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Firm Reputation as Liability, Product Reputation as Asset: A Study of New Product Recalls Over Time

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What's in a Reputation?

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Firm Reputation

- A positive reputation can signal quality (Rao and Kirmani 2000), command price premiums (Klein and Leffler 1981), and facilitate product diffusion (Dawar and Parker 1994)
- However, if the reputation is positive it can become a liability because it creates positive expectations that are then violated (Rhee and Haunschild 2006)

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Product Reputation

- Products develop their own reputation which may be separate from the firm reputation
- Product reputation is developed over time and can become a separate identity

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New Product Flaws

- When a new product is first released it's likely to contain more flaws than it's established counterparts
- When product flaws are revealed in the marketplace the product must be recalled and fixed
- New products can become liabilities, firms can learn from their mistakes and improve upon the product in subsequent versions

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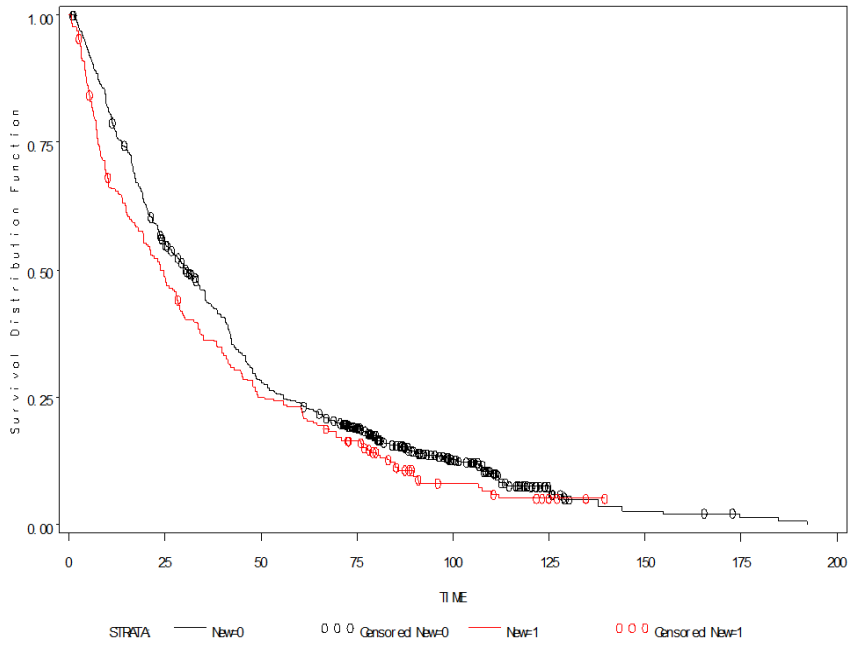
New Car Flaws

- Using the automotive industry in the United States between the years 2000 and 2010 we compared the probability of a new car (332) being recalled after its released into the market with the probability of an established car (2274) being recalled
- We used a hazard model to calculate the probabilities
- New Products were more likely to be recalled in the first four years than their established counterparts



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Research Questions

- What is the relationship between firm and product reputation?
- What is the relationship between firm and product reputation over time (for new products)?
- What is the relationship between firm and product reputation when product flaws are revealed?

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Reputation

- Reputation is formed by multiple actors: customers and third party experts
- The product's reputation is more permeable to change because each subsequent version can have a significant impact on the formation of reputation
- A firm's reputation is less permeable to change (more static) because it is comprised of all the firm's products

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Hypotheses

- A product's reputation changes and the most recent versions may be an accurate indicator of the quality of the product
- **H1:** The better a product's reputation, the lower the penalty incurred by the new product after a product recall
- A firm's reputation is less permeable to change and creates expectations
- **H2:** The better a firm's reputation, the higher the market penalty incurred by the new product after a product recall.

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Hypotheses

- The more time that passes the larger the recall will be
- **H3**: The more time that passes between the product introduction and the product recall, the higher the market penalty on the new product after a product recall.
- A positive product reputation over time shows that the product is improving or has improved
- **H4:** The length of time in the market increases the positive effect of a product's reputation on market response to a product recall.

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Data and Empirical Context

- United States Auto Industry from 2000 to 2010.
- Dependent Variable: Change in Market Share

$$M_{jkt} = \frac{\text{Sales}_{\text{kt}}}{\text{Total Sales per Product Category}_{\text{t}}}$$

$$\Delta M_{jk} = \frac{M_{jkt} - M_{jk(t-1)}}{M_{jk(t-1)}}$$

Recall *j*, Product *k*, Time *t*

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	Variable	Operationalization	Level (*Recall or Firm*)	Type	Sources
TB =	Time between the release of the car to the recall date	The time in months from the launch of the car into the marketplace until a recall was issued by the manufacturer.	Recall	Independent	*Car and Driver Magazine*, NHTSA, Company Sources
RP =	Reputation of the product	The signal of quality which the product projects to consumers regarding its offerings.	Recall	Independent	Dealers Association (NADA), J.D Power and Associates, Consumer Reports
R =	Reputation of the firm	The collective signal of quality which the firm projects to consumers regarding its product offerings.	Firm	Independent	National Automobile Dealers Association (NADA), J.D Power and Associates, *Consumer Reports*
SZ =	Log (Number of cars affected)	The number of vehicles which were subject to the recall across all product lines by the respective brand.	Recall	Control	NHTSA
DH =	Death or Grave Harm	Recalls which contained the possibility of death or grave harm	Recall	Control	NHTSA
GR =	Growth, the market share the month prior	Market share at time t-1 where t is the month of the recall.	Recall	Control	*The Automotive News*
A =	American-origin manufacturer	Manufacturers which are headquartered in the United States of America.	Firm	Control	*The Automotive News*
E =	European-origin manufacturer	Manufacturers which are headquartered in Europe.	Firm	Control	*The Automotive News*
AS =	Asian-origin manufacturer	Manufacturers which are headquartered in Asia.	Firm	Control	*The Automotive News*

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Table 2 - Reputational Rankings

	Reputation: third party ratings		Reputation: depreciation rates		Reputation: composite measure	
Order	Automaker	Score	Automaker	Score	Automaker	Score
1	Lexus	1.000	Porsche	1.000	Lexus	1.000
2	Infiniti	0.993	BMW	0.931	BMW	0.902
3	Acura	0.859	Lexus	0.907	Acura	0.881
4	BMW	0.792	Honda	0.901	Porsche	0.856
5	Toyota	0.755	Acura	0.824	Infiniti	0.838
6	Volvo	0.705	Saturn	0.810	Honda	0.837
7	Honda	0.698	Volvo	0.803	Volvo	0.789
8	Audi	0.687	Mercedes-Benz	0.789	Toyota	0.780
9	Mercedes-Benz	0.682	Toyota	0.738	Mercedes-Benz	0.769
10	Subaru	0.658	Audi	0.669	Saturn	0.753
11	Porsche	0.635	Subaru	0.623	Audi	0.738
12	Saturn	0.631	Infiniti	0.608	Subaru	0.669
13	Lincoln	0.606	Nissan	0.546	Nissan	0.567
14	Oldsmobile	0.553	Mazda	0.544	Mazda	0.540
15	Nissan	0.543	Volkswagen	0.539	Volkswagen	0.484
16	Mazda	0.515	Chrysler	0.471	Oldsmobile	0.482
17	Saab	0.492	Saab	0.427	Lincoln	0.466
18	Buick	0.457	Suzuki	0.413	Saab	0.459
19	Jaguar	0.447	Buick	0.386	Buick	0.436
20	Mercury	0.408	Oldsmobile	0.377	Jaguar	0.413
21	Cadillac	0.401	Pontiac	0.376	Chrysler	0.384
22	Volkswagen	0.396	Jaguar	0.353	Cadillac	0.370
23	Ford	0.370	Plymouth	0.349	Ford	0.357
24	Pontiac	0.280	Dodge	0.344	Suzuki	0.354
25	Suzuki	0.276	Ford	0.324	Mercury	0.354
26	Chrysler	0.273	Cadillac	0.316	Pontiac	0.337
27	Mitsubishi	0.259	Mitsubishi	0.311	Plymouth	0.307
28	Plymouth	0.250	Lincoln	0.293	Dodge	0.296
29	Dodge	0.244	Mercury	0.280	Mitsubishi	0.291
30	Chevrolet	0.236	Chevrolet	0.267	Chevrolet	0.256
31	Daewoo	0.126	Kia	0.263	Kia	0.129
32	Hyundai	0.021	Daewoo	0.061	Daewoo	0.088
33	Kia	0.000	Hyundai	0.000	Hyundai	0.000

*Table extracted from: Rhee, Moonweon and Pamela R. Haunschild (2006), "The Liability of a Good Reputation: A Study of Product Recalls in the U.S. Automobile Industry", Organization Science, 17 (1), pg. 109, copied with the persmission of Moonweon Rhee

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Hierarchical Linear Model

$$(1)\Delta M_{jk} = \beta_{0j} + \beta_{1j} TB_{jk} + \beta_{2j} RP_{jk} + \beta_{3j} DH_{jk} + \beta_{4j} \log SZ_{jk} + \beta_{5j} GR_{jk} +$$
$$+ \beta_{6j} (TB_{jk}) * (RP_{jk}) + \varepsilon_{jk}$$

$$(2)\ \beta_{0j} = \gamma_{00} + \gamma_{01} R_k + \gamma_{02} A_k + \gamma_{03} E_k + \gamma_{04} AS_k + \mu_{0k}$$

$$(3)\ \beta_{1j} = \gamma_{10} + \mu_{1k}$$

$$(4)\ \beta_{2j} = \gamma_{20} + \mu_{2k}$$

$$(5)\ \beta_{3j} = \gamma_{30} + \mu_{3k}$$

$$(6)\ \beta_{5j} = \gamma_{40} + \mu_{4k}$$

$$(7)\ \beta_{6j} = \gamma_{50} + \mu_{5k}$$

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Appropriateness of HLM Model

- We calculated the intra-class correlation to examine clustering by product on the change in market share
- Sample size of groups is sufficient based on the work of Maas and Hox (2005), a total of 33 firms were contained within our sample

$$p = \frac{65.9199}{65.9199+301.28} = 17.95$$

- Note, we tested a three level model but the intraclass correlation with product grouping was fairly low

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Random Effects

- The random effects within our model found that the variance components for intercepts is not significantly different from 0 ($p = 0.148$)
- The variance components for slopes cannot be estimated (largely because of a lack of similarity in reputation scores across firms) and thus we do not see significant variance across slopes.
- The component representing the covariance between intercepts and slopes is also small (.016) and we cannot reject the null hypothesis that it, too, is 0 ($p = 0.32$). We interpret this to indicate that the relationship between the intercept and slope does not differ by automaker.

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Fixed Estimes of Market Share Change, 2000 - 2010 (N = 332), Dependent Variable - Change in Market Share (Centered)

Variables	Model 1	Model 2	Model 3
Constant	-.197 (.387)	.379 (.266)	.668* (.331)
LogPotaff	.034 (.084)	-.067 (.046)	-.060 (.044)
Severe Recall	.098 (.141)	.070 (.079)	.401 (.079)
Growth	-.006 (.006)	-.008** (.003)	-.009** (.003)
American-origin	.199 (.141)	-.028 (.136)	-.005 (.090)
European-origin	.048 (.141)	.131 (.191)	.040 (.115)
Asian-origin	-.048 (.231)	-.031 (.117)	-.004 (.010)
Reputation (Car) (Hypothesis 1)		.192 (.278)	-.279 (.364)
Reputation (Firm) (Hypothesis 2)		-.269† (.166)	-.272* (.164)
Time Between Release and Recall (Hypothesis 3)		-.000 (.001)	-.014* (.007)
Reputation (Car)*Time Between Release and Recall (Hypothesis 4)			.018* (0.010)
AIC	599.9	348.7	352.7
SBC	602.5	352.5	356.4
-2LL	595.9	342.7	352.9

Notes:

1. Standardized coefficients are shown
2. Standard errors are shown in parentheses
3. All p values reported are at two-tailed significance
4. † p < .1 * p<.05 ** p<.01 *** p<.001

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Results

- A positive product reputation reduced the amount of market share lost after a product recall
- A positive firm reputation enhanced the market share lost after a product recall
- The time between product release and recall enhanced the market share lost after a product recall
- The impact of the product's reputation on the market response is positively affected by the amount of time that has passed since the product was introduced

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Contribution

- A firm's reputation and a product's reputation can differ
- Product reputation is more permeable to change as new versions are introduced and improve upon previous ones
- Firms that have a positive expectation have accumulated this reputation over time and create expectations that are fairly static, these expectations can become a liability
- Not all firms have a positive reputation and the firm can expend resources attempting to improve this but they may garner a greater return by focusing on developing the reputation of a few key products

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Thank You/ Questions?

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