(0.0389)	(0.0385)	(0.0390)	(0.0401)
Severe Disability Allowence			0.0632	0.0652	0.0283	0.0429	0.0479
			(0.0585)	(0.0582)	(0.0600)	(0.0613)	(0.0621)
Disability Living Allowence			0.0819***	0.0800***	0.0395*	0.0366	0.0384*
			(0.0235)	(0.0235)	(0.0240)	(0.0240)	(0.0231)
Attendance Allowence			0.0668	0.0624	0.0505	0.0456	0.0431
			(0.0786)	(0.0782)	(0.0783)	(0.0793)	(0.0782)
Aware of EMA (w2)				-0.0115	-0.0139	-0.0117	-0.0115
				(0.00956)	(0.00947)	(0.00964)	(0.00979)
Applied for EMA (w3)				0.0366**	0.0130	0.00840	0.0108
				(0.0174)	(0.0168)	(0.0166)	(0.0174)
Will apply for EMA (w3)				0.0424***	0.0138	0.0124	0.0121
				(0.0108)	(0.0110)	(0.0109)	(0.0105)
Lone parent					0.100***	0.102***	0.104***
					(0.0218)	(0.0219)	(0.0231)
Married Main Parent					-0.0586***	-0.0609***	-0.0614***
					(0.0197)	(0.0196)	(0.0207)
Step Family					0.0142	0.0188	0.0174
					(0.0265)	(0.0268)	(0.0267)
Number of Siblings					0.0163***	0.0161***	0.0160***
					(0.00394)	(0.00402)	(0.00401)
Disabled Father					0.125***	0.125***	0.126***
					(0.0191)	(0.0192)	(0.0185)
Disabled Mother					0.0172	0.0196	0.0191
					(0.0179)	(0.0182)	(0.0176)
Health of Main Parent Fairly or Very Good					-0.0590***	-0.0537***	-0.0542***
					(0.0144)	(0.0145)	(0.0154)
Internet Access in the home (w3)					-0.0376**	-0.0320**	-0.0336**
					(0.0149)	(0.0149)	(0.0142)
Main parent change to not working					0.0443**	0.0479***	0.0492***
					(0.0182)	(0.0182)	(0.0182)
Bullied: Called Names						0.00784	0.00882
						(0.0215)	(0.0226)
Bullied: Excluded from Friends						0.0289	0.0329
						(0.0332)	(0.0331)
Bullied: Hand over money						-0.0392	-0.0400
						(0.0470)	(0.0481)
Bullied: Threatened with violence						-0.0414	-0.0442
						(0.0349)	(0.0342)
Bullied: Experienced violence						-0.0304	-0.0318
						(0.0342)	(0.0366)
Observations	5,975	5,975	5,975	5,975	5,975	5,975	5,521
R-squared	0.071	0.322	0.327	0.329	0.366	0.373	0.374
Area FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic Language FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instrument	-	-	-	-	-	-	MSOA

notes: standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. Additional controls included in column 6 are six education dummies and ten age dummies of the mother

Table 5: Mechanisms

VARIABLES	(1) JSA	(2) Income Support	(3) Tax Credits	(4) Applied for EMA	(5) Lone Parent	(6) Disabled Father	(7) Disabled Mother	(8) Siblings	(9) Changed Job
Peer Group	-0.000556	-0.00528	-0.0414	-0.0795*	0.126***	0.00967	0.0789*	0.193	-0.0560
	(0.0183)	(0.0438)	(0.0630)	(0.0414)	(0.0345)	(0.0349)	(0.0417)	(0.178)	(0.0381)
Contact Availability	-0.00138	0.0202***	0.0134	0.0160***	0.00134	0.0210***	-0.0139**	0.0151	0.00177
	(0.00269)	(0.00645)	(0.0106)	(0.00604)	(0.00463)	(0.00605)	(0.00697)	(0.0267)	(0.00608)
Constant	6.163	-1.416	1.708	-7.092	0.116	40.01**	-0.995	40.69	-12.41
	(5.409)	(17.30)	(13.57)	(5.449)	(5.101)	(16.59)	(4.617)	(29.48)	(11.74)
Observations	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975
R-squared	0.036	0.242	0.090	0.235	0.701	0.149	0.156	0.195	0.076
Number of sch_yr	1,264	1,264	1,264	1,264	1,264	1,264	1,264	1,264	1,264
Area FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic Language FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

notes: standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. Additional controls include those in column 6 of table 1.3

Table 6: Robustness Checks: Sample Selection

	(1) Yr Group	(2) School	(3) LSOA	(4) MSOA
Panel A: *Age Samples*				
Age≥ 15	0.0815***	0.101***	0.119***	0.117***
	(0.00704)	(0.0101)	(0.00756)	(0.00662)
Age≥ 12	0.0988***	0.107***	0.133***	0.128***
	(0.00448)	(0.00967)	(0.00636)	(0.00636)
Age≤ 10	0.105***	0.112***	0.122***	0.120***
	(0.00367)	(0.00672)	(0.00570)	(0.00609)
Age≤ 7	0.106***	0.110***	0.117***	0.118***
	(0.00491)	(0.00718)	(0.00612)	(0.00614)
Panel B: *Age and Language Samples*				
Age≥ 15 & English Not 1st Language	0.109***	0.129***	0.111***	0.111***
	(0.00887)	(0.0122)	(0.0103)	(0.00831)
Age≥ 12 & English Not 1st Language	0.131***	0.143***	0.135***	0.135***
	(0.00555)	(0.0112)	(0.00808)	(0.00735)
Age≤ 10 & English Not 1st Language	0.138***	0.149***	0.140***	0.140***
	(0.00442)	(0.00773)	(0.00753)	(0.00645)
Age≤ 7 & English Not 1st Language	0.139***	0.145***	0.133***	0.136***
	(0.00590)	(0.00838)	(0.00726)	(0.00665)
Panel C: *Excluded Ethnic Groups*				
Pakistani	0.103***	0.110***	0.137***	0.128***
	(0.00272)	(0.00584)	(0.00529)	(0.00607)
African	0.0646***	0.0654***	0.0935***	0.0882***
	(0.00286)	(0.00493)	(0.00511)	(0.00454)
Bangladeshi	0.105***	0.113***	0.333***	0.127***
	(0.00278)	(0.00597)	(0.00105)	(0.00644)
Panel D: *Excluded High FSM Groups*				
Pakistani & English not 1st Language	0.102***	0.109***	0.136***	0.127***
	(0.00268)	(0.00364)	(0.00341)	(0.00466)
African & English not 1st Language	0.0680***	0.0682***	0.102***	0.0951***
	(0.00285)	(0.00329)	(0.00344)	(0.00375)
Bangladeshi & English not 1st Language	0.100***	0.108***	0.130***	0.124***
	(0.00258)	(0.00550)	(0.00508)	(0.00585)
Panel E: *Year Sample*				
2007	0.0932***	0.104***	0.123***	0.121***
	(0.00447)	(0.00606)	(0.00566)	(0.00778)
2008	0.100***	0.109***	0.134***	0.128***
	(0.00443)	(0.00594)	(0.00567)	(0.00787)
2009	0.0969***	0.105***	0.132***	0.127***
	(0.00440)	(0.00596)	(0.00572)	(0.00767)

notes: standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. Each cell is a separate regression. See notes to table 1.3 for additional controls

Table 7: Regional Analysis

	Panel A: Dropped Regions								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	London	West Mid	Yorks	N West	N East	S West	East	S East	E Mid
Peer Group	0.103***	0.0851***	0.0855***	0.0842***	0.0833***	0.0788***	0.0734***	0.0684***	0.0781***
	(0.00384)	(0.00345)	(0.00336)	(0.00343)	(0.00328)	(0.00333)	(0.00341)	(0.00350)	(0.00336)
Contact Availability	-0.00963***	-0.00608***	-0.00706***	-0.00693***	-0.00673***	-0.00674***	-0.00612***	-0.00572***	-0.00654***
	(0.000436)	(0.000425)	(0.000408)	(0.000414)	(0.000398)	(0.000405)	(0.000416)	(0.000429)	(0.000412)
Observations	2926831	4239602	4450792	4395758	4757097	4639948	4438095	4280557	4539616
	Panel B: Individual Regions								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	London	West Mid	Yorks	N West	N East	S West	East	S East	E Mid
Peer Group	0.0251***	0.0990***	0.0524***	0.0698***	-0.00894	0.172***	0.0204**	0.104***	0.162***
	(0.00661)	(0.00789)	(0.0119)	(0.00935)	(0.0207)	(0.0120)	(0.00908)	(0.00956)	(0.0112)
Contact Availability	-0.00593***	-0.0142***	-0.00440***	-0.00713***	-0.00389	-0.00633***	-0.00438***	-0.00692***	-0.00977***
	(0.000773)	(0.00107)	(0.00137)	(0.00121)	(0.00262)	(0.00141)	(0.000951)	(0.000875)	(0.00121)
Observations	1906706	593935	382745	437779	76440	193589	395442	552980	293921
R-squared	0.055	0.045	0.036	0.039	0.038	0.068	0.044	0.044	0.056

notes: standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. Each cell is a separate regression. See notes to table 1.3 for additional controls

Table 8: Hetrogeneous Effects: English Proficiency

	(1) School	(2) LSOA	(3) MSOA
Panel A: English as a First Language			
Peer Group	0.105***	0.173***	0.130***
	(0.00793)	(0.00745)	(0.00765)
Peer Group x English Not 1st Language	0.108***	0.0754***	0.0902***
	(0.00814)	(0.00692)	(0.00827)
Panel B: Own Key Stage 2 English Results			
Peer Group	0.186***	0.186***	0.189***
	(0.0115)	(0.0115)	(0.0102)
Peer Group x Eng Level 4 and Above	-0.0479***	-0.0557***	-0.0326***
	(0.00845)	(0.00867)	(0.00811)
Peer Group x Eng Level 5 and Above	-0.0733***	-0.0835***	-0.0766***
	(0.00775)	(0.00810)	(0.00783)
Panel C: Own Key Stage 3 English Results			
Peer Group	0.137***	0.164***	0.172***
	(0.0149)	(0.0144)	(0.0134)
Peer Group x Eng Level 5 and Above	-0.0216*	-0.0425***	-0.0468***
	(0.0125)	(0.0119)	(0.0123)
Peer Group x Eng Level 6 and Above	-0.0512***	-0.0577***	-0.0520***
	(0.0110)	(0.0115)	(0.0119)
Peer Group x Eng Level 7 and Above	-0.0590***	-0.0587***	-0.0616***
	(0.0181)	(0.0184)	(0.0177)
Panel D: Mean Level of English Of Contacts (Key Stage 2 English Results)			
Peer Group	0.196***	0.201***	0.251***
	(0.0172)	(0.0155)	(0.0162)
Peer Group x % KS2 Eng Level 4 and Above in Area/School	-0.0189	-0.0550***	-0.102***
	(0.0215)	(0.0185)	(0.0216)
Peer Group x % KS2 Eng Level 5 and Above in Area/School	-0.268***	-0.204***	-0.224***
	(0.0269)	(0.0217)	(0.0262)
Panel E: Mean Level of English Of Contacts (Key Stage 3 English Results)			
Peer Group	0.221***	0.199***	0.238***
	(0.0238)	(0.0174)	(0.0192)
Peer Group x % KS3 Eng Level 5 and Above in Area/School	-0.138***	-0.0975***	-0.130***
	(0.0339)	(0.0214)	(0.0275)
Peer Group x % KS3 Eng Level 6 and Above in Area/School	-0.0904**	-0.115***	-0.145***
	(0.0401)	(0.0252)	(0.0331)
Peer Group x % KS3 Eng Level 7 and Above in Area/School	-0.119**	-0.0382	-0.0303
	(0.0517)	(0.0421)	(0.0526)
Panel F: Own Key Stage 2 Maths Results			
Peer Group	0.169***	0.163***	0.170***
	(0.0112)	(0.0115)	(0.0101)
Peer Group x Maths Level 4 and Above	-0.0364***	-0.0370***	-0.0156**
	(0.00802)	(0.00869)	(0.00812)
Peer Group x Maths Level 5 and Above	-0.0440***	-0.0492***	-0.0458***
	(0.00765)	(0.00810)	(0.00788)
Panel G: Own Key Stage 3 Maths Results			
Peer Group	0.130***	0.151***	0.157***
	(0.0152)	(0.0146)	(0.0135)
Peer Group x Maths Level 5 and Above	-0.0228	-0.0307**	-0.0270*
	(0.0154)	(0.0141)	(0.0144)
Peer Group x Maths Level 6 and Above	-0.00365	-0.0132	-0.0194
	(0.0128)	(0.0136)	(0.0136)
Peer Group x Maths Level 7 and Above	-0.0362***	-0.0385***	-0.0353***
	(0.0125)	(0.0125)	(0.0126)
Panel H: Own Key Stage 2 Science Results			
Peer Group	0.170***	0.162***	0.169***
	(0.0113)	(0.0116)	(0.0101)
Peer Group x Sci Level 4 and Above	-0.0319***	-0.0310***	-0.0123
	(0.00829)	(0.00897)	(0.00861)
Peer Group x Sci Level 5 and Above	-0.0394***	-0.0430***	-0.0365***
	(0.00744)	(0.00771)	(0.00720)
Panel I: Own Key Stage 3 Science Results			
Peer Group	0.125***	0.153***	0.157***
	(0.0144)	(0.0138)	(0.0127)
Peer Group x Sci Level 5 and Above	-0.00596	-0.0327***	-0.0281**
	(0.0128)	(0.0119)	(0.0128)
Peer Group x Sci Level 6 and Above	-0.0364***	-0.0397***	-0.0380***
	(0.0120)	(0.0125)	(0.0128)
Peer Group x Sci Level 7 and Above	-0.0539***	-0.0528***	-0.0593***
	(0.0147)	(0.0157)	(0.0163)

notes: standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. See notes to table 1.3 for additional controls

Table 9: Alternative Specifications

	(1) Yr Group	(2) School	(3) LSOA	(4) MSOA
Logit	0.662***	0.659***	0.941***	0.703***
	(0.0104)	(0.00920)	(0.0105)	(0.00972)
Probit	0.426***	0.423***	0.587***	0.455***
	(0.00592)	(0.00522)	(0.00594)	(0.00547)
Include All Ethnicities	0.0445***	0.0562***	0.0755***	0.0703***
	(0.00384)	(0.00556)	(0.00532)	(0.00760)
Baseline inc other white background	0.0768***	0.0854***	0.104***	0.101***
	(0.00238)	(0.00328)	(0.00315)	(0.00446)
Baseline inc refused and not obtained	0.0949***	0.101***	0.126***	0.120***
	(0.00250)	(0.00340)	(0.00321)	(0.00444)
Levels/100 not logs	0.0501***	0.0964***	0.113***	0.474***
	(0.00674)	(0.0176)	(0.0239)	(0.125)
% FSM of Ethnic Language Group	0.0879***	0.490***	0.518***	0.572***
	(0.00218)	(0.00231)	(0.00175)	(0.00230)
	School and LSOA	School Not YGroup	School Not LSOA	LSOA not School
Peer Group	0.0412***	0.0956***	0.0879***	0.0857***
	(0.00276)	(0.00365)	(0.00371)	(0.00368)

notes: standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. Each cell is a separate regression. See notes to table 1.3 for additional controls

Table 10: Transition to Secondary School: Familiar & Unfamiliar Peers

	(1) Familiar OLS	(2) Unfamiliar OLS	(3) School IV	(4) School IV
Peer Group	0.166****	0.109****	0.278****	0.118****
	(0.0193)	(0.0140)	(0.0334)	(0.0152)
Contact Availability	-0.0125****	-0.0117****	-0.0290****	-0.0128****
	(0.00280)	(0.00205)	(0.00391)	(0.00225)
Constant	-0.340	-1.285		
	(1.908)	(2.048)		
Observations	96271	93012	93979	90957
R-squared	0.050	0.049	0.047	0.049
Number of Schools	6299	5776	4007	3721
School FE	Yes	Yes	Yes	Yes
Ethnic Language FE	Yes	Yes	Yes	Yes
Instrument			Familiar	Unfamiliar

notes: standard errors in parenthesis, *** p<0.01, ** p<0.05, * p<0.1, see notes to table 3 for additional controls

Table 11: Cashless Catering: Stigma Test

	(1)	(2)	(3)	(4)	(5)
Peer Group	0.0820***	0.0814***	0.0595***	0.0621***	0.0348**
	(0.0122)	(0.0124)	(0.0162)	(0.0121)	(0.0152)
Peer Group*Post Cashless	0.0521***	0.0556***	0.0707***	0.0628***	0.0797***
	(0.0163)	(0.0164)	(0.0186)	(0.0164)	(0.0181)
Observations	438,100	438,100	281,721	1,437,540	876,581
School Sample	All	All	Cashless	All	Cashless
Ethnic Language FE	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes
Includes White British	No	No	No	Yes	Yes
No Stigma $\beta_1 + \beta_2$	0.134	0.136	0.130	0.122	0.114
Welfare Shock - No Stigma	31%	32%	30%	7%	7%
Stigma β_1	0.082	0.0814	0.0595	0.0621	0.0348
Welfare Shock - With Stigma	17%	17%	12%	3%	2%
Stigma reduces welfare shock	45%	47%	61%	56%	73%

notes: standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. Each cell is a separate regression. See notes to table 1.3 for additional controls

Table 12: Previous Claimants: Information Test

	(1) School	(2) LSOA	(3) School	(4) LSOA
Peer Group	0.0342***	0.0440***	0.0460***	0.0472***
	(0.00857)	(0.0101)	(0.00366)	(0.00371)
Peer Group*Previous FSM			-0.0171***	-0.00821*
			(0.00520)	(0.00434)
Observations	352,642	350,663	1,335,648	1,329,536
R-squared	0.011	0.013	0.466	0.465
No Information $\beta_1 + \beta_2$			0.029	0.039
Welfare Shock - No information			4.6%	6.3%
With Information β_1			0.046	0.047
Welfare Shock - With information			7.5%	7.6%
Information increases a welfare shock by			39%	18%

notes: standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. See notes to table 1.3 for additional controls

Table 13: Cashless Catering: Stigma, Education and Income

	(1)	(2)	(3)	(4)
Employment Deprivation	Least			Most
Peer Group	0.0505**	-0.0195	0.0575**	0.0922***
	(0.0245)	(0.0237)	(0.0238)	(0.0224)
Peer Group*Post Cashless	0.0948***	0.0935***	0.0900***	0.0310
	(0.0350)	(0.0250)	(0.0251)	(0.0249)
Observations	58,621	72,055	76,523	74,522
No Stigma $\beta_1 + \beta_2$	0.14	0.074	0.147	0.12
Welfare Shock - No Stigma	21%	15%	42%	30%
With Stigma β_1	0.05	-0.019	0.057	0.09
Welfare Shock - With Stigma	7%	-3%	13%	21%
Stigma reduces a welfare shock by	69%	122%	69%	30%
Education Deprivation	Least			Most
Peer Group	0.0179	0.0683***	0.0940***	0.104***
	(0.0303)	(0.0167)	(0.0188)	(0.0226)
Peer Group*Post Cashless	0.0902***	0.0649***	0.0576**	0.0173
	(0.0348)	(0.0195)	(0.0239)	(0.0255)
Observations	72,034	208,161	143,167	74,052
No Stigma $\beta_1 + \beta_2$	0.108	0.13	0.15	0.12
Welfare Shock - No Stigma	18%	34%	41%	31%
With Stigma β_1	0.0179	0.068	0.09	0.10
Welfare Shock - With Stigma	3%	15%	22%	26%
Stigma reduces a welfare shock by	86%	56%	46%	18%

notes: standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. See notes to table 1.3 for additional controls

Table 14: Previous Claimants: Information, Education and Income

	(1)	(2)	(3)	(4)
Employment Deprivation	Least			Most
Previous Claimant Sample				
Peer Group	0.109***	0.0326	0.0154	0.0342***
	(0.0346)	(0.0211)	(0.0162)	(0.0124)
Welfare Shock	22%	6%	3%	6%
Interaction Method				
Peer Group	0.0527***	0.0586***	0.0346***	0.0370***
	(0.00528)	(0.00565)	(0.00665)	(0.00723)
Peer Group*Previous FSM	0.0212*	-0.00167	-0.0161**	-0.0313***
	(0.0117)	(0.00955)	(0.00754)	(0.00789)
No Information $\beta_1 + \beta_2$	0.074	0.057	0.019	0.0058
Welfare Shock - No information	7.8%	8.7%	3.3%	1.0%
With Information β_1	0.053	0.059	0.035	0.037
Welfare Shock - With information	5.5%	9.0%	6.3%	6.9%
Information increases a welfare shock by	-44%	3%	47%	85%
Education Deprivation	Least			Most
Previous Claimant Sample				
Peer Group	0.0427*	0.0105	0.0328**	0.0198
	(0.0252)	(0.0192)	(0.0166)	(0.0153)
Welfare Shock	5%	2%	5%	2%
Interaction Method				
Peer Group	0.0602***	0.0406***	0.0420***	0.0369***
	(0.00534)	(0.00635)	(0.00636)	(0.00771)
Peer Group*Previous FSM	0.000857	-0.0129	-0.0109	-0.0200**
	(0.00984)	(0.00823)	(0.00843)	(0.00934)
No Information $\beta_1 + \beta_2$	0.06	0.027	0.031	0.0168
Welfare Shock - No information	8.2%	4.4%	5.1%	2.9%
With Information β_1	0.06	0.04	0.042	0.0368
Welfare Shock - With information	8.2%	6.6%	7%	6.5%
Information increases a welfare shock by	0%	33%	27%	56%

notes: standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. See notes to table 1.3 for additional controls

Table 15: Peer Effect Esitmates Using Different Weights for School Year Group

	(1) School	(2) 1*O 0*Y	(3) 0*O 1*Y	(4) 1.5*O 0.5*Y	(5) 0.5*O 1.5*Y	(6) 0.75*O 0.25*Y	(7) 0.25*O 0.75*Y
All	0.108****	0.0971***	0.0793***	0.0977***	0.0885***	0.106***	0.0972***
	(0.00597)	(0.00504)	(0.00510)	(0.00490)	(0.00489)	(0.00557)	(0.00557)
Age$\geq$ 12	0.107***	0.113***	0.0812***	0.105***	0.0860***	0.113***	0.0942***
	(0.0106)	(0.00946)	(0.00915)	(0.00897)	(0.00853)	(0.0101)	(0.00968)
Age$\leq$ 12	0.113***	0.0880***	0.0899***	0.0949***	0.0951***	0.105***	0.105***
	(0.00745)	(0.00621)	(0.00615)	(0.00602)	(0.00597)	(0.00700)	(0.00695)
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic Language FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

notes: standard errors in parenthesis, *** p<0.01, ** p<0.05, * p<0.1, each cell is a separate regression, see notes to table 3 for additional controls