

Search Cost Reduction through Product Bundling

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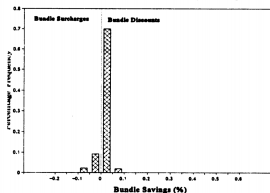
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Motivation

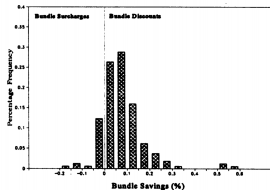
- ▶ Bundling: two or more products or services sold together as a single package: fast food menu, home theater system
- ▶ Motivations include economies of scale (production) and scope (distribution), simplification of purchase decision,...
- ▶ Usually grants a price discount
- ▶ Empirical evidence associated with bundling
 - ▶ Significant fraction of surcharges on bundled products (Estalami 1999)
 - ▶ Bundled products are more appealing for consumers who do not know well the market (Harris and Blair 2006a)
 - ▶ and for consumers who are concerned about compatibility between the individual products (Harris and Blair 2006b)

Distribution of bundle savings (Estelami 1999)

**DISTRIBUTION OF BUNDLE SAVINGS IN
PERSONAL COMPUTER BUNDLES**



**DISTRIBUTION OF BUNDLE SAVINGS IN
PHOTO EQUIPMENT BUNDLES**



**TABLE 1
SUMMARY STATISTICS ON BUNDLE SAVINGS**

	Fast-food Meals	Photo Equipment	Personal Computers
Number of Bundles Sampled	230	163	87
Average Savings	12.5%	8.6%	2.5%
Standard Deviation of Savings	7.95%	9.79%	2.38%
Maximum Savings	37%	57%	7%
Minimum Savings	-18%	-15%	-7%
Percent of Bundle Surcharges	3.5%	11.0%	11.5%

- ▶ Surcharges apply to a non negligible fraction of products
- ▶ Heterogeneity within and across sectors

Research question

- ▶ Bundle search is endogenous: the consumers search for a bundle in order to reduce the total search time
- ▶ How can we accommodate for these evidence?
- ▶ Bundling as a way to reduce (unsorted) search cost:
 - ▶ bundles are more appealing for non expert consumers (high search cost per sample)
 - ▶ and are more appealing at the begin of the search process (high expected number of samples)
- ▶ Q1: Can we explain demand for product bundles and existence of product surcharge with a simple search cost model?

Research question

- ▶ Bundle search is exogenous: the producers advertise bundles more often than single items
- ▶ Can we connect search cost and attention manipulation (advertising)?
- ▶ The consumer is more likely to sample the advertised products (dynamic version of the consideration set in Goeree 2008)
- ▶ The producer can use advertising to perturb the standard search process
- ▶ Q2: In a search cost model with perturbed consideration set, should the retailer advertise bundled products?

Literature review

- ▶ Estelami (1999) distribution of bundle savings/surcharge.
No market share data, no evolution in the last 20 years.
- ▶ Harris and Blair (2006a, 2006b) role of reduced search costs for product bundles, simulated purchase behavior
- ▶ **Search cost:** Stigler (1961), McCall (1970), Hong and Shum (2006), Santos, Hortacsu, and Wildenbeest (2012)
- ▶ **Product bundling:** Jedidi, Jagpal, and Manchanda (2003), Derdenger and Kumar (2013), Mikonnen et al. (2015), Pathak, Gupta, and McAuley (2017), Chen and Ni (2017)
- ▶ **Advertising:** Stivers and Tremblay (2004), Goeree (2008), Chen and He (2011) [advertising and search cost, welfare analysis]

Ideal dataset

- ▶ Physical or online electronics store data (e.g. Best Buy)
- ▶ Data grouped by transaction (better if credit card number)
- ▶ Product category: home theater system or photo equipment
- ▶ Computer could be problematic, as the assembling cost is high
- ▶ Desired data: choice set (product availability, both individual and bundle), market shares, prices, advertising (binary)

Intuition for the model (endogenous bundle search)

- ▶ Endogenous bundle search: the consumer with high search cost prefers to search among bundles
- ▶ Unsorted sequential search model
- ▶ At each step, the consumer can
 - ▶ Randomly sample a new bundle and pay a cost λ_b
 - ▶ Randomly sample a new single item j and pay a cost λ_j
 - ▶ Purchase the best bundle or set of single products viewed
 - ▶ Stop the search process without buying (outside option)
- ▶ Assume CDFs of prices $F_b(p)$, $F_j(p) \forall j$ are initially known
- ▶ Assume single item search cost $\forall j \lambda_j = \lambda_s \leq \lambda_b$
- ▶ Assume no additional complexity/compatibility costs

Intuition for the model (exogenous bundle search)

- ▶ Exogenous bundle search: the seller can manipulate product awareness (attention) through advertisement
- ▶ Same assumptions as before, but relax the search process: stop, purchase, or randomly sample (b or j)
- ▶ Advertisement affects the random search process: sampling probability for advertised products is higher: $p_a > p_{na}$
- ▶ Dynamic version of consideration set
- ▶ Advertising bundles is more convenient for the retailer than advertising single products (higher purchase rate)

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