Store brand penetration: the role of advertising

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March 2014
Motivation

- Interest in the product offering of retailers:
  - what determines retailers’ advertising and pricing decisions over store brands?
Store and national brands
Motivation

• Interest in the product offering of retailers:
  • what determines retailers’ advertising and pricing decisions over store brands?
  • regulators have expressed concern about the impact of store brand products on competition

• Why do retailers introduce store brand products?
  • IO literature: store brands can increase retailer bargaining power in negotiations with manufacturers
  • Marketing literature: allows retailers to price discriminate
Contribution

- Model retailers’ and manufacturers’ pricing and advertising decisions over store and national brands:
  - much of literature assumes that national brands are heavily advertised; but we allow for advertising of store brands
- We endogenise the advertising decisions of retailers and manufacturers:
  - incentives depend on how advertising affects demand
  - show that under certain circumstances, retailers may want to advertise their store brands more than national brand manufacturers
- Develop a number of predictions to take to data
Summary of model

- Hotelling framework in which we assume there is one store brand and one national brand
- Key parameters are how advertising affects demand:
  - **Rivalrous effect**: makes advertised product more attractive relative to the other product
  - **Expansionary effect**: makes both products more attractive, regardless of which product is advertised
- Assume that in the absence of advertising, SB and NB are equally attractive
Descriptives

- Data from Kantar Worldpanel: records all grocery purchases (food, drink, toiletries, household products etc.) for a representative panel of British households

- Stylized facts:
  - market share of store brands stable over time
  - big variation by product category
  - and by retailer type
Stable across time

![Chart showing market share of store brands from 2005 to 2012, with all years having a similar share near 1.0.](chart.png)
Differences across product category
Setup

- Two varieties of a good positioned at opposite ends of Hotelling line:
  - $i = 1$ is the store brand (SB)
  - $i = 2$ is the national brand (NB)
- Produced at constant marginal cost, $c$
- Three players; choices:
  - Retailer chooses advertising of store brand
  - NB manufacturer chooses advertising of national brand
  - Manufactures choose wholesale prices
  - Retailer sets retail prices of both

- Assume that the retailer is a local monopolist
- Assume market covered and some of both goods is bought
Timing

• Three stage game:
  1. NB manufacturer and retailer simultaneously set advertising levels, $(a_1, a_2)$
  2. NB and SB manufacturers simultaneously set wholesale prices, $p_i^w$, $i \in \{1, 2\}$
  3. Retailer sets retail prices, $p_i^r$, $i \in \{1, 2\}$

• Timing of moves is common in the literature and reflects the fact that brand image is built over a long period and cannot easily be adjusted to retail pricing decisions
  • advertising of store brand is less common
Consumer utility and advertising

- Utility of a consumer, with taste characteristic, \( x \) (distributed uniformly on unit interval) of buying a unit of variety \( i \) is given by:

\[
U_i(x) = V_i - p_i^r - \tau|x - (i - 1)|
\]

where

\[
V_i = \nu + \rho a_i + \xi(a_i + a_{-i})
\]

- Parameters:
  - \( \tau \) is perceived product differences parameter
  - \( \nu \): innate valuation
  - \( \rho \): parameter denoting rivalrous effect of advertising
  - \( \xi \): parameter denoting expansionary effect of advertising

- Variables:
  - \( p_i^r \) is retail price of variety \( i \)
  - \( a_i \) advertising level of variety \( i \)
Payoffs

• Let $x_1$ denote the value of $x$ such that $U_1(x) = U_2(x)$

• Retailer’s profit, where $\sigma$ is market share of retailer:

\[ \Pi^R = \sigma [(p_1^r - p_1^w) x_1 + (p_2^r - p_2^w)(1 - x_1)] - a_1^2 \]

• Manufacturers’ profits:

\[ \Pi^{M,1} = \sigma (p_1^w - c)x_1 \]
\[ \Pi^{M,2} = (p_2^w - c)(1 - x_1) - a_2^2 \]

• Solve for subgame perfect equilibrium prices, advertising and SB share
Subgame perfect equilibrium

Retail prices:

\[ p_i^r = \frac{4\xi (a_i + a_{-i}) + \rho (3a_i + a_{-i}) + p_i^w - p_{-i}^w - 2\tau + 4\nu}{4}, \quad i \in \{1, 2\} \]

Wholesale prices:

\[ p_i^w = \frac{3c + \rho (a_i - a_{-i}) + 6\tau}{3}, \quad i \in \{1, 2\} \]

Advertising:

\[ a_1 = \frac{\sigma \left[ \rho^2 (3\xi + 2\rho) - 54\tau (2\xi + \rho) \right]}{3\rho^2 (\sigma + 2) - 216\tau}, \quad a_2 = \frac{\rho (\rho \sigma (3\xi + 2\rho) - 36\tau)}{3\rho^2 (\sigma + 2) - 216\tau} \]

Store brand market share:

\[ x_1 = \frac{\rho^2 (\sigma - 2) + 3\xi \rho \sigma + 36\tau}{72\tau - \rho^2 (\sigma + 2)} \]
Difference in perceived attractiveness of the two varieties

- The bigger the difference in $V_1 - V_2$, the less competitive the wholesale market becomes, increasing the wholesale prices the manufacturers can charge.
- Differences in $V_1 - V_2$ make it possible for the retailer to differentiate prices based on product popularity.
- Strength of these incentives depends on how advertising affects demand i.e. the relative magnitude of $r$ and $g$. 

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Rivalrous versus expansionary effects of advertising

1. If effect of advertising is mainly rivalrous:
   - retailers economise on advertising of their SB: at equal prices, a larger share of consumers would opt for the NB
   - retailers increase prices of the popular NB, while decreasing those of the SB variety, leading to increased profits

2. If effect of advertising is mainly expansionary:
   - advertising by the NB manufacturer will be small due to free riding
   - the retailer will capture most of the benefit of advertising: can increase retail prices on both varieties, but competition in wholesale prices won’t be relaxed
   - SB variety might be advertised to the point where it is more attractive than the NB variety
Prediction: market share of store brand
Prediction: advertising differential

Rivalrous effect, $\rho$

Expansionary effect, $\xi$

Advertising differential, $a_1 - a_2$

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Prediction: price differential

\[ p^r_1 - p^r_2 \]

- Rivalrous effect, \( r \)
- Expansionary effect, \( x \)
- Price differential, \( p^r_1 - p^r_2 \)

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Empirical approach

- Data from:
  - Kantar Worldpanel: on store brand market shares across categories and retailers
  - A.C. Nielsen Digest of Advertising: records all brand level advertising expenditure in the UK

- Predictions:
  - in categories in which we observe high retailer advertising (relative to NB manufacturer advertising), we expect the expansionary effect of advertising to dominate
  - we therefore expect there the store brands to have a higher market share in these categories
1. Retailer market share, $\sigma$:

- large retailers can enjoy significant spill-over effects due to their advertising positively affecting the demand for the whole category
- so we would predict that larger stores will have higher SB market share
### Differences across retailer type

<table>
<thead>
<tr>
<th></th>
<th>Market share of store brands (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Big 4</strong></td>
<td></td>
</tr>
<tr>
<td>Asda</td>
<td>41.19</td>
</tr>
<tr>
<td>Morrisons</td>
<td>37.98</td>
</tr>
<tr>
<td>Sainsbury</td>
<td>43.16</td>
</tr>
<tr>
<td>Tesco</td>
<td>41.47</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Smaller, higher value</strong></td>
<td></td>
</tr>
<tr>
<td>Marks + Spencers</td>
<td>98.53</td>
</tr>
<tr>
<td>Waitrose</td>
<td>47.48</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Smaller, discounter</strong></td>
<td></td>
</tr>
<tr>
<td>Aldi</td>
<td>88.34</td>
</tr>
<tr>
<td>Lidl</td>
<td>70.49</td>
</tr>
<tr>
<td>Netto</td>
<td>19.73</td>
</tr>
</tbody>
</table>
Extensions I

1. Retailer market share, $\sigma$:
   - large retailers can enjoy significant spill-over effects due to their advertising positively affecting the demand for the whole category
   - so we would predict that larger stores will have higher SB market share

2. Vertical integration between retailer and store brand manufacturer:
   - wholesale price of the SB remains equal to cost, regardless of the relative attractiveness of the SB
   - retailers can also use this to indirectly put pressure on NB manufacturers to reduce wholesale prices
Summary and conclusions

- Develop a model to study the advertising and pricing decisions of retailers and manufacturers over store and national brands.
- Allow for wholesale price negotiation between retailers and manufacturers.
- Endogenise the advertising decisions, and compare equilibrium outcomes under different effects of advertising:
  - More rivalrous: expect to see small market shares of store brands.
  - More expansionary: expect to see more heavily advertised store brands with bigger market shares.
- Prediction robust, in general, to a number of extensions of the model.
- Plan to test predictions empirically.