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Modelling Tenants' Choices in the Public Rented Sector: A Stated Preference Approach

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Summary. This paper uses a stated preference (SP) approach to examine the potential housing choices of tenants in the UK public housing sector. The paper begins by explaining the policy significance of the choices that such tenants might make if alternative dwellings were offered to them. It then discusses the SP approach in general before explaining the way in which it is used in this study. The results of the SP modelling exercise are presented. These suggest that tenants are unlikely to move to housing estates that they see as being worse than their current estate solely in response to lower rents. This is because a number of factors other than rent are of more significance in their potential housing decisions.

1. The Policy Background

Approximately every 10 years since the early 1970s, rent-setting principles and systems of subsidy to public rented housing have been through major reforms in the UK. A further round of change and debate is currently taking place. The question of how tenants respond to rent levels, changes and differentials is of central importance to this debate. This question is the main focus of this paper.

For much of their history, public landlords in the UK operated rent-pooling policies which resulted in rent structures with limited differentials between different types of property and between different locations. This policy was implemented within a framework of recurrent revenue subsidy that resulted in rents considerably below market levels. This rent-setting regime was thrown into serious question in the 1970s and 1980s when issues were raised about the distortionary effects of price subsidies. There was particular concern that the level of average rents did not differ substantially between areas of the country and did not respond to local housing market and labour market requirements (see, for example, Minford *et al.*, 1987).

As is well known, legislative changes in 1980 and 1989 changed the subsidy system being used by central government so as to effect the shift from price subsidies to a reliance on personal subsidy. In 1980, aver-

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age council housing rents in England were £7.70 which represented 6.9 per cent of average earnings. In contrast, by 1989, they had reached £20.70 (9.4 per cent of average earnings) and peaked at 13.2 per cent of average earnings in 1996 (Wilcox, 1995, 2000). Increases were not implemented uniformly: the revised subsidy system was geared to ensuring that rents rose fastest in areas where capital values and regional earnings were highest, thereby leading to increasing differentiation in rents between regions.

Beyond concerns with regional rent differentials are more micro-level concerns with the impact of pricing upon the mobility of tenants and, equally importantly, upon the efficient utilisation of the public housing stock (for example, DoE, 1996). The argument is straightforward: rent-pooling and flat rent structures give tenants little incentive to optimise their housing consumption. Incentives are blunted even further by the 100 per cent marginal subsidy provided to recipients of assistance through the Housing Benefit (HB) system. Hence, it was argued that there was widespread underoccupation within the stock: older 'empty-nester' households were seen as particularly prone to remain in larger properties even when their current housing needs could be met by a smaller property. The shortage of larger accommodation in the public sector, partly as a consequence of sales under the Right to Buy policy, made freeing-up larger accommodation a pressing policy issue. A belief in pervasive underoccupation has been a recurrent theme in central government thinking. Survey evidence (for example, Barelli, 1992) indicates that there may be a significant proportion of households with at least one 'spare' bedroom, although Barelli (1992) also suggests that most such households do not perceive themselves as being 'overaccommodated'.

While a number of incentive schemes have been put in place in an attempt to induce tenants to move to alternative accommodation, the first attempt by central government to address this issue directly through pricing was section 162 of the Local Government and Housing Act 1989. The section enjoined local authorities, when reviewing rents

> to have regard in particular to the principle that the rents of houses of any class or description should bear broadly the same proportion to private sector rents as the rents of housing of any other class or description (1989 Local Government and Housing Act, section 162, sub-section (3)).

The objective of this section is to break with the principle of rent-pooling and to attempt to 'mirror' market differentials. By implication, this would present tenants with the appropriate incentives to optimise their housing consumption. Hence it represented a potentially important shift from the traditional approach of allocating public housing on the basis of 'objective' need to a greater reliance on ability and willingness to pay. In practice, the policy was widely ignored (see Walker and Marsh, 1995, 2000) and it confronted a number of difficulties at a conceptual level (Walker and Marsh, 1998).

While this concern with the efficient use of the housing stock persists, debate over rent policy has evolved. The impact of flat rent structures has become a more urgent question, given that certain parts of the social housing stock are experiencing high turnover and/or a high rate of voids. These and related phenomena are encompassed within the debate over 'low' or 'changing' demand for social housing (see, for example, Bramley *et al.*, 2000; PAT7, 1999). The link to rent policy is the belief that if rents are undifferentiated spatially then tenants will have little incentive to trade price off against quality, resulting in fewer tenants choosing to live in poorer-quality, lower-priced neighbourhoods. The problems of poorer neighbourhoods are reinforced in some areas where the costs of private housing are comparable—and, in some cases, favourable—to those in social rented housing. Similar problems are being experienced across the two social housing sectors—local authority and Registered Social Landlords—because of 'incoherent' rent differentials within and between the two sectors (see, for example, Wilcox, 1997).

The recent housing Green Paper (DETR/DSS, 2000a) explores the options for imposing a standard rent-setting method on social housing. This part of the current government agenda reflects a desire to "provide a closer link between rents and the qualities which tenants value in properties", "give tenants the opportunity to take more responsibility for their choice of housing", and "encourage better management by social landlords of their stock" (DETR/DSS, 2000a, para. 10.1). The Green Paper sets out plans for choice-based allocation systems and an important goal of rent policy reform is that rent structures should complement these new allocation systems. The statement of policy that emerged following consultation reasserts the broad thrust of the Green Paper agenda (DETR/DSS, 2000b, ch. 9).

Marsh (2001) argues that underlying the Green Paper discussion of rents are two interrelated, but separate, themes. On the one hand, there is a concern with developing a rent-setting policy that conforms to a particular definition of fairness. On the other, there is a relatively simple conception of decision-making and a concern with tenants' behavioural responses to price signals. If rents are more clearly differentiated by quality, then it would be expected that some tenants would be willing to trade down to poorer-quality accommodation in order to realise a saving in weekly housing costs. This in turn would shore up areas which may be at risk of 'low' demand or even abandonment. The government's concerns with the use of financial incentives to influence choices and deal with underoccupation are similarly present in the underoccupation pilot scheme running from April 2000 (DETR/DSS, 2000a, para. 11.76). The scheme gives tenants receiving housing benefit a lump sum equivalent to half of the HB saving that results from their moving to smaller accommodation.

The issue of rent-setting and appropriate rent policies is central to the current policy agenda in England. Whether increasing rent differentials will have the impacts that government anticipates hinges on whether, and how, tenants respond to rents and rent differentials. Addressing this question is fundamental to assessing the scope for using pricing mechanisms to achieve the government's broader policy goals. In the remainder of this paper, we report on research that addresses the question directly.

The research adopts a novel approach to the issue by employing a stated preference approach to modelling decision-making by local authority tenants. In section 2, we provide an overview of stated preference modelling and the situations in which it has been used. The methodology used to apply the stated preference approach to tenants' housing choices is summarised in section 3. Section 4 presents the principles of stated preference modelling and details of the model used in our research. Key results of our modelling exercises are also presented. The results are interpreted in section 5 and section 6 seeks to illustrate their application. Section 7 concludes by relating these results back to the policy agenda.

2. The Stated Preference Approach

2.1 An Overview of the Stated Preference Approach

Stated preference (SP) involves the simulation of choice situations. Those taking part in an SP exercise are presented with hypothetical alternatives and make choices between them in much the same way as they might do when making choices in market or other contexts. SP is a decompositional approach which recognises, following Lancaster (1971), that the overall attractiveness of a product is related to a set of relevant attributes (characteristics) and that changes to these attributes impact on the preferences towards and willingness to pay for the product.

SP has a number of key features. The decision-maker taking part in an SP exercise—who can be an individual, household, group or organisation—is offered hypothetical alternatives to evaluate. The evaluation might take the form of a choice between the

alternatives or entail ranking or rating them on either an interval or categorical scale. More conventional revealed preference (RP) methods, based on the results of actual choices, typically obtain one observation per respondent. In contrast, SP participants are required to make a series of choices or evaluations, typically between 8 and 16.

Each alternative presented to the decision-maker is characterised by a set of relevant attributes, with the number of attributes usually limited to between three and five in recognition that human cognitive abilities are limited. The levels or values associated with each attribute must be realistic and are usually combined according to the rules of an experimental design procedure, with orthogonality being by far the most commonly used (Hensher and Barnard, 1990). Trade-offs between attribute levels must be offered. Statistical analysis allows the relative importance of the attributes to be estimated. These estimates can then be used for purposes such as optimising product design features or social cost–benefit analysis and to forecast behaviour.

The attractions of the SP approach stem from its ability to control the choice stimuli, thereby providing an approximation to laboratory conditions. The SP approach also has a number of advantages over RP methods. It can avoid correlation problems, ensure sufficient variation in the data, offer better trade-offs between variables than often exist in the real world, collect multiple choices per person and avoid measurement error in the independent variables, all of which will improve the precision of the parameter estimates. SP methods can also be used to analyse markets, products or policy options that do not currently exist in the real world or attribute levels beyond the range of current experience. SP scenarios can be created in order to 'design out' those variables which are problematic to represent or model and in which we are not primarily interested by specifying them to be the same for each alternative so that they cannot influence choice. Such variables would have to be included in an RP model based on actual decisions.

2.2 Some Issues in the Use of Stated Preference

The main drawback of the SP method, as with all approaches based on hypothetical questions, is that the responses do not necessarily provide an accurate guide to actual preferences. In other words, in contrast to RP data where respondents have actually made a choice, SP respondents are not committed to behave in accordance with their stated preferences. However, in circumstances where the alternatives offered to consumers are new and/or consumers have little experience making choices between such alternatives, RP data may not be available. Similarly, suitable RP data may not be available where consumers are broadly familiar with the choices on offer and have experience of choosing, but the alternatives of interest to the research differ significantly from those consumers will previously have encountered. Where insufficient RP data are available, or are very difficult to collect, there may be no practical alternative to an SP approach in estimating the effects on consumers' choices of (changes in) key attributes.

The errors that SP responses contain may be random, such as might stem from respondents' uncertainty, misunderstanding or fatigue. We would not expect random error to have an adverse impact on the estimated relative importance of each attribute.[1] Of more concern is error which is systematic and which may result in biased estimates. There are five principal forms of such response error. First affirmation bias occurs where the SP responses are amended to affirm the perceived study objectives or to provide answers that the respondent expects the person conducting the SP exercise to want. Secondly, justification bias arises where responses are amended to justify actual behaviour in order to reduce 'cognitive dissonance'. Thirdly, errors may arise from the effects of breaking of habits resulting from the fact that real-world decision-making involves far greater transaction costs than decisions made under SP exercises. Fourthly, strategic or policy responses bias can occur where respondents

attempt, through their answers, to influence the likelihood or magnitude of changes in the real world. Finally, social norm bias may arise if SP responses fail to reflect actual preferences because actual preferences are perceived as socially unacceptable or 'politically incorrect'.

In addition, errors might arise from the inefficient or inappropriate design of the SP exercise itself. If the variations in attribute levels offered are too small or unreasonably large, the levels of the attributes are presented in unrealistic combinations or the absolute values are unrealistic, then they may be ignored by respondents. In such cases, the importance of the attributes in question will be understated. Additionally, an SP exercise could emphasise secondary variables which would have little impact on respondents' real-world choices, leading to an inflated importance being ascribed to these attributes.

Some of these risks of error can be mitigated by the appropriate design and conduct of the SP exercise. First, the alternatives offered should be of sufficient significance or importance to participants for them to take the exercise seriously. This might be achieved through basing sample selection on consumers who actually or potentially face choices in the relevant or associated markets. Secondly, the attributes of the alternatives offered should both be understandable, and sufficiently realistic, to the participants. Thirdly, to reduce the likelihood of strategic or affirmation bias, it is important that the SP exercise gives no special emphasis to the 'key' attributes with which the research is concerned. This can be facilitated by varying the levels of those attributes with which the researcher is less concerned.

Clearly, how well SP performs will vary. For example, it has long been widely recognised (for example, Bates, 1988) that the performance of SP in valuation, requiring an analysis of coefficient estimates relative to each other, may be different from that in forecasting, where the absolute values of the estimated coefficients are employed. The quality of the responses obtained depends upon, amongst other things, the questions asked (Widlert, 1994) and the incentive to bias (Wardman, 1998; Wardman and Whelan, 2001). Good design can mitigate many of these problems.

It is important, particularly for novel applications of SP, to obtain RP data where possible from a closely corresponding choice context. The performance of SP can then be assessed by examining whether RP data corroborate the evidence drawn from the SP exercise. Our attempts to do this are described later in this paper.

2.3 Using Stated Preference Analysis in the Local Authority Sector

The research reported here was primarily concerned with assessing the influence of rent levels and rent differentials on tenants' choices of dwellings. In particular, we wished to examine the impact of relative rent changes on choices between the tenants' current dwelling and those on better and worse estates. Previous housing policy research in the social housing sector suggested three main reasons why RP data alone, were they available, would not provide an adequate basis for estimating the significance of these factors. Using an SP approach allows each issue to be addressed.

First, previous moving behaviour within local authority housing has been constrained by allocation and transfer policies and by stock availability. As a result, tenants may not have been able to reveal their preferences through relocating. Secondly, rent differentials between dwellings within local authority housing are, typically, relatively narrow. Walker and Marsh (2000), for example, estimate that rent differentials widened somewhat during the mid to late 1990s, but that the rent of a one-bedroomed dwelling was still 78 per cent of that of a three-bedroom dwelling in 1998/99. Such comparatively flat rent structures reduce the financial incentive for tenants to adjust their housing consumption by relocation. It is therefore unsurprising that previous research (for example, Walker and Marsh, 1995) suggests that rent levels and differentials are not currently a major

factor in most tenants' decisions to move between council properties. Indeed, qualitative work with tenants has indicated that rent levels and differentials are not an issue that tenants tend to raise spontaneously, either as a particular concern or as something with which they were particularly satisfied (Walker *et al.*, 2000, Figure 1.1). If current rent structures provide insufficient incentive to move, then any existing RP data will inadequately capture the effects of higher rents and wider differentials were they to be introduced in the future.

Thirdly, even if tenants had the opportunity to choose their council housing in the presence of more sharply differentiated rents, the majority would not face any increase in their rent or would continue to pay no rent at all. Over two-thirds of tenants receive HB. Such tenants, in principle at least, do not have to consider rent levels when making housing decisions, although there is some evidence that HB recipients are more sensitive to rents than might have been expected (see, for example, Walker and Marsh, 1995 and 1998 for a discussion). To the extent that receipt of HB affects mobility at present, available RP data will give no guide to the effects on location decisions that would arise from any reform of HB which made recipients contribute (more) towards their rents and to rent increases. Such reforms were under consideration at the time of this research, although the Green Paper subsequently did not propose any material changes to the HB system (DETR/DSS, 2000a, ch. 11).

2.4 The Use of Stated Preference Analysis in Previous Work

SP has its origins in mathematical psychology and statistics, with Luce and Tukey (1964) often cited as the seminal work. Many market researchers and other practitioners have made strong claims for its validity in their field (Green and Srinivasen, 1978; Louviere, 1988; Louviere *et al.*, 2000), where it is often termed 'conjoint analysis'. According to Cattin and Wittink (1982), there had been 1000 commercial applications in the US in the 1970s, whilst Wittink and Cattin (1989) estimate that there were about 400 commercial applications per year in the early 1980s. Carroll and Green (1995) provide a more recent review in this area.

Transport researchers were also among the first to employ the technique (Sheldon and Steer, 1982; Bates, 1983), particularly given the significant developments in disaggregate modelling which had occurred in this area. There have subsequently been a considerable number of transport applications (for example, Ortuzar, 2000; Louviere *et al.*, 2000), as well as a number of methodological developments in this field. Similar developments were also apparent in geography (for example, Timmermans, 1984; Louviere and Timmermans, 1990). The technique has proved to be particularly useful where there is no actual market place in which preferences can be expressed. Thus, there have been notable areas of practical SP application in health economics (McClain and Rao, 1974; Wind and Spitz, 1976; Ryan, 1999; Ryan and Wordsworth, 2000), welfare economics (Donnelly *et al.*, 1976; Hoinville, 1971) and environmental economics (Adamowicz *et al.*, 1994; Boxall *et al.*, 1996).

In relation to housing market choices, the significance of housing costs within the household budget led to some early marketing research in the field (Fiedler, 1972). Knight and Menchik (1976) provided an early SP contribution to the residential choice literature, while more recent SP applications have covered a wide range of issues relating to housing and locational choices (for example, Benjamin and Paaswell, 1981; Veldhuisen and Timmermans, 1984; Joseph *et al.*, 1989; van de Vyvere, 1994; Timmermans *et al.*, 1996; Molin *et al.*, 1997; Schellekens and Timmermans, 1997; Wardman *et al.*, 1998; Cooper *et al.*, 2001).

However, the use of SP in a housing context to date appears to be exclusively concerned with private-sector decision-making. There appear to be no published studies using SP to model tenants' choices in the social rented sector. The absence of SP

work in this area means that the research we discuss below represents an innovative approach to the topic. It should therefore be seen as a pilot of the SP approach in the analysis of such housing choices, particularly since it examines both willingness to pay for specific housing attributes and choice behaviour in response to price (rent) changes. Most residential choice studies examine one or the other.

3. Applying Stated Preference Analysis to Tenants' Housing Choices

3.1 Selecting the Samples

The research, undertaken in 1999–2000, was based on two different samples, drawn using different sampling approaches. The first sample was drawn to identify participants in the SP exercise. The second sample comprised households who had actually moved within the past two years who would provide RP information. Where SP respondents had relocated in the past two years, they were asked also to provide RP information.

The sample size for the SP exercise was set at 400 in total, located in 3 local authority areas in England. The areas were selected as broadly illustrating the known geographical differences in demand for social housing. Since these differences, and the associated problems, are particularly evident in large urban areas, 3 heavily urbanised local authorities were chosen, one in the North, one in the West Midlands and one in London. It follows that generalising our findings to less urbanised areas, and especially to rural areas, should be treated with caution.

Within these authorities, the SP sample was further limited to a few selected estates. This allowed the SP scenarios to incorporate named nearby estates. Further, the estates selected, in association with the local authority, were of medium popularity on the grounds that tenants could then choose to trade up or down from their current dwelling in response to cost changes. Selecting very popular or very unpopular estates would have reduced the plausible options that could be offered in the scenarios.

The 400 SP interviews were distributed as follows: 135 in the West Midlands authority (hereafter, W. Midlands); 137 in the Northern authority (North); and 128 in a London Borough (London). The SP sample finally drawn proved to be somewhat younger than the profile of English council tenants as a whole and more likely to be living in flats or larger properties with 3 or more bedrooms. However, 70 per cent of the sample were receiving HB, broadly similar to the population of council tenants.

The RP sample was designed to include as high a proportion as possible of people who had made or considered a housing choice of the type being offered in the SP experiments within the past two years and had been a council tenant at that time. To increase the probability that RP respondents would be similar in these respects to the SP participants, the samples were drawn from the same three local authority areas. Briefly, the sampling frame for the RP attempted to identify those who had moved within the local authority sector and from that sector to other sectors, including through Right to Buy (RTB) and private purchase, using local authority records.

The achieved RP sample comprised 468 responses. It provided some useful information on relocation decisions (see Walker *et al.*, 2000, ch. 2). However, the RP respondents in general proved unable to provide sufficient detailed information on the costs of their previous dwelling to enable us to model their choices in the same way as the SP data. This prevented us from checking the accuracy of our SP model against an RP model. As explained in the conclusion, this may not be as major a drawback as it might have been, given the results of our SP analysis, but it is an admitted weakness in the interpretation of the results of the SP modelling exercise.

3.2 The Stated Preference Exercises

The SP exercises in this research presented respondents with a series of scenarios, each scenario describing a number of alternative

dwellings with different combinations of attribute levels. Respondents were asked to choose the preferred alternative. The exercises were designed to allow any sensitivity to rent levels revealed by participants' choices to be isolated from the influence of changes in other variables, while minimising bias from all sources. The key dimensions of the exercises were the attributes included in the scenarios, the levels of each attribute and the way in which choices were presented. Also fundamental to the research was the way in which rent changes were handled when respondents received HB. We consider each of these in turn.

The attributes included. The attributes included in the exercises were selected because they were hypothesised to be important in housing decisions and because they could be simply described and varied in the scenarios. To keep the choices offered to respondents as clear and simple as possible, it was decided that no more than five attributes should be included in any one of the scenarios to be presented. Inevitably, this process involved a gross simplification of the factors likely to be considered by tenants when making choices in the real world, although we know of no compelling evidence to indicate what the 'right' number of such variables should be.

After piloting, the attributes offered were selected from

—rent
—the local authority estate on which the property being considered was located;
—the type of property;
—the number of bedrooms;
—the condition of the property;
—the amenities of the estate;
—the opportunity to change tenure.

The levels of the attributes. The variables used in the exercise took the following values or levels.

Rent. The changes in rent levels offered in the scenarios were limited to the range + £10 to − £10 relative to the weekly rent on the current dwelling. This was thought to be a reasonable and realistic range of rent changes in the context of current and recent rent policy. For example, a £10 per week rent increase for the modal group of tenants—whose rents lay between £150 and £199 per month—represents a 20–27 per cent increase in the rent charged.

The Local Authority Estate. Participants were offered choices between a worse estate, the current estate and a better estate. As explained above, respondents were selected from estates adjudged by the local authority to be of medium quality or popularity. The worse and better estates that appeared in the exercise were classified according to the local authority's assessment and the actual estates named in the scenarios were chosen by the participant as being the most familiar to them. Preceding the exercise, these respondents were asked to rate each estate in terms of quality, environment, location, neighbours and security. Their assessment closely matched the local authority's classification of better and worse estates.

The type of property. The dwelling categories used were bedsit, maisonette, house and flat.

The number of bedrooms. The values set were one less bedroom, same number of bedrooms, one more bedroom and two more bedrooms, compared with their current property.

The condition of the property. The conditions of the properties offered were described as being in a poor, average, good or very good state of repair.

The amenities of the estate. Participants were asked to indicate whether security on an estate or the range of shops available was more important to them. If security was more important, the amenity levels offered were no extra security measures, CCTV, or CCTV and approved neighbourhood patrols. If shops were chosen as more important, the

levels were set as no shops available within 10 minutes walk, some shops and a good range of shops within that distance. In practice, the great majority of participants chose security as the more important amenity.

The opportunity to change tenure. In addition to local authority dwellings on the current or another estate, participants were also offered the opportunity to change tenure. Participants could choose to rent from a housing association, rent privately, buy their current home under RTB or buy in the private market. The costs of these options were set according to information collected in the local authorities about local rent and price levels. The cost of owner-occupation was based on assumed repayments on a 90 per cent mortgage on an 'average' or indicative dwelling price in the area. This understates the full costs of home-ownership by ignoring the capital cost of the deposit and repair and maintenance costs. The cost for RTB was arbitrarily set at 66 per cent of the full ownership level to allow for RTB discount. These costs did not vary for each respondent. To allow more variation in the costs of RTB, about half the participants, chosen at random, were presented with the full RTB costs and half with 80 per cent of that value.

Allowing for Housing Benefit. HB was dealt with by asking respondents in receipt of part or full benefit to assume that they would have to pay the increase in rent if they chose an alternative with a higher rent than the rent set for their current dwelling. Thus, if the rent of the alternative was £10 per week higher than the rent set for their current dwelling they were asked to assume that they would have to pay £10 per week, but that HB would continue to cover the remainder of the rent. Respondents currently not receiving HB were assumed not to be eligible for (partial) HB receipt after an increase in rent.

If the rent of the chosen alternative was lower than the rent set for their current dwelling, participants receiving full HB were asked to assume that they would receive the difference in cash. Hence, if the rent of the alternative chosen by them was £10 per week less than that set for their current dwelling, they were asked to assume that they would receive £10 per week. Participants on part HB were asked to assume that any decrease in rent would reduce the amount that they currently paid themselves with their HB entitlement remaining at the same level. Thus, part HB claimants were asked to assume that they would retain (rather than receive) any rent savings.

These assumptions do not reflect the way in which the current HB system operates since a rent reduction (increase) does not result in any financial benefit (cost) to HB recipients. However, any future reform of HB is likely to involve greater contributions from recipients towards their rent. Our approach here can be seen as a partial simulation of likely housing choices of recipients under such a reform. More importantly for modelling the influence of rents on choices, it was important that some cost be attached to choices of better accommodation and that financial benefits should be received as a result of choosing worse accommodation. Even on the basis of a very weak assumption of consumer rationality, it would be expected that if better choices were free of charge to HB recipients and worse choices made no difference to their financial position, they would always choose the former. In that situation, there is no need for them to trade off an improvement or decline in their housing consumption against higher or lower costs. Consequently, the assumptions that HB recipients were asked to make were intended to encourage them to consider 'trades' in the same way as non-recipients.

Presenting choices in the stated preference experiments. The SP experiment was conducted by showing participants scenarios containing a combination of those attributes and values discussed above drawn at random from a set of scenarios consisting of a wide range of such combinations. The scenarios were constructed in order to eliminate correlation between attributes. The participant chose their preferred alternative or indicated

that they could not make a choice. The exercise was then repeated with another randomly drawn scenario.

In order to constrain the complexity of each choice decision, the SP experiment was divided into two parts. In the first exercise (SP1), respondents were shown paired choices between their own dwelling and another house on the same estate, described as 'close to where you live now'. This was designed to reduce inertia due to an unwillingness to change estates while getting respondents to consider property size, condition and rent. Each participant was shown 9 scenarios drawn at random from a set of 64 possible scenarios.

The second SP exercise (SP2), also undertaken by those participating in the first exercise, offered a choice between the current estate, better estate and worse estate with rents varying on each property offered. This exercise, again offering 9 scenarios from a set of 64, used fewer non-rent variables than in the somewhat simpler first exercise.

3.3 The Results of the Stated Preference Exercises

The results of the two exercises were combined to give 6297 observations of choices, each observation taking the form of 'would choose the alternative' or 'would not choose the alternative'. This total falls short of maximum number of choices that could in principle have been achieved (400×18 scenarios $= 7200$ choices) by about 14 per cent. This was for three reasons.

First, some participants withdrew from the exercise before they had considered all 18 scenarios, although this happened rarely. Secondly, in about 4 per cent of the exercises, the participants indicated that they were unable to make a choice, even given the choice of staying where they currently were, and these non-choices were excluded from data. Thirdly, it transpired that a notable feature of the choices made by participants was that only in around 10 per cent of cases did they involve the choice of the non-local-authority alternative. This is perhaps not surprising. Choosing to buy or to rent from a different landlord is arguably a much more significant change than choosing another dwelling in the same sector with the same landlord since it involves changes in property rights and security of tenure and, if buying, incurring long-term debt. Further, the information constraints on the SP exercise meant that the information presented about the non-local-authority alternatives was not as rich as that desired for any actual choice. It is likely therefore that the exercise underestimates the extent to which participants might make choices of dwellings in the other sectors. However, given that one of our main research objectives was to explore intratenure choice, we decided to exclude choices involving tenure change from the set to be modelled.

4. Modelling Tenants' Stated Preferences

4.1 The Principles of Stated Preference Modelling

This study deals with a discrete dependent variable indicating the choice made between different housing alternatives. Discrete dependent variables of this type are most commonly analysed using discrete choice models which analyse variations in choices across participants as a function of the characteristics of participants and of the alternatives between which choices are being made.

We can conceive of the alternatives between which the household is making choices as yielding different levels of satisfaction or utility to the household. The total utility of an alternative is made up of utilities associated with each of the relevant attributes and the household is assumed to maximise its utility by choosing the alternative with the highest total utility. In making such a choice, the household is assumed to make trade-offs between characteristics.

The utility function for alternative i and household n (U_{in}) can be presented in general terms as

$$U_{in} = f(X_{in}, S_n, A_n) \quad (1)$$

where X denotes, in our case, housing attributes; S reflects socioeconomic factors; and A denotes any underlying attitudes influencing the utility of the alternative to the household. In attempting to maximise utility, the household will choose alternative 1 if U_1 is greater than U_i for all i.

To examine some of the implications of the approach, suppose for simplicity that each housing alternative can be described solely in terms of a housing quality index (Q) and rent (R). The linear-additive form of the utility function, as typically used, in this case can be represented as

$$U_i = \alpha_Q Q + \alpha_R R \tag{2}$$

To allow for the unobserved aspects of utility arising from, for example, omitted variables and, where SP data are concerned, errors that arise because households are not committed to behave in accordance with their stated preferences, we enter an error term for each alternative (e_i). Letting $V_i = \alpha_Q Q + \alpha_R R$, this gives

$$U_i = V_i + e_i = \alpha_Q Q_i + \alpha_R R_i + e_i \tag{3}$$

V_i is known as 'representative' or 'deterministic utility'; whilst e_i, capturing the net effect of omitted variables, is 'stochastic utility'. The latter is entirely analogous to the specification of an error term in multiple regression to account for the net effect of unobserved factors.

We can observe Q_i and R_i and therefore obtain some estimate of V_i. Since e_i is unobservable, the analysis of housing choice behaviour must proceed on the basis of V_i alone. However, we cannot be certain that, say, alternative 1 is preferred if V_1 is highest since the error may influence the outcome. We would, however, expect the probability that a household chooses alternative 1 to increase as V_1 increases. The probability that an individual chooses alternative 1 from the set of alternatives available can be represented as

$$P_1 = \Pr[(V_1 + e_1) > (V_i + e_i)] \tag{4}$$

where, for all i, $i \neq 1$.

By assuming some probability distribution for the e_i, the probability of a household choosing alternative 1 can be specified solely as a function of the component of utility that can be estimated (V_i). If we assume that the errors associated with each alternative have a type I extreme value (Weibull) distribution, have the same variances and are uncorrelated, then equation (4) yields the multinomial logit (MNL) model which we have used in this study. The probability of choosing an alternative is then a function of the deterministic utilities of each alternative, that is

$$P_1 = \frac{e^{V_1}}{\sum_i e^{V_i}} \tag{5}$$

In turn, the deterministic utilities are a function of relevant observable variables, which in the case of our general utility function in equation (1), will be

$$V_i = f(\Omega\alpha X_i, \Omega\beta S_n, \Omega\delta A_n) \tag{6}$$

where,

$$\Omega = \frac{\pi}{\sqrt{6}\sigma_{ei}}$$

The coefficients of V_i are estimated by maximum likelihood methods. Note that a scaling factor (Ω) is common to all the parameter estimates. It allows for the effect of the unobserved influences on choice, where σ_{ei} is the standard deviation of the errors. All the coefficients are scaled in units of residual deviation. This is unique to choice models and has no parallel in regression-based approaches. As the random error underlying choices increases, then the coefficients fall and the probabilities would tend to the equal share. As the random error underlying choices falls, then the coefficients increase and the probabilities tend to the extremes.

4.2 The Model Used

The illustrative utility function below contains variables which are specific to the dwelling or to the household and outlines the general principle involved in handling categorical variables, such as housing type or ratings of estate features, which are common

in this study. We consider two dwelling-specific attributes, rent level and the rating of the estate's environment, along with a household-specific effect relating to the extent to which the household is satisfied with its current property and a modifier in terms of the area in which the household lives. Let us therefore specify a utility function for the current dwelling (U_c) as

$$U_c = \alpha R + \beta_2 E_2 + \beta_3 E_3 + \beta_4 E_4 + \gamma_2 S_2 + \gamma_3 S_3 + \alpha_2 A_2 R + \alpha_3 A_3 R \quad (8)$$

It is the purpose of model calibration to determine the set of parameters (α, β, γ) which provides the best explanation of the SP responses given the levels of the explanatory variables. In our example, R denotes the rent level, the Es denote different ratings of the estate's environment, the Ss denote different levels of satisfaction of the current household and the As denote the different areas. The latter three variables are categorical and hence we use dummy variables to represent their effects.

Rent is a continuous variable and enters simply as R. If the current estate is rated as very good, good, adequate or poor, we can specify three dummy variables, for say 'good' (E_2), 'adequate' (E_3) and 'poor' (E_4). Their coefficients indicate the effect of each of these ratings relative to the omitted environmental category of 'very good'. An entirely analogous procedure is adopted to represent satisfaction levels, which are attributes specific to the household rather than variables relating to the alternative offered. In the utility function specified above, three levels of satisfaction require the two dummy variables specified (S_2 and S_3).

A similar procedure is adopted to handle the modifier effects, but now we allow the dummy variables which are household-specific to interact with the dwelling-specific attributes. In the example above, we are allowing households' responses to rent levels to depend on area. With three areas, two dummy variables are specified (A_2 and A_3). These are each multiplied by the rent level to produce interaction terms, the coefficients of which indicate the extent to which the sensitivity to rent changes varies across areas. For the omitted category (area 1), the sensitivity to rent changes is simply represented by α. For area 2, the sensitivity to rent changes is $\alpha + \alpha_2$, and for area 3 it is $\alpha + \alpha_3$. Although separate rent coefficients by area can be obtained by estimating separate models for each area, allowing the coefficients to vary within the model is statistically far more efficient. In contrast to estimating separate models, it allows only the coefficients of interest to us (rent), rather than all the model's coefficients, to vary across areas.

It is also necessary to include variables that are specific to the alternatives offered and which will influence choice but which were not explicitly varied in the SP exercises. Given that the second SP exercise involved choices between properties on different estates, factors specific to the estates must be included. In order to allow this, ratings of each estate were obtained from participants in that experiment to indicate their perceptions of the overall condition and environment of the estate, the general condition of the properties, the local facilities, residents and neighbours and the convenience of the location for work and visiting. The ratings were located on a five-point scale of very good, good, adequate, poor and very poor. Although the property type was varied also, with the best estate varying the property between house and flat, a wider range of property-type variables must be included since the property type of the current dwelling varies across households and will potentially influence choices. The different property types are also represented by dummy variables.

4.3 Allowing for the Effects of Income

We would expect those with higher incomes to be less sensitive to rent variations of a given absolute size on the grounds that the marginal utility of money is expected to diminish as income increases. One way of allowing for this is to segment the rent coefficients according to income-group, using a dummy variable approach, and the proportion of the

full rent actually paid. This would involve different rent variables for $n-1$ of n income-groups, the coefficients of which would show the incremental effect on rent coefficients of being in a particular income-group. We would expect the implied rent coefficients to fall (be less negative) as income increases.

In this study, we have used a different and more straightforward approach which involves dividing the rent variables by household income. If for each household we enter into the model rent divided by that household's income (Y), the sensitivity to rent will depend on income. Ignoring terms other than rent for the moment, the utility function for any alternative i used in our study took the form

$$U_i = \alpha_1 \frac{R_i}{Y^{\lambda}} \tag{9}$$

The effect of rent on utility is now α_1/Y^{λ} rather than simply α_1. The use of Y^{λ} rather than Y offers greater flexibility because it avoids assuming that a relationship exists between the sensitivity to rent changes and income, and that any relationship is proportional. Neither assumption may be empirically justified. The value of the additional parameter λ is estimated by the model using an iterative procedure.

A value for λ between 0 and 1 will dampen the income effect. If, for example, λ is 0.5 and α_1 is -50, the rent coefficient for a household with a £10 000 annual income would be -0.5, falling to -0.35 for those with a £20 000 annual income. Thus, in this case, a doubling of income would lead to a 30 per cent reduction in the sensitivity to rent changes. In the limit, a value of zero for λ would mean that the sensitivity to rent variations is independent of the level of income, whilst a value of 1 indicates that the relationship is proportional.

4.4 Results

Table 1 summarises the attributes (variables) from the SP exercises that were available for inclusion in the model.

Recall that the MNL model reported here is based on 6297 observations relating to intralocal authority choices only. Table 2 shows the attributes that were included in the final model yielding the best fit. The estimated model contains a large number of

Table 1. Explanatory variables (attributes) considered

Variables	SP1 exercise	SP2 exercise
Current and alternative dwelling attributes		
	Bedrooms	Property type
	Condition	Amenities
	Rent	Rent
		Overall environment
		Property condition
		Facilities
		Neighbours
		Location
Household attributes		
	Satisfaction	Satisfaction
	Retired Household	Retired Household
	Children	Children
	Length of residency	Length of residency
	On transfer list	On transfer list
Other factors		
	Income	Income
	Housing Benefit status	Housing Benefit status
	Local authority area	Local authority area

Table 2. Attributes included in the reported model

Attribute name	Attribute
RentC	Rent on current estate
RentW +	Rent on worse estate (non-negative)
RentB	Rent on Better Estate
RentO	Rent of other dwelling, current estate
A1	Area 1 (West Midlands)
A2	Area 2 (North)
A3	Area 3 (London)
CCTV2	CCTV
CCTV3	CCTV plus approved neighbourhood patrols
Beds − 1	One less bedroom
Beds + 1	One more bedroom
Beds + 2	Two more bedrooms
CondVG	Property in very good condition
CondG	Property in good condition
CondA	Property in adequate condition
Flat	Property is a flat
Mais	Property is a maisonette
Bedsit	Property is a bedsit
Tlist	Respondent on transfer list
Ret	Respondent is retired
Vsat − C	Very satisfied with current property
Sat — C	Satisfied with current property
Worse (*A1*, *A2*, *A3*)	Worse estate in Area 1, 2 or 3
Better A2	Better estate in A2
Other (*A1*, *A2*, *A3*)	Other dwelling on current estate in Area 1, 2 or 3

attributes with coefficients statistically significant at, as a minimum, the 5 per cent level and of the correct sign (Table 3). The p^2 goodness-of-fit statistic indicates how much better the model predicts choices than chance alone. A value of 0.23 is, in our experience, somewhat higher than is typically achieved in more straightforward applications in transport research. Hensher and Johnson (1980) state that a fit between 0.2 and 0.4 is regarded as 'excellent'.

The properties of the estimated model are encouraging with regard to the design of the SP experiments, their presentation and conduct, and the quality of the SP responses obtained.

5. Interpretation

5.1 The Impact of Rents

To analyse the impact of rents on choices, separate rent coefficients were estimated for the current estate (*RentC*), the worse estate (*RentW* +), the better estate (*RentB*) and the other dwelling on the current estate (*RentO*). This allows the importance attached to changes in rent to differ between the different estates.

Recall, however, that those in receipt of HB who currently pay no or very little rent would usually receive or retain money under the assumptions of the SP experiment when the worse estate was chosen. Given that there is a possibility that households respond differently to monetary outlay and to receiving money, we specified separate rent variables for the worse estate according to whether the rent to be paid by the participant was negative (*RentW*-) or non-negative (*RentW* +). The coefficient for *RentW*- did not achieve statistical significance ($t = 0.2$) and hence was not included in the final model. This result implies that households have generally not placed any importance on negative rents. Thus variations in rents that resulted in the payment of negative rents appear to have no

Table 3. The results of stated preference model ($\rho^2 = 0.23$)

Attribute name	Coefficient (*t*-value)
RentC	−0.0891 (7.0)
RentW+	−0.0784 (5.2)
RentB	−0.0961 (7.1)
RentO	−0.0726 (5.6)
CCTV2	0.6050 (3.0)
CCTV3	0.9510 (5.5)
Beds-1	−2.1690 (11.6)
Beds + 1	0.6811 (5.8)
Beds + 2	0.3593 (3.0)
Flat	−1.0270 (10.8)
CondVG	1.6070 (11.5)
CondG	1.4950 (10.8)
CondA	1.0590 (7.5)
Tlist-C	−0.2774 (3.7)
Ret	−1.4780 (16.0)
VSat-C	1.7180 (16.6)
Sat-C	0.6480 (9.4)
Mais-C	−0.2087 (1.9)
Bedsit-C	−0.3505 (2.1)
Flat-C	−0.4866 (5.4)
Worse-A1	−2.3210 (14.3)
Worse-A2	−5.3610 (10.0)
Worse-A3	−1.6830 (10.0)
Better-A2	−1.3120 (10.2)
Other-A1	−1.5800 (9.8)
Other-A2	−1.6740 (10.3)
Other-A3	−1.7753 (9.9)

effect on utility and hence do not influence choices in the SP experiment, although it is possible that respondents found this part of the exercise implausible.

The rent coefficients have the correct sign, since an increase in rent makes an alternative less attractive. The coefficient of −0.0784 for non-negative rents (*RentW+*) is lower (in absolute terms) than the coefficients for *RentC* and *RentB*, indicating that households were less sensitive to rents on the worse estates than to those set on better estates or on their current dwelling. This is not surprising on the grounds that we might expect respondents to be much more willing to 'trade-up' than to 'trade-down' and hence reductions in rent on worse estates are not regarded as particularly relevant to them. The coefficient for rent on other dwellings on the same estate (*RentO*) is also low, indicating that there is relatively little desire to move within the estate.

It is possible that the ordering of the coefficient estimates could have been influenced by the operation of strategic bias. Respondents, in an attempt to influence policy, could be signalling to decision-makers that increases in rents on their current dwellings or on better estates are much more important, or less acceptable, to them, than changes in other rents. Even so, the lack of sensitivity to reductions in the rents on worse estates is a notable finding.

In order to capture any effects which living in the three different local authority areas might have on the rent coefficients, we initially estimated separate models for each area, but found that there was little difference in rent coefficients between these models. We would conclude from this that the rent coefficients in our model in Table 3 are 'transferable' in that the estimated rent coefficient(s) accurately capture the impact of rents in different areas. Further, we did not obtain any evidence that the rent coefficients varied across other categories of the sample, with the single exception of a slight income effect which is discussed below.

5.2 The Influence of Housing Benefit

The approach used to establish whether HB influenced a household's responses to rent changes involved the specification of dummy variables. In brief, we created dummies indicating those who, after HB, paid 0 per cent, 1–33 per cent, 34–66 per cent and 67–99 per cent of the full rent, with the omitted category being those paying the full rent. Despite extensive segmentations of the data according to the level of HB, no convincing, systematic relationship with the rent coefficients was apparent. This was the case both with and without the specification of the income effect, as described below, and was independent of local authority area. The findings were supported by the estimation of separate models for those with different HB entitlements.

The important implication of the in-

significance of the HB variables, allied to the insignificance of the *RentW-* variable noted above, is that, as modelled here, HB status does not appear to affect, in a statistically significant manner, households' decisions as to whether to move in the face of changing rents. However, this does not mean that household income, which is correlated with HB receipt, does not influence households' responsiveness to rent. We consider this next.

5.3 Allowing for the Effects of Income

To estimate the value of λ in equation (9) above, income was defined as weekly household income before deductions. The average income level was used for those who did not provide income data. We had experimented with dividing the income variable by the number of people in the household, but this did not provide as good a fit as total household income.

The best-fitting model was obtained for a λ of 0.15. This means that, for example, a doubling of household income will reduce the sensitivity to rent changes by 10 per cent. This is only a weak effect, suggesting that households' decision as to whether to choose an alternative dwelling in the presence of varying rent levels is not greatly affected by their income.

5.4 The Effect of Area

Our findings suggest that participants living in the North (A2) were much more reluctant to move from their current dwelling to the worse or better estates. This may simply be a reflection of a regional difference in mobility, or it may be because the respondents in the Northern authority viewed their current estate as significantly better than the alternatives offered in the SP experiments.

The model also contains a set of 'alternative specific' constants which reflect the net effect of variables not included in the model. If there are n alternatives, $n-1$ constants can be estimated. We specified constants for property on the worse estate (*Worse*), property on the better estate (*Better*) and another property on the current estate (*Other*). These effects are interpreted relative to the current property. We also wanted to allow these constants to vary by area, which was found to be warranted during our initial estimation, noted above, of separate models by area to establish whether there was any variation in the rent coefficients.

The negative constants for other properties on the same estate in all areas (*Other-A1*, *Other-A2*, *Other-A3*) denote that there is an inherent preference for remaining in the current property. We would expect the constant for the worse estate to be more negative given that it discerns estate-specific effects as well as an aversion to moving. This is the case for two of the three areas (*Worse-A1* and *Worse-A2*). The constant for the better estate in A1 and A3 is insignificantly different from that of the current estate, indicating that the higher quality of the estate is barely sufficient to overcome the inertia to moving. However, in the North the negative constant on the better estate (*Better-A2*) further reflects the noticeably low desire to move among the households in this area.

5.5 The Effects of Other Attributes

The model identified a range of statistically significant 'household-specific' effects (Table 3), all of which are specific to the current dwelling and denote variations in the propensity to switch dwelling. The coefficient for those on a transfer list (*Tlist-C*) is negative which denotes that, when given the possibility of moving house, these households are more likely to move, as might have been expected. On the other hand, the retired (*Ret*) and those who are very satisfied (*VSat-C*) or satisfied (*Sat-C*) with their current property are less likely to move. Although correlated with degree of satisfaction, those whose current dwelling is a maisonette (*Mais-C*), a bedsit (*Bedsit-C*) or a flat (*Flat-C*) are more likely to move than those who currently live in a house or bungalow. These findings are intuitively reasonable.

Of the other variables explicitly controlled

in the SP experiments, it was found the CCTV and neighbourhood patrols had significant positive values, but that households were, in general, indifferent to the provision of local shopping facilities. The latter attributes were not therefore retained in the model.

One fewer bedroom (*Beds*-1) had a particularly strong negative effect whilst two additional bedrooms (*Beds* + 2) had less of a (positive) impact on household choice than one additional bedroom (*Beds* + 1). This is explicable in terms of the declining marginal utility of space and may reflect the additional costs associated with a significantly larger property. The results clearly suggest that participants did not feel that they had 'too much' room currently, but that some additional room was preferable to substantially more.

The condition of the property is also an important attribute. Given the absence of any natural units in which to measure and represent property condition, there is a degree of subjectivity surrounding respondents' interpretations of the very good, good, adequate and poor categories specified in the SP exercise. Dwellings in poor condition were defined as the base category. As expected, properties in very good condition (*CondVG*) were more likely to encourage an alternative to be chosen than those in good condition (*CondG*) which in turn influence choice more strongly than those in adequate condition (*CondA*). The largest increase in the probability of choosing an alternative is when that alternative is changed from poor condition to adequate condition, with the two further possible improvements having a diminishing impact.

6. Applying the Stated Preference Model

There are a number of uses to which this type of SP model can be put. Here, we discuss two applications: estimating the values which households place on different dwelling and area characteristics; and, forecasting households' probabilities of moving.

6.1 The Valuation of Housing Characteristics

The monetary values that households place on different housing and environmental characteristics are implicit in the choices that they make when given the opportunity to consume different bundles of characteristics at differing rent levels. The valuations can be readily estimated from the coefficients of a linear additive SP model since the relative importance of any characteristic in monetary terms in such a model is the ratio of the coefficient of that characteristic to that of rent.

Recall from equation (9) above, however, that the rent coefficient in our model is itself divided by household income raised to the power of ($\lambda =$) 0.15. As a result, monetary valuations will depend upon income and will increase as income rises. Since monetary values indicate the maximum willingness to pay for an attribute, it is plausible that monetary values will be higher for those with higher incomes.

In our model, the value of a particular attribute with coefficient α for a household i would be

$$\frac{\alpha}{\beta/Y_i^{0.15}} = \frac{\alpha}{\beta} Y_i^{0.15} \tag{10}$$

where, Y is the household's income and β is the coefficient estimated for rent divided by $Y^{0.15}$. This implies that a doubling of household income would increase values by 11 per cent.

As we have seen, the rent coefficients vary across alternatives, implying different monetary valuations according to which rent coefficient is used. Here, we express the monetary valuations in terms of the rent coefficient estimated for the current dwelling so that the valuations relate to the characteristics of that dwelling. Table 4 presents summary statistics for the valuations of a number of attributes across our sample of households.

The relative values all have the correct sign and, where the attribute has more than two levels, the relative magnitudes are plausible. Thus, higher security is valued more

Table 4. Monetary valuations (£s per week), selected attributes

Characteristics	Mean	Standard error	Minimum	Maximum
Flat	− 24.3	0.09	− 19.2	− 28.9
CCTV2	14.3	0.05	11.3	17.0
CCTV3	22.5	0.08	17.8	26.7
CondVG	38.0	0.14	30.1	45.1
CondG	35.3	0.13	28.0	41.9
CondA	25.0	0.09	19.8	29.8
Beds-1	− 51.3	0.18	− 40.6	− 60.9
Beds + 1	16.1	0.06	12.8	19.1
Beds + 2	8.5	0.03	6.7	10.1

than lower security (*CCTV3* > *CCTV2*) and progressively higher valuations are placed on properties in average, good and very good condition (*CondVG* > *CondG* > *CondA*). The value placed on one extra bedroom is much higher than that placed on one less bedroom but, as noted earlier, is also higher than that placed on the significant extra space implied by two more bedrooms (*Beds-1* < *Beds + 1* > *Beds + 2*). Flats are clearly unpopular.

One concern is that the absolute monetary values in Table 4 generally appear to be high, particularly when the average weekly rent of the modal group of tenants is £42–50 per week. In the specific case of property condition, where respondents appear to be indicating that, for example, they are willing to pay £38 per week *more* for a dwelling in very good condition compared to poor condition, this may well be because of high correlations with the constants for the other properties on the current estate. The coefficients for property condition will be inflated if they are reflecting some of the inherent features of the estate which ideally should be picked up by the constants. It is also possible to argue that tenants in council housing currently pay sub-market rents, on average, but are in effect indicating through the experiment that this is the sum that they might be prepared to pay in the market for these characteristics. For example, paying an additional £22.50 per week—or about 50 per cent more in weekly rent—for high security may seem implausible, given current public-sector rents. However, it is quite possible that tenants in the market may be prepared, and be expected, to pay this sum for an otherwise identical dwelling in a safe environment in the private sector.

More generally, it might be suggested that the high values are a result of participants exhibiting strategic bias in respect of rent. However, were this present it would most likely be reflected in an increase in households' reported sensitivity to rent in order to send signals to policy-makers which reduce the likelihood or magnitude of a rent increase and increase the likelihood or magnitude of a rent reduction. Strategic bias operating on rent by increasing the size of the rent coefficient would thus tend to lead to relatively low monetary values. However, there may be an element of respondents overemphasising the importance of improved property conditions, the number of bedrooms, CCTV and dwelling type in order to increase the chance that policy-makers will make improvements in these areas. Comparison against a well-controlled RP sample using a large sample size would be able to test for this.

A final issue which may be relevant here is that a basic assumption of the SP approach is that households will engage in 'compensatory decision-making', meaning that they are prepared to trade-off rent changes against changes in other housing attributes. However, it is possible to argue that choices in the housing market are made on a different basis. If households believe that there are minimum standards or target levels that attributes such as space and property condition must

Table 5. Choices between current property and properties on worse and better estates

	West Midlands			North			London		
Scenarios[a]	C	W	B	C	W	B	C	W	B
Base	71.1	2.0	26.9	91.7	0.1	8.2	68.5	7.0	24.4
Current + £1	70.4	2.1	27.5	91.4	0.1	8.5	67.8	7.2	25.0
Current + £5	67.8	2.3	29.9	90.1	0.1	9.8	64.9	7.9	27.2
Current + £10	64.5	2.5	33.0	88.3	0.2	11.5	61.0	8.8	30.2
Worse − £1	71.0	2.1	26.9	91.7	0.1	8.2	68.4	7.3	24.3
Worse − £5	70.8	2.4	26.8	91.7	0.1	8.2	67.7	8.3	24.0
Worse − £10	70.6	2.8	26.6	91.6	0.2	8.2	66.9	9.7	23.4
Better + £1	71.7	2.1	26.2	92.0	0.1	7.9	69.1	7.1	23.8
Better + £5	74.2	2.2	23.6	93.1	0.1	6.8	71.4	7.6	21.0
Better + £10	77.1	2.4	20.5	94.3	0.1	5.6	74.0	8.0	18.0
Current + £0 Better + £5 Worse − £5	73.9	2.6	23.5	93.1	0.1	6.8	70.5	8.9	20.6
Current + £5 Better + £10 Worse − £10	73.4	3.8	22.8	93.1	0.2	6.7	68.4	12.3	19.3
Worse and Better and Flat	86.9	0.9	12.2	97.2	0.0	2.8	85.9	3.1	11.0
Worse and Better and Beds + 1	60.3	2.9	36.8	85.8	0.2	14.0	56.4	9.8	33.8
Worse − £5, Beds + 1 and Very good condition	65.8	10.9	23.3	91.1	0.8	8.1	53.3	30.0	16.7

[a]The factors shown in this column are the only ones in each scenario that change relative to the current dwelling.

achieve, they may be far less willing to trade between these attributes than is assumed in the SP exercise. This may lead to coefficient estimates which imply a high willingness to pay for certain attributes when in fact this is not the case. We have already noted that the rent coefficient differs across estates even though these coefficients relate to the same basic commodity. This does not mean that we can state conclusively that households do not engage in compensatory decision-making, but the results can be read as consistent with non-compensatory approaches. We would certainly conclude that this issue of high relative valuations is one that merits further attention.

6.2 The Probability of Moving

The SP model can be used to forecast the probability of households choosing another dwelling (moving) as housing characteristics change. Such forecasts are particularly important for policy purposes, particularly where the characteristics can be directly changed by policy.

Table 5 indicates the probabilities (proportions) of tenants who will move in each of our study areas in response to changes in, predominantly, the rents on the current dwelling (C) and dwellings on the worse estate (W) and the better estate (B). The base scenario in each case indicates the proportion of tenants moving if offered a dwelling otherwise identical to their current dwelling except that it is on a better or worse estate. In this situation, around 70 per cent of tenants in the West Midlands and London, and over 90 per cent in the North wish to stay in their current property. The low propensity to move to a worse estate, particularly noticeable in the West Midlands and the North, is to be expected. It can be inferred that the tenants who appear to be willing to move in this situation do not actually regard the worse estate as being worse than the one on which they are currently located.

The table shows that an increase in the

rent of the current property by £10 per week would bring about a move by an additional 7–8 per cent of households in the West Midlands and London, but only just over 3 per cent in the North. The majority of these moves would be to a better estate. Lowering the rent on the worse estate by £10 per week has only a marginal impact on the desire to move there, with the additional 3 per cent of households who would do so in London being the largest quantitative effect. Raising the rent on the better estate reduces the desire to move there with about 6 per cent of households in the West Midlands and London indicating a preference for staying in their current dwelling in such circumstances. Only a very small number of households would consider moving to a worse estate in such a situation.

Offering a flat on the worse and better estates (Worse Better and Flat) significantly reduces the desire to move there in all areas. Offering a property with one more bedroom has little effect on the desire to move to the worse estate but increases by 6–9 percentage points the number of households willing to move to the better estate (Worse and Better and Beds + 1). Perhaps the most striking result in Table 5 is that for the London borough when a property in very good condition, one extra bedroom and a rent £5 lower than that of the current dwelling is offered (Worse − £5, Beds + 1 and Very good condition). While only an extra 9 per cent of households would move to such a property in the West Midlands, and very few additional households would move in the North, a notable 23 per cent of respondents would do so in London. One reason for this may be that the proximity of the alternative estates in the London borough compared with that of the West Midlands and the North overcomes inertia. It may also reflect the premium that households place on extra space in the capital.

Perhaps the most important results for policy concern the effects of rent changes alone on the probability of public-sector tenants moving within the sector. Two scenarios most closely reflect current proposals to increase rent differentials. One is where the current rent remains the same but the rents of the better and worse estates increase and decrease respectively by £5 per week (Current + £0 Better + £5 Worse − £5). The other is where rent of the current dwelling increases by £5 per week, and those on the better and worse estates increase/decrease by £10 per week (Current + £5 Better + £10 Worse − £10).

In the first case, where current rent is unchanged and there is a smaller increase in differentials, the desire to stay put increases somewhat in all areas. The desire to move to the worse estate increases only marginally or not at all while the property on the better estate in all cases becomes less popular. In the second case, where current rents are increased and there are significantly larger changes in the rents elsewhere, the desire to remain in the current dwelling remains broadly the same or increases slightly compared to the base scenario. In particular, the implied increase in the differential to £15 per week between the current property and one otherwise identical to it on a worse estate leads to only a 5 percentage point increase in the number of households wishing to move there in London. It leads to increases of less than 2 percentage points in the number of households relocating to a worse estate in the West Midlands and the North.

7. Conclusions

We conclude by reflecting upon the method used for this research and seek to highlight some of the policy implications of our findings.

In respect of method, the SP approach models hypothetical choices and, as we have acknowledged, because of data constraints we have not been able to test these against RP information in the way that we would have wished. In our SP exercise, we have estimated households' preferences assuming that the choices offered are available. In this sense, we have 'artificially' created a market where one barely exists currently. However, we would argue that because social tenants—

both currently and historically—have had very little choice, SP is the only feasible way of assessing how tenants might reflect their preferences through choices. Nevertheless, even though the SP experiment itself was carefully constructed, the issues around which it was based were relevant to participants and the analysis based upon their responses is statistically robust, the absence of RP data means that we cannot be certain that the participants' choices reflect their preferences. There are clear difficulties in applying choice experiments in housing, given that we have little theoretical guide as to how those choices are made and the relative weight of various factors in decision-making. It is also possible that the assumption that households will engage in trade-offs is inappropriate to housing, although if this is the case it has serious implications for the great majority of economic analyses of consumer behaviour in the housing field.

It also needs to be recognised that households would not repeatedly make the sort of choices offered in the exercises—i.e. households generally make housing choices at infrequent intervals, particularly in the public rented sector. Another model would be required to forecast when individuals would actually put themselves in the position of choosing. While this could be based on changes in current or potential housing attributes and prices or on changes in household circumstances, a necessary requirement is, clearly, that housing authorities actually offer alternative housing where none existed previously. Such a model would have to include a time-lag so that households did not evaluate and re-evaluate options more often than they would in practice.

An extended specification of the MNL model, such as that discussed by Timmermans *et al.* (1996) may, in future work, prove to be a potentially fruitful way of modelling the sort of constrained choices faced by social housing tenants. However, it needs to be recognised that the major constraint facing many such tenants is the reality of a lack of choice and a lack of alternatives within the sector at present. Further, our study was concerned with piloting a complex decision-making exercise where it is difficult to identify and model in detail the (other) constraints facing respondents. In some respects, the fact that the results of the SP experiment are intuitively reasonable in itself gives support to the argument that the way in which we have used the approach is valid. If participants had not indicated that they had valued, for example, property condition and more, but not too much more, space rather than less, there would be greater concerns about the usefulness of the method and/or the way in which it had been applied. Further, in indicating that rent is not the most important factor in housing decisions and in being extremely reluctant to move to worse areas despite much lower rents, participants are confirming what many in the housing field might have expected.

Given these considerations, we are able to draw three main policy implications from our work. First, given the background that the majority of households display a preference for remaining in their current dwelling, households' decisions to move from their current dwelling in the light of changing rents do not appear to vary significantly by area or household income. Consequently, policies to encourage mobility through rent changes are unlikely to impact differentially on households' decisions as a result of their incomes or the (urbanised) area in which they live.

Secondly, whether or not a household receives any HB does not appear to affect their moving decisions when they are faced with changes in the relative rents of the alternative dwellings offered. This may be because HB recipients (other than the retired) do not see their HB status as permanent and thus respond, or fail to respond, to rent changes in a similar manner to those who are paying all of their rent. This finding also carries the implication that, for example, reducing, or indeed increasing, recipients' entitlements to HB while also changing the rents on different properties would not encourage either a greater or lesser number of such households to move compared to households not receiving HB.

Finally, for tenants as a whole, relocation decisions are comparatively insensitive to rent changes and such decisions are particularly insensitive to reductions in rent on the worse estates. Our findings suggest that widening rent differentials significantly between better, average and worse estates would have little impact on the moving decisions of most tenants. This suggests that policies intended to encourage relocation through relative rent changes alone are unlikely to be very successful. Rather, moving decisions are more likely to be affected by higher levels of security on an estate, the condition of the property, being offered a house there rather than a flat and being offered a somewhat larger property, all of which positively influence the decision to move. Further support to this argument is given by the finding that households place high implicit monetary valuations on property condition, estate security and larger (but not very much larger) dwellings.

The significance of these factors can be taken as indication of the sort of considerations that social landlords should take into account when devising investment strategies intended to provide the types of new or refurbished housing which will prove attractive to tenants. The emphasis tenants place on the quality of the estate and security are also very much in line with current thinking in the UK about those factors which policies for urban regeneration and estate improvement ought to address.

Note

1. Although it will influence demand forecasts through its effects on the absolute scale of the parameters even if their relative scale is unaffected (Wardman, 1991).

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