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**Consumer satisfaction with local retail diversity in the UK:  
Effects of supermarket access, brand variety and social deprivation**

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## **Consumer satisfaction with local retail diversity in the UK:**

### **Effects of supermarket access, brand variety and social deprivation**

#### **Abstract**

Levels of concentration in the grocery sector have led to concerns about reduced diversity of local retail provision and its potential negative effects on consumer welfare and choice. Using empirical evidence from a study of consumer perceptions of retail choice across nine purposefully sampled neighbourhoods in the city of Worcester in the UK, the paper illuminates consumer satisfaction with local provision and investigates how satisfaction varies with the local mix of grocery stores. The study adopts a stated-preference approach with realistic but hypothetical scenarios being presented to consumers in which the level, form, brand composition and accessibility of local retail provision is systematically varied to gauge the sensitivity of householders in different types of neighbourhoods to variations in local retail assortments. The contributions of the paper are reflected in three main findings: (1) that the residents value having a large supermarket close by and reveal that they value diversity of provision rather than over-concentration; (2) that consumers in deprived areas overall display greater satisfaction for the same offer than consumers in less deprived areas; and (3) that whereas small stores in a local store assortment significantly contribute to reducing dissatisfaction with the local retail offer they contribute little to achieving higher levels of consumer satisfaction. The study stresses the need for planners and policy-makers to maximise choice and welfare through both the number and diversity of stores in local neighbourhood areas.

**Keywords:** retail planning, provision, retail assortment, access, consumer choice, consumer welfare, neighbourhood valuation, experimental analysis, stated-preference.

## **Introduction**

Over the past thirty years, local access to food stores has become an increasing concern for retail planners and policy makers. The continuing expansion of the major supermarkets has reduced the overall number of food stores and increased brand concentration, resulting in reduced choice in some areas, especially for socially disadvantaged consumers. This effect has been observed both in the USA (Nayga and Weinberg, 1999) and in the UK (Clarke, Hallsworth et al, 2006; Wrigley et al, 2009, 2011). In the 1980's and early 1990's the major supermarkets faced few restrictions in building large out-of-town stores. In response to the subsequent impact on traditional high streets and smaller retailers, retail planning policy since the late-1990's has been more restrictive with a clear emphasis on redirecting investment towards town centres. In quantitative terms this policy has met with a degree of success and, by 2003, more than 40% of retail development was in town centres (Cheshire et al, 2011). However, much of this new in-town development has also been dominated by the multiple supermarkets. Tesco and Sainsbury, in particular, have opened many smaller store formats, partly to respond to planning restrictions but also to exploit the 'basket shopping' market (Guy, 2011). The combined effect of multiple retailers' out-of-town dominance combined with these new in-town corporate convenience stores has resulted in a significant increase in local brand concentration.

This increase in retail concentration has led to concerns about whether there is sufficient competition in the grocery retail system. Most notably, successive investigations by the UK government's Competition Commission into the supply of groceries have identified local 'areas of concern' where retail provision is regarded as problematic. These include urban localities that suffer a lack of consumer choice because they either have limited access to competitively priced local food stores (i.e. so-called 'food deserts'), limited access to large

stores for one-stop shopping, and/or because they have a high proportion of stores under the control of one or two of the major multiples. The Competition Commission drew attention to the negative effects of the growth in retail concentration for local consumer choice and recommend the introduction of a competition assessment ahead of new food superstores being approved. The proposal was “to prevent the emergence or strengthening of a concentrated position held by a grocery retailer in local markets” (Competition Commission, 2008a, p.8), as well as to “promote consumer choice and retail diversity” (DCLG, 2008).

Assessments of competition, consumer choice and retail diversity are typically conducted at the regional, conurbation or town level. These levels of analysis are, however, inappropriate for gauging consumer perceptions of available choice because there is a large variation of household circumstances within them, both in terms of socio-demographics and access to retail provision. This is well illustrated in research in the UK (Jackson et al, 2006) which used detailed household ethnographies to detect the different ways in which consumers perceive and exercise choice, showing how choice takes place within much smaller geographic areas than previously assumed. The implication is that new retail developments do not necessarily benefit all neighbourhoods in a given city. The upshot is that approaches to local competition that use the number and size of major retail operator fascias as a proxy for local choice (e.g. the Competition Commission, 2008a) overlook variations in the utility that individual households attach to retail operator brands and store formats. These limitations underline the need for a more sensitive approach to the evaluation of local retail provision in different neighbourhoods and therefore a need to conduct investigations into different types of households in different neighbourhoods.

This paper addresses these challenges of conducting research into consumer perceptions of choice at a local level commensurate with the way choice is experienced. To conceptualize

the factors influencing choice perceptions, we adopt the concept of 'retail assortment'. It has been shown in the retail literature that the assortment of products within a store positively relates to consumers' perceptions of the value of the store as a whole (e.g., Arnold, Oum, and Tigert, 1983; Oppewal and Koelemeijer, 2005). Hence we use the analogy of retail 'assortment' here to capture similar effects on perceptions of the local store mix or retail provision and show how the number and diversity of stores can contribute directly to consumer satisfaction with the local retail mix.

In order to examine these effects empirically, we adopt a stated-preference approach (Louviere, Hensher and Swait, 2000). We present consumers with descriptions of neighbourhoods that systematically vary the level, form, brand composition and accessibility of local retail provision and measure their satisfaction with these neighbourhoods to determine which local assortments of stores are perceived as constraining and/or facilitating perceived choice. We apply this approach to consumers from neighbourhoods with different levels of deprivation to assess the effect of levels of household deprivation as a moderator of consumers' perceptions of choice. Adopting a stated-preference approach enables us to obtain consumer responses to variations in local retail assortments that would be otherwise impossible to observe. Stated preference methods can provide sufficient external validity providing certain precautionary measures are taken (Louviere, 1988; Louviere et al., 2000).

The present paper sheds new light on the effects of local retail provision (Cotterill, 1997; Clarke, 2000; Guy, 2010) by addressing the fundamental relationship between local store 'assortments' and perceptions of consumer choice. This relationship is particularly relevant to study in light of the most recent policy debates regarding retail diversity and the role of the small stores. The findings of this paper have implications for this debate and so we first elaborate further on these recent developments. We then continue our argument about

consumer perception of local assortments and review the literature on store access and assortment evaluation. This is followed by a description of the data collection method. We then discuss the results and their implications for understanding the effects of local store assortment on consumer perceptions of choice. Finally, we identify implications for retail policy-makers.

### **Recent policy issues: 'retail diversity'**

As Guy (2009) has documented, the term retail diversity has come to the fore in retail planning and competition debates over the past five years in the context of supermarket competition, 'clone towns', brand concentration, and questions over the extent to which small independent and specialist stores should be encouraged and protected. The Consultation Paper (PPS4) in 2009 included many references to promoting retail diversity and consumer choice, encouraging local authorities to support a diversification of uses, plan for a strong retail mix and recognise that small shops make a valuable contribution to consumer choice (DCLG, 2009).

A major study by Wrigley and Dolega (2011), published recently in this journal, supports the importance of retail diversity in the context of town centres and high streets. Importantly, the study distinguishes between the effects on retail diversity caused by supermarket competition, and the impact of declining store occupancy rates arising from the combined effects of the global economic crisis, a fall in consumer confidence and the impact of online retailing. The authors argue that retail diversity is key to the ability of a particular centre to adapt and thrive in the face of environmental and competitive forces. Towns with more retail diversity are found to be more resilient, with corporate-owned food stores playing an anchor role in maintaining the quality and range of shopping and benefiting smaller stores by facilitating linked trips and hence retaining spending within the locality.

Related research papers by Wrigley and his associates have also served to draw attention to the value of small and corporate convenience stores to consumers and the position of these stores in the retail landscape (Wrigley, 2007). Wrigley, Branson et al (2009) challenged the view that all small stores are in long-term decline, suggesting that while supermarkets have affected greengrocers and fishmongers, bakers, delicatessens, health food shops and convenience stores have been more resilient against corporate supermarket competition. They argue that independent convenience stores provide a complementary service to supermarkets, and both are important components of resilient retail centres.

The latest Draft National Planning Policy Framework by the UK Government reaffirmed commitment to local retail diversity (DCLG, 2011) and in May 2011, retail expert Mary Portas was asked to lead an independent review to explore the problem of town centre vitality in a holistic way, with the aim of identifying actions to promote the development of more prosperous and diverse retail centres (ODPM, 2011). The results of the review (Portas, 2011) put town-centre management schemes centre stage as the mainstay of a solution to enhancing retail diversity in the longer-term, encouraging local authorities to be more flexible and supportive of different retail forms. In spite of the increasing references to retail diversity, however, Guy (2009) has observed that retail planning policy statements have yet to define what this means in practice in terms of the ideal mix of stores.

### **Consumer satisfaction with local store assortments**

Unfortunately, what none of the recent studies do is carefully calibrate the effects of different components of local retail assortments - be they store brand, ownership, format or size - and their impacts on consumer satisfaction. Hence, in this paper we focus attention on consumer satisfaction with assortments of stores at the local level. Studies have investigated the effects



of shopping centre store mix on consumer preference and choice (e.g., Oppewal, Timmermans, and Louviere, 1997) and have looked at how consumers use different stores to combine their purchases into multipurpose shopping trips (e.g., Arentze, Oppewal, and Timmermans, 2005; Brooks, Kaufmann, and Lichtenstein, 2008; Dellaert, et al, 1998), but none have addressed consumer satisfaction with the total portfolio, or choice *assortment*, of available stores. An exception to this criticism is the work by Jackson et al, who in a rich, qualitative study combined in-depth interviews, observation and a longitudinal analysis to understand consumer perceptions of local choice (Jackson, Perez del Aguila, et al, 2006). They found substantial variation in how consumers perceive and value local provision – noting that consumer choice involves consumers making judgments on taste, quality, and value as well as evaluating more ‘objective’ questions of convenience, price, and accessibility. The study found that these judgments are related to households’ differential levels of cultural capital and involve ethical and moral considerations as well as more mundane considerations of practical utility.

Terms such as ‘convenience’, ‘value’, and ‘habit’ are conventionally advanced as explanations for consumer choice, but Jackson et al found that these terms have very different meanings depending on households’ circumstances. What the research advocated is that in order to understand these meanings, researchers should relate consumers’ at-store behaviours to the domestic contexts in which their consumption choices are embedded. By bringing theories of practice to bear on the nature of consumer choice, the study demonstrated that consumer choice between stores can be understood in terms of accessibility and convenience, whereas choice within stores involves notions of value, price, and quality. It also demonstrated that choice between and within stores is strongly moderated by consumers’ household contexts, reflecting the extent to which shopping practices are embedded within consumers’ domestic routines and complex everyday lives.

In stark contrast to the paucity of studies on consumer perceptions of store provision, many studies have looked at consumer perception and satisfaction with choice *within* stores. Assortment studies have shown that the size and composition of the mix of products within a store can positively impact store perceptions regardless of the actual preference for the available options (Oppewal and Koelemeijer, 2005), although consumers do not always seem to notice variations in assortments (Broniarczyk, Hoyer and McAlister, 1998; Sloot, Fok and Verhoef, 2006). Huddleston, Whipple et al (2009) found that product assortment is positively related to store satisfaction, regardless of store type. These findings reflect insights gained from research into the broader field of consumer choice perception, with consumers valuing access to assortments of goods because this provides them with flexibility and convenience of choice, the opportunity to compare goods and the opportunity to feel as though they are in control (Botti and Iyengar, 2006; Kahn and Lehmann, 1991). Consumers value the availability of multiple options, although it has also been found that beyond a certain choice range there are diminishing returns to offering more choices (Botti and Iyengar, 2006; Chernev, 2006; Iyengar and Lepper, 2000). A recent meta-analysis has also indicated that conditions for optimal choice provision at the consumer level vary across many dimensions and consumer characteristics, although not very consistently so (Scheibehenne, Greifeneder and Todd, 2010).

In a similar way to the effects of in-store availability, the availability of a choice of stores within a locality provides consumers with a number of advantages. At its most basic, this is because having multiple stores within a single category provides a perceived 'back-up' for consumers should their preferred stores be out of stock, as well as serving to reduce consumer purchasing risks by enabling them to make price and quality comparisons (Kahn and Lehman, 1991). The presence of multiple stores also stimulates perceived convenience

through the opportunities for multipurpose shopping it provides both within and between categories (Arentze, Oppewal, and Timmermans, 2005; Teller, 2008).

The composition of the store mix is one determinant of consumers' satisfaction with their local store assortment. Another major determinant, as already mentioned, is access. Access to services and stores is of direct relevance to consumers' perception of well-being and quality of life (Baker, Gentry, and Rittenburg, 2005). Several studies have looked into measuring access based on physical distribution measures (Guy 1983; Handy and Niemeier 1997; Limanond and Niemeier, 2003; Talen and Anselin, 1998). For consumers, distances are also perceived rather than real (Mackay and Olshavsky, 1975) and some models of store choice have therefore incorporated cognitive distance (Cadwallader, 1975). Marjanen (1997) suggested subjective distance is not linearly related to objective distance because closer and shorter distances tend to be overestimated, and longer distances underestimated. Similarly, consumers can estimate a larger, more attractive, store to be more accessible than a smaller one. Also, distances towards towns can be underestimated, while distances away from city centres can be overstated. Marjanen (1997) also found that cognitive distance depends on the nature of intervening terrain, the attractiveness of the destination and barriers (e.g. street intersections). Other studies have also noted that lack of access to quality and affordable products (Hill, 2001) can serve to increase consumers' feeling of vulnerability and therefore perceived quality of life. For example, research by Kirkup, de Kervenoael et al (2003) highlighted the impact of perceived access on consumers' physical vulnerability, and their consequent need to develop elaborate coping mechanisms (such as through friends and other support networks) to help satisfy food store needs.

The effects of access are in turn likely to depend on consumers' levels of social deprivation. Previous research has identified links between social deprivation and store choice. Davies

and Champion (1980) identified groups of deprived consumers with different store choice needs: particularly the elderly, large young families, unskilled manual workers, the unemployed, the sick and infirm, and those without cars, but especially those suffering extreme disadvantage such as the handicapped, elderly with severe mobility problems, and families with large numbers of children and/or bedridden relatives. Extreme disadvantage as faced by disabled consumers acts to impose severe restrictions on access to, and choice of, food stores (Bromley and Matthews, 2007). In addition, many elderly consumers have likes and dislikes of different shopping destinations which impose further restrictions on choice (Bowlby, 1985). Piacentini et al (2001) observed that the elderly are often driven by functional motives, with their behaviour best described as conforming to the 'economic shopper' and 'convenience shopper' typologies, albeit that different aspects of their disadvantaged situation (e.g. income, mobility and social support networks) can affect patronage behaviour.

Wrigley et al (2003) confirmed the intensity of food access problems in deprived urban areas through a study in Leeds. The authors found 70% of their sample to be beyond walking distance of retail outlets selling healthy foods. However, Williams and Hubbard (2001) concluded that the problem of retail disadvantage is not clear-cut for disadvantaged groups in urban areas because many households tend not to *feel* disadvantaged. Most consumers are broadly happy with the quality of locations and stores that they incorporate into their shopping routines, with most feeling they pursue the best option available to them. Nonetheless, the study provided support for the notion of a polarization between those who are able to immerse themselves in a wide range of shopping experiences and those who are increasingly reliant on a limited number of stores. This suggests that a complex behavioural geography of exclusion and inclusion is evident. It is not surprising, therefore, that the

authors called for spatially-specific explorations of consumer disadvantage to help unpack the patterns and mediators of inequalities in choice.

Based on these various insights and findings from past research, we propose and test three key relationships between the local store mix and consumer satisfaction. First, we propose that consumers will be more satisfied with their local assortment of stores if they are closer to a supermarket. Second, we hypothesize they will be more satisfied when they have access to a number of stores, especially if their choice comprises a wider variety of store brands and formats rather than being dependent on multiple outlets of the same operator or store format type. Third, we expect to find that satisfaction with local store assortments varies with the level of household disadvantage and deprivation. Specifically, we expect that more deprived consumers will be more satisfied with the constraints imposed by a given local assortment than less deprived consumers.

## **Method**

To test our hypotheses, we adopted a stated-preference approach. Stated-preference methods present respondents with experimentally designed product descriptions or choice scenarios and measure their responses as preference ratings or choices. Stated-preference methods have become popular for assessing consumer choice because, although relying on stated responses to hypothetical conditions only, they enable respondents to be presented with a wider range of choice alternatives than available in the real market and allow researchers to retain control of the variation in the independent variables. There are several benefits to using stated preference methods. Benefits firstly include the independent assessment of how determinant factors influence the dependent variable. Because we independently vary access or travel distance and numbers of stores while also varying/controlling the diversity of formats and brands, we are able to estimate the separate contribution of each of these factors to

consumer satisfaction with the local store mix. Second, because the method is experimental it allows stronger inferences of causality than can be derived from survey-based approaches using real market observations. Third, the approach allows observing responses to configurations of store mixes that might be otherwise impossible to observe, for example, by including store assortment configurations with extremely poor access or excessively high levels of concentration. Finally, although the hypothetical nature of the task does impose some limitation on the external validity of the findings, stated preference methods are very well able to capture respondents' preference functions and have been shown to be adept at predicting real market behaviours (for reviews see Louviere, 1988; Louviere et al., 2000). The validity of stated preference tasks very much depends on the respondents being able to relate to the hypothetical task as an example of a possible decision environment. To ensure this was the case, in the present study we conducted extensive pretesting to ensure tasks would be realistic, would make sense to respondents, and used a face-to-face interview format to ensure respondents would pay attention and make genuine attempts to complete the tasks.

Face-to-face interviews were conducted across various neighbourhoods in Worcester, in central England. According to the Herfindhal-Hirshmann Index (HHI) of market concentration used by the UK Competition Commission, at the time of our field study in 2007, the city's level of competition (HHI=2135) was close to the UK national weighted average (2456). Retail fascias present in Worcester at the time included Tesco (two major out-of-town stores), Tesco Express (three outlets), Sainsbury (one high street and out-of-town store), Somerfield (two outlets) and the Cooperative Group (three outlets). Morrisons and ASDA were located just outside of the main town catchment. There were 46 small stores operators, two discount stores, and three luxury grocery outlets. The city has a population of around 95,000, with a socio-economic profile almost identical to England as a whole. Proportions of the working population within each of the AB, C1/2, DE socio-economic

grades are within 1% of the national average (ONS, 2005). Overall therefore, Worcester represents a more-or-less ideal study site.

### **Sample and Procedure**

Nine neighbourhoods were selected that varied over three levels of social deprivation, measured using the Index of Multiple Deprivation (IMD). The IMD is based on seven domains of deprivation, each containing a series of domain-specific indicators – income; employment; health and disability; education, skills and training; barriers to housing and services; living environment; and crime. The overall IMD is conceptualised as a weighted area-level aggregation of the specific dimensions of deprivation (ODPM, 2004). Within each level of deprivation (designated as low, medium, or high) we selected three neighbourhood locations, one with a major supermarket within less than 1km, another with a major supermarket between 1 and 2km, and a third comprising a neighbourhood that had no major supermarket within 2km distance. This sampling scheme provided nine study locations in total. In each location, a starting point for recruitment was randomly selected, after which additional respondents were recruited from the same area by door knocking until over 30 interviews had been successfully completed within each neighbourhood. Interviewers were instructed to keep a distance of at least six addresses between respondent dwellings in each area. The procedure resulted in 288 completed householder interviews.

Interviews were conducted face-to-face by trained professional interviewers. They took about 30 minutes and included questions about existing grocery shopping preferences and behavioural patterns followed by the stated preference task. The stated preference tasks comprised realistically defined scenarios describing the store mix in a hypothetical neighbourhood. Respondents received four scenarios, one at a time, and the interviewer asked for each how satisfied the respondent would be with the store mix in terms of retail

choice (see Figure 1). The experimentally-designed variations in available store mixes enabled an assessment of the contribution of the variety of small and large stores, and the variety of store brands, to consumers' overall evaluations of neighbourhoods.

### **Experimental Design**

The experimentally designed store mixes were presented on show cards as shown in Figure 1. Hypothetical store mixes varied the presence or absence of each of the four main operator brands operating in the UK: Tesco, Sainsbury's, ASDA and Morrisons. Tesco is the largest multiple operator of supermarkets and superstores in the UK and has by far the largest market share of the four main operator brands. ASDA is a part of the Wal-Mart group. Sainsbury's has a slightly more upmarket positioning than the other three brands. Morrisons is the final main chain, an operator that acquired Safeway's UK operations in 2004. In addition, the store mixes included a Somerfield supermarket. At the time of data collection, Somerfield (now acquired by the Cooperative Group or divested to other competitors) was a national chain of small supermarkets. The experimental design furthermore varied the presence or absence of one 'independent small' fascia, representing a range of smaller brands, and the presence or absence in the mix of Tesco's convenience format as 'Tesco Express'. Finally, we allowed for systematic variation of the presence of multiple instances of Tesco's main supermarket format on the show cards, enabling us to test for the effect of additional supermarkets of the same brand (in this case using Tesco) in the area on satisfaction with the store mix.

Show cards were designed to describe provision at three types of location, as shown in Figure 1: a "local parade at 5 minutes travel" (a 'local parade' of shops in the UK is equivalent to a local shopping 'strip' in the US context), a location "at 15 minutes travel but near the town centre", and another location "at 15 minutes but located in another direction, towards the edge of town". These three locations were fixed across conditions and were



selected to represent the most typical geographical choice set configuration for residents, where many would indeed have one or a few stores nearby and a wider selection of stores at a further distance. Selecting this base configuration allowed independent manipulation of the presence or absence of identical store brands at different locations, as well as estimation of pair-wise interactions for any combination of stores.

**[INSERT FIGURE 1 ABOUT HERE]**

The following eight store names or formats were selected to appear across the three possible locations. The 5 minute local parade had 3 possible store options: (1) an 'independent' family-owned small store (equivalent to a 'mom and pop' store in the USA), (2) a Tesco supermarket and/or (3) a Sainsbury supermarket. At the 15-minute edge of town location the options were: (4) a Tesco supermarket, (5) a Tesco branded small store (Tesco Express) and/or (6) an ASDA supermarket. Finally at the 15-minute location towards the centre of town the options were: (7) a Morrisons supermarket, (8) a Tesco, and/or (9) a Somerfield. The latter supermarket was a constant alternative, present in each scenario but only at 15 minutes travel. All store mix effects were estimated against a situation of minimal provision where consumers only had access to a single Somerfield supermarket at 15 minutes travel time, and no other food stores within 30 minutes travel distance.

A  $2^8$  "presence/absence" design (Louviere, Hensher, and Swait, 2000; Louviere and Woodworth, 1983) was used to create a total of 64 different store mix scenarios. Respondents each received a subset of four scenarios and rated each in terms of how satisfied they would be if this were the mix of grocery stores accessible from their neighbourhood, using a five point rating scale (1= very unsatisfied; 5= very satisfied with this mix of stores). Additional questions were asked but the current paper focuses on the analysis

of these satisfaction ratings and how they were affected by the composition of the local store assortment.

## Findings

The sample for this paper consisted of 288 households, distributed evenly across the local areas selected to reflect areas of high, medium and low levels of deprivation and local access. Of the sample respondents surveyed in Worcester, 42.4% were under 45 years old, 31.3% were between 45 and 65, and 26.3% were over 65. In terms of grocery shopping behaviour, the Tesco superstores were chosen by 50.7% of respondents for their 'main' shopping trip, with 20.6% preferring Sainsbury, and 3.8% Morrisons; the remaining 24.9% of respondents shopped at other operator brands. 19.8% of respondents undertook their main grocery shopping at least twice a week while the majority (64.2%) did their main grocery shopping trip once per week. 71.1% travelled for their main trips by car. Only 5.4% of respondents use the Internet more than once a month for grocery shopping.

The satisfaction ratings were analysed using ordinal logistic regression. Treating the satisfaction rating scale as an ordinal dependent variable allows avoiding scale assumptions required when applying ordinary multiple regression. The model (see 1 below) predicts the probability that a respondent chooses a higher scale category than ordinal category  $j$ , from a linear combination of predictors:

$$P(Y_i > j) = g(X\beta) = \frac{\exp(\alpha_j + X_i\beta)}{1 + \exp(\alpha_j + X_i\beta)}, j = 1, 2, \dots, M - 1 \quad (1)$$

where  $X_i$  is a vector with predictor values for individual  $i$  and  $M$  is the total number of ordinal categories. In addition to the predictor effects  $\beta$ , one threshold (intercept) term  $\alpha_j$  is

estimated for each transition between categories of the dependent variable (Norusis, 2012; Williams, 2006). The model effects are typically interpreted in terms of their effects on the log odds of the event that category  $j$  or lower is selected over the event that a higher category is selected, as shown in (2) below:

$$\ln\left(\frac{\text{prob}(Y_i \leq j)}{\text{prob}(Y_i > j)}\right) = \alpha_j - X_i\beta \quad (2)$$

Predictor variables in the estimated model consisted firstly of eight dummies to represent the eight stores and their locations. Additional dummies were included to represent the differences between neighbourhoods in terms of level of deprivation. The initial model also included several two-way attribute interactions. In principle, all two-way interactions were estimable but we limited the analysis to only the 28 most relevant interactions. In addition, the model included the products of these attributes and attribute interactions with the deprivation dummies. The latter dummies represent a test for group differences and are used to assess which attributes or attribute interactions vary significantly across the three levels of deprivation.

Insignificant attribute and dummy interactions were next pruned from the model in a series of analyses that resulted in the final model displayed in Table 1. This final model included all main effects and a selection of interaction effects. Testing for the ‘parallel lines’ (or proportional odds) assumption underlying ordinal regression however revealed the model did not meet this assumption, meaning at least some of the predictor effects in  $\beta$  are significantly different across the ordinal categories. Additional analysis was therefore conducted using a generalized ordinal logit routine (Williams, 2006), in which it was assessed which effects should have separate parameters for different category levels. This analysis revealed that the effects of the small independent store and the Tesco supermarket at

five minutes distance as well as the two deprivation dummies vary significantly across the ordinal levels, as shown in Table 1. This final, generalized ordinal regression model had a low but acceptable fit (Pseudo Rho-square = 0.05); and was overall significant (Chi-sq = 182.97, df = 29, p<. 001).

**[INSERT TABLE 1 ABOUT HERE]**

From an inspection of the parameters in Table 1 it can first be seen that the two supermarkets at 5 minutes distance both make a large contribution to satisfaction. Having a Tesco supermarket at only 5 minutes travel time leads to an increase between 0.22 and 0.45 units in the log-odds of choosing the higher satisfaction rating (meaning a higher category on the scale is 1.25 to 1.56 times more likely to be selected, see right hand column in Table 1), with the largest increase occurring when reaching the highest level of satisfaction; for Sainsbury the effect is 0.31 (a higher category is 1.36 times more likely to be selected) across the different satisfaction levels. However, there is a significant negative interaction between these two stores, indicating that if *both* stores are present at 5 minutes their joint effect on the log odds is 0.15 units less than the sum of the two individual effects.

The independent small store at 5 minutes has significant parameters but only for the lower levels of the 5 point satisfaction scale. This means the independent small store contributes only to enhancing satisfaction when satisfaction levels are low. The small store helps reduce *dissatisfaction* but does not contribute to achieving high levels of satisfaction. This effect of the small independent store holds across different levels of deprivation. Hence, for our city, across the selected set of supermarket brands and store locations, the presence of an additional small store contributes to reducing consumer dissatisfaction with the local store

mix for groceries but it does not help to further enhance satisfaction, regardless of neighbourhood type.

There are similarly no significant effects for the two Tesco supermarkets located at 15 minutes travel in opposite directions. In contrast, there are substantial contributions from the ASDA located 15 minutes travel time away at the edge of town (0.15 increase) and the Morrisons supermarket located at 15 minutes travel time away towards the centre of the town. The latter store's contribution of 0.33 units is in the same range as the Tesco and Sainsbury effects.

An additional interaction concerns the combined presence of a Sainsbury at 5 minutes and ASDA at 15 minutes travel. If both are present, the logit scale underlying the satisfaction ratings increases by 0.21, meaning that, despite Tesco tending to have the highest satisfaction contribution, a combination of Sainsbury's at 5 minutes and ASDA at 15 minutes creates greater levels of satisfaction than a combination of Tesco and ASDA. A similar but even more remarkable effect is the interaction of Sainsbury and the Tesco Express convenience store. While the latter does not add to satisfaction by itself, it appears that it does have a significant effect on satisfaction with the local assortment when present in combination with a Sainsbury – it enhances the mix with 0.16 log units – while no such effect occurs for the combination of the Tesco supermarket with the Tesco Express. This is another indication that variety in store brands enhances satisfaction.

The remaining effects in the model capture the significant differences between neighbourhoods based on their level of deprivation. Firstly, respondents from medium and low deprivation areas have overall lower satisfaction ratings compared to those from highly deprived areas; they are in particular less likely to be highly satisfied (reductions of 1.29 and 1.00 units respectively for the highest satisfaction category). Secondly, respondents in

neighbourhoods that are classified as moderately deprived appear to perceive less value (0.61) in having an ASDA store in their mix, especially if they already have a Sainsbury in their mix (another 0.34 drop on the log scale). In contrast, this same group of respondents values having a Morrisons in addition to an ASDA. This effect, an increase of 0.91 points, largely compensates for the earlier negative parameter for ASDA for this group of respondents. The total outcome of these effects is that respondents value having either an ASDA or Morrisons, but having both in addition to a Sainsbury does not add substantially to satisfaction levels.

Finally there is a negative effect (0.41) of the 5-minute Tesco store for respondents from the most affluent areas. Hence, for respondents from these areas, a Tesco adds less to satisfaction than is the case for the high and medium deprived areas, which is consistent with the more upmarket positioning of Sainsbury.

### **Discussion, conclusions and implications**

At the beginning of this paper, we identified three problems with the appraisal of competition and consumer choice: (a) that the spatial unit of analysis at the level of a town or city is inappropriate for gauging consumers' perceptions of available choice; (b) that such approaches to local competition tend to use the number of major retail operator fascias to capture the effect of provision on local choice, rather than the variable utilities different types of household might attach to retail operator brands or store formats; and (c) research to date does not capture the complex and situation-specific nature of consumer choice perceptions. In this study, we have been able to respond to these three issues by observing and analysing consumer perceptions at the micro-level of neighbourhoods: by explicitly comparing situations with different levels of supermarket access (defined as the distance to the nearest

supermarket); by systematically varying different levels of retail diversity in local assortments, including duplication of brands and the presence or absence of different formats; and by observing how these effects vary across neighbourhoods with different levels of deprivation. This paper addressed these three issues by experimentally modelling the effects of local assortment composition on satisfaction with retail provision. Experimentally designed scenarios varied the presence or absence of various supermarkets brands and store formats to allow us to estimate the effects of the occurrence and proximity of any particular store.

We firstly find that access is a critical factor influencing consumers' satisfaction with their local retail assortment. Put simply, an assortment overall can be perceived as attractive, but without a store close-by, consumers can remain dissatisfied. In our study, the contribution of a Tesco supermarket was significantly greater if it was located at only 5 minutes travel than if it was at 15 minutes travel. If the nearby store is a Sainsbury rather than a Tesco, we find that the level of satisfaction is similarly high, although Tesco has a greater contribution to achieving the highest possible level of satisfaction. While satisfaction among respondents increased substantially, if at least one major supermarket was available at only 5 minutes distance, adding a second supermarket at close range added much less to satisfaction and no more than having another supermarket at 15 minutes distance.

Second, we find that the presence of a small independent store adds to satisfaction but only when overall provision is rated low. The small independent store contributed significantly to reducing dissatisfaction if the local mix was perceived as poor but it did not contribute if satisfaction levels were already moderate to high. This indicates that small independent stores can play an important support role but they cannot act as substitutes for the major supermarkets. The Tesco branded convenience store did not significantly contribute to satisfaction if the respondent was in close proximity to a Tesco supermarket but it did if the

nearby main supermarket was a Sainsbury. This is an indication that consumers value brand variation. These effects occurred regardless of deprivation level of the neighbourhood.

Thirdly, we find that the diversity of major supermarket brands adds significantly to consumer satisfaction with the local retail assortment, even if the second supermarket is located some distance away. Satisfaction levels of our respondents increased significantly when the number and especially the variety of supermarkets in the presented scenarios increased. The presence of a second Tesco at 15 minutes travel added very little to the satisfaction levels but the presence of a different supermarket brand (e.g. ASDA or Morrisons) significantly increased satisfaction levels, even when stores were located 15 minutes away. There was one particular combination of stores that led to a significant extra increase in satisfaction: Sainsbury and ASDA. This suggests that consumers value complementary brand positions as a key feature of their local retail assortment. As noted, a similar complementarity was observed for the combination of Sainsbury and a Tesco Express convenience store.

Our results do not, however, indicate that respondents are overly concerned about brand duplication. The lack of significant negative interaction effects among the three Tesco stores in our design suggests that having more of the same stores does not negatively affect satisfaction levels. There is, however, a diminishing return when a brand has a presence at multiple locations. Across the scenario conditions, a Tesco at 15 minutes added significantly less to satisfaction than Morrisons or ASDA at similar distance. This suggests that a different supermarket, rather than another of the same brand, even at a distance, is more valued than a similar supermarket. Hence, diversity is an attractive feature of a local retail assortment.

Finally, we find that consumers' satisfaction with their local retail assortment also varies with the level of social deprivation. Deprived consumers tend to be more satisfied with a given



store mix than affluent consumers and respond differently to the presence or absence of particular retail brands, suggesting different socio-economic groups have different priorities. Consumers in the most affluent areas were substantially less satisfied if they had a Tesco supermarket at close range than if they had the more 'upmarket' Sainsbury supermarket in their area, suggesting this brand is a priority for them, which is consistent with the Sainsbury market position. In contrast, neighbourhoods of average deprivation were most responsive to the addition of the two brands (ASDA and Morrisons) that were not available in their local retail assortments.

In summary, our results indicate that consumers firstly appreciate having nearby access to at least one major supermarket, but then also value having a wide range of options and brand variety. The presence of a small independent store only adds to satisfaction levels when satisfaction without their presence would be low; as satisfaction levels increase their contribution diminishes rapidly. This suggests that small stores fulfil a support role in the store mix but cannot fulfil the needs served by supermarkets. Finally, satisfaction levels vary with the level of deprivation, with less affluent consumers showing greater satisfaction with the same assortment of stores.

The findings presented here provide strong support for retail planning policies aimed at preserving store brand variety at the local level. They suggest that low levels of provision, and/or a lack of brand variety act as constraints on consumer choice; and conversely, a larger number of stores and a greater variety of store brands help maximise consumer choice and welfare by positively influencing consumers' satisfaction with their local mix of grocery stores. Clearly, our respondents appreciated having more choice and appreciate the availability of multiple stores, even if these are located at a somewhat greater distance.

The wider contributions of the paper to the literature lie in developing a clearer understanding of how consumers evaluate their local retail assortments, specifically in terms of the role of local access, diversity and the moderating effects of social deprivation. Our study controlled many factors that typically remain confounded in other survey based studies and provided insight into the actual contribution of store formats, brand names and location to consumer satisfaction with the local store mix. Whereas the study did include the most typical formats, brands and locations, further extended experimental research could attempt to include a larger range of brand names and store formats, perhaps including small specialist food stores such as bakeries and butchers (as for example attempted by Oppewal, et al. 1997), and a wider range of convenience formats, including the possible role of the Internet as a substitute for access to physical retail outlets. Including more options will, however, substantially increase the demands on the experimental design because the nature of the study requires the estimation of many interaction effects. The present study is unique in that it was designed to ensure that at least all pair-wise interactions between individual stores could be estimated independently. Future research could also explore how effects on satisfaction, as observed in this paper for hypothetical scenarios, correspond with ratings produced for each locality's current assortment of stores. Finally, future research could investigate the relationship between satisfaction with the local assortment and actual store patronage, since store mix effects on patronage may well be different from effects on satisfaction.

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**TABLE 1**  
**GENERALIZED ORDINAL LOGISTIC REGRESSION PARAMETERS**  
**FOR THE STORE MIX SATISFACTION MODEL**

	Answer Category	Estimate ( $\beta$ )	Std. Error	z	Sig.	Exp ( $\beta$ )
Thresholds ( $\alpha_i$ )						
		2.742	0.231	11.860	0.000	15.518
		1.899	0.176	10.800	0.000	6.667
		0.693	0.146	4.750	0.000	2.000
		-0.231	0.143	1.620	0.105	0.794
At 5 minutes, Local Parade						
Independent small retailer	1	0.386	0.143	2.700	0.007	1.471
	2	0.217	0.099	2.190	0.029	1.242
	3	0.057	0.082	0.690	0.490	1.058
	4	-0.062	0.087	0.720	0.472	0.939
Tesco supermarket	1	0.304	0.143	2.120	0.034	1.355
	2	0.398	0.115	3.470	0.001	1.489
	3	0.228	0.094	2.430	0.015	1.257
	4	0.446	0.094	4.750	0.000	1.562
Sainsbury supermarket		0.312	0.073	4.300	0.000	1.366
At 15 minutes, Edge of Town						
Tesco Express		-0.086	0.072	1.190	0.233	0.917
Tesco supermarket		-0.071	0.071	1.000	0.318	0.932
ASDA		0.150	0.086	1.750	0.081	1.162
At 15 minutes, near Town Centre						
Morrisons		0.333	0.144	2.310	0.021	1.395
Tesco supermarket		0.081	0.071	1.140	0.255	1.085
Interaction effects						
Tesco at 5 minutes AND Sainsbury at 5 minutes		-0.154	0.073	2.120	0.034	0.857
Sainsbury at 5 minutes AND Tesco Express at 15 minutes		0.161	0.072	2.240	0.025	1.175
Sainsbury at 5 minutes AND ASDA at 15 minutes		0.212	0.085	2.480	0.013	1.237
Deprivation effects						
Medium deprivation (MedD)	1	-0.276	0.250	1.100	0.270	0.759
	2	-0.699	0.194	3.610	0.000	0.497
	3	-0.470	0.171	2.750	0.006	0.625
	4	-1.292	0.188	6.890	0.000	0.275
MedD with ASDA		-0.611	0.169	3.620	0.013	0.543
MedD with Sainsbury AND ASDA		-0.342	0.143	2.390	0.000	0.710
MedD with ASDA AND Morrisons		0.905	0.238	3.810	0.017	2.472
Low deprivation (LowD)	1	-0.602	0.244	2.470	0.014	0.548
	2	-0.579	0.193	3.000	0.003	0.560
	3	-0.572	0.165	3.470	0.001	0.564
	4	-1.004	0.176	5.720	0.000	0.366
LowD with Tesco at 5 minutes		-0.407	0.135	3.020	0.003	0.665



**FIGURE 1**  
**SHOWCARD ILLUSTRATIVE SCENARIO \***

Instruction: “Imagine that your neighbourhood has a completely different range of food stores available. Pretend there is a small parade of shops, possibly including some food stores, about 5 minutes travel from your home, and there are some supermarkets about 15 minutes away, either near the town centre or on the edge of town. The travel time is using your normal means of transport to do grocery shopping, whether that’s car, bus, walking, etc. There are no other grocery shops within 30 minutes travel distance.”

<b>POSTCARD 14A</b>	
Local parade 5 minutes away	Independent small retailer Sainsbury Supermarket Tesco supermarket
15 minutes away but near the town centre	Morrison Somerfield Tesco Supermarket
15 minutes away in another direction, towards the edge of town	Tesco Express Tesco Supermarket ASDA

If this situation were real I would be

VERY UNSATISFIED (1) -- (2) -- (3) – (4) -- (5) VERY SATISFIED with the mix of stores

\* This is one of 64 possible cards. If a store was absent in a card condition its entry was left blank.