Market Response Models and Demand Creation

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Overview

- What is marketing ?
- Research traditions
- Building brands
- Growing customer equity

Natural Evolution of Business

- Production orientation
- Sales orientation
- Market orientation: new challenges

- STP
  - segmentation
  - targeting
  - positioning
- Marketing Mix
  - product
  - pricing
  - distribution
  - communications
- Building customer equity & brand equity

Academic Research Support

- Customer Behavior
  - Cognitive, social psychology
  - Behavioral decision theory
- Marketing Science
  - Analytical models (economics, mgmt science)
  - Empirical models (econometrics, stochastic models)

How important is marketing?

- PIMS studies:
  - ROI = f(marketing, cost factors)
  - R^2 = 85 %
- From US and UK focus to global focus

Performance Improvement is called for

- Half of advertising does not work
- 85% of promotions lose money
- Up to 80% of new products fail
- Clio award winners do not perform better
- Spending escalations prevail
- Cost plus pricing still rules

The New Marketing Strategy

- Importance of Marketing Investments
- Need for a Market Response focus
- Digital data enriched, 1-on-1 marketing
- Marketing Science approach
  - statistics, econometrics, data mining
  - resource allocation prescriptions
  - long-term strategic view

Serving a dual purpose

- Building brand equity
  - difference between products and brands
  - give customers a reason *not* to shop
- Growing customer equity
  - difference between first-time and repeat buying
  - asymmetry between acquisition and retention costs
- In both cases, long-term effects are essential

I. Focus on the brand

Market Response Principles

- Sales response curves are concave or S-shaped
- Elasticities are good response metrics
- Most models are short run or cross-sectional
- VAR models offer systems approach, with long-term effects

Short-term Empirical Generalizations

- Price elasticity is -2.5
- Distribution response is S-shaped, elasticities are high
- Sales force elasticity is 0.5
- Quality elasticity is 0.4
- Promotion elasticity is 4 to 12
- Advertising elasticity is 0.1
- Life cycles: p=0.01, q=0.5

Sources of long-term marketing effects

- Immediate effect
- Carry-over effects
- Feedback effects
- Purchase reinforcement effects
- Decision rules in the firm
- Competitive reactions

Long-term Effects ?

- Unlikely for price and sales force due to competitive matching
- Distribution : yes
- Quality: yes, except in high-technology
- LR Promotion elasticity is 0
- LR Advertising elasticity = 2 * SR

Illustration:
Short and Long-Term Sales Effects of Price Promotions
(VAR methodology)

	SR	LR
Positive	64%	4%
Negative	5%	1%
Zero	31%	95%

- average SR elasticity: 3.944
- average LR elasticity: 0.046

Conclusions

- Most marketing-mix effects are realized in the short run
- Little evidence of hysteresis
- Brand building opportunity resides mostly in sustained quality, innovation, distribution and advertising (weaker)
- Thus brand building is expensive

Are brands worth the sustained marketing investment?

- Research opportunity: compare branded and generic products across various categories (Ailawadi et al., JM, October 2003)
- Branded products enjoy a positive revenue premium $= vol_b * price_b - vol_g * price_g$
- Source of premium: higher market share, lower price elasticity

II. Focus on the customer

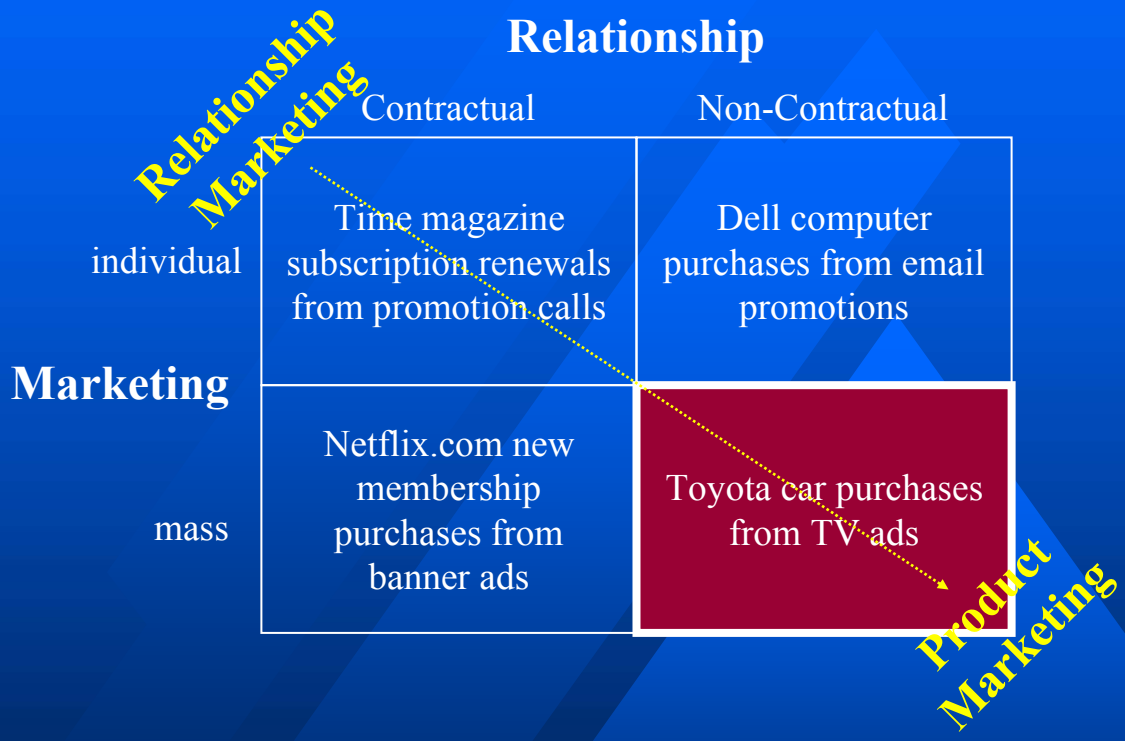
based on joint research with Shijin Yoo,

Singapore Management University

Contrasting Domains and Metrics

- Product marketing (PM): sales volume and revenue, market share, brand equity, product prices and margins, marketing mix spending, profitability
- Comes from the world of mass marketing
- Relationship marketing (RM) : customer acquisition, retention rates, cross-selling, lifetime value, customer equity, offer
- Comes from the world of direct marketing

PM/RM focus differs by industry



$$CE_t(a_t, r_t) = f(\text{marketing mix}^t)$$

CE: why hard to measure in PM environment?

$$CE = am - A + a\left(m - \frac{R}{r}\right)\frac{r}{1+\delta-r}$$

(Blattberg and Deighton 1996)

Acquisition spending (A)
Retention spending (R)
Contribution margin (m)
Discount factor (δ)

$$\text{Acquisition rate } (a) \equiv \frac{\#\text{ prospects acquired}}{\#\text{ prospects}}$$

$$\text{Retention rate } (r) \equiv \frac{\#\text{ customers retained}}{\#\text{ customers}}$$

Research questions

- How do marketing mix efforts influence *acquisition* and *retention rates*, and thereby CE in product marketing environment?
- Is marketing mix impact on CE different from its impact on sales ?
- Is there any difference between these effects in the short-run vs. the long-run?

What is CE for a product marketer ?

- The trick is to distinguish sales to existing customers vs. sales to new customers
- Also, competitor sales come from either lost customers or lost prospects
- These distinctions map product sales into acquisition and retention

Acquisition rate vs. Retention rate

$$a_t = \frac{N_t^{AP}}{N_{t-1}^{P}} = \frac{N_t^{AP}}{N_t^{PRO}} \cdot \frac{N_t^{PRO}}{N_t^{P}} = \frac{S_t^{AP} / q^{AP}}{S_t^{PRO} / q^{PRO}} \cdot \frac{N_t^{PRO}}{N_{t-1}^{P}} = \underbrace{\frac{S_t^{AP}}{S_t^{PRO}}}_{\text{sales}} \cdot \underbrace{\frac{q^{PRO}}{q^{AP}}}_{\substack{\text{purchase} \\ \text{quantity}}} \cdot \underbrace{\frac{N_t^{PRO}}{N_{t-1}^{P}}}_{\substack{\text{purchase} \\ \text{incidence rate}}}$$

$$r_t = \frac{N_t^{RC}}{N_{t-1}^{C}} = \frac{N_t^{RC}}{N_t^{CUS}} \cdot \frac{N_t^{CUS}}{N_t^{C}} = \frac{S_t^{RC} / q^{RC}}{S_t^{CUS} / q^{CUS}} \cdot \frac{N_t^{CUS}}{N_{t-1}^{C}} = \underbrace{\frac{S_t^{RC}}{S_t^{CUS}}}_{\text{sales}} \cdot \underbrace{\frac{q^{CUS}}{q^{RC}}}_{\substack{\text{purchase} \\ \text{quantity}}} \cdot \underbrace{\frac{N_t^{CUS}}{N_{t-1}^{C}}}_{\substack{\text{purchase} \\ \text{incidence rate}}}$$

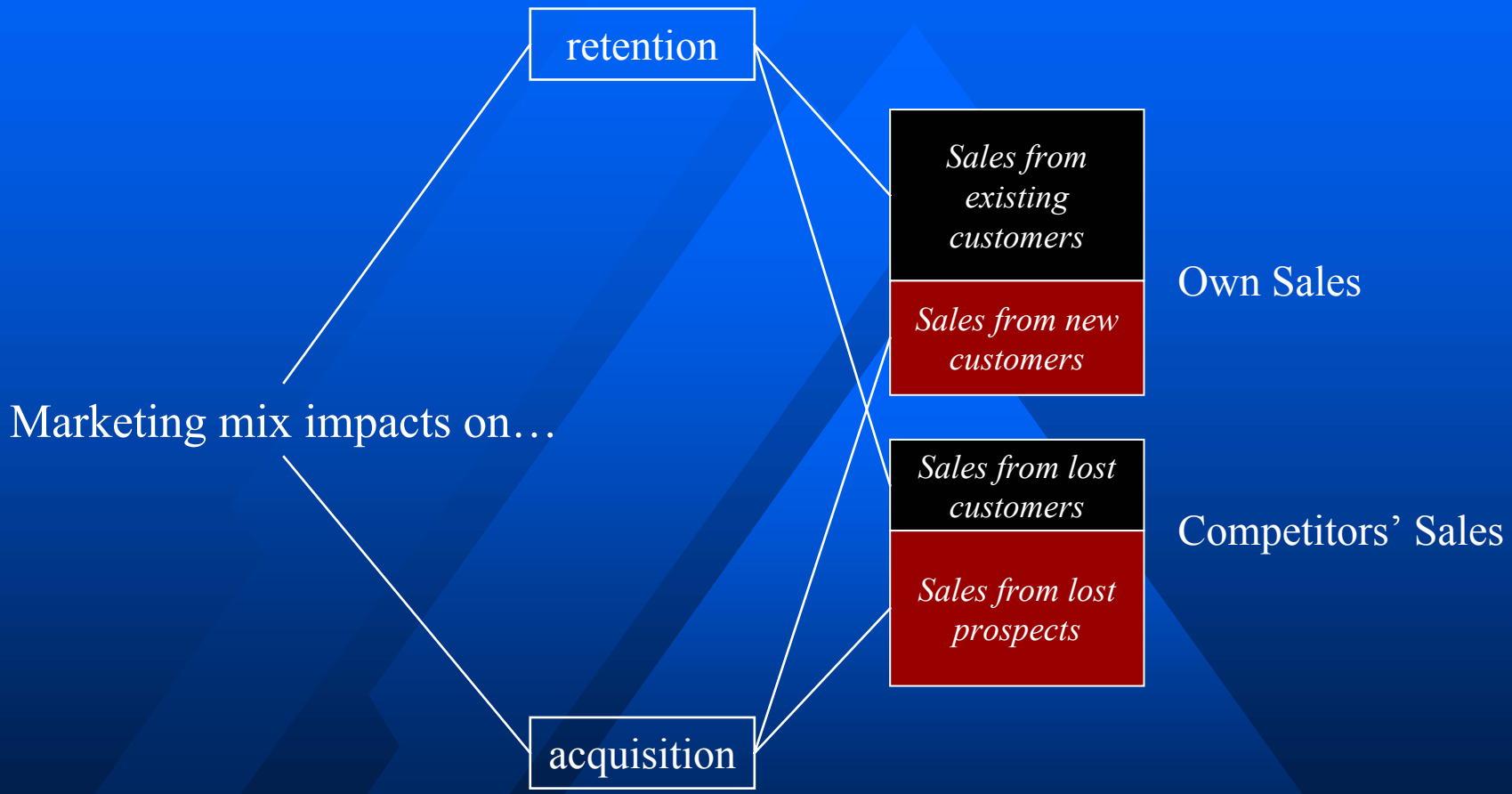
Switching Matrix

	Customers	*t*	Prospects
Customers	Retained customers S_t^{RC}		Lost customers S_t^{LC}
t-1			
Prospects	Acquired prospects (= New customers) S_t^{AP}		Lost Prospects S_t^{LP}

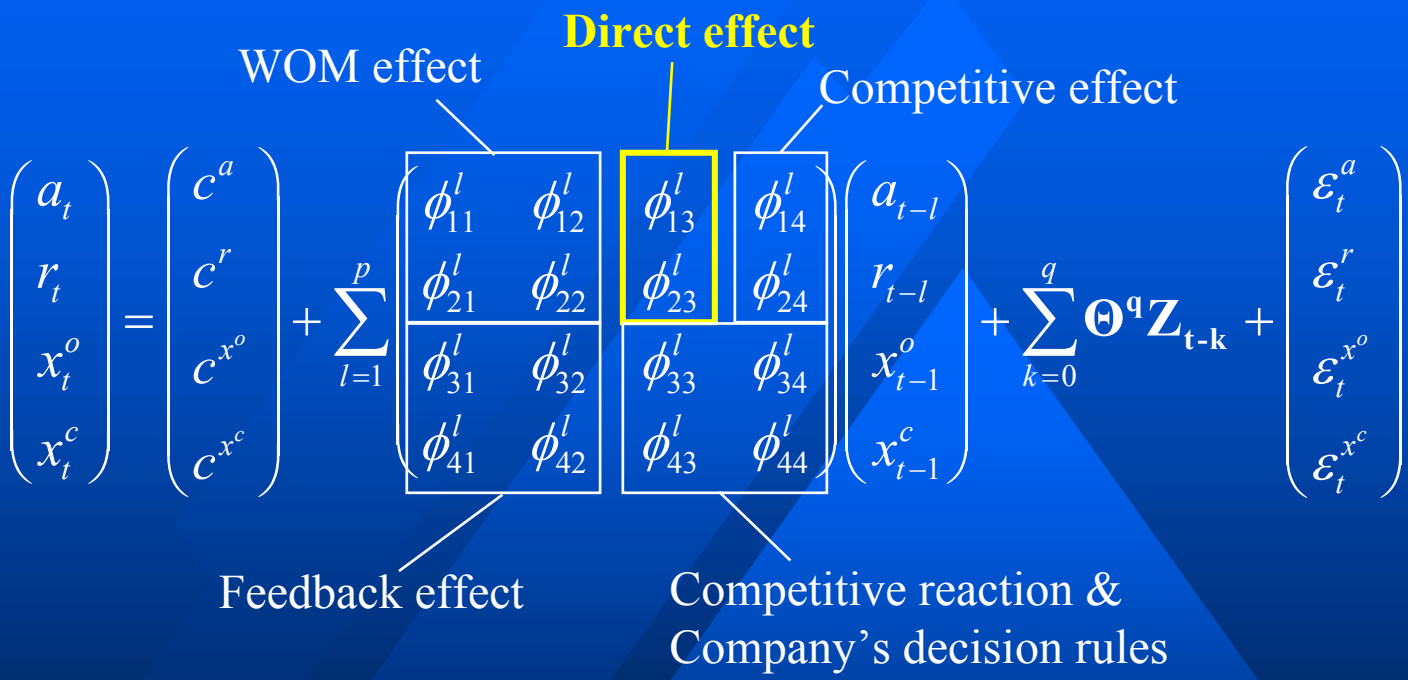
$\rightarrow$ Retention $\quad \dfrac{S^{RC}}{S^{RC} + S^{LC}}$

$\rightarrow$ Acquisition $\quad \dfrac{S^{AP}}{S^{AP} + S^{LP}}$

Now include marketing spending



Model



$$\begin{pmatrix} a_t \\ r_t \\ x_t^o \\ x_t^c \end{pmatrix} = \begin{pmatrix} c^a \\ c^r \\ c^{x^o} \\ c^{x^c} \end{pmatrix} + \sum_{l=1}^{p} \begin{pmatrix} \phi_{11}^l & \phi_{12}^l & \phi_{13}^l & \phi_{14}^l \\ \phi_{21}^l & \phi_{22}^l & \phi_{23}^l & \phi_{24}^l \\ \phi_{31}^l & \phi_{32}^l & \phi_{33}^l & \phi_{34}^l \\ \phi_{41}^l & \phi_{42}^l & \phi_{43}^l & \phi_{44}^l \end{pmatrix} \begin{pmatrix} a_{t-l} \\ r_{t-l} \\ x_{t-1}^o \\ x_{t-1}^c \end{pmatrix} + \sum_{k=0}^{q} \Theta^{q} \mathbf{Z_{t-k}} + \begin{pmatrix} \varepsilon_t^a \\ \varepsilon_t^r \\ \varepsilon_t^{x^o} \\ \varepsilon_t^{x^c} \end{pmatrix}$$

$$IRF(j \mid x \to y) = E\left[y_{t+j} \mid x_t = E(x_t) + \delta \right] - E\left[y_{t+j} \mid x_t = E(x_t) \right]$$

Automobile Data Example

- Weekly transaction and marketing mix data of luxury segment in automobile industry from JDPA
  - Observation period: 1/10/99~6/30/02 (182 weeks)
  - 26 PIN markets
  - 9 of 12 brands (93% of 500K transactions): Acura, Audi, Benz, BMW, Cadillac, Infiniti, Lexus, Lincoln, Volvo
  - Trade-in model information
  - Vehicle price, consumer rebates, and APR
- Monthly advertising data from CMR
  - Virtually all media including print, TV, radio, and outdoor
  - Manufacturer ad + dealer ad

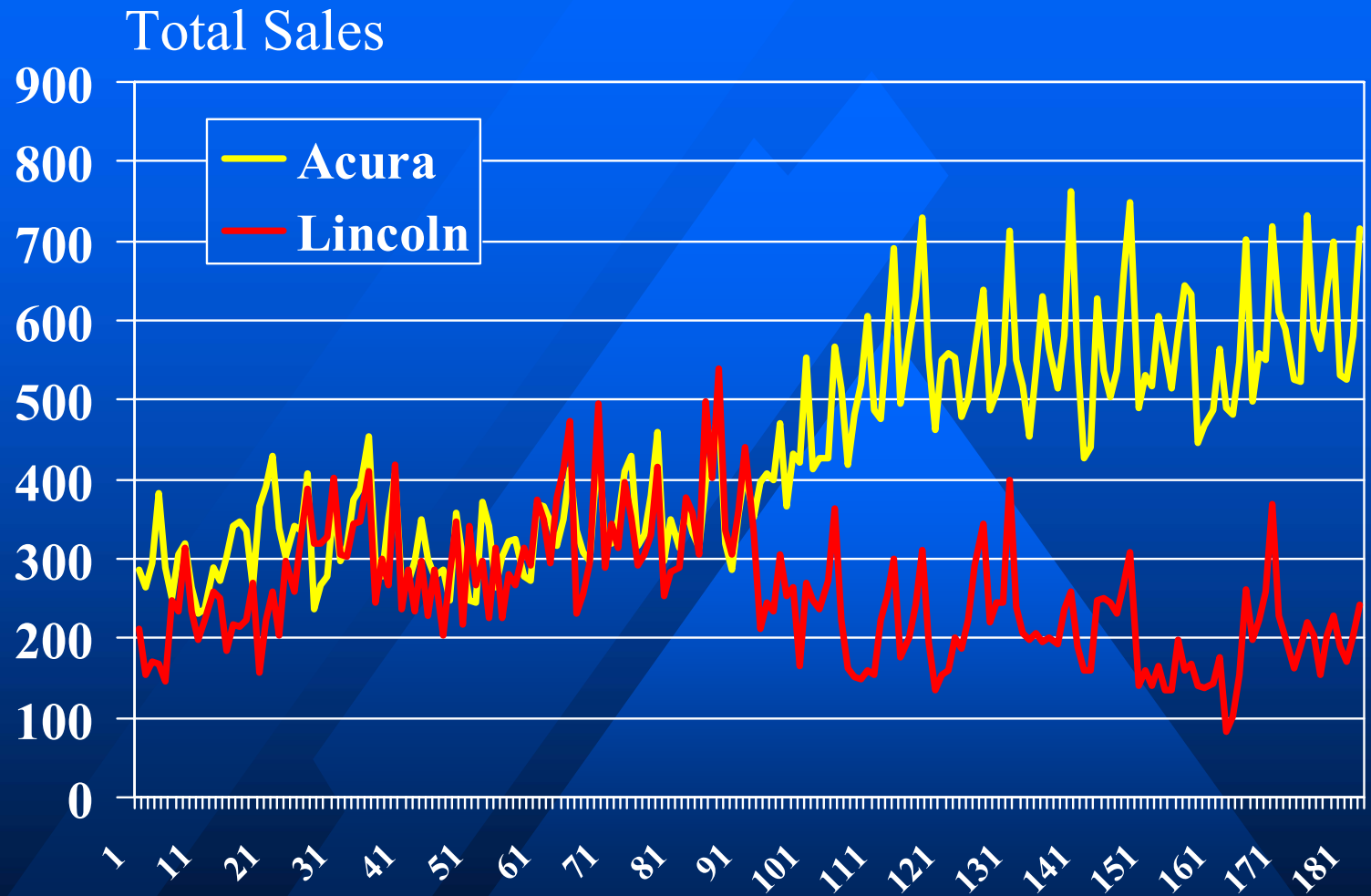
Sample Data

Acura		wk1	wk2	wk3	…	wk182
Trade-in Brands	Acura	20	25	30	…	40
	Audi	2	3	0	…	2
	BMW	4	1	3	…	4
	:				…	
	Ford	1	1	2	…	4
Price		35,100	35,100	36,200	…	38,400
Rebate		2,000	0	1,000	…	3,000
APR		7.5%	4.6%	8.5%	…	7.1%
AD spending		3,500K	3,500K	3,800K	…	4,000K

Variables

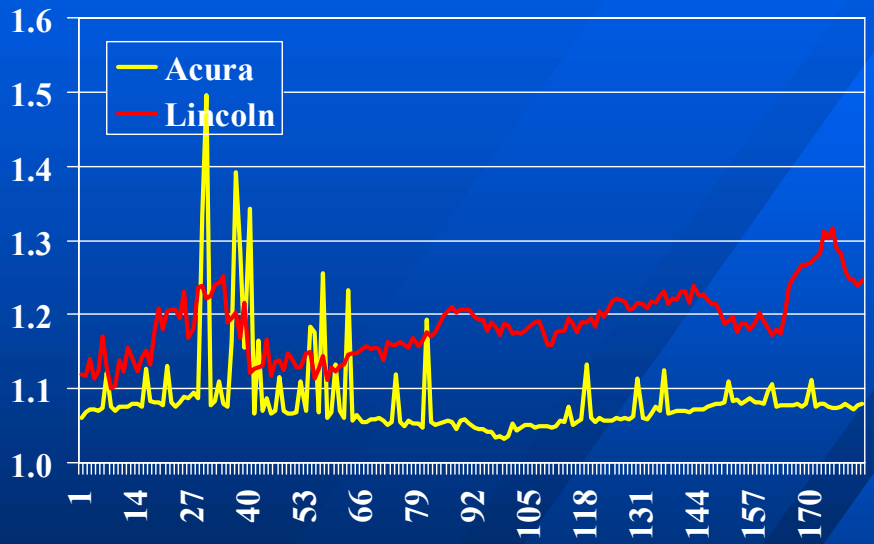
- Endogenous Variables
  - Retention rate and acquisition rate
  - Discount index = *f* (price, rebate, APR)
  - Advertising spending
  - Competitive discounting / advertising
- Exogenous Variables
  - Constant and Trend
  - Seasonal Dummy: Labor Day, Memorial Day, End of each quarter (Pauwels et al. 2003)
  - New product introduction: step dummy
  - Product quality and customer satisfaction
    - » APEAL (Automotive Performance Execution And Layout)
    - » IQS (Initial Quality Study)
    - » VDI (Vehicle Durability Index)

Case study: Acura vs. Lincoln

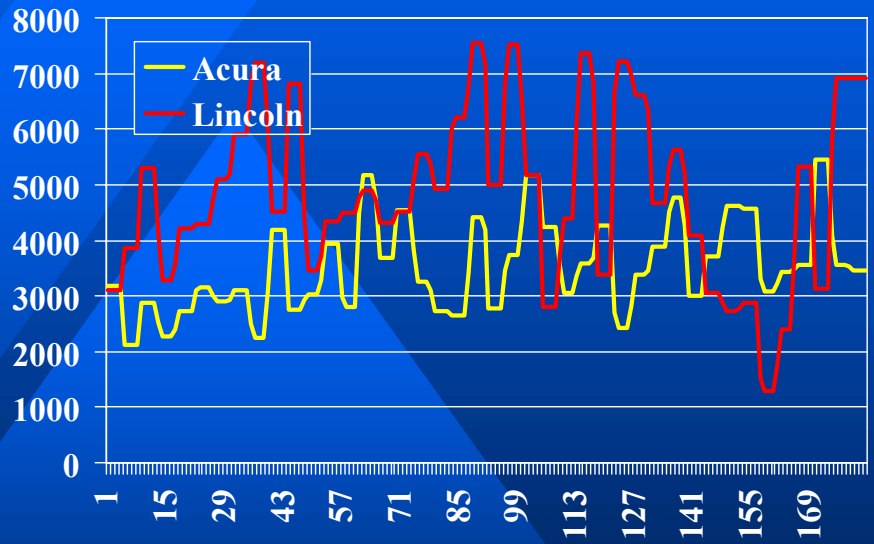


Marketing Mix

Discounting

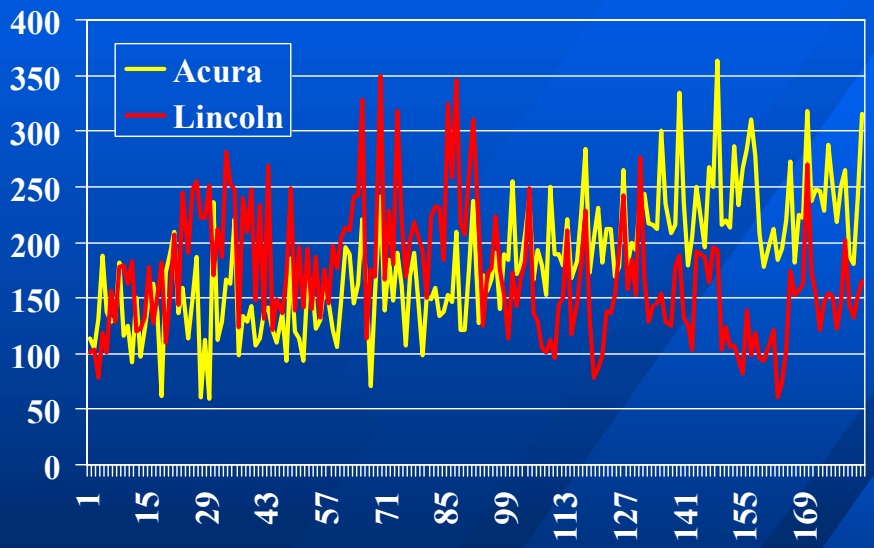


Advertising

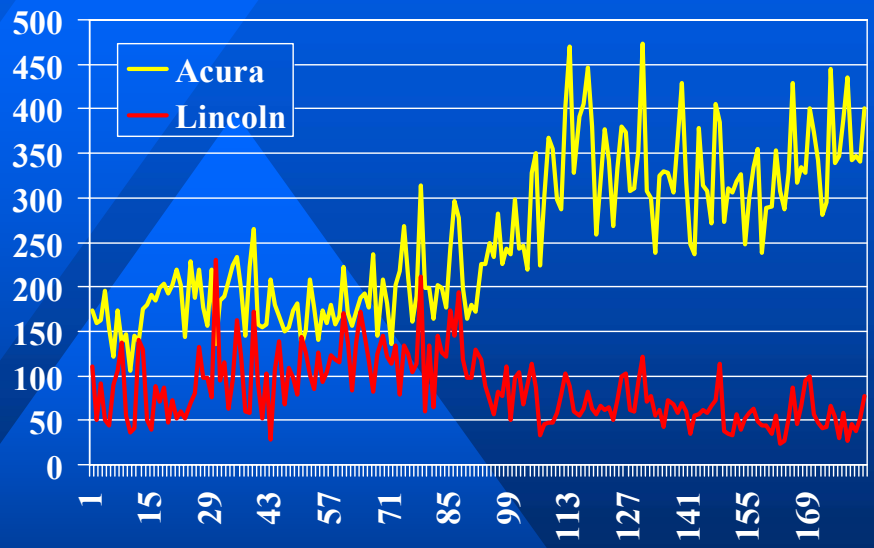


Sales Decomposition

Sales from existing customers

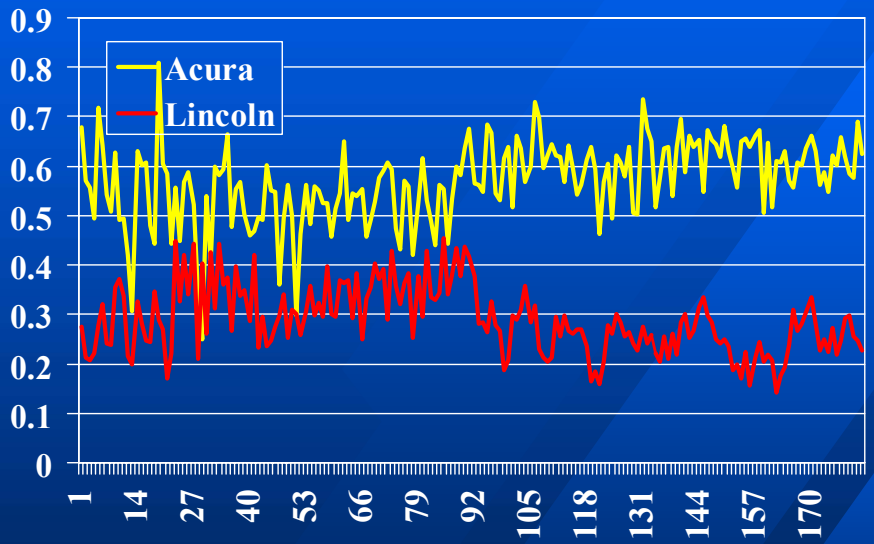


Sales from prospects

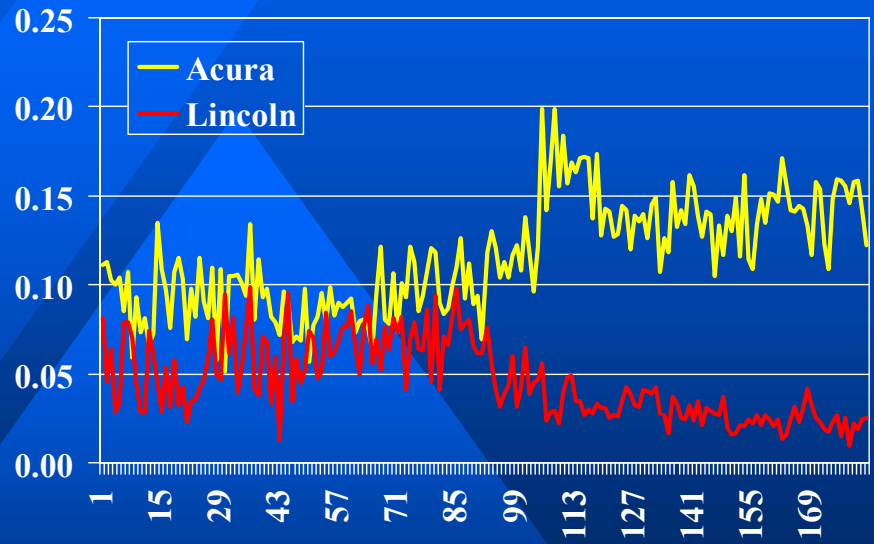


CE Metrics

Retention rate



Acquisition rate



Impact of Marketing Mix on CE

Discounting	Sales	
	ST	LT
Acura	0.00	0.00
Lincoln	2.10	0.00

Retention Rate		Acquisition Rate	
ST	LT	ST	LT
-0.91	0.00	0.00	0.27
0.00	0.00	0.00	-0.48

Advertising	Sales	
	ST	LT
Acura	0.17	0.00
Lincoln	0.00	0.00

Retention Rate		Acquisition Rate	
ST	LT	ST	LT
0.00	0.00	0.00	0.08
0.00	0.00	0.00	0.21

Numerical Illustration

Acura (Hysteresis)

Status Quo			
	Current	4 Weeks later	1 Year later
Number of Customers	87,000	87,209	89,554
Profit	1,265,162	1,266,776	1,281,190
Customer Equity	561,735,680	562,207,732	567,483,558

Marketing Intervention ($2,000 extra discount)			
	Current	4 Weeks later	1 Year later
Number of Customers	86,982	87,169	89,755
% of Status Quo	*99.98%*	*99.95%*	*100.22%*
Profit	277,732	1,280,712	1,296,524
% of Status Quo	*21.95%*	*101.10%*	*101.20%*
Customer Equity	567,916,404	568,982,982	574,470,488
% of Status Quo	*101.10%*	*101.21%*	*101.23%*

Numerical Illustration

Lincoln (Escalation)

Status Quo			
	Current	4 Weeks later	1 Year later
Number of Customers	50,762	50,452	47,081
Profit	473,532	472,119	459,842
Customer Equity	193,131,746	192,833,691	189,591,654

Marketing Intervention ($2,000 extra discount)			
	Current	4 Weeks later	1 Year later
Number of Customers	50,762	50,512	47,087
% of Status Quo	*100.00%*	*100.12%*	*100.01%*
Profit	121,454	272,211	218,799
% of Status Quo	*25.65%*	*57.66%*	*47.58%*
Customer Equity	75,835,987	75,565,550	87,516,407
% of Status Quo	*39.27%*	*39.19%*	*46.16%*

Conclusions

- Marketing mix effects are different in the sales domain and the CE domain, both in the short run and in the long run
- On average,
  - Advertising and discounting affect sales
  - Discounting does not increase customer equity in the long-run
  - Advertising does not affect retention rate, but it has a positive impact on acquisition rate in the long-run
- Higher-quality brands are more acquisition effective in their marketing, and lower-quality brands are more retention effective

III. Overall Conclusions

- As economies develop, a market orientation becomes more important for firms
- Marketing is about building brand equity and customer equity
- A good academic resource base is already in place, and growing
- Marketing practice is being challenged
- Rigorous research on good data can be managerially relevant

and, of course,

- The internet changes everything

References

- Gupta, Sunil and Donald Lehmann (2005). *Managing Customers as Investments*. Wharton School Publishing.

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