Entry under quality uncertainty: lessons from supermarkets

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Competition and strategies in the retailing industry

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Motivation

The usual regulationpolicyofentrybarriers

- Entry barriers in supermarket industry is a common policy.
- Effects of entry regulation? Based on “european” vision of Competition Policy (equity *vs* efficiency).
- Canary Islands (Spanish autonomous community) have developed own legal restrictions on retail entry (based on population and surface area of incumbents).
- A German hard discount (LIDL) entered in this market

Main objective: (how)has LIDL changed prices in this industry?

Motivation

WhyisthereanuncertaintybyLIDL´sentry?

- LIDL wanted to enter in Canary Islands but…..itneededtofighta legal battle. Five years later, LIDL won.
- To placate local sensitivities, LIDL announced (in 2006) that it might enter as a traditional supermarket rather than a hard discount one.
- For incumbents there was **uncertainty** as to the characteristics and product variety that the future entrant would offer.
- Finally, LIDL enter (2010) as a hard discount one, but it does not offer all products.

Supermarket industry

Literaturereview

- Decissiontoentry(Cotterill and Haller, 1992; Daunfelt et al, 2010)
- Entrybarriers and prices(Griffith and Harmgart, 2008)
- Employment(Bertrand andKramarz, 2008; Griffith and Harmgart, 2008)
- Dynamic of entry(Foster et al, 2006)
- Effects of mergers(Nishida, 2008; Gómez-Lobo and González, 2009)
- Wal-Mart: effectsonlabour, exits, localizationorprices(Basker, 2005a; Matsa, 2009; Jia, 2008, Zhu and Singh, 2009; Basker, 2005b; Hausman and Leibteg, 2007; Basker and Noel, 2009)

Supermarket industry

Literaturereview (2)

- Entry´seffectsonprices:

Author	Country	Year	Entry's effect on prices
Basker (2005b)	USA	1982-2002	1.5%/3% (s.r.) 7%/13% (l.r.)
Hausman and Leibteg (2007)	USA	1998-2003	25%*
Liria, Rivero and Vergara (2007)	Chile	1998-2004	7%-11%
Basker and Noel (2009)	USA	2001-2004	1%-1.2%
Abe and Kawaguchi (2010)	Japan	2000-2007	0.4%-3.1%

Moderate price reductions after new competitor entry

Model

Entrantunderqualityuncertainty: periods

t_0 Entrantannouncesitsentrydecision (LIDL won legal battle).

t_1 *Interimperiod*: theincumbent decide pricetocharge (customerfidelity and crediblethreat). Incumbentdoesn´tknowwhatproductsentrantwilloffer.

t_2 Entrant and incumbent compete in priceswithdifferentiatedproducts(A, B). Incumbent´sbenefitsdependsonprices in t_1. Demandandcostofsupplyingproduct A and B are independent

Model (2)

Pricingdecision

*Pricingdecision of theincumbentifthereis**no**entry*

- Incumbentsmaximize:

$$\pi = \pi_A^1\left(p_A^1\right) + \pi_B^1\left(p_B^1\right) + \delta \cdot \left[\overline{\pi}_A^2\left(p_A^1\right) + \overline{\pi}_B^2\left(p_B^1\right)\right]$$

- Nomenclature: 1,2.- Period; A,B are products; π istheprofit of theincumbent; δisdiscount factor.

- Customerfidelityimpliesthat: $\frac{\delta\overline{\pi}_j^2}{\delta p_j^1} < 0$

Result: $$\frac{\delta\pi_j^1}{\delta p_j^1}\left(\tilde{p}_j^1\right) > \frac{\delta\pi_j^1}{\delta p_j^1}\left(\tilde{p}_j^1\right) + \delta \cdot \frac{\delta\overline{\pi}_j^2}{\delta p_j^1}\left(\tilde{p}_j^1\right) = 0$$

Model (3)

Pricingdecision

Pricingdecision of theincumbentifthereisentry

- Incumbentmaximizes:

$$\pi = \pi_A^1\left(p_A^1\right) + \delta \cdot \pi d_A^2\left(p_A^1\right) + \delta \cdot \left[\alpha \cdot \overline{\pi}_B^2\left(p_B^1\right) + \left(1-\alpha\right) \cdot \pi d_B^2\left(p_B^1\right)\right]$$

- Nomenclature: α probabilityentrantwillsellonlyproducts A.

- Fromf.o.c. ($\frac{\delta\pi}{\delta p_A^1}$ *and* $\frac{\delta\pi}{\delta p_B^1}$), weobtaintworesults (next slide):

Model (4)

Pricingdecision

Pricingdecision of theincumbentifthereisentry (2)

-Pricesfor A (anditisthesameforB)withentrywill be lowerthanwithoutentryif :

$$\frac{\delta \pi d_A^2}{\delta p_A^1} < \frac{\delta \overline{\pi}_A^2}{\delta p_A^1} < 0 \quad \forall \; p_A^2 \Leftrightarrow \hat{p}_A^1 < \tilde{p}_A^1$$

- Once uncertaintyis resolved, incumbent compite in allproducts, whichyieldstobothpricesremainconstantorfall.

Model(5)

Pricingdecision

Pricing decision of the incumbent if there is entry (3)

-…orto compete only in A, which may increasepricesfor B. In this case, prices in thesecondperiod are set optimally so that:

- Whichrequiresthat:

Conclusion: incumbent reduce pricesforallproductsafterannouncement and, once uncertaintysolved, itonly competes in product A.

Database

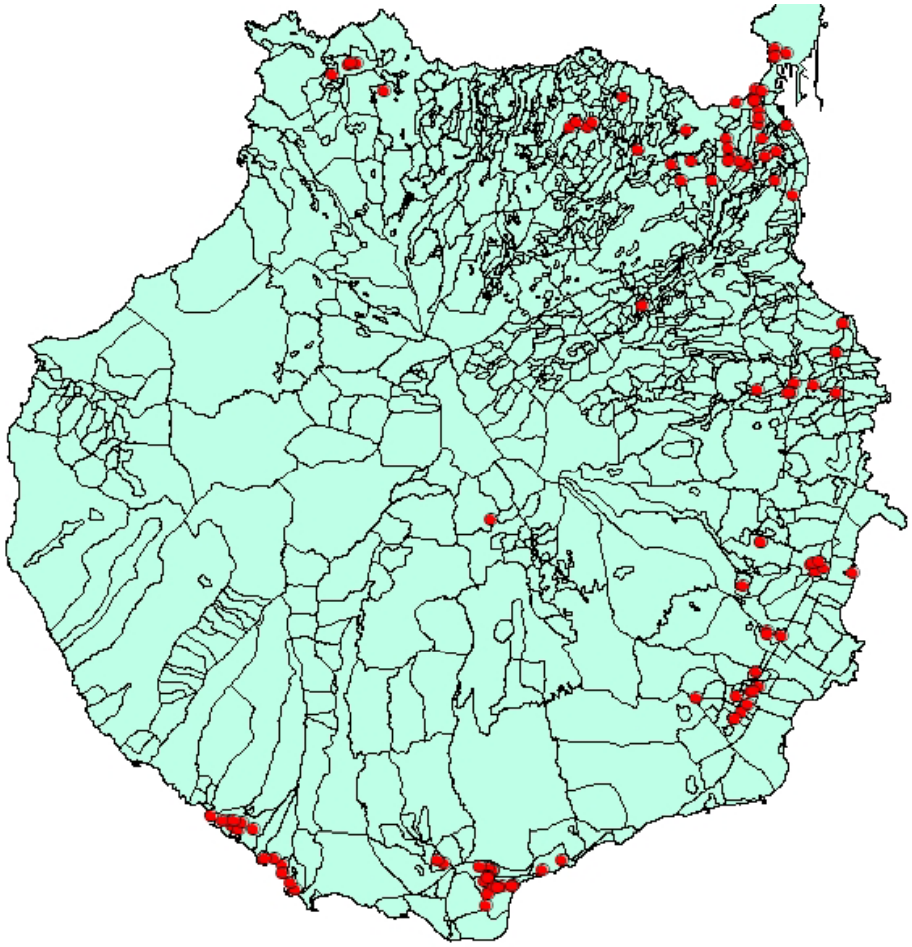
Specialsurvey

- **Sample:**
  - 2weeks (Januaryandapril 2010).
  - 30 basicproducts
  - All supermarkets >2000 m^2
  - Stratifiedrandomsampleforretailers< 2000 m^2.

- **Methodology:**
  - Wegeorreferentiatedall supermarkets.
  - Populationsurrounded supermarkets in a radius 250 to 1950 meters (distanceincrease by 50 meters).
  - Numberofretailers in thoseradius (ownandrivals).

Grocery retail market

Geographicalanalysis of retailers

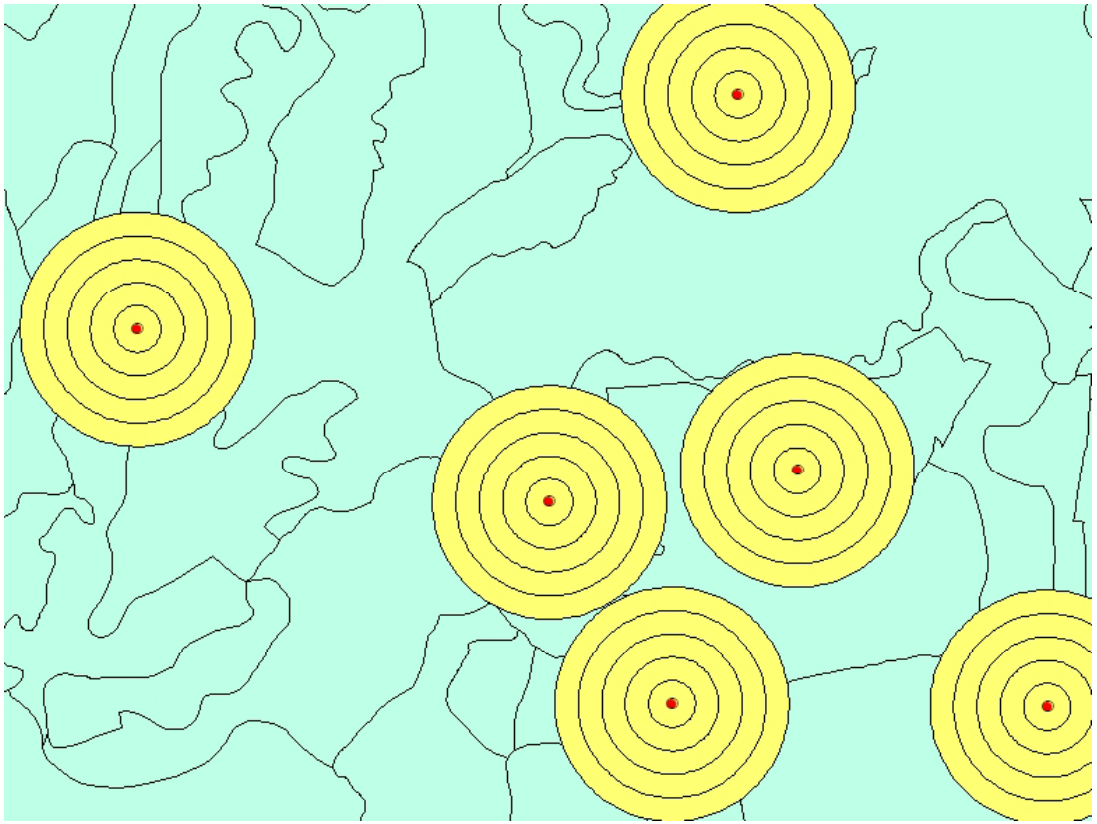


Characteristics:

1. Citieswithpopulation> 15,000 inhabitants (10 out of 21 cities; 90% population).
2. Total retailers: 760.
3. Sample= 112+4 (LIDL). Itis 15% of total population. Sampled error < 5%
4. Red points are sampledretailers.

Grocery retail market

How to calculate data on `relevant´ market?



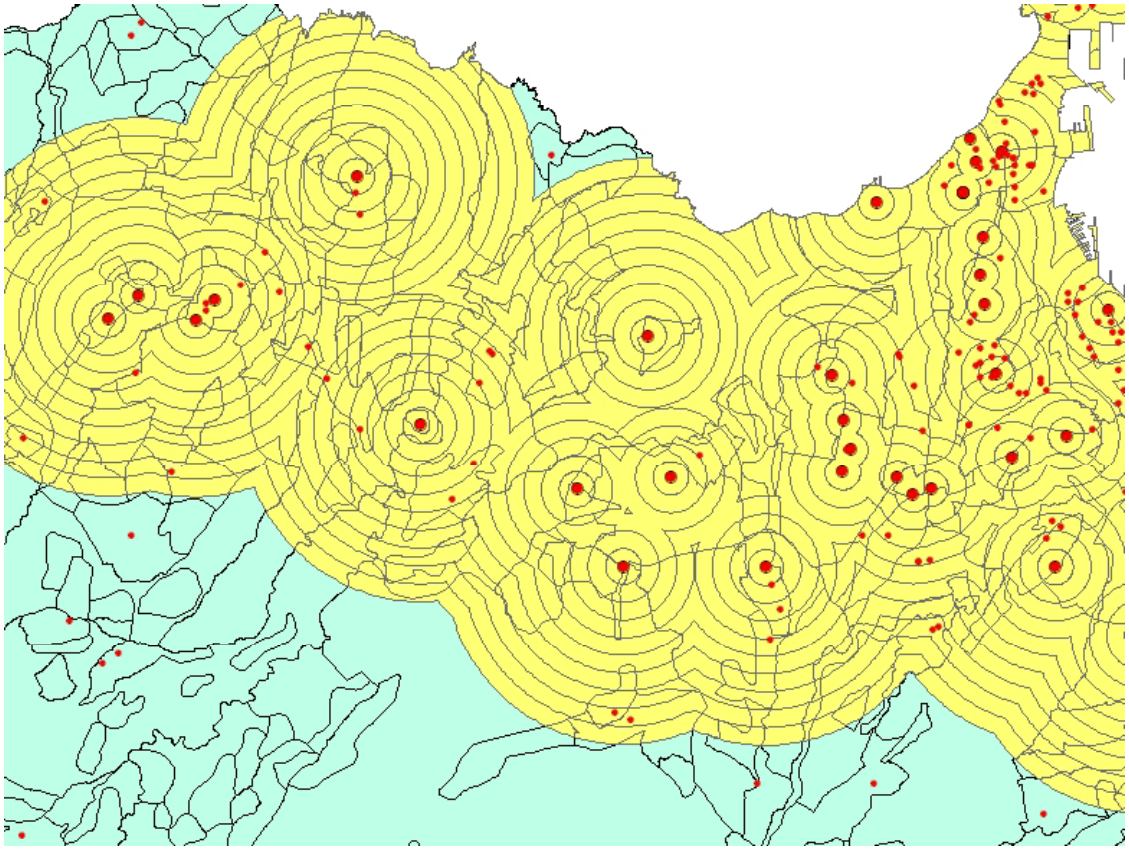
Example: North-westzoneof capital (Las Palmas de G.C.)

Comments:

1. We use censusdelineation(eachblacklines)
2. Assumption: uniformdistributionofpopulation.
3. Weighteddistributionofpopulationd ependingonsurface.
4. Populationanalized by 50 meters (from 250 to 1950).

Grocery retail market

How to calculate `geographical´ competition?



Example: North-westzoneof capital (Las Palmas de G.C.)

Comments:

1. Weobtainnumberofrivals in X meters.
2. Officialcensuswasused.
3. Wegeorreferentiatedbothsampled (116) andnotsampled supermarkets (644).
4. In thisexample, bigpoints are sampled supermarkets.
5. Competitionradiusobtainedfrom 250 to 1000 meters.

Grocery retail market

The sample

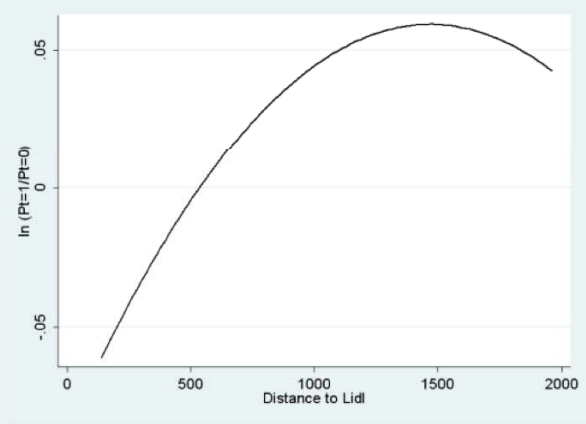
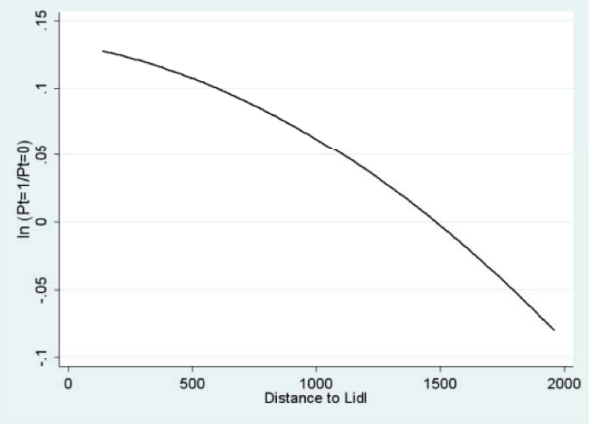
- Total populationandsampled supermarkets

Size	Number of supermarkets	Sample	Percentage of supermarkets analyzed
Less than 120 m^2	341	41	12%
Between 120 and 399 m^2	208	23	11%
Between 400 and 999 m^2	68	6	8.8%
More than 1000 m^2	51	49	96%
Total	668	119	18%

Empirical analysis

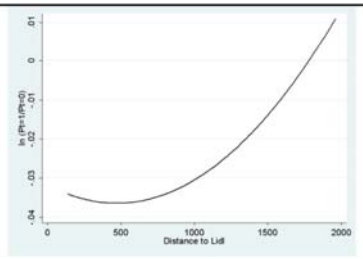
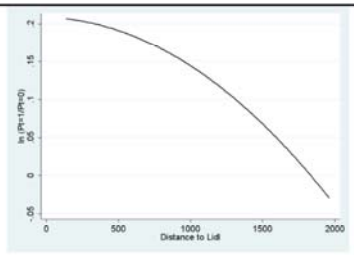
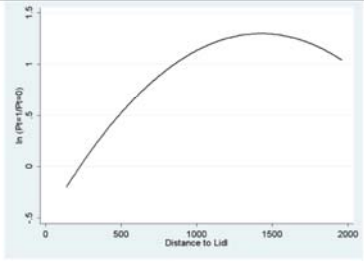
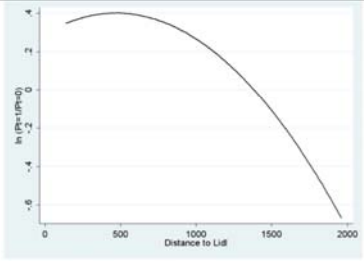
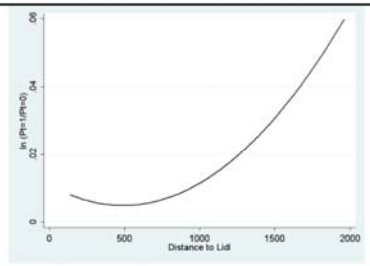
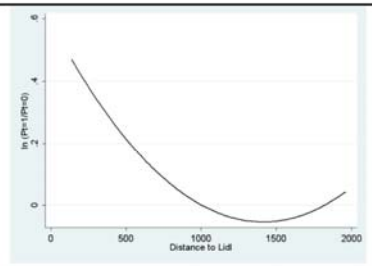
Graphicalexplanation of entry

- Fittedquadraticequationstochange in prices*vs*distanceto LIDL

Products **sold** by Lidl	Products **not sold** by Lidl
Average of products	Average of products
	

Empirical analysis

Graphicalexplanation of entry (2)

Products **sold** by Lidl	Products **not sold** by Lidl
Rice	Cornflakes
	
Beef	Potatoes
	
Beer	Rum
	

Empirical analysis

Statisticalanalysis

- Firstpricesforallgoodsnormalized by the average priceforthesamegood prior toentry.
- Comparativeresultsofpriceindex (normalized) before/afterentry:

		Is there a LIDL less than 0.5 kms?	
		No	Yes
Is this product sold by LIDL?	No	-2 %	+7 %
	Yes	+3 %	+5 %

Empirical analysis

Econometricalanalysis

- Are thesedifferencesamong supermarkets closeto and farawayfrom LIDL statisticallysignificant?
- Equation:

$$\ln\left(p_{ij}^{1}\right)-\ln\left(p_{ij}^{0}\right)=\beta_0+\beta_1\text{Productnotsoldby Lidl}_i+\beta_2\text{LidlinXmeters}_j+$$

$$+\beta_3\text{Prod*Lidlin}_{ij}+\beta_4\text{PopulationinXmeters}_j+\sum_{h=1}^{11}\beta_h\text{City}+\sum_{l=1}^{5}\beta_l\text{Supermsize}_j$$

-p_{ij}= priceproduct*i* at supermarket *j* in period 1 or 0. *ProductnotsoldbyLidl*is a binary variable thattakesvalue 1 iftheproduct*i*isnotsold by entrant.

-*Prod*Lidlin*isthedif-in-difestimator.

-Population, citiesand supermarket size are included.

Empirical analysis

Econometricalanalysis

- Estimationresults:

Distance (meters)	Product not sold by LIDL	LIDL near in X meters	Interaction	Constant
500	0.043***	-0.031	0.125**	-0.033
750	0.037**	0.015	0.126**	-0.033
1000	0.039**	0.008	0.086**	-0.035
1250	0.039**	-0.011	0.059**	-0.035
1500	0.039**	-0.003	0.056*	-0.039
1750	0.042**	-0.008	0.036	-0.034
1950	0.043**	-0.009	0.032	-0.034
Number observations	2631	R^2 (Average)	0.019	

Conclusions

1. Worldwide (and especially in Spain) there are strict regulations in the supermarket industry (entry regulation).

2. Supermarkets have been analyzed from several perspectives.

3. Incumbents near to new entry supermarkets reduce prices before entrant starts.

4. For the goods not sold by the entrant, prices rose by close 9% after entry. The same did not occur for goods sold by the entrant.

5. 1.5 kms. seems to be a reasonable cut-off point for the definition of relevant market.