Factors affecting Store Choice in the Food Market for Fruits and Vegetables

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***Abstract* - Store choice decisions in the food retailing industry have been widely discussed in the literature. The importance of pricing, quality and assortment is known, and the influence of sociodemographic variables is small. In this paper, a mixed nested logit model is used, to study the relationship between specific attitudes of households and their store choice for fruits and vegetables. The mixed nested logit model includes a random intercept for the different store types and therefore allows for individual taste variation. Household attitudes are about quality, freshness, environment, organic food and prices. An implied image ranking of stores regarding these attitudes can be established.**

Introduction

Expenditures on food and soft drinks are 152 billion euros in 2008. The share of food expenditures in total expenses is about 11%, which is nearly the lowest in a European comparison. In the EU-27, the share is on average 19.4%. Expenditures for fruits and vegetables (f&v) have increased from 16.3 bn in 1991 to 22.2 bn euros in 2006.

The food retailing sector in Germany is exposed to high competition. Only a few large retailers in Germany share the largest portion of the market. Six companies Edeka, Rewe, Schwarz, Aldi, Metro and Tengelmann share more than 75% of total revenues in the food market. The companies use different stores and store types to sell their groceries. A store type is generally characterized by stores, which have similar attributes over a long time period. They can be classified by four categories: 1. the amount of different products (full, part or special), 2. general service (self-service), 3. service (personnel, location) and 4. quality of products (Specht & Fritz, 2005). Distinguished by these four categories, four different main store types are established in the food market: discounters, supermarkets, small and large hypermarkets. For f&v, specialized stores like weekly farmers' markets can be added as a store type. The stores within a store type share usually many similar characteristics, but nevertheless they mostly are at least a bit different within these characteristics.

The consumers' decision to buy groceries is based on a dynamic decision behavior of 1. determining whether there is a need to go shopping or not, 2. deciding what purchases need to be made, and 3. choosing a particular store (Leszczyc et al., 2000). At the third decision, choosing a particular store, first a specific store type is chosen and then a specific store within this store type. This paper analyzes store choices of households in the food market for f&v. Previous literature concludes that several variables, like assortment, location and price among others, influence store and store type choice. This paper considers specific consumer attitudes towards quality, freshness, environment, organic food and prices, several sociodemographics and a loyalty factor.

Up to now, there is no research with focus on the explicitly role of consumer attitudes towards store choice. Analyzing these attitudes and the actual place of purchase show, which of these attitudes actually influence to which degree store choice. It shows which store is preferred by e.g. quality orientated, freshness orientated, organic food orientated, or price-conscious households. Assuming there is a true relation between these choices, an implied image ranking can be established. That means it can be shown that e.g. specific stores have a higher or lower implied quality or price image. Suggestions can be given for improving the implied image of specific stores.

Data and Model

The dataset is provided by the GfK and is based on the GfK ConsumerScan household panel dataset, which includes electronically collected, the purchases of around 12,000 households. 1,300 households with f&v purchases between January and June 2006 are randomly selected for estimation and a random sample of 700 households is taken for validation. The householder who is responsible for shopping answers attitudes towards different themes. The included attitude variables are: environment, freshness, organic food, pricing and quality.

The store choice decision follows after the store type choice. Accounting for this information, a mixed nested logit model (mixed NL) is used to estimate store choice. The stores are nested within store types, an individual i chooses a specific store, given his store type choice. The mixed NL is used with random coefficients for each grocery store type and with fixed coefficients for all other variables. Random effects are applied only to the intercepts for capturing heterogeneity through not included variables. 200 Halton sequences are taken for every household to simulate the model.

Additionally to the attitude variables, the sociodemographics age, gender and income, and a loyalty

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variable are included in the independent variable part. To identify the model, the discounter Aldi is taken as the base category, so all coefficients for that choice are normalized to zero. This leads all coefficients to interpret relative to Aldi.

Results

Three different models are estimated: 1. The basic model, where only the household attitudes are used to explain consumers' choice. Additionally a random constant is estimated allowing for an intrinsic preference for one or another store type. 2. The dummy loyalty model extends the basic model by a loyalty variable. Loyalty is represented by a dummy variable, which is 1 if the previous choice is the same choice as the current choice. 3. The sociodemographic model, which extends the basic model by the three variables age, gender and income.

Correct predictions within the validation sample are between 11.3 and 25.8 percentage points superior to the chance criterion. The chance criterion is simply the share of the most chosen store. The estimated standard deviations of the random coefficients are all highly significant. Heterogeneity over households is present and nearly all random coefficients are significant. The influence of the sociodemographics is small. The loyalty dummies are significant for most stores and represent mostly the share of purchasing occasions.

The 27% of consumers who care about the environment prefer Rewe and weekly farmers' markets. Nearly all other stores are less preferred compared to Aldi. The within-variance regarding environmental characteristics for f&v is supported by the result that foreign farmers' markets are less preferred than some discounters by consumers who care about the environment, and a standard weekly farmers' market is more preferred. Within discounters, Aldi is the ruling store. Penny, Plus, Netto and Norma are generally less preferred with no significant difference within these stores.

The specialized stores (foreign and weekly farmers' market) are the most favored stores for f&v by consumers who care about freshness. Also the discounters Plus and Penny are preferred compared to Edeka or Rewe and the other discounters. The implied freshness image of the supermarkets is the lowest over all stores. The discounters score on average quite well, but Aldi is not generally the most preferred store within the discounters. The implicit freshness image ranking, starting with the highest image, is: weekly farmers' or foreign farmers' market or Plus, Penny, Aldi, Lidl, Netto, Edeka or Rewe.

Specialized stores are the most preferred stores by the 26% of households in the dataset who like organic food. The supermarkets get the worst results and Plus and Netto are the preferred discounters. The implicit organic food image ranking, starting with the highest image, is: weekly farmers' or foreign farmers' market, Kaufland or Penny or Plus, Aldi, Edeka or Rewe.

The store types can be classified into different price strategies: Discounters offer EDLP, supermarkets offer HiLo pricing, small and large hypermarkets offer hybrid pricing. Specialized stores offer prices between hybrid and high. The associated price order beginning with the lowest priced store type is discounter, large hypermarket, supermarket, small hypermarket and specialized store. It is assumed that price- and very price-conscious consumers prefer store types with a lower price image. Mainly the specialized stores are avoided and the large hypermarket Kaufland is preferred compared to discounters. There are two explanations why Kaufland is preferred to the discounters. First, consumers perceive large hypermarkets in average as really "cheaper" than discounters. Second, the hybrid pricing of large hypermarkets keep cherry pickers going to this store type. The huge assortment gives enough opportunities for consumers to find cheaper groceries than in discounters. Within the discounters, Aldi is the preferred discounter, meaning Aldi has the lowest implied price image of all discounters.

One way to signal quality are prices as Milgrom & Roberts (1986) state. High prices signal high quality, and low prices signal low quality. The discounters Norma and Aldi are the least choice for f&v by quality orientated consumers. Lidl and Netto have a higher implied quality image. The specialized stores enjoy the highest implied image for f&v and enjoy therefore the highest confidence for this quality sensitive grocery. The implicit quality image ranking, starting with the highest image, is: weekly farmers' or foreign farmers' market, Edeka, Netto or Lidl, Aldi, Norma.

Discussion

Foreign and weekly farmers' markets enjoy the highest implied freshness, organic food and quality image. Foreign farmers' markets are rather negatively associated within the environmental attitude. Nevertheless, the very good implied images come with the highest implied price image. The supermarkets Edeka and Rewe get comparable bad results for freshness and organic food, while the discounters Plus and Penny score quite well in these two categories. Aldi gets average results in most categories.

Several issues have to be considered. The households reported their purchases by their own. Due to the self-observation, one can expect some changes in behavior and therefore some bias in the estimation results. The intention to capture true loyalty by a dummy variable is rather unlikely. It can just represent, that visiting one store at one time, increases the probability to visit the same store next time. True loyalty cannot be captured by just the revealed point of purchase, without further information of the consumer.

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