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The Spatial Targeting of Urban Policy Initiatives: A Geodemographic Assessment Tool

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Abstract

Government frequently adopts an area-based approach to the targeting of urban policy initiatives as an indirect way of reaching the individuals that the initiatives are intended to help. The paper develops a method for assessing the success of this spatial targeting. It uses a geodemographic classification system to produce a generalised socio-economic profile for a particular initiative. This profile can be used to examine the targeting of the initiative in different localities, in order to assess whether targeting has been *inefficient* (the targeted areas have been defined so that many of the people they contain are in fact not those for whom the initiative is intended) or *incomplete* (deserving cases have been missed because the initiative's boundaries have been drawn too tightly). The utility of the method is demonstrated by employing the P^2 People and Places geodemographic system to assess the targeting of the Sure Start initiative in eight large provincial cities in England.

1. Introduction

Area-based initiatives (ABIs), designed to tackle the problems of deprived and disadvantaged communities, have long been a feature of urban policy in the UK and have generally been seen by policy-makers as an effective means of targeting poor people (Holtermann, 1975; Bulmer, 1986; and Tunstall and Lupton, 2003). Indeed, successive governments have favoured area-based measures and introduced a range of geographically-limited policies and programmes that, in many instances, have been identified through the use of area deprivation indices (DETR, 1998; Noble et al, 2000).

It is important at the outset to consider the purpose of the targeting associated with ABIs. In principle there is a whole spectrum of possibilities. At one extreme, there could be a situation in which the sole purpose of targeting is to identify a group of individuals who share a common set of characteristics that are relevant to the initiative (individual-, or people-oriented targeting). In this case the attraction of an area-based approach is that it gives ready access to a concentration of such individuals and may therefore help in the delivery of the initiative. At the other extreme, there could be an initiative that is entirely geographically-based, to the extent that the characteristics of the local population are completely irrelevant (area-, or place-oriented targeting).

In practice ABIs invariably lie somewhere between these two extremes. Even initiatives that appear at first sight to be either place-oriented or people-oriented turn out to be a combination of the two. What distinguishes them is the relative importance attached to targeting the individual and the area. Two examples of ABIs in England will serve to illustrate this point. The first of these might seem to be a place-oriented initiative, but actually has an important people-oriented component. The *Housing Market Renewal Initiative* aims to tackle poor housing stock and housing market failure in declining urban areas (ODPM, 2003). A series of nine Housing Market Renewal Pathfinders have been created to implement the initiative in those areas that are worst affected. While the main activity revolves around housing investment, improvement and re-modelling, and therefore can be seen as place-oriented, there is nevertheless a very significant people-oriented element: there is specific mention of the need to focus on social and economic interventions such as education, crime prevention, economic development and job creation, and cultural development, all of which are based on an assessment of the needs of the local population. The second example stresses targeting people but also has a secondary place-oriented element. The *Working Neighbourhoods* initiative is

currently being piloted by the UK Government (Job Centre Plus, 2005). Working Neighbourhoods provides a programme of intensive support in neighbourhoods with very high concentrations of worklessness and deprivation. In twelve pilot areas, where there are large concentrations of people receiving working age benefits, a number of ways of reducing worklessness are being tested. Among the barriers to work identified by the initiative are a number of people-related constraints such as: labour market factors, including a lack of suitable, well-paid jobs; lack of qualifications; and poor motivation. Also important, however, are place-related factors including poor local childcare provision and inadequate transport facilities for travelling to work. Furthermore, the initiative has uncovered evidence that some employers discriminate against recruits because of where they live, thus adding to the concentration of worklessness in particular neighbourhoods (Dewson, 2005).

Over the past twenty years, the use of spatial targeting has been the subject of a great deal of academic debate. A useful summary of the arguments for, and against, spatial targeting is provided by Smith (1999). Opinion is divided about the merits of ABIs and some authors express the desire to see stronger evidence of the existence of area or neighbourhood effects that aggravate the problems faced by individuals (McCulloch, 2001; Kleinmann, 1999). Others are less convinced about the need for this and adopt more pragmatic arguments in defending the area targeting approach (Smith et al, 2001).

Tunstall and Lupton (2003) provide a more detailed discussion of the use of area targeting as a means of reaching the poor and review the work that has been done by British government departments in developing and applying methods for the spatial targeting of urban policy programmes. They introduce some simple, yet effective, concepts that help in considering the effectiveness of targeting. The population of any

given area is never perfectly segregated by income and all areas are therefore, to some extent, mixed. This means that a degree of inefficiency is built into targeting by area, because people who are not the intended beneficiaries will be included. At the same time, the targeting will be incomplete, because intended beneficiaries living outside the targeted area will be excluded. Hence, it is likely that there will be a trade-off between "completeness" (the proportion of the target population that is reached) and "efficiency" (the proportion of individuals reached that are poor).

This paper is intended as a contribution to the discussion about the effectiveness of spatial targeting, particularly in relation to those urban policy initiatives where the primary purpose is to target areas as a proxy for individuals. It focuses on the issue of how well spatial targeting has been done, developing a method to assess the degree to which spatial targeting succeeds in reaching the population groups for which urban policy initiatives are intended. The method draws upon a geodemographic classification system, a national typology of residential neighbourhoods, based on their social, economic and demographic characteristics. Such systems are based on the principle that people living in the same neighbourhood share similar characteristics and neighbourhoods can be classified in terms of that similarity (Batey and Brown, 1995). They rely heavily on small area census data in their construction.

Because of their focus on the variety of different types of residential neighbourhoods, geodemographic classification systems are well suited to the task of characterising the areas targeted by urban policy initiatives in a flexible, yet succinct, manner. Geodemographic systems provide a way of establishing the main types of residential neighbourhood that are associated with particular area-based initiatives, a means of judging the degree of validity and appropriateness of the boundaries that have been

defined in order to target resources and regeneration activities, and of determining how well such boundaries reflect the spatial distribution of socio-economic need. They also provide a basis for examining how the types of residential neighbourhood targeted vary from place to place and for assessing the justification for this variation.

The paper is organised into five main sections. In the next section geodemographic methods for characterising an area-based initiative are explored. In Section 3 the question of how to assess targeting performance is addressed, with particular reference to different sources of targeting error. Section 4 presents a case study based on the Sure Start urban policy initiative, showing how each element of the assessment method can be applied. In Section 5 conclusions are drawn.

2. Characterising Area-Based Initiatives

2.1 Use of Geodemographics

The method adopted here assumes that it is possible to describe any targeted area in terms of a series of census Output Areas, the smallest geographical units employed in the UK Census (see Martin et al, 2001). Local instances of ABIs generally extend over a wider area than that covered by a single Output Area and, although the match will seldom be a perfect one, it should be relatively easy to list the relevant Output Areas that constitute a targeted area and to make consistent assumptions about split Output Areas. By describing targeted areas in this way, it is a straightforward step to link them to the geodemographic classification which itself is based on the use of data assembled at the Output Area level.

The geodemographic typology represents an attempt to identify groupings of Output Areas that share similar characteristics and, at the same time, are distinctly different from

one another. According to the grouping process, each Output Area is assigned to a specific geodemographic residential neighbourhood type (cluster) that has these characteristics.

The distinguishing features of each neighbourhood type are described by examining the location of the cluster in n-dimensional space, based on the values taken by a wide range of variables. This is usually achieved with the aid of an index table that compares the mean value of each variable with the national mean of that variable – the latter value set to 100. In this way, relatively high and low values of variables in relation to the national mean can be picked out and highlighted in "pen picture" descriptions of cluster characteristics.

The neighbourhood types provide a convenient way of summarising the main features of the population that is being targeted by an initiative. It is likely that a combination of different neighbourhood types will be needed, rather than a single dominant type. How these neighbourhood types are identified is an important issue, as is measuring the closeness of fit between these neighbourhood types and the population targeted by the initiative. The aim here is to obtain the best possible approximation, recognising that a perfect fit is unattainable, never mind how detailed is the geodemographic classification.

Two complementary approaches will be adopted in identifying the list of relevant neighbourhood types. The first of these is referred to as a "penetration ranking" or "concentration" approach and identifies the neighbourhood types that have the greatest over-representation of the ABI population. The second approach employs a method of ranking based on the overall similarity between particular neighbourhood types and the general socio-economic profile of the ABI. This is described as a "programme profile

distance" approach. In drawing up a final list of neighbourhood types, elements of the two approaches are combined.

2.2 Penetration Ranking (Concentration) Approach

By studying the composition of neighbourhood types that make up local instances of targeted areas across the complete set of local authorities, it is possible to establish whether there are particular types that occur more frequently than others. Taken together, such neighbourhood types are likely to account for a high proportion of the total population resident in the targeted areas. These may be regarded as *Core Poor Neighbourhoods*. These neighbourhoods are likely to play an important part in characterising the areas targeted by a particular initiative. In defining them, it is necessary first to calculate an index value for each neighbourhood type, to measure the extent to which that neighbourhood type is over-, or under-represented in the full set of areas targeted by a given initiative.

This index value, I, sometimes known as a penetration index, may be defined as:

$$I = \frac{\text{Proportion of an ABI's population falling within Neighbourhood Type X}}{\text{Proportion of the national population falling within Neighbourhood Type X}} \times 100$$

Neighbourhood types are ranked in descending order according to the index value and a cut-off point is set at 100. Neighbourhood types above this threshold, implying a greater representation than average of initiative-targeted population – the core poor neighbourhoods – would, according to this definition, be those that are disproportionately represented in the area-based initiative. *Core Poor Neighbourhoods* are referred to as Category 1 Neighbourhoods.

It is important to recognise that certain types of neighbourhood are concentrated in particular parts of the country, and may not emerge near the top of a national ranking of prevalent neighbourhoods. The method used here must be sufficiently flexible to reflect local and regional distinctiveness of this kind. To do this, it is necessary to define a second category of neighbourhood type, namely *Locally Distinctive Poor Neighbourhoods* – referred to as Category 2 Neighbourhoods.

Candidates for definition as Category 2 Neighbourhoods will have to satisfy the criterion that they are locally important (local here could mean a particular local authority area) in that they are over-represented in that area and display a high local penetration index.

Inevitably, some neighbourhood types will lie outside both Categories 1 and 2. These are defined as *Other, Less Poor Neighbourhoods,* and are assigned to Category 3.

Successful spatial targeting will ensure that the bulk of the targeted areas are either Category 1 or 2 Neighbourhoods (reflecting the *efficient* targeting of the initiative), and that the incidence of Category 1 and 2 Neighbourhoods outside the targeted areas is kept to a minimum (reflecting more *complete* targeting of those whose needs are greatest).

The penetration ranking or concentration approach provides a simple and effective way of identifying the neighbourhood types that contain the greatest concentration of targeted initiative population. However, there is no guarantee that the neighbourhood types identified in this way are actually similar to the general socio-economic profile of the ABI. There may be instances where neighbourhood types, that are quite different from this profile, happen to have a large component of targeted population and it is important that such instances are given less weight in the process of characterising the ABI. In order to

do this, a second approach is presented that focuses attention on the overall similarity of neighbourhood types and the profile of the ABI.

2.3 Programme Profile Distance Approach

The basis of this approach is to treat, as a new “cluster” or “neighbourhood type”, the entire set of census Output Areas that comprise the local areas on which the national area based initiative or programme is targeted. The national programme can then be represented, in n-dimensional space, with respect to a wide range of descriptive variables, in a similar manner to the way in which the geodemographic clusters are characterised (noted above). If the set of variables used to construct this “programme profile” is the same as that used to describe the characteristics of the geodemographic clusters, the degree of similarity between each geodemographic cluster and the programme profile may be determined using a simple Euclidean measure of distance. As this is possible for all clusters, this distance measure can be used to rank neighbourhood types according to their similarity to the programme profile. This ranking provides a basis for deriving a more rigorous specification of neighbourhood category assignment – in which again a distinction is made between “Core” and “Locally Distinctive” Poor Neighbourhoods.

An analogy can be drawn between the process of accumulating similar neighbourhood types and the rolling of a snowball. The snowball begins as a small nucleus of snow and as it rolls it gets progressively larger by gathering more snow. In the present example, the first neighbourhood types to be accumulated are those closest to the centroid of the programme profile. Gradually more neighbourhoods are added until the process reaches the stage where the population accumulated is equivalent to the total population targeted by the ABI, described here as the quota population. At this point the process is stopped –

the snowball stops rolling. The results of the process are assembled in a composite table in which are ranked, in terms of ascending order of distance from the programme profile, the “national” neighbourhood types (i.e. comprising all of the Output Areas assigned to that type) and “local” neighbourhood types (i.e. comprising the Output Areas in each district or local authority featured in the programme).

The accumulation of neighbourhood types works by giving precedence to national clusters. Thus, if a national cluster is added to the cumulative total, all of the local / district / local authority versions are included, and all local versions that have previously been found to be closer to the programme profile, are dropped from the ranking table.

The end result, when the quota population is reached, is a composite table, containing both national and local neighbourhood types. The national neighbourhood types are assigned to Category 1 (Core Neighbourhoods) and the local neighbourhood types are assigned to Category 2 (Locally Distinctive Neighbourhoods). In this way, the Category 1 and 2 neighbourhoods are as similar as possible to the ABI “programme profile” and they will account for as high an ABI population as possible.

This distance-based approach has the potential drawback that some of the neighbourhood types that are most similar to the programme profile do in fact have a relatively small ABI population. To overcome this problem, one possibility would be to use the penetration index from the first approach and to accumulate only those neighbourhood types that exceed a certain threshold. However, this would favour smaller neighbourhood types, including those defined as Category 2 neighbourhoods. A better solution is to use a Chi-square statistic (Visvalingam, 1983; Dykes and Unwin, 1998) that explicitly takes account of group size.

3. Measures of Targeting Performance

3.1 Simple Measures of Targeting Performance

Some simple measures can be calculated to describe how successful targeting has been, based on the cell values contained in a 2 x 2 table. Table 1 provides an example for the city of Liverpool. In this table the two rows represent the combination of Category 1 and Category 2 neighbourhoods (i.e. those whose needs are greatest) and Category 3 neighbourhoods (i.e. those whose needs are least) and the two columns are specified to represent, respectively, Output Areas within, and outside, the areas on which the ABI programme is targeted.

In such a table, the two main diagonal entries represent *correct targeting* – comprising, respectively, the *deserving* Categories (1 and 2) that fall within the defined initiative area boundaries and the *undeserving* Category (3) that fall outside the defined area. This "correctness" can be translated into a rate by adding the two figures together and dividing by the total population of the city and expressing the result as a percentage.

The two off-diagonal entries each represent different types of error, as follows:
Type 1 Error refers to *inefficiency***,** or the capturing, within the initiative area, of people who are in the less deserving Category 3, and *Type 2 Error* refers to *incompleteness***,** or the omission, from the defined area, of people who are in the more deserving Categories 1 and 2.

[Table 1 – about here]

As an illustration, Table 1 features the relevant counts relating to Liverpool for one particular area-based initiative. These counts are then used to derive the corresponding measures of inefficiency and incompleteness, as follows:

1. *Correct Targeting*: (83125 + 235516) x 100 / 433951 = 73.4%
2. *Targeting Error*: 100 – Correct Targeting = 26.6%
3. *Type 1 Error (Inefficiency)*: 40591 x 100 / 433951 = 9.4% or 35.2% of total error
4. *Type 2 Error (Incompleteness)*: 74719 x 100 / 433951 = 17.2% or 64.8% of total.

In this example, approximately three-quarters of Liverpool's population is found to be correctly targeted, implying that the remaining quarter is not. For this quarter, it is possible to apportion the error between Types 1 and 2. Here, Type 2 (incompleteness) turns out to be appreciably more important than Type 1 (inefficiency). The implication is that in Liverpool, the boundary of the area-based initiative needs to be drawn more extensively, so that it includes a greater number of people that are found in Category 1 and 2 neighbourhood types.

3.2 Extending the Basis for the Assessment of Targeting Performance

The measures introduced above provide a straightforward basis for assessing performance in terms of the overall total numbers of people found in Output Areas that are in more deserving and less deserving categories of neighbourhood and lie inside and outside the areas to which a specific initiative is directed. This has some merit but it can only provide a measure of *relative* targeting success since it depends on comparisons with the overall programme profile which itself may not reflect fully the targeting intentions of those promoting the initiative. This may be described as a problem of *systemic mis-targeting.*

It is wise to consider the possibility that everyone made the same kinds of targeting errors, either because they repeatedly misinterpreted the purpose of the initiative or they encountered similar difficulties in translating it into practice. There is no ideal solution to

this problem but there are ways of increasing confidence in the assessment of targeting performance. As a step in this direction, other relevant data can be introduced to provide an independent check.

One potentially useful source of information of this kind is to be found in the 2001 Census. For the first time, the Census included a table (Table UV67 Classification of Household Deprivation) recording the number of different dimensions of deprivation (DD) experienced by each household. Four dimensions are identified, in relation to employment, education, housing and health, and the Census records how many dimensions are experienced by a particular household. The benefit of this information, compared with other measures of multiple deprivation like the Index of Multiple Deprivation or the earlier Index of Local Conditions, is that it is based on a count made at the individual household level rather than relying on ecological correlations that use aggregate spatial data (Bulmer, 1986; Bailey and Gatrell, 1995).

It is possible to combine this information on multiple deprivation with the information on categories of neighbourhood types from the geodemographic analysis to obtain a more robust measure of targeting performance. Particularly valuable are the counts of households experiencing three or four dimensions of deprivation. Across the whole of England and Wales, some 10.0% of households were found to be experiencing three or four dimensions of deprivation in 2001.

3.3 Derivation of More Refined Measures of Targeting Performance

The totals contained in Table 1 enable the estimation of the number and percentage of households located in the different categories of neighbourhood type, both inside and outside the areas targeted for the purposes of a particular area-based initiative. The

inclusion of census information on multiple deprivation, cross-tabulated against neighbourhood type and targeted areas, enables the simple measures of correct targeting and the definitions of targeting error to be refined. It leads to the identification of a three-point scale for the assessment of targeting: *good targeting*; *some doubts*; and *serious doubts*, the precise definitions of which are given below. The percentage of households lying within each of these categories provides a valuable summary of targeting performance.

Table 2, which also refers to Liverpool, contains the data required to carry out the more refined assessment of targeting. The imprecision of spatial targeting is readily apparent in this table. Some 42,863 households (out of 184,514 households in total) are described as deprived in three or four dimensions. Only 15,791 of these households were targeted by the initiative. It is disturbing to find that as many as 10,744 households were not targeted despite experiencing multiple deprivation *and* living in the Category 1 or 2 neighbourhood types that characterise the initiative nationally.

[Table 2 – about here]

The assessment of inefficiency and incompleteness are now brought together in a series of calculations that relate successful targeting to the number of households in the city as a whole. Using figures set out in Table 2, the first set of calculations concerns *inefficiency*:

- the percentage of the city's households that are located in a targeted area and are assigned to Category 3 (i.e. less deserving) neighbourhoods;
- the percentage of the city's households that are located in targeted areas and are found to be experiencing no more than two dimensions of deprivation (i.e. relatively non-deprived);

- and the percentage of the city's households that are located in targeted areas, are experiencing no more than two dimensions of deprivation, and are assigned to Category 3 neighbourhoods.

For the case of Liverpool, the following results are obtained:

- (Category 3)	17744 x 100 / 184514	=	9.6%
- (0, 1 or 2 DD)	(54662 – 15791) x 100 / 184514	=	21.1%
- (both)	(17744 – 4315) x 100 / 184514	=	7.3%

The second set of calculations relates to *incompleteness*:

- the percentage of the city's households that are located in non-targeted areas and are assigned to Category 1 or 2 (i.e. more deserving) neighbourhoods;

- the percentage of the city's households that are located in non-targeted areas and are found to be experiencing three or four dimensions of deprivation;

- the percentage of the city's households that are located in non-targeted areas, are experiencing three or four dimensions of deprivation and are assigned to Category 1 or 2 neighbourhoods;

For the example of Liverpool, this gives the following results:

- (Category 1 or 2)	33368 x 100 / 184514	=	18.8%
- (3 or 4 DD)	16328 x 100 / 184514	=	14.7%
- (both)	19272 x 100 / 184514	=	5.8%

These results provide the basis for calculating the percentage of households in each of the three assessment categories. The *serious doubts* category applies to a situation in

which both pieces of evidence point to poor targeting. In this case, adding together the results for inefficiency and incompleteness provides an overall measure of the extent of *serious doubts*. For Liverpool, (7.3 + 5.8 =) 13.1% of households fall within the *serious doubts* category.

The *some doubts* category refers to a situation in which one or other of the two pieces of evidence suggests poor targeting. In the example used above, the *some doubts* category is calculated by added together the first and second results in each case, and then subtracting the *serious doubts* figure, to avoid double counting. For inefficiency, this gives (9.6 + 21.1 – 7.3 =) 23.4%; and for incompleteness the equivalent figure is (18.8 + 14.7 – 5.8 =) 27.7%. This produces an overall figure for *some doubts* of 51.1%.

The *good targeting* category is applied to those households the targeting of which is not the subject of doubt. In the example used here, *good targeting* applies to [100 – (13.1 + 51.1) =] 35.8% of households.

This completes the picture as far as the development of methods for the assessment of targeting performance is concerned. The following sections of the paper move on to consider the application of these methods to a case study of a particular national area-based initiative, Sure Start, in the context of eight large provincial cities in England.

4. Application of the Method to a Specific Area-Based Initiative

4.1 The Sure Start Programme

The Sure Start programme is used here to demonstrate the practical application of the geodemographic assessment tool in examining variation in the targeting performance of a 'national' area based initiative. Sure Start is well suited to this purpose. The programme

lends itself to geodemographic analysis as the target group of those in need of assistance is characterised by particular combinations of demographic and socio-economic features of the population. Sure Start is primarily a people-oriented ABI and so it is fair to judge the success of its targeting according to the measures introduced in Section 3. By concentrating on a comparison between the eight large provincial cities, the application also provides an opportunity to illustrate the extent to which the assessment tool is able to isolate variation in targeting performance between areas that display varied local mixes of underlying social and economic conditions.

The aim of the £3bn 10-year Sure Start programme, launched in 1998, is to work with parents, parents-to-be and children to promote the physical, intellectual and social development of babies and young children, and particularly those who are disadvantaged. The programme is focussed on combating child poverty in neighbourhoods with concentrations of children aged 0-4 by reshaping existing support services – from pregnancy until children are 14 and, in the case of those with disabilities, until 16 (see Sure Start, 2005).

All services are expected to contribute to achieving Sure Start's objectives: improving health, improving ability to learn, improving social and emotional development, and strengthening families and communities. Local programmes work towards national targets, such as a 5% reduction in low birth-weight babies and 75% of parents reporting improved services. Once areas are selected, Sure Start services are made available to all families in the area (Eisenstadt, 2002), a fact that reinforces the case for the adoption of the geodemographic targeting assessment approach presented here.

Districts in receipt of Sure Start funding were selected according to levels of deprivation, but detailed decisions about the definition of individual Sure Start programme area boundaries were made locally. The starting point in each case was the national list of the 20% most deprived wards, as measured by the IMD 2000 (Noble et al, 2000). Other locally-gathered indicators, such as low birth weight and teenage pregnancy, were taken into account. Draft Sure Start area boundaries were modified using local knowledge and the results of this exercise were submitted on paper maps to the group coordinating the national evaluation (Frost, 2005). The process of defining the Sure Start areas therefore used a combination of formal and informal methods (Barnes et al, 2005).

At the end of 2004, some 524 Sure Start programmes were helping up to 40,000 children living in disadvantaged areas (including a third of under 4s living in poverty). The number of Sure Start programmes in each of the eight cities was as follows: Manchester – 12; Liverpool – 11; Sheffield – 10; Newcastle – 8; Birmingham – 15; Leeds – 11; Nottingham – 8; Bristol – 6 (see NESS, 2005).

In order to assess the quality of spatial targeting associated with Sure Start, it is first necessary to establish which census Output Areas comprise each Sure Start area. Figure 1 indicates, for part of Liverpool, the spatial relationship between Sure Start areas, Output Areas and wards. Output Areas nest within wards and because, in this case, the boundaries of the Sure Start area largely coincide with those of a particular ward (Pirrie), most of the Sure Start area will consist of whole Output Areas. Elsewhere the Sure Start boundary takes a different path causing some Output Areas to be split. In these instances it is necessary to define which Output Areas should be regarded as part of a Sure Start area and which should be omitted. The deciding factor here was the location of an Output Area centroid relative to the Sure Start area boundary: an Output Area with its

centroid outside the Sure Start area was excluded from the definition. The observation made here, that the vast majority of Output Areas making up a Sure Start area are whole, rather than split, can be repeated in relation to all eight cities. It means that the impact of a relatively arbitrary procedure for allocating split Output Areas is likely to be very slight and so there can be confidence in the quality of the match between Sure Start areas and Output Areas.

[Figure 1 about here]

4.2 The P^2 People and Places Geodemographic Typology

Geodemographic classifications have been widely used to study variation in the geographical and socio-economic distribution of particular conditions of interest to agencies in the public sector, such as, for example, in relation to health, crime and education (see Brown et al, 2000, Reading et al, 1994). The last ten years or so have witnessed a number of reflections on experience in the development of area typologies (see, for example, Batey and Brown, 1994; Leventhal, 1995; Harris et al, 2005 (especially Chapters 3 and 6)) and critical evaluation of their performance in different circumstances (see, for example, Voas and Williamson, 2000, 2001, Harris et al, 2005 (Chapter 8)). Webber and Longley (2003) provide a useful illustration of their use in gaining a better understanding of the "geography of need". Longley (2005, p58) has gone on to suggest that "a new generation of geodemographic indicators is being used to represent intra-urban geographies, in ways that are robust, defensible and generalized", with GIS fulfilling a central role in understanding geographies of public service consumption and stimulating a "renaissance of geodemographics for public service delivery".

The P^2 People and Places classification system is one of nine updated (or brand new) geodemographic typologies to emerge from the analysis of data from the 2001 Census

that are reviewed by Sleight (2005). It is the only system that was co-developed by an academic research team and a commercial firm both to support private sector applications and to serve as a public policy research tool (Batey and Brown, 2004, 2005; Beacon Dodsworth, 2005) although the ONS National Classification of Output Areas (Vickers et al, 2005) clearly also has a very strong academic pedigree.

The P^2 People and Places typology is based exclusively on data from the 2001 Census, thus ensuring comprehensive coverage and consistency of data specification throughout Great Britain. However, in the context of this analysis of Sure Start, the Census does have the potential drawback that it lacks a direct measure of household income, an important factor in the definition of need. This is less of a problem than might first appear since there are several correlates of income that are drawn upon extensively in the construction of a geodemographic typology. It is reassuring to note that, at an aggregate level, these indirect measures of income are strongly correlated with sample survey observations of income obtained from consumer diary exercises such as TGI (see, for example, Batey and Brown, 1995).

Census geography was radically improved with the adoption of purpose-designed Output Areas. These are based on an aggregation of full postcodes, smaller than the corresponding 1991 Census enumeration districts (containing c. 125 households on average, compared with c. 150) and displaying a high degree of internal homogeneity with respect to both dwelling type and dwelling tenure (see Martin, 2002), a beneficial feature when attempting to identify groups of areas that share common characteristics.

Different levels of clustering or area-type description are commonly used in classification systems, depending on the level of detail required for analysis. Thus, the P^2 system

provides three levels of description. These range from the most detailed level, with 157 clusters (or *Leaves*), to 40 clusters (or *Branches*), and 13 clusters (or *Trees*), the least detailed. The Leaves, Branches and Trees are labelled and presented in a sequence that reflects the affluence ranking of the area types (see Batey and Brown, 2004). However, the classificatory variables do not include the measure of multiple deprivation introduced in Section 3.2 as a supplementary indicator of 'need'.

The analysis in this study is carried out at the P^2 Branch (40 clusters) level. The choice of level is generally a compromise between the quest for greater precision and the manageability of the analysis. The method of characterising Category 1 and 2 neighbourhood types tends to militate against use of P^2 Leaves because of the large number of potential neighbourhood types. In the case study, the combination of eight cities and 157 Leaves would potentially mean a total of [(8 + 1) x 157] = 1413 neighbourhood types, making the analysis very unwieldy.

The paper now turns to the results of the Sure Start analyses, following the same sequence as was used in developing the assessment methods in Sections 2 and 3.

4.3 Results of the Basic Analysis

The first stage of the analysis focuses on the variation between the eight cities in terms of the population in designated Sure Start areas compared with the overall population of each city. This is shown in Table 3. The highest rates are recorded in Newcastle and Nottingham, at between 45 and 69% above the eight-city average of 199 per 1000. The lowest rates are recorded for Birmingham, Leeds and Bristol, at between 30 and 40% below the average.

[Table 3 – about here]

In the second stage, a pen picture of the programme profile is presented, describing the distinguishing features of the Sure Start areas. The profile was based on an index table comparing the mean value of a selection of census variables for the census Output Areas that are located in the Sure Start areas with the corresponding mean value of those variables for the eight cities as a whole, typically picking out variables that display relatively high or low values. The profile is shown in Figure 2.

[Figure 2 about here]

The principal purpose of the third stage of the analysis is to identify the P^2 People and Places Branches that fall into each of the three categories:

Category 1 - Core Neighbourhoods;

Category 2 – Locally-Distinctive Poor Neighbourhoods (within each local authority district);

Category 3 – Other, Less Poor Neighbourhoods falling in neither Category 1 nor 2.

This was undertaken by using the programme profile referred to above. This profile is further specified as the location, in n-dimensional space, of the set of Output Areas that together describe the eight-city Sure Start areas. This location is defined, more precisely, with respect to the scores of a total of 93 descriptive variables on the nine principal components that account for c. 90% of the variance present in the data used to characterise the distinguishing features of the Output Areas in the development of the P^2 People and Places geodemographic typology. This location is taken to be equivalent to that of a separate Sure Start "cluster", or set of Output Areas that, together, make up the Sure Start programme.

With this location defined, it is possible to establish the Euclidean distance of each P^2 People and Places Branch (40 level cluster) from the Sure Start programme profile

centroid. Branches are ranked initially according to their distance from this centroid – with entire national (eight-city) Branches given precedence in the sense that, while initially the Branches represented in individual cities may be found to be closer to the centroid of the profile, when a national Branch is found, all earlier individual city Branches are dropped from the ranking and the national Branch retained in the table. All individual city branches remaining in the ranked table, when the accumulation process is stopped, are retained as Category 2 Branches.

[Table 4 – about here]

The outcome of this ranking process is summarised in Table 4. Branches 38, 35 and 39 appear at the top of the table at the distances from the programme profile centroid indicated in column 3. However, in addition to this distance, account is taken of the relative size or population of each candidate branch by deriving a Chi Square value. This is obtained by comparing the number of people in Sure Start areas found to be present in a Branch with the number expected if the average rate of occurrence across the eight cities was observed (squaring the difference and dividing by the expected value). This gives greater prominence to the larger Branches. A composite ranking is presented in the final column of the table; this gives equal weight to the distance from centroid and Chi statistic elements.

Table 4 indicates that Branch 26 in Nottingham is third in terms of distance from the programme centroid but has a Chi rank of ten, with respect to size, giving a combined ranking of fourth. This is one example of a Category 2 (Locally-Distinctive Poor) neighbourhood. Similarly, Branch 40 in Manchester and in Nottingham, occurs in the ranked table before the quota Sure Start population of 798357 is reached and thus serves as another Category 2 Neighbourhood in the subsequent analysis.

With the neighbourhood categories identified for Sure Start areas, the next step is to construct 2 x 2 tables recording the match (and mismatch) of neighbourhood category and Sure Start area, as illustrated in Table 1. For the eight cities as a whole, the geodemographic neighbourhood typology succeeds in characterising 77.2% of the population of the Sure Start areas (see Table 5).

An indication of the extent of the match between Category 1 and 2 neighbourhood types and Sure Start areas in a particular city can be obtained from Figure 3. The map shows one of the eight cities, Nottingham, where the fit is relatively poor and many Category 1 and 2 neighbourhoods are excluded from the Sure Start areas.

[Figure 3 about here]

Table 5 presents the results in terms of the notions of correct targeting and targeting error introduced in Section 3.1. The resulting values provide a basis for ranking the eight cities. This ranking places Bristol at the top, with a correct targeting measure of 86.6% or 12% above the average for the eight cities as a group. The complement, targeting error, ranges from 13.4% for Bristol to 32.9% for Manchester, the latter 44% higher than the eight-city average of 22.8%.

[Table 5 – about here]

The same table also records the two components of targeting error: Type 1 (Inefficiency) and Type 2 (Incompleteness). Table 5 reveals that, in those cities with a higher rate of correct targeting, there is a tendency for Inefficiency to exceed Incompleteness, i.e. for a larger number of less deserving people to be included in Sure Start areas than should be. Similarly, towards the bottom of the table, notably in Liverpool (with the highest value of 64.8%), Nottingham and Manchester, Incompleteness is more marked, implying that, in these cities, the Sure Start area boundary has been drawn too tightly, causing a greater proportion of potentially deserving recipients to be excluded.

4.4 Results of the Refined Analysis

Consistent with the process of refinement presented in Section 3, further measures of targeting performance were derived, based on the use of additional information on multiple deprivation drawn from the 2001 Census.

[Table 6 – about here]

The incidence of households with 3 or 4 dimensions of deprivation varies widely between the eight cities, ranging from less than 10% in Bristol to over 23% in Liverpool (see Table 6).

[Table 7 – about here]

The outcome of the analysis is revealed in the overall comparison of Inefficiency and Incompleteness measures presented in Table 7. This includes the components of Inefficiency and Incompleteness that contribute to the overall assessment meriting "serious doubts" about targeting performance, occurring where, in the case of Inefficiency, both the geodemographic / Branch category-based measure (Category 3) and household deprivation measure (0, 1 or 2 dimensions of deprivation) conditions coincide in Sure Start areas. Similarly, with respect to Incompleteness, Category 1 and 2 areas coinciding with households with 3 or 4 dimensions of deprivation outside Sure Start areas contribute to the *serious doubts* measure. In Bristol, the city with the highest percentage of *good targeting*, these *serious doubt* components are found to be 7.1% (for Inefficiency) and 0.7% (for Incompleteness), respectively, giving a *serious doubt* measure of 7.8%.

From the evidence in Table 7, it is clear that Inefficiency is generally much more important than Incompleteness. The exceptions are Liverpool, Manchester and Birmingham where the scale of the task facing the Sure Start programme is greater than

elsewhere. The higher Incompleteness levels in these cities may be attributable to a number of operational or politically motivated causes, among which may be the recognition of a capacity constraint on local ability to deliver the Sure Start programme to such large numbers. It is notable that in Newcastle and Nottingham the targeting of the programme has been relatively weak, resulting in a large number of less needy households in Sure Start areas.

The *some doubts* assessment is made by adding together the individual component measures of Inefficiency / Incompleteness, and deducting from this the percentage of households in which the conditions coincide, i.e. *serious doubts*. In the case of Bristol, this calculation is as follows: (for Inefficiency: 8.2 + 11.3 - 7.1 = 12.4%) + (for Incompleteness : 4.8 + 7.1 - 0.7 = 11.2%) = 23.6%.

The final *good targeting* measure is then estimated by deducting the *serious doubts* and *some doubts* percentage figures from 100% (100% - (7.8% + 23.6%) = 100% - 31.4%) resulting in the assessment of 68.6% “good targeting” for Sure Start areas in Bristol. These results are shown in the final three columns of Table 7.

It is interesting to compare the results in Table 7 with those in Table 5. It is clear that Bristol again tops the ranking in terms of this more refined measure of targeting performance. It is worrying that, in four of the eight cities, at least 60% of the targeting of Sure Start is, to some extent, suspect. Comparing Tables 5 and 7 reveals that these same four cities perform relatively badly in both analyses.

5. Conclusions

This paper has demonstrated the benefits of using a geodemographic approach to assess the success of spatial targeting as applied to area-based urban policy initiatives. Even though the original basis for spatial targeting may sometimes be ill defined and may reflect political, rather than technical factors, the approach presented here allows the targeted areas to be analysed consistently and systematically. The geodemographic approach works by characterising the main types of residential neighbourhood that account for the bulk of the population in targeted areas. Some neighbourhood types are widely represented, while others are distinctive to particular localities. Neighbourhoods that have been wrongly targeted can be easily identified, as can those that have been missed in targeting.

A geodemographic approach uses aggregate data about groups as a surrogate for small geographical areas and these areas are themselves aggregations of individuals and households. It is important to recognise that in a geodemographic classification it is the Output Areas that are being classified, not the individuals and households living within them. The fact that Output Areas are likely to be socially mixed puts limits on the quality of the geodemographic classification, a point addressed by Mitchell et al (1998) who propose a new technique for 'unmixing' aggregate data based on an analogy with the classification of mixed pixels in remotely sensed imagery.

A number of operational decisions will influence the results obtained from the assessment method. Two important issues are the manner in which the ABI boundaries are linked to those of census Output Areas, and the selection of which level of aggregation to use when characterising the targeted areas. In the case study presented here, the match between Output Areas and ABI was a close one, helped by the fact that Sure Start areas are substantially larger than Output Areas. It is possible, however, that if the ABI were to

be focused on smaller areas, the quality of the match would suffer as a result of a higher proportion of split Output Areas. In this case a more refined matching procedure would be needed.

The second issue concerns the decision about which *level* of typology to adopt (in the P^2 People and Places system, Leaves, Branches or Trees). This is not an easy decision to make. Ideally, the neighbourhood types should be sharply defined but if they are too specific, the characterisation process is liable to break down. A closely related issue is the choice of spatial units for the geodemographic system. The use of Output Areas, as opposed to the much larger Super Output Areas used in other targeting systems, offers substantial advantages in that it works with smaller population groups.

The method developed in this paper puts emphasis on comparing local targeting with a national socio-economic profile for a particular initiative. The possibility that this profile is not fully reflective of the targeting intentions of those promoting the initiative was considered and this led to a refinement of the method, involving the use of Census multiple deprivation variables as an independent check. This had the benefit of strengthening the analysis, increasing confidence in the assessments of targeting performance.

The geodemographic approach is flexible. The Sure Start case study has shown that it is possible to compare targeting performance in one city with that in other cities and thus to draw conclusions about the consistency with which particular nationally-initiated area-based initiatives are implemented. In some instances, poor targeting is found to be largely a product of incomplete targeting, where the definition of targeted areas has stopped short of including the full complement of deserving areas. In other cases, the

poor targeting outcome reflects an inefficient definition in which areas are targeted wrongly, resulting in a targeted population that includes a mixture of neighbourhood types, only some of which are closely related to the socio-economic profile for Sure Start.

Some degree of spatial mis-targeting is inevitable and, indeed, it may be argued that this is no bad thing since it implies that, in any given targeted area, there will be a number of less deprived households that can serve as positive role models for those households intended to benefit from the policy initiative. However, the empirical results presented here in relation to Sure Start indicate that the quality of targeting is highly variable among cities and reveal that, even in the best cases, there is a substantial amount of mis-targeting. Taken as a whole, these results do give cause for concern and suggest that there is plenty of scope for achieving better spatial targeting of urban policy initiatives. The assessment tool developed in this paper provides clear guidance about where the emphasis should be placed in making these improvements.

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Figure 1: The Relationship Between Sure Start, Output Area and Ward Boundaries – A Liverpool Example

Figure 2: A Pen Picture of Sure Start Areas

Sure Start areas are characterised by households that are relatively youthful, with the 15 to 25 age group and student population strongly over-represented. Residents are typically living in terraced property (40%), semis (25%) and high-rise flats (20%), a relatively high proportion of accommodation being without central heating and/or vacant. About a third of the property is in owner occupation (half the national average), a third council rented and 12% housing association. Male unemployment among the mainly semi- and unskilled workforce is relatively high and over half of the households are without a car, reflected in a higher rate of bus commuting. There is a relatively high level of residential turnover and about twice the national average of lone parent households, with a modest level of over-representation of ethnic minority groups.

Figure 3: The Relationship Between Sure Start Areas and Category 1 and 2 Neighbourhood Types in Nottingham

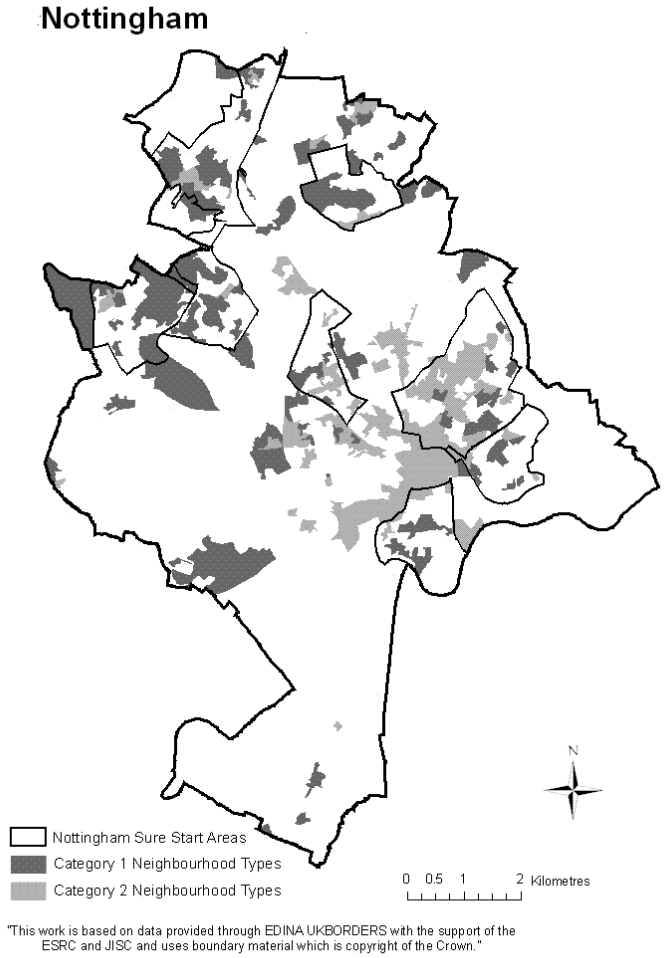

Table 1: The Match Between Targeted Areas and Neighbourhood Categories: A Population Analysis for Liverpool

	Targeted Areas	Non-Targeted Areas	Total
Category 1 or 2	83125	74719	157844
Category 3	40591	235516	276107
Total	123716	310235	433951

Table 2: The Match Between Targeted Areas and Neighbourhood Categories: A Household Analysis for Liverpool Showing the Incidence of Multiple Deprivation

	Targeted Areas	Targeted Areas	Non-Targeted Areas	Non-Targeted Areas	Liverpool Totals	
	All H'holds	H'holds 3 or 4 DD	All H'holds	H'holds 3 or 4 DD	All H'holds	H'holds 3 or 4 DD
Category 1 or 2	36918	11476	33368	10744	70286	22220
Category 3	17744	4315	96484	16328	114228	20643
Total	54662	15791	129852	27072	184514	42863

Table 3: The Distribution of Sure Start Population by City

[Note: based on data derived from the 2001 Census]

	Resident Population	Sure Start Population	Sure Start Rate/1000
Manchester	383213	119544	312
Liverpool	433951	123716	285
Sheffield	505271	97969	194
Newcastle	253502	85032	335
Birmingham	952932	113421	119
Leeds	708489	103150	146
Nottingham	255988	73738	288
Bristol	374333	51836	138
All 8 Cities	**3867679**	**768406**	**199**

Table 4: Ranking of People and Places Branches with respect to Distance from Sure Start Programme Profile

Branch	City	Distance	Population	Sure Start Population	Branch Rate (%)	Cumulative Population	Chi Statistic	Chi Rank	Distance Rank	Sum of Ranks
38	All	4.43	310004	126261	40.73	310004	253.6	1	1	2
35	All	6.74	199090	85782	43.09	509094	226.7	2	4	6
39	All	6.86	101110	49224	48.68	610204	201.1	3	5	8
26	Nottingham	6.64	9223	3354	36.37	619427	34.4	10	3	13
40	Manchester	7.52	18013	10024	55.65	637440	105.7	7	9	16
32	Liverpool	6.09	560	240	42.86	638000	12.0	14	2	16
33	All	7.65	131640	53329	40.51	769640	163.5	5	12	17
40	Nottingham	8.19	26628	18596	69.84	796268	179.9	4	15	19
40	Newcastle	8.11	11922	9344	78.38	808190	141.1	6	13	19
37	Manchester	7.54	8098	3363	41.53	816288	42.6	9	10	19
28	Newcastle	7.22	2534	1259	49.68	818822	33.0	12	8	20
32	Newcastle	7.63	3528	1624	46.03	822350	34.1	11	11	22
32	Nottingham	7.11	1736	552	31.80	824086	10.7	15	7	22
28	Manchester	7.09	5956	1400	23.51	830042	5.6	16	6	22
31	Newcastle	8.36	5377	2555	47.52	835419	44.5	8	16	24
37	Liverpool	8.17	28820	7529	26.12	864239	22.2	13	14	27

Table 5: Comparison of Inefficiency and Incompleteness in the Definition of Sure Start Areas by City

[Note: all expressed in percentage form]

City	Correct Targeting	Targeting Error	Type 1 Error (Inefficiency)	Type 2 Error (Incompleteness)
Bristol	86.6	13.4	61.7	38.3
Sheffield	82.2	17.8	58.7	41.3
Birmingham	79.5	20.5	43.3	56.7
Leeds	77.7	22.3	50.1	49.9
Newcastle	73.8	26.2	70.3	29.7
Liverpool	73.4	26.6	35.2	64.8
Nottingham	72.1	27.9	43.6	56.4
Manchester	67.1	32.9	41.8	58.2
All 8 Cities	**77.2**	**22.8**	**51.5**	**48.5**

Table 6: Dimensions of Deprivation among Households in Eight Cities

[Note: based on data derived from the 2001 Census]

City	Resident H'holds	H'holds with 3 or 4 DD	% H'holds with 3 or 4 DD
Manchester	167497	26582	15.9
Liverpool	187882	43861	23.3
Sheffield	217631	26338	12.1
Newcastle	111223	14798	13.3
Birmingham	390748	65074	16.7
Leeds	301575	40856	13.5
Nottingham	116098	14755	12.7
Bristol	162084	15190	9.4
All 8 Cities	**1654738**	**247454**	**15.0**

National Mean % Households with 3 or 4 Dimensions of Deprivation = 10.0%

Table 7: A Comparative Assessment of Spatial Targeting in Eight Cities

		Inefficiency			Incompleteness			Overall Assessment		
Good Targ-eting Rank	City	Sure Start %Cat 3	Sure Start 0,1,2 DD	Sure Start Both	Non-Sure Start %Cat 1+2	Non-Sure Start 3 or 4 DD	Non-Sure Start Both	Serious Doubts	Some Doubts	Good Targ-eting
1	Bristol	8.2	11.3	7.1	4.8	7.1	0.7	7.8	23.6	68.6
2	Sheffield	10.3	15.8	8.7	7.7	8.4	1.5	10.1	32.0	57.9
3	Birmingham	7.8	8.3	6.1	12.1	14.0	3.0	9.1	33.1	57.8
4	Leeds	10.8	11.5	9.1	11.3	10.8	2.7	11.8	32.6	55.6
5	Newcastle	18.7	27.8	15.8	7.9	6.6	1.6	17.5	43.5	39.1
6	Liverpool	9.6	21.1	7.3	18.1	14.7	5.8	13.1	50.3	36.6
7	Nottingham	20.1	29.6	18.0	12.2	6.5	1.5	19.4	49.1	31.5
8	Manchester	13.5	25.9	11.3	19.9	9.6	3.9	15.2	53.6	31.2
	All 8 Cities	**11.5**	**15.9**	**9.5**	**11.4**	**10.7**	**2.7**	**12.2**	**37.3**	**50.6**