Estimating Price Rigidity in Vertically Differentiated Food Product Categories with Private Labels

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Background

- Rapid emergence of private labels (PL) → new and stiff competition for manufacturers of national brands (NB).
- Market share of PLs 2009

<table>
<thead>
<tr>
<th>Country</th>
<th>Salad dressing</th>
<th>Bacon</th>
<th>Milk</th>
<th>Margarine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switzerland</td>
<td>42%</td>
<td>28%</td>
<td>14%</td>
<td>11%</td>
</tr>
<tr>
<td>Germany</td>
<td>32%</td>
<td>24%</td>
<td>16%</td>
<td>14%</td>
</tr>
<tr>
<td>France</td>
<td>28%</td>
<td>25%</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td>Canada</td>
<td>22%</td>
<td>24%</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td>Australia</td>
<td>18%</td>
<td>24%</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td>Chile</td>
<td>14%</td>
<td>24%</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td>Brazil</td>
<td>10%</td>
<td>24%</td>
<td>12%</td>
<td>14%</td>
</tr>
</tbody>
</table>


- Agri-food industrial organization literature has paid limited attention to the new differentiated PL product lines and the deeper analysis of role of wholesale prices.
- Relatively constant prices despite changes in demand and costs → Prices change gradually because of price adjustment costs (Blinder et al., 1998).
- Variation of retail prices rather explained by price promotions than by changes in costs (Hosken and Reiffen, 2004).
- Kumar and Steenkamp (2007) divided PLs into:
  - Generics: low price, standard quality, no advertising
  - Copycat: price below and quality/packaging close to brand leader, frequent price promotions
  - Premium: price and quality close or higher than leading brand, source of differentiation, limited price promotions, higher margins
- Assumption: Price rigidity (PR) higher for PLs than for NBs
  → PR_{Premium} > PR_{Generic} > PR_{Copycat}

Objectives

- Quantifying the impact of the different types of PLs on price rigidity.
- Analyzing the impact of wholesale prices on price rigidity across products and categories.

Data

- Case study analysis:
  - Weekly store level scanner data from 2004/W1 – 2007/W22
  - Major U.S.-Canadian retail chain
  - 70 stores across Canada
  - Two case studies:
    - Packaged side bacon and bottled salad dressings

Bacon: retail price variability > wholesale price variability

Price in CAD/100 g

Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bacon</th>
<th>Salad dressings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS(*)</td>
<td>Probit(*)</td>
</tr>
<tr>
<td></td>
<td>OLS(*)</td>
<td>Probit(*)</td>
</tr>
<tr>
<td>PL_{G}</td>
<td>0.091***</td>
<td>-0.066**</td>
</tr>
<tr>
<td>PL_{C}</td>
<td>0.109***</td>
<td>-0.186***</td>
</tr>
<tr>
<td>PL_{P}</td>
<td>0.021***</td>
<td>-0.060***</td>
</tr>
<tr>
<td>SP_{w}</td>
<td>-0.035***</td>
<td>-</td>
</tr>
<tr>
<td>PROMO</td>
<td>-0.490***</td>
<td>-0.358***</td>
</tr>
</tbody>
</table>

Methods

1) Double-log regression model of price rigidity:

\[ PR = f(PL_{G}, PL_{C}, PL_{P}, SP_{w}, Z) \]

2) Probabilistic model of retail price adjustment:

\[ Y(\Delta P_{t+1}) = f(PL_{G}, PL_{C}, PL_{P}, \Delta P_{w}, \Delta P_{w-2}, \Delta P_{w-3}, Z) \]

Conclusions

- Wholesale prices more rigid than retail prices → high price variation due to sales.
- Rigid wholesale prices provide evidence for long term contracts.
- Salad dressings: Higher PR for all types of PLs. Bacon: Marginal effect and no consistent results for the types of PLs.

References


Selected results of estimation coefficients marginal effects of probability **99.9 % significance level.

- If \( SP_{w} \) increases by 1 %, PR decreases by 0.035 %: → Marginal effect.
- If \( \Delta P_{w} \) immediately or in following week passed.
  - PR differs across categories and quality levels: → Salad dressings: 98.6 % higher for PL, 134.7 % for PL compared to NBs.
  - Bacon: PR of PL lower than PR of NBs in the regression and effects are marginal.