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## ABSTRACT

### Racial Harassment, Ethnic Concentration and Economic Conditions<sup>\*</sup>

In this paper, we analyse the association between spatial concentration of ethnic minorities, and racial harassment. Ethnic concentration relates to racial harassment through at least three channels: hostility in attitudes of majority individuals that find expression in harassment behaviour, the probability of minority individuals meeting majority individuals, and the cost of expressing hostility aggressively. Harassment can thus not simply be modeled as a stronger form of hostility. Using unique data for Britain, we show that, in area of higher local ethnic concentration, experience of harassment is lower, even though hostility on the side of the majority population is not.

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# I Introduction

Acts of intimidation and harassment aimed at minority individuals create high social and economic costs, discourage long term integration and act as a barrier to otherwise economically beneficial population movement (see Bisin, Patacchini, Verdier, and Zenou 2006; Manning and Roy 2007), with potentially wide reaching economic consequences.<sup>1</sup> Maintaining good ethnic relations and avoiding inter-ethnic tensions and violence is therefore a primary objective of race relations and immigration policies. But what exactly are the mechanisms leading to inter-racial intolerance, hostility, and acts of racial harassment?

One focus has been on the spatial concentration of ethnic minorities as a possible determinant of hostility.<sup>2</sup> Dustmann and Preston (2001) find that a higher concentration of ethnic minority individuals increases hostile attitudes of the majority population, after correcting for selective out-migration of majority individuals from areas with high ethnic concentrations.<sup>3</sup> However, does this imply that higher ethnic minority concentration in an area leads to higher intensity of harassment in that area, with aggravated hostility in attitudes as an intermediary step? We argue here that this does not necessarily follow. Although acts of racial harassment towards minority individuals require hostility in attitudes on the side of the potential harasser,

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<sup>1</sup>Recent violence against ethnic minority students in Sydney and Melbourne raised fears of harming Australia's third largest export article (after coal and iron ore): international education. (see <http://www.aol.co.nz/news/story/Australian-PM-calls-for-calm-amid-racial-violence/2089731/index.html>). Similarly, racially motivated attacks against minorities in the early 2000's when Germany introduced its "green card" policy to attract highly skilled workers in the IT sector were cited as one reason why the policy did not attract the number of applications expected. For the UK, Shields and Wheatley Price, 2002a provide evidence that racial harassment of ethnic minority nurses reduces their job attachment, with serious implications for the British National Health Service which is highly dependent on ethnic minorities (Royal College of Nursing, 2007).

<sup>2</sup>Economic deprivation is another possible reason. However, the social sciences literature has not as yet provided unanimous empirical evidence on the strength and significance of the link between economic circumstances and racial hostility. Green, Glaser and Rich (1998) provide a survey. Krueger and Malecková (2003) show that economic conditions do not affect the propensity to commit terrorist acts, often an extreme type of hate crime.

<sup>3</sup>For the UK, Bowyer (2009) also finds a positive association between hostile attitudes and local concentration of individuals of Pakistani and Bangladeshi origins. In a study at the European level, Gang, Rivera-Batiz and Yun (2002) show that local immigrant concentration is positively correlated with xenophobic attitudes.

it requires also that the harasser and the harassed come into contact and that the harasser sees the benefit of harassing as outweighing the cost. We argue that living in an area of higher minority concentration both decreases the frequency of encounters with potential harassers and increases the costliness to the harasser of aggression. As a consequence, the effect that ethnic minority concentration may have on hostility in majority attitudes could be fundamentally different from the effect it has on the probability for a minority individual to experience harassment. The main contribution of this paper is to measure the extent to which local economic conditions and the spatial concentration of minorities relate to racial harassment on the one hand, and to hostility in attitudes on the other. Besides its effect on acts of racial harassment, we also study the effect of ethnic concentration of minorities on precautionary behaviour of minority individuals, which can be viewed as another measure for the perceived threat of harassment.

The main result of our analysis is that we find strong evidence that the probability of being racially harassed is lower in areas with larger minority populations. We find similar results for precautionary measures taken on the side of minority individuals. By contrast, hostility in attitudes amongst majority respondents are found to increase in ethnic concentration, after adjusting for endogenous location choices of majority individuals. We conclude that the relationship between racial harassment and ethnic minority concentration needs to be modeled differently to that between hostility in attitudes and ethnic concentration, and that evidence of increased hostility towards minorities associated with higher ethnic concentration does not imply an increase in ethnic harassment. The likelihood of harassment, and in particular precautionary behaviour, is aggravated by poor economic circumstances, whereas no effect can be detected from economic conditions on attitudinal hostility. Our results have potentially important consequences for migration policy. For instance, attempts to evenly spread new immigrants across spatial areas may not reduce harassment and violence against them.

Our analysis begins with a conceptual framework for analysis, which draws on existing

theories about hostility formation and inter-ethnic violence.<sup>4</sup> We then present our empirical model, and empirical findings which are based on analysis of the Fourth British National Survey of Ethnic Minorities (FNSEM) and the 1991 UK census.

## II Conceptual Framework and Estimation

We begin by outlining a conceptual framework that emphasizes the variety of channels through which economic and ethnic context can affect the prevalence of harassment. We distinguish between three elements involved in any incident of racial harassment: hostility towards minority individuals on the side of the potential harasser (assumed here always to be a majority individual, as reflected in our data), a meeting between that individual and an ethnic minority individual, and the decision on the side of the potential harasser to express hostility aggressively. Harassment occurs as the combination of a meeting between a potential harasser and a minority individual, and the willingness on the side of the potential harasser to harass.

### *A Simple Model*

Consider first the formation of hostility. Group conflict theories<sup>5</sup> hold that racial prejudices and hostility derive from a threat to real resources and accepted practices of the majority population. Empirical implications of group conflict theories are that levels of intolerance will be higher where the threat from ethnic minorities is perceived as greater. Thus areas with higher concentration of ethnic minorities should be afflicted with greater levels of hostility to minorities. Such processes may in turn be moderated by induced population outflows among

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<sup>4</sup>Although economists have recently shown increasing interest in issues associated with the economic costs of ethnic diversity and conflict (e.g. Alesina and La Ferrara, 2005, Caselli and Coleman 2006, Glaeser 2005, Easterly and Levine 1997, Antecol and Cobb-Clark 2008 and 2009, Shields and Wheatley Price 2002a,b), most of the literature that theorises about the possible determinants of racial harassment and attitude formation can be found in other social sciences.

<sup>5</sup>See, for example, Blumer (1958), Campbell (1965), Blalock (1967), Bobo (1983), Tolnay, Beck and Massey (1989).

the majority community, as the most hostile individuals may leave the neighborhood after their attempts to stop the minority inflow fail.<sup>6</sup> Besides association with ethnic concentration, hostility should be higher in areas with deprived economic conditions, to the extent that group conflict is economic and intensified by economic difficulty. Group conflict theory can also be seen as subsuming economic theories which draw attention to labour market competition or to pressures exerted on public finances. Among others Scheve and Slaughter (1999), Mayda (2006), Gang, Rivera-Batiz and Yun (2002), Dustmann and Preston (2005, 2007), and Card, Dustmann and Preston (2009) provide empirical analyses of association between individual preferences over immigration policies and indicators of labour market status viewed in the context of such ideas.<sup>7</sup> Thus, we should expect that higher ethnic concentration leads to increased hostility towards minority individuals but - at the same time - to selective out-migration of hostile majority individuals.

However, although hostility may predispose majority individuals towards harassment, harassment is not simply a more extreme form of hostility but a particular mode of manifestation. Since the tendency to harass, unlike the simple existence of hostility, arises from a conscious choice of the harasser, it may depend on the perceived benefits and costliness of harassment to the perpetrator, as suggested by the literature in economics of other forms of crime (see Becker, 1968). Since most salient among the likely costs are the possibility of reprisal or punishment and since it is likely that minorities can protect themselves better in neighborhoods at high ethnic density, this provides a reason to expect that harassment incidents may be less likely, for a given level of hostility, in areas of high ethnic concentration - a “safety in numbers” argument<sup>8</sup>. Economic conditions may also be relevant in this respect. The likelihood that white natives choose to express hostility through harassment may also depend upon the availability

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<sup>6</sup>This is often referred to as “white flight” (Clark 1993). See Card, Mas and Rothstein (2007) for an interesting study that quantifies “tipping points”.

<sup>7</sup>Frijters (1998) models discriminatory behaviour based on these considerations.

<sup>8</sup>This idea underlies the *power-differential hypothesis* found in Green, Strolovich and Wong (1998) and Levin and McDevitt (1993).

of other means of releasing dissatisfaction. More affluent, more articulate and more educated whites may, for example, be less inclined to resort to violent expression of discontent against minorities.<sup>9</sup>

To formalise these arguments in a simple model, consider a randomly chosen majority individual encountered by a minority individual in an area with minority concentration  $\pi$ . Suppose that the majority individual's hostility in attitude is captured in a function  $A(\xi, \pi)$ , which depends positively on  $\pi$  through associated intensity of group conflict and positively on the individuals' innate hostility towards minorities  $\xi$ . Similarly to Becker (1968), suppose further that the individual chooses to harass if the perceived gain from doing so<sup>10</sup>, say  $B(A(\xi, \pi), \pi)$ , which is an increasing function of hostility and possibly also varies with  $\pi$ , exceeds the cost, say  $K(\pi)$ , depending positively on  $\pi$  through the possibility of reprisal or punishment.

To the extent that location decisions of majority individuals are driven by ethnic characteristics of any area, the innate hostility of majority individuals will differ in areas of different ethnic concentration. Thus, the probability of an encounter resulting in harassment will be the conditional probability of  $\xi$  being great enough to induce an act of harassment,

$$\Pr_{\xi|\pi} (B(A(\xi, \pi), \pi) > K(\pi) | \pi) . \quad (1)$$

Finally, we need to consider the frequency with which encounters occur. The probability of a harassment incident depends on the frequency with which ethnic minority individuals encounter majority individuals, say  $\mu(\pi)$ . Blau (1977) points out that, other things being equal, the frequency with which ethnic minority individuals encounter whites decreases as ethnic minority concentration increases in an area, meaning that there are less opportunities

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<sup>9</sup>In another context of violence, there is some evidence to the contrary, however. Krueger and Maleckova (2003) find that members of Hezbollah's military wing or Palestinian suicide bombers are at least as likely to come from advantaged families and have relatively high levels of education.

<sup>10</sup>We draw a distinction between the the perceived benefit from harassment  $B(A(\xi, \pi), \pi)$  and underlying hostility in attitudes  $A(\xi, \pi)$  because we have data on both harassment outcomes and expressions of attitudes by majority individuals.

for harassment to occur. Insofar as meetings between individuals occur as a result of random circulation there is a mechanical relationship whereby  $\mu(\pi)$  decreases with  $\pi$ . Even allowing that patterns of circulation of minority and majority communities may be influenced by the wish to avoid confrontation or to keep within ethnic communities this would still be expected to be so. This provides a further sense in which there may be “safety in numbers” for minority individuals - for a fixed level of hostility, processes of interaction predict a *decrease* in exposure to harassment with increasing ethnic concentration as the probability of encountering individuals from other communities diminishes.

Putting these considerations together we arrive at a model of arrival of harassment events for a minority individual:

$$\lambda(\pi) = \mu(\pi) \Pr_{\xi|\pi} (B(A(\xi, \pi), \pi) > K(\pi) | \pi). \quad (2)$$

The dependence of  $\lambda(\pi)$  on  $\pi$  is clearly ambiguous. Group conflict theory suggests that  $B(A(\xi, \pi), \pi)$  should increase with  $\pi$ . However, location decisions of majority individuals should lead the conditional probability of high values of  $\xi$  to decrease with  $\pi$ . Furthermore,  $K(\pi)$  should increase with  $\pi$ , while the probability of interethnic encounters  $\mu(\pi)$  falls with  $\pi$ . There is no reason indeed to expect  $\lambda(\pi)$  to be necessarily monotone. In the empirical application below we therefore experiment with linear and quadratic forms for the dependence of  $\ln \lambda(\pi)$  on  $\pi$  without imposing any sign on the direction of the effect.

## ***Empirical Implementation***

We estimate models of minority harassment experience, using minority community respondents. In our data, we observe the number of times a minority individual has been harassed, which we denote  $H_j$ .

Let the arrival rate of harassment, which corresponds to the expression we derive in (2), be given by  $\ln \lambda_j = \alpha_1 \pi_j + Z_j \alpha_2 + Y_j \alpha_3 + \epsilon_j$  where  $\pi_j$  is minority concentration in the locality

occupied by individual  $j$ ,  $Z_j$  includes indicators of economic deprivation of the area,  $Y_j$  includes all relevant observed characteristics of the individual, and  $\epsilon_j$  captures unobserved influences on harassment propensity. Then the probability of being harassed  $k$  times is

$$\Pr(H_j = k | \lambda_j) = e^{-\lambda_j} \lambda_j^k / k! . \quad (3)$$

Our key parameter of interest is  $\alpha_1$ , which measures the association between ethnic concentration and harassment. As our discussion in the last section suggests, the sign of this parameter is not clear-cut, and depends on the relationship between the incidence of harassment and ethnic concentration through each of the channels we discuss above.

Besides reports of harassment incidents we also have data on precautionary responses to fear of harassment, such as going out less frequently, making the home safer and so on. Since one would expect such precautions to be motivated by the prevalence and seriousness of harassment in the area, this provides an alternative indicator which we also use empirically. Indeed this is an indicator which may reflect more fully the costliness to the recipient of acts of harassment. For precautionary activity, we observe a binary indicator  $n_i$  which we take to reflect a latent underlying disposition to precaution  $n_j^*$  where  $n_j^* = \beta_1 \pi_j + Z_j \beta_2 + Y_j \beta_3 + \eta_j$  and  $\eta_j$  captures unobserved influences on precautions taken. We choose a normal distribution for  $\eta_j$ :  $\eta_j | X_i \sim \mathcal{N}(0, 1)$ . To the extent that the level of precautions taken is induced by (expected) harassment incidents, then the sign of  $\beta_1$  should correspond to the sign of  $\alpha_1$ .

It is likely that our vector of observable characteristics does not pick up all the factors that affect precautionary behaviour and harassment at the same time. To allow for correlation in unobservables in the harassment and precaution equation, we also estimate the two equations jointly. We model  $e^\epsilon$  as a conditional gamma distribution:  $e^\epsilon | \eta, X_i \sim \Gamma(e^{\psi\eta}, 1/\zeta)$ . Here  $\psi$  captures correlation between harassment and precaution arising either from the influence of one on the other or from correlation in unobserved influences on the two. To allow for correlation in unobservables we allow  $\psi \neq 0$ .

The parameter  $\zeta$  permits unobserved variation in harassment propensity  $\lambda_i$  independent of precautionary behaviour. In addition, it divorces the mean and variance of the harassment process, allowing for “over-dispersion” or “under-dispersion” in the harassment equation relative to a Poisson model. As  $\zeta \rightarrow 0$ , the specification reduces to one in which harassment follows a Poisson process with unobservable influences perfectly correlated in the two latent specifications. In the appendix, we provide details of the likelihood function.

Finally, to contrast our results with those we obtain by estimating the effect of ethnic concentration on hostility in attitudes of majority individuals, we estimate equations for hostility, based on information from the white sample in our data. This corresponds to the expression  $A(\xi, \pi)$  above; the parameter of interest is  $\partial A(\xi, \pi) / \partial \pi$ . Any measure of hostility, regressed on ethnic concentration in the area, expresses the association in the level of hostility in attitudes in an area with ethnic concentration *after* possible out-migration of majority individuals according to their like or dislike of minority individuals. This is precisely the relationship we should be measuring when estimating the probability of experiencing harassment in a particular area with minority concentration  $\pi$  from the minority individual’s perspective, as in (2). Thus, regressing a measure of majority hostility on ethnic concentration in the area where the majority individual lives allows us to assess the strength of the one channel that predicts a positive relationship between harassment and ethnic concentration. However, to answer the question as to how ethnic concentration of minority individuals affects hostility of majority individuals who have been randomly allocated across areas with different ethnic concentrations, one would like to estimate the effect *before* white majority individuals have sorted themselves into areas according to their innate hostility. Estimation of this parameter, and comparing it with the one we obtain without taking account of majority sorting, allows us also to assess how hostility as one of the three channels that link ethnic concentration and harassment is affected by sorting of majority individuals. We address this below by using an identification strategy that relies on ethnic concentration in larger spatial units as an instrument.

We use two measures of hostility: self-assessed prejudice against minorities from the Caribbean

and/or Indian subcontinent (which constitute the largest groups of ethnic minority individuals in the UK), and attitude towards marriage of a close relative with an ethnic minority individual.<sup>11</sup>. As we observe responses on a three-point scale or as binary indicators, we express these again as a latent underlying disposition to prejudice  $a_i^*$  where  $a_i^* = \delta_1\pi_j + Z_j\delta_2 + Y_i\delta_3 + v_i$ . As before,  $v_i$  captures unobserved influences on attitudes taken. We choose a normal distribution for  $v_i$ :  $v|X_i \sim \mathcal{N}(0, 1)$ .

## ***Identification***

Key parameters in our analysis involve the effects of area characteristics  $\pi_j$  and  $Z_j$  on harassment (or precautionary behaviour). As residential location is a choice by the minority individual, estimates of these parameters may be biased by selective out-migration.

The main issue is that those minority individuals who are most likely to be affected by harassment may leave areas where harassment is most likely to occur. Since this means the most vulnerable will be more likely to be found in areas with low values of characteristics likely to encourage harassment, estimated coefficients on these variables may be biased towards zero. Thus, estimates can be interpreted as lower bounds on magnitudes.

The bias can be addressed by the idea that values of such characteristics at higher levels of spatial aggregation qualify as suitable instruments. This is similar to issues discussed in Dustmann and Preston (2001), where the ensuing endogeneity problem when regressing hostility in attitudes on ethnic concentration is addressed.<sup>12</sup> The key idea is that minority individuals who move away from areas with a high harassment potential are more likely to move to neighborhoods that are close in distance, but less dangerous, than to areas that are far away. It is shown

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<sup>11</sup>Wording of the prejudice question: “Would you describe yourself as very prejudiced against Caribbean and/or Indian/Pakistani/Bangladeshi people, a little prejudiced, or not prejudiced at all?” Variable coded as one if at least a little prejudiced. “Wording of the marriage question: Would you personally mind if a close relative married a person of ethnic minority origin?” Variable coded as one if respondent minds.

<sup>12</sup>See Evans, Oates and Schwab (1992) and Bertrand, Luttmer and Mullainathan (2000) for similar identification strategies.

in Dustmann and Preston (2001) that such instruments will reduce the bias induced by sorting of (in our case) minority individuals. Below, we check the sensitivity of parameter estimates to endogeneity issues created by the location choice of the respondent to using such instruments. We use a similar identification strategy for estimating the effect of ethnic concentration on the hostility in attitudes, but this time to address the sorting of majority individuals.

We implement these checks of robustness to endogeneity using the control function idea (see Blundell and Powell 2003, Wooldridge 2002 for discussion). Potentially endogenous variables are regressed on the exogenous variables, including the instruments, and the residuals from these equations are added to the main regression as additional regressors. Standard tests for a zero coefficient on the residual can be regarded as tests of exogeneity of the variable concerned. If this test is failed then coefficient estimates on the endogenous variables are consistent (and correspond to the IV estimator) given the inclusion of the residual.<sup>13</sup>

### III Data and Sample

The data we use for our analysis comes from the British Fourth National Survey of Ethnic Minorities (FNSEM). The FNSEM is a cross-section survey collected between 1993 and 1994, consisting of a main sample of respondents belonging to ethnic minorities, and a reference sample of individuals belonging to the white majority population<sup>14</sup>.

One section of the survey is dedicated to “victimisation” experienced by ethnic minority individuals in the year previous to the interview. Various incidents are recorded, such as

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<sup>13</sup>Let  $a_1$  in  $y = a_0 + a_1 x + u$  (A) be the parameter of interest, and  $z$  a suitable instrument. Then  $E(y|x, z) = a_0 + a_1 x + E(u|x, z) = a_0 + a_1 x + f\eta$  where  $\eta$  can be estimated as the residual in a regression of  $x$  on  $z$ . The equation we estimate corresponds to  $y = a_0 + a_1 x + f\hat{\eta} + \tilde{u}$  (B). A test on the significance of the parameter  $f$  is a test on endogeneity of  $x$ . If  $f$  is significantly different from zero, then  $\hat{a}_1$  in (B) corresponds to the IV estimate of  $a_1$  in (A), using  $z$  as an instrument. If  $f$  is insignificant, then the estimate of  $a_1$  in (A) is unbiased and consistent. See Blundell and Powell (2003) for more details. This idea can be extended to cover the sort of limited dependent variable cases which we deal with here.

<sup>14</sup> The complex geographically stratified sampling design, designed to obtain nationally representative samples of each major ethnic group, is described in Smith and Prior (1996). Sample averages reported below apply the sampling weights provided with the data.

personal attacks, property damage, and insult and whether the victim believed such incidents were based on reasons of race or colour. Certain types of incident occur only for a very small proportion of the sample. For instance, 1% and 2% of the minority sample report to have experienced personal attacks and property damage due to reasons related to race or colour respectively. Since the implied numbers are too small for reliable empirical analysis, we base our analysis on reports of a milder form of harassment affecting over 10% of the sample, whether the respondent has been insulted “for reasons to do with race or color”. The wording of the question in the survey is as follows: “In the last twelve months, has anyone insulted you for reasons to do with race or color? By insulted, I mean verbally abused, threatened or been a nuisance to you?”<sup>15</sup>. In our sample, 11.1 percent of individuals report at least one incident of harassment over the last 12 months. We should point out that harassment incidents based on surveys are incidents as perceived by the victim and therefore incorporate differences across individuals in perception as to what constitutes harassment. However, this is likely to be exactly the measure that is important from a welfare perspective. Antecol and Cobb-Clark (2008) argue along similar lines, emphasising that as far as the welfare of the victim is concerned, it is the perception that actually matters.

The data gives information both on whether or not the individual has been harassed and if so how often. We use the latter information to take account of differences in frequency of insult. However there is some bunching and rounding in this data at higher frequencies as well as an imprecise category corresponding to a frequency too high to count. We therefore group values of 6 times or above (calculating the likelihood contribution appropriately by integration over the range of values). We provide frequencies in Table 1.<sup>16</sup>

A randomly chosen subsample of survey respondents were also asked about precautions

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<sup>15</sup>To insure against the possibility that respondents underreport racially motivated offences because they are intimidated by the (different) ethnicity of the interviewer, ethnicity of respondents was matched to ethnicity of interviewers.

<sup>16</sup>See Virdee (1997) for a description of the data, showing that harassment is more likely to be experienced by men, by the young, by non-manual workers and by those in rented accommodation. Perpetrators are typically male, under 30 years of age, often harassing in groups and overwhelmingly white.

taken in response to concern about harassment. Nearly a quarter (23.6%) of minority respondents expressed worry about racial harassment and a substantial number (12.9%) had taken at least one of fourteen different possible precautions which were suggested<sup>17</sup>. Since taking any of these precautions involves cost to the individual, this may be a good indicator of the severity of the harassment problem faced. We concentrate on modeling a binary variable reflecting whether or not any precaution was reported as undertaken. Of the respondents who were asked this question, 12.9 percent reported having taken one or more of these precautions.

The FNSEM contains extensive information on both personal sociodemographic characteristics of the interviewees and characteristics of the localities in which they reside. Summary statistics are provided in Table 2.

At the personal level all estimates below include controls for demographic status, including age and children, labor market status and education. Education is likely to influence the type of socioeconomic environment in which the individual interacts. Therefore, it can affect the probability of being harassed. Also, attitudes and, in particular, propensity to harass may vary in different socioeconomic environments. In addition, individuals with different qualifications may come in contact with the majority population to different extents. Age may be another determinant of the propensity to be harassed. Older individuals, for example, may tend to go out less or to go to places less frequented by majority individuals. In addition, potential harassers may prefer to target certain age groups rather than others.

We use ethnic group identifiers, namely Black Caribbean, Indian, African-Asian, Pakistani, Bangladeshi and Chinese<sup>18</sup>. Ethnicity indicators may capture the extent to which cultures differ from the majority one and the extent to which different ethnic groups have integrated in British society. Harassment may be experienced particularly by individuals whose look and

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<sup>17</sup>The full list, in order of frequency in the data, comprises: avoiding going out at night (9%), making the home safer (7.8%), visiting shops only at certain times (5.4%), avoiding going out alone (4.1%), stopping children playing (4.5%), avoiding white areas (3.1%), changing travel routes (1.9%), stopping going to pubs (1.8%), worshipping less frequently (1.4%), making business premises safer (1.3%), changing telephone number (1.2%), stopping use of public transport (1.2%), moving home and moving school (0.7%).

<sup>18</sup>These correspond to the ethnic groups oversampled in the survey. See Smith and Prior (1996).

behavior are perceived as different from individuals of the white majority population. We also look at different harassment experiences for ethnic minority immigrants and native born ethnic minorities as natives may tend to mix with majority individuals more than immigrants. In the sample, 70 percent of ethnic minorities were born abroad.

The information on ethnic concentration comes from the British census at ward level.<sup>19</sup> We define ethnic concentration as the percentage of (all) minority individuals living in a ward. This allows us to capture the wide diversity in local ethnic composition within regions and, consequently, gives sufficient variation across different geographical units for subsequent analysis. According to the 1991 Census of population, in Britain, almost 80% of ethnic minorities live in the South East (mainly Greater London) and the Midlands regions. Inside these regions, however, ethnic concentration varies widely across smaller areas, such as wards. We use information on country of birth from the 1991 census to construct a measure of ethnic density, calculated as the percentages of immigrants from South Asia and the West Indies. These particular sources are the main geographical origin of minority ethnic immigration to the UK (excluding only East Asia).

Our other central focus is on the role of local economic conditions. As a measure of economic deprivation, we incorporate census information on the percentage of the working population which is unemployed. We also investigated the use of other measures of socio-economic deprivation, like the percentage of houses with shared facilities, the percentage of car ownership, and the percentage of high density accommodation. We do not include these variables in the reported specifications as they were typically individually insignificant and highly correlated with the unemployment rate. We also experimented with indicators for the skill composition in an area, using the percentage of individuals with high qualifications. Again, estimates were never significant.

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<sup>19</sup>In Britain, a ward is the smallest geographical area identified in the Population Census, and typically comprises about 5500 individuals. In Britain there are 9,527 wards. In our sample, there are 240 wards.

## IV Results

### *Harassment and Precautions*

Table 3 presents estimation results, where we model the number of occurrences of racial harassment and the probability of undertaking precautionary measures.<sup>20</sup> All estimates, for this and other specifications, are reported with standard errors robust to ward level cluster effects in unobserved heterogeneity. In the Table we report coefficients on the role of ethnic density as well as indicators of local area deprivation. All specifications condition on a set of individual observed characteristics, like sex, age and its square, whether the individual has children, educational attainments, indicator variables for unemployment, absence from the labour force, being a student, being foreign born, ethnicity variables, as well as a dummy variable for London.

The first column in Table 3 presents results with a single linear ethnic concentration variable, measured at ward level. Coefficients on the full set of variables are reported in Table A.II-6 in Appendix II. These suggest that men are more likely to suffer harassment. There is a nonlinear relationship with age typically peaking for individuals in their 30s. The more educated are more harassed, while those born outside Britain are less likely to be harassed. These effects may come from the different milieux frequented by persons with different characteristics or from differences in demeanour which attract or repel the attention of harassers. Different ethnic groups suffer harassment of differing intensity.

The estimate on the ethnic concentration variable points clearly to lower harassment in areas of higher minority concentration. This is consistent with an interaction-based story or with harassment being more costly to the perpetrator in areas with higher ethnic concentration, as we discuss above.<sup>21</sup> The implied marginal effect at mean values of characteristics on the

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<sup>20</sup>We have also estimated models where we combine harassment counts in a simple binary variable. This does not change the conclusions of the analysis, and results are qualitatively very similar to those we present below.

<sup>21</sup>Krueger and Pischke (1997) investigate the link between crime against minorities and ethnic concentration for Germany. Results for Germany as a whole provide evidence that associates high concentrations of minorities with more criminal acts against minorities. However, separate results are provided for East and West Germany, and are stronger and statistically significant only for the East where rates of victimisation are found to decline

probability of any harassment for the specification in column (1) indicates that a 10 percent increase in ethnic minority concentration reduces the probability of harassment by 2 percentage points. This is not a negligible effect, given that 11 percent of our respondents report to have been harassed over the last 12 months. Local unemployment seems to be associated with higher harassment, though the statistical strength of the evidence is weak.

In column (2), we report results where we add a quadratic term of ethnic concentration, allowing for possible non-linearities in the way ethnic concentration relates to incidences of harassment. The linear term is similar to the one reported in column (1), while the quadratic term is not significantly different from zero. We thus conclude that there is no evidence of a non-linear relationship between ethnic concentration and incidences of harassment. More formally, and as is obvious from the likelihood values reported underneath, a likelihood ratio test does not reject the linear specification.

In the third and fourth columns of the table, we present results from the precaution equation. Again, and as in the case of the harassment, a likelihood ratio test does not support the nonlinear specification. Concentrating on the results in column (3), the pattern of results regarding local area characteristics is very much compatible with the findings from direct analysis of harassment. As with harassment, precautions seem to decrease with ethnic concentration. The implied marginal effect at mean values of characteristics on the probability of any precautions indicates that a 10 percent increase in ethnic concentration reduces the probability that any precautions are taken by 4 percentage points.

There is now stronger evidence of association with local unemployment. Remember that the theories we discuss above all suggest a positive relationship between harassment and economic hardship. If the results linking unemployment to precautions are indicative of a link with greater harassment, it could perhaps be because unemployment provokes greater hostility in the expression of negative attitudes. It may also be because it puts a pool of unemployed individuals into contact with others in circumstances where hostile outcomes can easily occur.

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with concentration, compatibly with what our results suggest for Britain.

The findings are in line with work by Falk and Zweimüller (2005) who report that higher unemployment is positively associated with acts of right-wing extremist crime. They are in contrast to findings of Green, Strolovich and Wong (1998, p.373) for the US who “...turn up no relationship between unemployment rates and racially motivated crime.”

As we discuss above, if those who are harassed make location decisions motivated in any part by desire to avoid harassment then area characteristics are themselves a choice and may be correlated with unobservables. This should lead to a bias of our estimated coefficients towards zero, so that our estimates can be viewed as lower bounds. In the last two columns of Table 4 we allow for endogeneity of location choice on the side of the respondent, for the linear specifications. We follow the estimation strategy we explain earlier, regressing area characteristics (ethnic concentration and unemployment) on values of the these variables at a higher spatial level.<sup>22</sup> We then enter the residuals from these equations as additional regressors in our main estimation.

Tests for exogeneity of the variables concerned are simple t-tests on the coefficients on the residuals for “Ethnic Concentration” and “Unemployment”, reported in the last two rows of the Table. The results show that residuals are both insignificant in the harassment and the precaution equation, suggesting therefore that exogeneity can not be rejected.<sup>23</sup> The point estimates of the ethnic concentration variables increase slightly in magnitude. Our central finding is thus that the probability of harassment is *reduced* in high ethnic concentration areas. Within the framework we discuss in section II, where we identify channels through which higher ethnic concentration affects harassment (increase in hostility, decrease in interaction, and increase in costs through possible reprisal), our estimates imply that the last two channels seem to dominate this relationship.

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<sup>22</sup>We choose county level. At the time of the data there were 46 counties in England with average population of slightly over a million individuals. In other words there were around 2000 wards per county.

<sup>23</sup>The unemployment residual in the harassment equation is significant at the 10% level, pointing at any positive association between harassment and unemployment being due to sorting.

## ***Joint estimation***

Not all determinants of precautions and harassment are observable. Much variation in these two variables is explained by unobservables. In Table 4 we present results of a joint model, where we allow the unobservables in the two equations to be correlated.<sup>24</sup>

In columns (1), (2) and columns (3), (4) we report results for a linear and non-linear specification of the harassment- and precaution equations respectively. As before, a likelihood ratio test does not reject the linear specification against the non-linear one. We will thus focus our discussion on the linear specification.

The estimates point very conclusively towards a positive value for the coefficient  $\psi$ , showing that harassment and precautionary behavior are positively associated either because of correlation in unobserved influences or because precaution responds to the prevalence of harassment.

The effect of ethnic concentration on harassment and precautionary behaviour remains well identified when we estimate both equations jointly. In particular, our key finding of a negative relationship between ethnic concentration on the one hand and the incidence of harassment and of precautionary responses on the other continues to find strong support in these estimates. As before, the strongest evidence of association between local unemployment and harassment is through the precaution equation. The marginal effects change only slightly: for the linear models, and evaluated at mean characteristics, an increase in ethnic concentration by 10 percent reduces the probability of harassment and any precautions being taken by 2.3 and 3.7 percentage points respectively.

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<sup>24</sup>Questions on precautionary behaviour are only asked to half of the sample population. Nonetheless likelihood contributions can be calculated making full use of harassment information even where there is no information on precaution (by integrating appropriately across the full range of possible values for unobservable variation) and the joint model is therefore estimated on the fullest possible sample using all available information on harassment.

## ***Hostility in Attitudes***

Our discussion in section II suggests that hostility of majority individuals should increase with ethnic concentration according to group conflict theory. This effect may be mitigated through out-migration of majority individuals who are most prejudiced against minorities ("white flight").<sup>25</sup> In Dustmann and Preston (2001), we aim at identifying the effect of local ethnic concentration on majority attitudes, if migration responses were not to take place. The effect we seek to identify in that paper corresponds to randomly allocating majority individuals to areas of different minority concentrations, and relating hostility in their attitudes to concentration measures. In that work we find a pronounced positive effect, suggesting that increased minority concentration leads to more hostility of majority respondents.

As we emphasize above, this is not the measure of majority hostility that enters our estimated model of harassment, as set out in our conceptual discussion above. In our analysis what matters is the region-specific level of hostility *after* location choices of majority individuals have been made, as it is this level of hostility that impacts on harassment probabilities towards minorities living in these areas.

For completeness, and to assess by how much selective out-migration of majority individuals may reduce the effect of ethnic concentration on harassment, we estimate equations for hostility, based on information from the white sample in our data. We use two measures of hostility: self-assessed prejudice against minorities from the Caribbean and/or Indian subcontinent (which constitute the largest groups of ethnic minority individuals in the UK), and attitude towards marriage of a close relative with an ethnic minority individual. In Table 5 we report results. The table reports coefficients on ethnic neighborhood concentration and area unemployment. All regressions include a set of characteristics of the respondents (gender, age and age squared, education, a dummy for London, presence and number of children, foreign born, unemployed, out of the labour force, and student). The strongest of these effects is from education, with

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<sup>25</sup>Card, Mas and Rothstein (2008) provide strong evidence that white population flows exhibit tipping-like behavior in most cities in the US, with a distribution of tipping points ranging from 5% to 20% minority share.

higher education in particular being strongly associated with lower prejudice.

Columns (1) and (3) of Table 5 report results from (ordered) probit models that include individual background characteristics and a linear term in ethnic concentration. The results on both attitudinal measures show no significant relationship with ethnic concentration.<sup>26</sup> Notice again that this is the relationship between the ethnic concentration and attitudes that is observed after any out-migration of the most prejudiced that might have taken place. As discussed above, it is this relationship between hostility and ethnic concentration that contributes to determining the effect of ethnic concentration on harassment through hostility, as estimated above. The estimates we obtain here suggest that there is little in this relationship to counteract the negative impact of ethnic concentration on harassment that works through the other two channels (interaction and cost of expression of hostility).

In columns (2) and (4) we report results where we correct for endogenous location choice of majority respondents, by including (as before) residuals from first stage regressions where we predict ward ethnic concentration with country level ethnic concentration. This should reduce any bias through out-migration when the intention is to estimate the causal effect of ethnic concentration on majority attitudes. Now the signs of the coefficients change, and estimates are significant, pointing strongly towards migration responses of majority individuals leading to lower levels of hostility in areas with high ethnic minority concentrations.<sup>27</sup> Our results therefore suggest that higher ethnic concentration does aggravate hostility in majority community attitudes, as predicted by theories of group conflict. Further, they also suggest that location responses of hostile majority individuals leads to lower hostility in areas with higher ethnic concentration.

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<sup>26</sup>We have also estimated models with squared terms. Linear and squared terms were never jointly statistically significant at the 5 percent level.

<sup>27</sup>These results are very similar to those reported in Dustmann and Preston (2001).

## V Discussion and Conclusions

This paper analyzes the relationship between ethnic concentration of minorities and economic conditions on the one hand, and acts of racial harassment on the other. We argue that intensity of racial harassment depends not only on the factors determining hostile attitudes in the majority population but also on the costliness of expression of those attitudes through harassment, and the frequency of encounters between harasser and potential victim.

Our empirical analysis is supportive of this hypothesis, and suggests that intensity of racial harassment as well as induced precautionary behaviour decreases with concentration of ethnic minorities in the individual's immediate neighbourhood. On the other hand, estimates we obtain for hostility in attitudes show no association between hostility towards minorities and high ethnic concentration. Indeed controlling for location choices points towards a possible adverse effect of high ethnic concentration on hostility offset by spatial sorting of the majority population.

These results imply that racial abuse can not be seen as simply an intensification of hostile prejudice towards minorities. The transmission of majority prejudice into acts of harassment is mediated by processes of interracial interaction and choices which may be affected by costliness of harassment, as well as majority location choices. These are themselves likely to be affected in important ways by ethnic concentration in the area concerned.

A number of recent papers emphasise the subtlety of the relationship between concentration of minority individuals and minority welfare. Recent work by Edin, Fredriksson and Åslund (2005) and Damm (2009) provide convincing evidence that living in larger enclaves enhances labour market prospects for minority individuals. Our results show that experiences of harassment by minority individuals are reduced by the ethnic concentration in their area of residence. This puts into question settlement policies of immigrants that aim at an equal distribution of minorities across spatial areas. These policies may - on average - lead to higher rather than lower incidences of harassment and aggression against minorities.

Table 1: **Harassment: Annual frequency of occurrence**

Frequency	None	1	2	3	4	5	>5
Percentage of sample	88.9	2.4	2.5	1.0	0.6	0.6	3.8

Wording of the question: “In the last 12 months, has anyone insulted you for reasons to do with race or colour? By insulted, I mean verbally abused, threatened or been a nuisance for you?”

Unweighted number of cases: 4935

Table 2: Descriptive Statistics

	.6 Minority sample	White sample		
Variable	Mean	S.d.	Mean	S.d.
<i>Local</i>				
% Black/Asian	0.123	0.101	0.019	0.041
London	0.407	0.491	0.092	0.289
% Unemployed	0.139	0.069	0.085	0.046
% Sharing facts	0.012	0.009	0.007	0.009
<i>Personal</i>				
Male	0.486	0.500	0.449	0.497
Age	37.22	15.15	45.29	18.33
Has children	0.528	0.499	0.331	0.471
No of children	1.219	1.518	0.622	1.022
Degree	0.125	0.330	0.078	0.268
Voc training	0.217	0.412	0.250	0.433
A Level	0.247	0.432	0.333	0.471
Unemployed	0.131	0.337	0.063	0.243
Student	0.134	0.341	0.045	0.207
Out of lab force	0.255	0.436	0.353	0.478
Foreign born	0.703	0.457	0.052	0.222
Caribbean	0.304	0.459	.	.
Indian	0.251	0.433	.	.
Afro Asian	0.154	0.361	.	.
Pakistani	0.166	0.372	.	.
Chinese	0.074	0.261	.	.
Sample	5098		2780	

Source: FNSEM 1994, UK Census 1991. Entries are weighted using population weights provided with the data.

Table 3: **Harassment and Precautions**

Variable					IV Estimation	
	<i>Harass.</i>		<i>Precau.</i>		<i>Harass.</i>	<i>Precau.</i>
	(1)	(2)	(3)	(4)	(5)	(6)
Ethnic concentration	-6.283 (-4.41)	-8.042 (-2.153)	-1.947 (-3.43)	-1.690 (-1.25)	-8.153 (-2.03)	-1.242 (-0.89)
Ethnic concentration squared	–	3.838 (0.512)	–	-0.644 (-0.183)	–	–
% Unemployed	2.435 (1.20)	3.043 (1.430)	1.327 ( 1.81)	1.289 (1.786)	-1.219 (-0.30)	0.209 (0.15)
Ethnic Conc. Residual	–	–	–	–	0.786 (0.18)	-1.085 (-0.71)
Unemployment Residual	–	–	–	–	8.310 (1.71)	1.788 (1.04)
$\zeta$	25.687 (12.32)	25.667 (12.314)	–	–	25.421 25.362	– –
Mean log-likelihood	-0.467	-0.467	-0.387	-0.387	-0.493	-0.393
Number of cases	4935	4935	2424	2424	4935	2424

t-statistics in parentheses. Cols 1,2,5: Independent negative binomial model. Cols 3,4,6: Probit model. All regression include individual characteristics of the victim (sex, age and its square, whether individual has children, educational attainments, indicator variables for unemployed, out of the labour force, being a student, being foreign born, and ethnicity variables). Standard errors are clustered by ward.

Table 4: **Harassment and Precaution: Joint Model**

Variable	<i>Harass.</i>	<i>Precau.</i>	<i>Harass.</i>	<i>Precau.</i>
	(1)	(2)	(3)	(4)
Ethnic concentration	-6.941 (-3.76)	-3.76 (-1.749)	-8.457 (-1.863)	-1.828 (-1.095)
Ethnic conc <sup>2</sup>			3.540 (0.395)	0.184 (0.042)
% Unemployed	2.425 (0.88)	0.88 (1.296)	2.844 (0.982)	1.326 (1.813)
$\zeta$		13.354 (6.28)		13.24 (2.157)
$\psi$		2.580 (9.08)		2.58 (8.90)
Mean log-likelihood		-0.634		-0.634
Number of cases		4935		4935

t-statistics in parentheses. Joint model. All regression include individual characteristics of the victim (sex, age and its square, whether individual has children, educational attainments, indicator variables for unemployed, out of the labour force, being a student, being foreign born, and ethnicity variables). Reference individual is of Bangladeshi origin.

Table 5: **Majority Attitudes**

Variable	(1)	(2)	(3)	(4)
	<i>Prejudiced against</i> <i>minorities</i>		<i>Inter-ethnic</i> <i>marriage</i>	
Ethnic concentration	0.438 (0.610)	3.181 (3.130)	-0.384 (0.660)	2.677 (2.12)
% Unemployed	0.034 (0.007)	-0.083 (-0.010)	-0.074 0.100	0.989 (1.090)
Ethnic conc residual		-4.931 (-5.070)		-5.938 (-2.67)
Unemployment residual		-0.231 (-0.180)		-2.582 (-2.02)
Mean log-likelihood	-0.600	-0.604	-0.600	-0.604
Number of cases	2763	2008	2632	1918

t-statistics in parentheses. Dependent variable first panel: Self-reported prejudice against Caribbean or/and Indian/Pakistani/Bangladeshi. Dependent variable second panel: Respondent minds marriage of close relative with ethnic minority individual. All regression include individual characteristics of the victim (sex, age and its square, whether individual has children, educational attainments, indicator variables for unemployed, out of the labour force, being a student, being foreign born).

Standard errors are clustered by ward.

## VI Appendix I: Likelihood contributions

Let the joint density of  $\epsilon$  and  $\eta$  be denoted  $p_{\epsilon,\eta}(\epsilon, \eta)$ , the conditional density of  $\epsilon$  given  $\eta$  be  $p_{\epsilon|\eta}(\epsilon|\eta)$  and the marginal density of  $\eta$  be  $p_\eta(\eta)$ . Then the likelihood contribution for the  $i$ th observation, supposing say that precautions are undertaken, is

$$\begin{aligned}\Pr(H_i = k, n_i^* > 0 | X_i) &= \\ &\frac{1}{k!} \int_{-X_i\alpha}^{\infty} \int_{-\infty}^{\infty} e^{-\exp(X_i\beta+\epsilon)} e^{(X_i\beta+\epsilon)k} p_{\epsilon,\eta}(\epsilon, \eta) d\epsilon d\eta \\ &= \int_{-X_i\alpha}^{\infty} \left[ \frac{1}{k!} \int_{-\infty}^{\infty} e^{-\exp(X_i\beta+\epsilon)} e^{(X_i\beta+\epsilon)k} p_{\epsilon|\eta}(\epsilon|\eta) d\epsilon \right] p_\eta(\eta) d\eta.\end{aligned}$$

Given  $\eta|X_i \sim \mathcal{N}(0, 1)$  and  $e^\epsilon|\eta, X_i \sim \Gamma(e^{\psi\eta}, 1/\zeta)$  we can integrate to derive (see Cameron and Trivedi 1990)

$$\begin{aligned}\Pr(H_i = k, n_i^* > 0 | X_i) &= \\ &\int_{-X_i\alpha}^{\infty} \left[ \frac{\Gamma(k+1/\zeta)}{\Gamma(k+1)\Gamma(1/\zeta)} \left( \frac{1}{1 + \zeta e^{X_i\beta+\psi\eta}} \right)^{1/\zeta} \left( \frac{\zeta e^{X_i\beta+\psi\eta}}{1 + \zeta e^{X_i\beta+\psi\eta}} \right)^k \right] \phi(\eta) d\eta.\quad (4)\end{aligned}$$

This formula involves only a single integral which we compute numerically (by Gauss-Legendre quadrature). In cases where precaution behavior is unrecorded we integrate over the whole real line. Estimations are done in GAUSS.

## VII Appendix II: Full set of estimates

Table A.II-6: Harassment and Precaution, Full set of Estimates

Variable	Harassment		Precaution	
	Coeff	Est/S.e.	Coeff	Est/S.e.
Ethnic concentration	-6.2826	-4.411	-1.9467	-3.428
% Unemployed	2.4347	1.197	1.3272	1.809
Male	0.9408	4.213	-0.0186	-0.248
Age	5.6567	1.153	1.0695	0.869
Age <sup>2</sup> /100	-7.1125	-1.248	-1.5156	-1.158
Degree	-0.0177	-0.067	0.0220	0.202
Voc training	0.1896	0.674	-0.0333	-0.336
A Level	0.6072	2.291	0.1525	1.583
London	0.4717	1.973	0.4073	4.261
Has children	-0.0864	-0.253	-0.1231	-1.287
No of children	1.6374	1.628	0.5206	1.738
Foreign born	-1.2946	-4.177	0.0229	0.262
Unemployed	-0.1998	-0.672	0.2587	2.557
Student	0.1106	0.235	0.2532	1.878
Out of lab force	-0.2013	-0.709	0.2215	2.210
Caribbean	0.7117	1.671	-0.4478	-2.867
Indian	0.6733	1.612	0.0858	0.571
Afro Asian	1.3718	3.015	0.2143	1.402
Pakistani	0.9090	2.108	0.1498	0.997
Chinese	0.9759	1.718	-0.2281	-1.144
$\zeta$	25.6871	12.319		
Constant	-1.7738	-1.584	-1.5034	-4.767

Cols 1,2: Independent negative binomial model. Cols 3,4: Probit model.

Standard errors are clustered by ward. Reference group: Bangladeshi.

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