Approximating diversion ratios for retail chain mergers

Presentation to CRESSE European Conference on Competition & Regulation, 5 July 2008

Chris Walters*

Assistant Director, Mergers

*Views expressed are mine only
Overview

- Econometric methodology based on Somerfield/Morrisons (2005) for approximating diversion ratios to measure competitive effects of local retail mergers

- Apply methodology to two recent (2006) local retail mergers examined by OFT and CC: Vue/Ster (cinemas) and Waterstone’s/Ottakar’s (book stores)

- Suggest some thresholds against which predicted diversion ratios can be judged
Background

- Local retail mergers tend to have been examined by OFT/CC using isochrone/fascia count/market share rules

- E.g. supermarkets, book stores, cinemas, pharmacies, bingo halls, off-licences, licensed betting offices, funeral homes, pubs

- This methodology is convenient but may be unrealistic. Alternative?

- Diversion ratios—closeness of competition
Diversion ratios

- Diversion ratio from A to B represents proportion of revenue from A’s customers who would choose B as their second choice as opposed to C or D (cross-\(p_B\) to A/own-\(p_A\))

- In an undifferentiated/equidistant market, diversion ratios match market shares: if A, B and C each have 33% shares, the diversion ratio from A to B is 50% (33%/66%)

- In differentiated single-good Bertrand model, diversion ratios may be combined with margins to ‘predict’ post-merger price increases
**Somerfield/Morrisons (2005)**

- Completed acquisition by Somerfield of 115 geographically non-contiguous, mostly mid-range supermarkets from Morrisons

- Isochrone/fascia count/market share rules suggested acquisition of 56 of these supermarkets potentially problematic

- Survey of 5,400 shoppers at these stores asking for second choice supermarket
Survey results

Chart 29: Store would have used instead if would have used another supermarket or convenience store

- Tesco: 23%
- Asda: 19%
- Sainsbury’s: 12%
- Co-op: 9%
- Somerfield: 10%
- Morrison: 10%
- Kwiksave: 2%
- Lidl: 2%
- Spar: 2%
- Iceland: 2%
- Netto: 2%
- Other*: 7%
- Don’t know: 1%

* No other individual mention more than 1%

Base: Those who would have shopped at another supermarket or convenience store (4,116)
Approximating diversion ratios

- Diversion ratios can be laborious to measure, e.g. with customer surveys, especially at phase 1
- Can they be approximated using the traditional isochrone/fascia count/market share methodology?
- Econometric model relating diversion ratios to such local market characteristics
Pseudo-ML fractional logit model

- Diversion ratios (d) are non-negative and cannot exceed 1, therefore usual to assume they are generated by a model \( d = \frac{1}{1 + \exp(-x\beta)} \)

- Logit transformation gives \( \ln\left[\frac{d}{1-d}\right] = x\beta \), which can be estimated by OLS

- However, 8 diversion ratios in sample are 0, so preserve these by using pseudo-ML estimator instead of OLS (Papke & Wooldridge, 1996)
Pre-merger independent variables

- Diversion ratios implied by market shares
- Number of proximity stores in isochrone
- Drive time to nearest proximity store
- Number of competing fascias
# Results (marginal/partial effects)

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>dy/dx</th>
<th>Std. Err.</th>
<th>z</th>
<th>P &gt; z</th>
<th>X*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of proximity stores</td>
<td>0.027</td>
<td>0.008</td>
<td>3.25</td>
<td>0.001</td>
<td>1</td>
</tr>
<tr>
<td>Urban dummy†</td>
<td>0.048</td>
<td>0.022</td>
<td>2.23</td>
<td>0.026</td>
<td>1</td>
</tr>
<tr>
<td>Drive time to closest proximity store</td>
<td>-0.000</td>
<td>0.003</td>
<td>-0.13</td>
<td>0.899</td>
<td>4.8</td>
</tr>
<tr>
<td>Urban dummy X proximity drive time</td>
<td>-0.014</td>
<td>0.006</td>
<td>-2.37</td>
<td>0.018</td>
<td>3.0</td>
</tr>
<tr>
<td>Diversion ratio from pre-merger market shares</td>
<td>0.183</td>
<td>0.067</td>
<td>2.73</td>
<td>0.006</td>
<td>0.1</td>
</tr>
<tr>
<td>Number of pre-merger competing fascias</td>
<td>-0.030</td>
<td>0.012</td>
<td>-2.46</td>
<td>0.014</td>
<td>3</td>
</tr>
</tbody>
</table>

†For discrete change from 0 to 1.

*Value of independent variable at which marginal effect is calculated (generally mean or median of independent variable).
Predicted and actual diversion ratios
Discussion

- Model appears to over-predict low diversion ratios (<20%) and under-predict high diversion ratios (>20%)
  - Could add other independent variables but would competition authority have these ex ante?
- Further, is this over- and under-prediction an issue from the perspective of the competition authorities?
Extension

● Simultaneity between diversion ratio and number of competitors?
  - Customers come to supermarkets but supermarkets locate where customers are

● Instrument number of proximity stores and fascia count with population in isochrone, number of car parking spaces and store size, using 2-step procedure of Wooldridge (2005)

● Results essentially unaltered
Sensitivity analysis

- Apply model to data on explanatory variables from Vue/Ster (cinemas) and Waterstone’s/Ottakar’s (book stores)

- Both comparable to supermarkets in terms of multi-product nature, differences in store size, small number of large players

- But unitary demand for cinemas, and book stores are not destinations
Vue/Ster (2006)

- In April 2005, Vue acquired 6 Ster multiplex cinemas
  - No national concerns
  - Local overlaps in Basingstoke, Edinburgh, Leeds and Romford

- OFT examined fascia counts of multiplexes and market shares in 20-minute drivetime isochrones
  - Found possible problems in Basingstoke, Leeds and Romford

- CC examined 4 overlaps on a case-by-case basis
  - Found problem only in Basingstoke and Vue divested the acquired cinema
## Results for Vue/Ster

<table>
<thead>
<tr>
<th>Locality</th>
<th>Market shares</th>
<th>Implied diversion ratio</th>
<th>Proximity</th>
<th>Predicted diversion ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local</td>
<td>National</td>
<td>Local</td>
<td>National</td>
</tr>
<tr>
<td>Basingstoke (urban)</td>
<td>47</td>
<td>53</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Cardiff (urban)</td>
<td>25</td>
<td>0</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Edinburgh (urban)</td>
<td>15</td>
<td>16</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Leeds (urban)</td>
<td>13</td>
<td>9</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Norwich (rural)</td>
<td>31</td>
<td>0</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Romford (urban)</td>
<td>100</td>
<td>0</td>
<td>14</td>
<td>2</td>
</tr>
</tbody>
</table>

(Note: The Predicted diversion ratio for Basingstoke (urban) is calculated as 65.2.)

- **Market shares**: Local and National market shares for Vue and Ster.
- **Implied diversion ratio**: Implied diversion ratio based on market shares.
- **Proximity**: Proximity measures such as Number, Drivetime, and Fascias.
- **Predicted diversion ratio**: Predicted diversion ratio calculated from the implied diversion ratio.
In September 2005, Waterstone’s announced it intended to acquire 141 Ottakar’s book stores
- No national concerns
- 33 local overlaps (within 1 mile on high street)

OFT analysis emphasized degree of direct competition between Waterstone’s and Ottakar’s on non-price factors

CC cleared merger unconditionally given no difference in range or service quality between overlap and non-overlap stores
- CC surveyed customers at 33 overlap locations and 40 comparable non-overlap locations
- Obtained diversion ratios at 33 overlap locations
Results for Waterstone’s/Ottakar’s
Three sources of possible thresholds

First, from increment to HHI ($\Delta$) per OFT Merger Guidelines

For HHI of 1,000, $\Delta$ of 100 problematic
  - Implies 7.6% threshold (7.1%/92.9%)

For HHI of 1,800, $\Delta$ of 50 problematic
  - Implies 5.3% threshold (5%/95%)
Thresholds for diversion ratios (2/3)

● Second, from previously used fascia count rules

● OFT and CC previously have used 5-to-4 and 4-to-3

● Symmetric 5-to-4 merger implies 25% threshold (20%/80%)

● Symmetric 4-to-3 merger implies 33% threshold (25%/75%)
Thresholds for diversion ratios (3/3)

- Third, from CC Merger Guidelines, combined market share of 25% potentially problematic

- Combined symmetric 25% market share implies 14.3% threshold (12.5%/87.5%)

- Not equivalent to 8-to-7 fascia count as nothing assumed about market shares non-merging firms
Further extensions

- Latent class model?

- Pool samples for Somerfield/Morrisons and Waterstone’s/Ottakar’s?
Conclusions

- Diversion ratios can be approximated using traditional rule-of-thumb isochrone/fascia count/market share rules
- Model predicts sensible diversion ratios in 25 cases out of 37, when applied to *Vue/Ster* and *Waterstone’s/Ottakar’s*
- Several important caveats and possible extensions, however