Market Power, Brand Characteristics and Demand for Retail Grocery Products*

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Abstract

This paper examines the effects of market power and product differentiation on demand for grocery products in Australia over the period 2002 to 2005. We construct a model of the relationship between demand, market power and brand characteristics and then estimate the model using monthly data on price, quantity and volume sold for a bundle of 92 brands in 12 product categories from major supermarket stores across Australia. We also use data on the characteristics of each brand such as whether the product is environment-friendly, is a "private label", or is made from recyclable materials. Our results suggest that firms are able to affect their demand curves through both product differentiation strategies and through market power.

1. Introduction

This paper examines the effects of both market power and product differentiation on demand for grocery products in Australia over the period 2002 to 2005. The grocery industry is a particularly interesting case study since expenditure on grocery items as a proportion of household income has shown a considerable increase over the last 20 years in Australia. Only part of this real increase in demand can be explained by increased per capita consumption of the quantity of raw food inputs consumed. The residual is due to an increase in the quality and variety of groceries consumed. These patterns of consumption would not be remarkable but for the fact that the intensity of trade mark usage in the food industry has also increased strongly over the past two decades.[1] Compounding this trend is econometric evidence of a strong growth in the value of trade marks to companies (see Griffiths, Jensen and Webster 2005). Taken together, these observations suggest an interesting empirical question: how might the increased intensity of brand and trade mark usage be associated with the increase in real expenditure on grocery items?

In order to address this question, we collected monthly data from ACNielsen on a bundle of 92 brands in 12 product categories[2] from major supermarket stores across Australia over the period February 2002 to January 2005. These data provided measures of prices, quantities sold and concentration in product category markets. We also hand-collected data on the characteristics of each brand such as whether the product is environment-friendly, is generic (i.e. a "private label"), is made from recyclable materials, donates profits to a charity, offers consumers a prize, is Australian-made or is health-conscious. These characteristics are unobservable quality characteristics that can only be revealed though labelling. In addition, we collected data from IP Australia when the trade mark was first registered and the density of brands in each product line.

[1] The trend in the intensity of trade mark usage is more widespread than this. In fact, it appears that all trade mark classes in Australia have experienced strong real growth in recent years and that this is consistent with other industrialised nations (see Jensen and Webster 2004).

[2] These 12 product categories are bread, canned fruit, tea, tomato sauce, rice, pasta, pasta sauce, milk, toilet paper, frozen chips, laundry detergent and salad dressing. These product categories were selected because the quality of products in each category is relatively constant and homogeneous.

The rest of the paper is structured as follows. Section 2 provides some background on the Australian retail grocery market over the last 20 years and on the real level of trade marking activity. Section 3 presents a model of demand for grocery products. In section 4, we describe the data collected and the empirical framework used to analyse the effects of concentration and product differentiation on price. Section 5 concludes.

2. Characteristics of the Australian Retail Grocery Sector

Annual retail food turnover in Australia in 2003-04 was $88.7 billion, of which 62 per cent was accounted for by sales in supermarket and grocery stores. This represents a substantial increase relative to 1992-93 when total (real) turnover was only $58.7 billion (DAFF 2005). A key input into the supermarket and grocery sector is the food processing industry, which is a $65.0 billion industry made up of 3,400 firms of various size. However, with 20 firms accounting for almost half of the total industry turnover, the food processing industry is concentrated (DFAT 2005).

One common trend in almost developed countries is the increasing market penetration of generic goods. Australian is no exception to this rule despite the fact that our average private label share is about 12 per cent, whereas it is typically around 30 per cent in the UK and 20 per cent in the rest of Europe. Numerous studies have analysed the competition between national brands and private labels (see, for example, Raju et *al.* 1998; Hoch and Banerji 1993). Private labels are typically sold at a much lower price than branded goods despite the fact that they are often produced by large food processing firms using similar ingredients to the branded products (although they generally have simpler packaging).

Over the period 1986-2004, actual expenditure on supermarket goods rose from 9.1 per cent of total household income to 10.6 per cent in 2003. If we adjust this trend for changes in the absolute level of raw food inputs consumed over the same period, we find that about 39 per cent of the wedge between actual expenditure and expenditure on the 1986 bundle of goods can be explained by increases in quantity consumed.[3] The

[3] According to ABS data, per capita kilograms of food inputs across retail and takeaway food sector increased by 0.7 per cent per annum between 1978-79 and 1998-99. This figure is derived from total food inputs (i.e. meat, milk, vegetables in kg) consumed across all food retailing outlets. There are two

remaining 61 per cent must be due increases in the quality or variety of goods sold through the supermarket and grocery sector. The strong trends in the number of trade mark registrations in the food sector suggest that this expansion of quality and variety might be associated with branding. The overall level of trade marking activity in the food sector (which we assume is a proxy for the number of brands[4]) increased annually by 3.8 per cent more than real sales over the period 1975 to 2002.

3. The Model

While the theory of brands (and trade marks) in determining consumption and price setting behaviour has existed since Chamberlin (1933), more recent contributions by economists have addressed the role that brands play in signalling product *quality* and how investment in reputation provides an incentive to produce high quality goods. Branding provides consumers with valuable information about the quality characteristics of goods for which the consumer will be prepared to pay a premium only if quality is assured (see Shapiro 1983; Riordan 1986; Wolinsky 1983; Png and Reitman 1995).

However, other theories of branding suggest that brands may be used for other purposes. For example, brands can be used to heighten *consumer loyalty* so when faced with a choice among numerous substitutes, brands enable consumers to identify a product that they know or have been told about. This effect can be positively reinforced by both the level of advertising expenditure and the longevity of the brand. In other situations, such as the ready-to-eat breakfast cereal market, brands can be used to create powerful barriers to entry which enable firms with monopoly power to earn super-normal profits (see Schmalensee 1978).

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countervailing trends that may affect the accuracy of the estimate for the growth in the quantity of supermarket and grocery sales: changes in non-supermarket and grocery food sales, and changes in non-food supermarket and grocery products. Retail turnover in Supermarkets and Grocery Stores increased faster over this period than other forms of food retailing, (Takeaway Food Retailing, 'Other' Food Retailing and Total Hospitality and Service Industries), but we have no data on change to non-food sales within supermarkets and grocers. (ABS Retail Trade, Australia, cat 850101, Table 3 Supermarkets and Grocery Stores).

[4] It is often assumed that brands and trade marks are synonymous. However, there is an important difference: a branded good can be sold on a supermarket shelf without being formally registered as a trade mark. Such a brand is offered such legal protection by the common law of "passing off".

Brands can also be used to give the consumer an illusion of *product choice*, especially when the substance of the product is essentially homogeneous with competitor products. There is mixed evidence suggesting that persuasive advertising can be used to induce price premia over and above production, packaging and marketing costs for branded pharmaceuticals such as aspirin relative to bio-equivalent generic labels (Hurwitz and Caves 1988; Scott-Morton 2000). And in many other product categories where quality is either easily observable or is regulated by the government – such as milk – branded goods continue to play an important role despite the increasing market penetration of private labels. If consumer choice is random, the greater the number of brands in a given product category, given the size of the market, the greater the chance that a firms which produces many brands will be randomly chosen from the shelf (but the lower the chance that each brand will be chosen).

More recently, Seabright (2002) has suggested that consumers may purchase a particular brand for its *labelling features* in order to signal to others the type of person they are (or would like to be). Consumers are prepared to pay a premium to buy a brand which signals to others that they are rich, cool, sophisticated, or have other characteristics. Consumption of such products may have a "feel good" effect for the consumer, particularly if advertising suggests that consumption is indulgent or luxurious, or, beneficial to third parties or the environment. Of course, this has been known by economists for some time. Leibenstein (1950) had previously noted that consumers often buy products in order to belong to a group or to signal that they are not part of a group which they feel is undesirable: the former phenomenon he referred to as the "bandwagon effect", while the latter is the "snob" effect.

We model the effects of these three applications of brands – in addition to the effects of market concentration and price – on demand. Let us assume that for a homogeneous product category, firms are given a set of product characteristics, c, for brand i based on either the history of the brand (in the case of accumulated customer loyalty), the behaviour of competitors (in the case of brand density) or marketing decisions made prior to the reference period (in the case of labelling features). Subsequently, they choose a price, p, to maximise profits.

Hence, for each time period they try to maximise profits, π, where:

$$\pi_i = (p_i - m_i)x_i \tag{1}$$

where *m* is marginal (and average) cost and *x* is quantity sold, subject to the demand equation:

$$x_i = f(p_i, \bar{p}, \mathbf{c}_i) \tag{2}$$

where $\bar{p}$ is the average price of products in the same product category, and $\mathbf{c}_i$ is a vector of brand *i*'s characteristics – loyalty, density and features – which affect demand.[5] For simplicity, we do not use product category (or firm) subscripts in our notation but assume that all variables refer to a single firm selling *i* brands in a homogeneous product category such as tomato sauce or full-cream milk.

Aside from the effect of brands on demand, the conventional wisdom – which has been largely supported by empirical evidence – is that higher levels of market concentration affect price positively (or other price-related phenomena such as price-cost or profit margins). The precise mechanism by which this occurs is not often stated, but one common interpretation is that offered by Adam Smith: fewer firms in an industry provides fertile ground for collusion. Accordingly, we model this as:

$$\bar{p} = g(p_i, H_i) \tag{3}$$

where *H* is a summary measure of the brand's ability to influence the price of other goods in the market.[6]

Since our observed prices and quantities should be the revealed behaviour following the choice of price, we derive the profit-maximising price and quantity sold. To do this, we introduce two specific functional forms. First, we define the demand function as:

$$x_i = e^{\boldsymbol{\gamma}'\mathbf{c}_i}\, p_i^{\alpha} \bar{p}^{\beta} \qquad \alpha < 0,\ \beta > 0 \tag{4}$$

where $\boldsymbol{\gamma}$ is a vector of coefficients which represent the effects the characteristics of brands $\mathbf{c}_i$ will have on demand for each brand given p_i and $\bar{p}$. For given prices,

[5] Alternatively, $\mathbf{c}_i$ may refer to the characteristics of the brand relative the average characteristics of all brands in the product category. This does not affect estimation as the latter will be included in the fixed effect.

[6] In this model, we are assuming that there is only one brand per firm. In the empirical model, we relax this assumption and introduce multi-brand firms. In this context, our measure of the ability to affect the price of other goods in the market is a measure of firm, rather than brand, market power.

demand for brand *i* will be higher the greater is the more favourable brand characteristics the brand assumes (from a list of *j* characteristics) relative to other competing brands.

Secondly, we define the tacit collusion equation 3 as:

$$\bar{p} = e^{\phi(1-H_i)} p_i \qquad \phi < 0 \qquad (5)$$

where *H* represents the brand's market power in the product category and ϕ reflects the effect this has on other prices in the same product category. If a firm controls all sales in the category then $H_i = 1$, and $\frac{\partial \bar{p}}{\partial p_i}$ =1. If the firm has negligible sales, then $H_i \approx 0$ and $\frac{\partial \bar{p}}{\partial p_i} \approx e^{\phi}$.

With substitutions from (4) and (5), the profit equation becomes:

$$\pi_i = (p_i - m_i) e^{\boldsymbol{\gamma}'\mathbf{c}_i} p_i^{\alpha+\beta} e^{\phi\beta(1-H_i)} \qquad (6)$$

and the first-order conditions are:

$$\frac{d\pi}{dp_i} = \left[e^{\boldsymbol{\gamma}'\mathbf{c}} e^{\phi\beta(1-H_i)}\right]\left[(\alpha+\beta+1)\left(p_i^{\alpha+\beta}\right) - m_i(\alpha+\beta)\left(p_i^{\alpha+\beta-1}\right)\right] = 0 \qquad (7)$$

which gives an optimal price of: $p_i^* = m_i \frac{(\alpha+\beta)}{(\alpha+\beta+1)} \qquad |\alpha| > |1+\beta| \qquad (8)$

We may think of the last expression in (8) as the mark-up such that $\frac{(\alpha+\beta)}{(\alpha+\beta+1)} = (1+\mu)$. Note that this implies that the brand characteristics affect demand, but not the mark-up. We can substitute the optimal price, p_i^*, back into the demand function (4), and after taking logs we have:

$$\ln(x_i^*) = \boldsymbol{\gamma}'\mathbf{c}_i + \beta\phi(1-H_i) + (\alpha+\beta)\ln m_i - (\alpha+\beta)\ln(1+\mu) \qquad (9)$$

4. Data and Empirical Specification

Out theoretical model examines the relationship between demand, market power, brand characteristics and marginal cost. However, since we do not have a measure of the marginal cost of manufacture, we need to use a proxy in our empirical estimation. We use the approximation $(\alpha+\beta)\ln m_i \approx \lambda \ln p_i$ to get:

$$\ln\left(x_i^*\right) = \boldsymbol{\gamma}'\mathbf{c}_i + \beta\phi H_i + \lambda \ln p_i + u \qquad \lambda < 0 \qquad (10)$$

where u is a fixed effect common to all brands in a given category.

The empirical specification used to estimate equation (10) for multiple product categories in multiple time periods can therefore be written as follows:

$$\ln(QUANTITY) = \sum_{j=1}^{10} \gamma_j (CHARACTERISTICS) + \beta\phi(MARKET\ POWER) + \lambda \ln(PRICE) + u$$

$$\begin{aligned} &= \gamma_1 TMAGE + \gamma_2 BRANDDENSITY + \gamma_3 GENERIC + \gamma_4 EFRIENDLY \\ &+ \gamma_5 RECYCLED + \gamma_6 CHARITY + \gamma_7 HEALTH + \gamma_8 AUSFLAG \\ &+ \gamma_9 AUSMADE + \gamma_{10} PRIZE + \beta\phi MARKET\ POWER + \lambda \ln(PRICE) + u \end{aligned}$$

The variable *QUANTITY* is the volume of sales (in kg or litres) of the *i*th brand sold in each month, which was collected for a bundle of 92 brands in 12 product categories sold in the largest supermarkets in Australia over a 39 month period from ACNielsen. We selected product categories (and the brands in each product category) where the quality was relatively constant and homogeneous. By selecting products and brands on this basis, we do not need to include additional variables in the model to account for differences in quality which may affect demand. Price data were also included in the ACNielsen dataset.

Ten branding characteristics were included in the estimation. The variable *TMAGE* was calculated by taking the difference between the current time period and the birth of the relevant trade mark (as reported in IP Australia data). Trade mark age is an important indicator to include in the model since it is an important proxy for consumer loyalty – older brands are more well-known (and therefore more likely to have developed loyal consumers) than newer ones.

The pervasiveness of a brand is proxied by the variable *BRANDDENSITY*, which is the number of brands in a product category in a given month divided by the total sales in the product category in that month (which is then multiplied by 100). This measures the amount of choice consumers have in a given product category. The remaining characteristics are all dummy variables capturing information that the brands signal to consumers (and amongst consumers) about the product's properties. *GENERIC* is a dummy variable which equals 0 if good is a branded product and 1 if it is a private label.

EFRIENDLY is a dummy variable which is 1 if the brand has characteristics which indicate that it is earth friendly, such as whether it contains biodegradable cleaning agents or uses recycled paper (such as in the toilet tissue product category). *RECYCLED* is a dummy variable which is 1 if the brand label indicates that the packaging is made from recycled materials. *CHARITY* is a dummy variable indicating whether the company donates some of the proceeds from the sale to a charitable organisation. *HEALTH* is a dummy variable according to whether the product advertises the fact that it is promoting health conscious attributes such as being low fat or low salt. *AUSFLAG* indicates whether there is some sort of Australian flag or other insignia suggesting that the product is made in Australia, while *AUSMADE* is a dummy variable which is 1 if the product is *certified* as being Australian made by the Australian Made or Ausbuy logo. *PRIZE* indicates whether the label offered entry into a competition. We added *u* a category fixed-effect to represent as all other factors associated with category that may affect demand such as how essential consumers consider the good to be and the normal quantity purchased in a given period. *u* is equal to $\left[\beta\phi-(\alpha+\beta)\ln(1+\mu)\right]$ in equation 9.

Finally, in order to measure the impact of market structure on quantity, we constructed the variable *MARKETPOWER*, which is the square of the value of the firm's sales in each month divided by the square of the total sales in the product category in that month. As such, this measure is a measure of *firm* market power, rather than *brand* market power. In order to calculate this, we had to find out who owned each brand in our bundle of goods, which we did by searching IP Australia's online trade mark database ATMOSS, which provides details on the owner of each registered trade mark.

Descriptive statistics on the population and the sample bundle are presented in Table 1. The average total monthly expenditure in the 12 product categories was $372,672,920, of which the largest expenditure is on milk ($96,400,750) and bread ($88,442,730). The smallest product categories in terms of average expenditure were tomato sauce ($5,640,260) and rice ($8,704,820). There was also quite a lot of variation in the depth of each product category market, which is reflected in the total number of brands in each product category. Some product categories – such as tomato sauce (15) and frozen chips (19) – had relatively few brands, while product categories such as bread had 246 brands. The bundle of goods we have selected accounts for 55.01 per cent of the total monthly

expenditure in these 12 product categories. While there is some variation across the product categories, the brands we have chosen account for more than 50 per cent of total product category expenditure in all but 2 of the categories: laundry liquid (20.02) and salad dressing (47.91). This reflects the fact that even though our bundle contains a small fraction of the total number of brands available, we have included most of the biggest selling brands in each product category.

Table 1 also reports statistics on the market power that each firm has in our sample and the extent of market penetration by generic labels. Market power varied across the 12 product categories in our sample, with the market power index ranging from 0.02 in pasta sauce and laundry liquid to 0.24 in rice. Each of the product categories considered here has varying degrees of penetration by generic goods. Ideally, we would have treated the generic products from both major supermarket chains separately. However, due to commercial sensitivity, the ACNielsen datatset combines these two private labels into one. Nevertheless, total consumption of generic goods is an important component of total expenditure on grocery items: in the frozen chips product category, for example, generics account for 22.73 per cent of total expenditure.

Table 1: Descriptive Statistics by Product Category

CATEGORY	POPULATION			SAMPLE		
	No. Brands	Total Expenditure ($000)[(a)]	Generic Expenditure ($000)[(a)]	No. Brands	Firm Market Power Index	Percentage of Total Expenditure
Bread	246	88,442.73	6,167.65	10	0.07	53.22
Canned Fruit	57	20,576.81	2,179.41	7	0.14	66.27
Tea	102	20,503.67	1,067.46	11	0.04	57.30
Tomato Sauce	15	5,640.26	964.97	5	0.04	85.53
Rice	45	8,704.82	875.66	6	0.24	52.37
Pasta	82	12,048.94	1,479.36	7	0.08	85.97
Pasta Sauce	82	13,170.10	693.09	10	0.02	50.50
Milk	84	96,400.75	13,664.93	4	0.07	56.67
Toilet Paper	36	48,424.76	2,869.68	11	0.06	65.44
Frozen Chips	19	11,637.03	2,645.35	3	0.11	68.33
Laundry Liquid	83	37,298.78	651.19	12	0.02	20.02
Salad Dressing	60	9,824.27	918.20	6	0.04	47.91
Total	**911**	**372,672.92**		**92**	**0.07**	**55.01**

Notes: (a) Monthly Expenditure

Data on the observable characteristics of each brand in the bundle of goods is presented in Table 2. The first observable characteristic is trade mark age. The descriptive statistics indicate that there is considerable variation in the average age of the trade marks of the products in our bundle across product categories. The average age of the laundry liquid trade marks in our bundle, for example, was 18.44 years compared to 50.27 years for tomato sauce. This reflects the fact that the tomato sauce market is fairly stable and mature, and therefore has a few old brands (such as Heinz and Rosella) which dominate the product market. The descriptive statistics on brand density also suggest much variation across product categories. Per hundred thousand dollars of expenditure, there are 0.09 brands in the milk market, whereas the figure for the pasta market is 0.69. This suggests that there is wide variation in the intensity of brand competition across the different product categories included in our sample.

Table 2: Characteristics by Product Category

CATEGORY	Trade Mark Age (Years)	Brand Density	Generic	Earth Friendly	Recycled	Charity	Health	Aust Flag	Aust Made	Prize
Bread	15.91	0.28	1	1	0	0	4	2	0	0
Canned Fruit	32.20	0.28	1	0	6	1	1	4	0	0
Tea	39.64	0.50	1	2	3	1	0	3	0	3
Tomato Sauce	50.27	0.27	1	0	2	0	1	1	2	0
Rice	19.85	0.52	1	0	1	0	2	3	0	0
Pasta	26.47	0.69	1	0	2	0	2	1	0	0
Pasta Sauce	21.39	0.62	1	0	4	1	1	4	0	0
Milk	35.03	0.09	1	0	1	0	1	0	0	0
Toilet Paper	22.31	0.07	1	4	3	0	1	4	1	2
Frozen Chips	38.22	0.17	1	0	0	0	2	0	0	0
Laundry Liquid	18.44	0.22	1	4	3	0	2	7	0	1
Salad Dressing	26.18	0.68	1	0	0	1	3	1	1	0
Total	**26.83**	**0.37**	**12**	**11**	**25**	**4**	**20**	**29**	**4**	**6**

Table 2 also presents information on the dummy variables included in the empirical model. Specifically, it presents information on how many brands in each of the product categories have the signalling characteristics we identified as being important. The data reveal that all product categories have a generic label, that 25 brands are made from recycled materials and that 29 brands have an Australian flag or other nationalistic insignia. Of some concern is the small number of products that are Australian Made, that advertise a prize or donate money to a charitable organisation. However, there is a good spread of the observable characteristics across most of the product categories (i.e. they don't appear to be clustered in specific product categories). Take the *HEALTH*

characteristic, for example, where all product categories except tea have at least one brand which promotes itself as being health conscious.

5. Results

We present results for two different models: Model 1 using an instrumented variable fixed-effects regression – where product category is the fixed effect – and Model 2 using Ordinary Least Squares. The instrumented variables used in Model 1 are *PRICE* and *MARKETPOWER* which were instrumented using the following: the set of brand characteristics, the lag of itself and a few macroeconomic variables such as the consumer price index and the consumer sentiment index to account for business cycle effects. Both of the models provide consistent results, but the results of the instrumented variable method seem to produce more statistically significant coefficients and so the results of this model will be discussed in more detail.

The results of both models are presented in Table 3. The total number of brand-month observations in the sample bundle is 3,588 (92 brands across 39 months); although some observations had to be dropped from each of the models. The dependent variable in each estimation is quantity, so the estimation enables us to examine the effects of various regressors on the demand for a given product. The effect of price on demand was negative and highly significant. As expected *a priori*, this suggests that lowering the price of a product of given quality results in increased demand. The variable *PRICE* is a simple price elasticity of demand, which we interpret as follows: increasing price by 1 per cent causes a 2 per cent reduction in demand. The effect of market concentration – as measured by our variable *MARKETPOWER* – on demand also confirms a standard finding: firms with greater market power in a given product category are able to positively influence the demand for their product.

Much of the focus of this paper is on the effects of brand characteristics on demand for goods. While firms chose their branding characteristics based on their perceptions of market preferences during the reference period, their choices are not always vindicated *ex post.* Table 3 presents the estimated effects for the three brand-related factors: brand loyalty, product choice and product signals. Brand loyalty – which is proxied here by the

age of the trade mark (*TMAGE*) – is positively and significantly related to demand. In other words, there is some evidence to suggest that consumer loyalty matters: the older is the trade mark associated with the brand, the more likely is the consumer to buy the product. The extent of product choice, however, is negatively related to demand. The negative sign on the coefficient for the variable *BRANDDENSITY* suggests that product categories with fewer real choices amongst competing brands (as measure by the number of brands divided by the total sales value) will increase demand for a given brand.

Table 3: Fixed-Effects Regressions of Product Characteristics on Quantity

	Model 1			Model 2		
Dep. Var: ln(*QUANTITY*)	**Coef.**		**z**	**Coef.**		**t**
ln(*PRICE*)	-2.837	***	-13.36	-1.154	***	-16.5
Market Power						
MARKETPOWER	7.837	***	29.67	8.134	***	34.16
Brand Characteristics						
Consumer Loyalty						
TMAGE	0.109	***	9.60	0.104	***	10.1
Product Choice						
BRANDDENSITY	-0.958	***	-3.45	-0.763	***	-3.08
Labelling Features						
GENERIC	0.771	***	6.72	1.497	***	21.15
EFRIENDLY	-0.753	***	-8.54	-0.701	***	-8.61
RECYCLED	0.679	***	10.72	0.721	***	12.51
CHARITY	1.965	***	15.84	1.574	***	15.05
HEALTH	0.359	***	5.13	0.094		1.31
AUSFLAG	-0.748	***	-11.7	-0.453	***	-9.14
AUSMADE	0.854	***	6.96	1.048	***	9.3
PRIZE	-0.499	***	-4.56	-0.146		-1.48
Constant	9.612	***	20.09	5.922	***	31.22
Estimation method	IV			OLS		
Rho	0.894			0.434		
R squared – within	0.392			0.480		
- between	0.849			0.836		
- overall	0.629			0.692		
n	3270			3454		

Notes: *** statistically significant at the 1 per cent level.

Other important results in Table 3 relate to the effect of specific observable brand characteristics on demand. The signs of these variables were largely as expected *a priori*: products promoting their health conscious aspects (such as low fat/low salt), those products which were made from recycled materials, and those products which were

certified as being Australian Made all were positively related to demand. There were, however, a couple of surprising results. For example, earth-friendly and the non-certified Australian-Made symbols had a negative impact on the demand function. The other surprising result relates to the sign on the coefficient on the variable *GENERIC*, which we expected to be negative. However, our results suggest that generic products are not regarded as inferior goods: rather, being generic increases demand for the product. This might reflect the fact that many independent reports by consumer groups (such as the Australian Consumers' Association), have compared the quality of generic and branded goods and have generally concluded that generic products are not substantially lower in quality.

6. Conclusions

This article examines the factors affecting demand for retail grocery items in Australia. In particular, we attempted to analyse the effects of the observable characteristics of brands on demand. In order to address these issues, we collected monthly data from ACNielsen on a bundle of 92 brands in 12 product categories from major supermarket stores across Australia over the period February 2002 to January 2005. These data provide measures of prices, quantities sold and concentration in product category markets. We also hand-collected data on the characteristics of each brand such as whether the product is environment-friendly or is a private label.

The results support some standard findings: for example, we find that our estimate the price elasticity of demand is negative and that market power is an important determinant of demand. With regard to other observable product attributes, we find that certain characteristics – such as whether the product is certified as being Australian Made, is a generic product or is health conscious – have a positive effect on demand. However, somewhat surprisingly, environmentally friendly goods had a negative effect on demand. Overall, this suggests that firms are able to affect their demand curves through product differentiation strategies, in addition to the more standard methods such as through increasing market share.

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