

The Intergenerational Transmission of Automobile Brand Preferences: Empirical Evidence and Implications for Firm Strategy

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People buy same brands as parents ...

Parents' brand	GM	Ford	Chrysler	Toyota	Honda	Other	
						Asian	European
GM	0.41	0.20	0.13	0.06	0.05	0.11	0.04
Ford	0.32	0.28	0.15	0.06	0.05	0.11	0.04
Chrysler	0.30	0.21	0.19	0.07	0.07	0.12	0.04
Toyota	0.19	0.17	0.12	0.20	0.11	0.15	0.06
Honda	0.16	0.17	0.13	0.12	0.20	0.17	0.06
OtherAsian	0.27	0.19	0.14	0.08	0.07	0.19	0.05
European	0.21	0.16	0.08	0.09	0.09	0.18	0.19
Child's market share	0.33	0.22	0.14	0.08	0.07	0.12	0.05

... and same types

Parents' type	Child's type			
	Car	Truck	Van	SUV
Car	0.58	0.16	0.08	0.18
Truck	0.47	0.25	0.08	0.19
Van	0.53	0.17	0.11	0.18
SUV	0.49	0.19	0.06	0.25
Child's overall share	0.55	0.18	0.08	0.19

Brands vs. attributes

- Blurry distinction—brands overlap with attributes
- Attributes (major, objective, quantifiable): class, size, 4WD, fuel economy, horsepower, etc
- Brand (minor, subjective, qualitative): styling, dashboard layout, perceived reliability, etc
- This paper is on brands; future work on attributes

Why are family choices correlated?

1. Parents and children are similar

- Demographics: income, education, family size
- Location: urban vs. rural, mountains, dealers
- Other: political beliefs, hobbies

2. Parents influence their children directly

- Choices: nostalgia, tastes, information, familiarity
- Preferences: persuasion or information sharing

What are potential implications?

- Firm strategies
 - Pricing decisions [choices vs. preferences]
 - Advertising decisions
 - Broad product lines
 - Long-run barriers to entry
- Government policy
 - Long-run effects of gas tax and CAFE regulations
 - Family effects in preferences for fuel economy

What we do in this paper

1. Try to rule out “parents and children are similar”
 - Control for observed demographics
 - Control for location
 - Focus on “similar” brands (e.g., Ford vs. GM)
2. Provide evidence that family “choices” matter
 - Long vs. short periods of ownership
 - Cars owned before vs. after children left home
3. Explore theoretical implications for firm strategy
 - Prices are lower as firms compete for future buyers
 - Firms have unilateral incentive to encourage loyalty

Panel Study of Income Dynamics (PSID)

- Follows initial 1968 sample and descendants
- Surveyed every two years 1999 – 2009
- Detailed info on demographics, income, and spending patterns
- Detailed info on vehicles added in 1999
 - Number of vehicles owned
 - Make, model, year, acquisition date, and method of acquisition for up to 3 vehicles (we drop gifts)

Construction of main sample

- For each vehicle purchased by an adult child ...
 - Match to the vehicle owned by parents that was purchased most recently *before* child's purchase
- Drop children that do not own cars and/or that cannot be matched to parents with cars
- Roughly 3 purchases per child in this sample

Summary statistics for main sample

	Adult children	Parents
Age (years)	35.8	59.5
Years of education	13.4	12.4
Annual family income (\$)	77,231	60,419
Number of people in household	3.1	2.3
Number of vehicles owned	2.3	2.1
Number of unique individuals	4,006	2,381
		<u>Matched Pairs</u>
Number of child vehicle choices matched to parent choice		13,535
Total number of parent to child vehicle matches		14,530

- More parents than children due to siblings
- Extra matches for divorced parents (50% wt.)

Statistical estimation (in words)

- Outcome variable: child's brand choice for each purchase
 - 7 lines of data: GM, Ford, Chrysler, Toyota, Honda, Asian, Euro
 - Variable equals 1 for chosen brand; 0 for others
- Explanatory variable: parent's prior brand choice
 - Variable equals 1 for chosen brand; 0 for others
- Controls for child and parent characteristics [vary by brand]
 - Demographics: income, urban vs. rural, age, sex, education, number of kids, and household size
 - Location: state, county, and census tract dummies
- Estimate using linear regression (linear probability model)

Statistical estimation (in math)

Correlation between child's brand choice and parent's choice

Differential effects of demographic and location controls across automakers

$$b_{ifjt} = \gamma \cdot 1(b_{pft} = b_{ifjt}) + \mathbf{X}_{ift}'\beta_j + \mathbf{X}_{pft}'\delta_j + \alpha_{jt} + \epsilon_{ifjt}$$

=1 if child chose brand j;
0 otherwise

=1 if parent chose same brand
0 otherwise

Controls for child and parent demographics and location

Monthly trend in market shares

Note: This is equivalent to running a separate LPM for each manufacturer but imposing that the coefficients on parent choices are identical across models.

Strong parent-child correlations

Dependent Variable: Child's Brand							
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Parent's brand = child's brand	0.101 (0.008)	0.093 (0.008)	0.083 (0.008)	0.081 (0.008)	0.065 (0.008)	0.070 (0.014)	0.056 (0.014)
Month of purchase fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child's demographics	No	Yes	Yes	Yes	Yes	Yes	Yes
Parent's demographics	No	Yes	Yes	Yes	Yes	Yes	Yes
Child's state fixed effects	No	No	Yes	Yes	Yes	Yes	Yes
Parent's state fixed effects	No	No	No	Yes	Yes	Yes	Yes
Child's county fixed effects	No	No	No	No	Yes	Yes	Yes
Child's census tract fixed effects	No	No	No	No	No	No	Yes
Number of choices	14,530	14,530	14,530	14,530	14,530	6,017	6,017
R^2	0.093	0.107	0.122	0.128	0.229	0.293	0.412

Notes: Standard errors everywhere are clustered at the original PSID family level.

With 7 brands, the “average” baseline market share is about 14%.

Same for Ford vs. GM sample

Dependent Variable: Child's Brand							
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Parent's brand = child's brand	0.143 (0.021)	0.147 (0.021)	0.124 (0.019)	0.118 (0.020)	0.098 (0.020)	0.082 (0.033)	0.089 (0.037)
Month of purchase fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child's demographics	No	Yes	Yes	Yes	Yes	Yes	Yes
Parent's demographics	No	Yes	Yes	Yes	Yes	Yes	Yes
Child's state fixed effects	No	No	Yes	Yes	Yes	Yes	Yes
Parent's state fixed effects	No	No	No	Yes	Yes	Yes	Yes
Child's county fixed effects	No	No	No	No	Yes	Yes	Yes
Child's census tract fixed effects	No	No	No	No	No	No	Yes
Number of choices	7,983	7,983	7,983	7,983	7,983	3,117	3,117
R^2	0.079	0.083	0.106	0.121	0.279	0.325	0.454

This sample's market shares: Ford is 40% and GM is 60%.

Evidence suggests “long run” effects

- Lags of previous parent purchases: coefficients are significant and declining in size
- Individual fixed effects: coefficients remain significant but are much smaller in size
- MSA market shares in 1990: coefficients are large and positive but insignificant

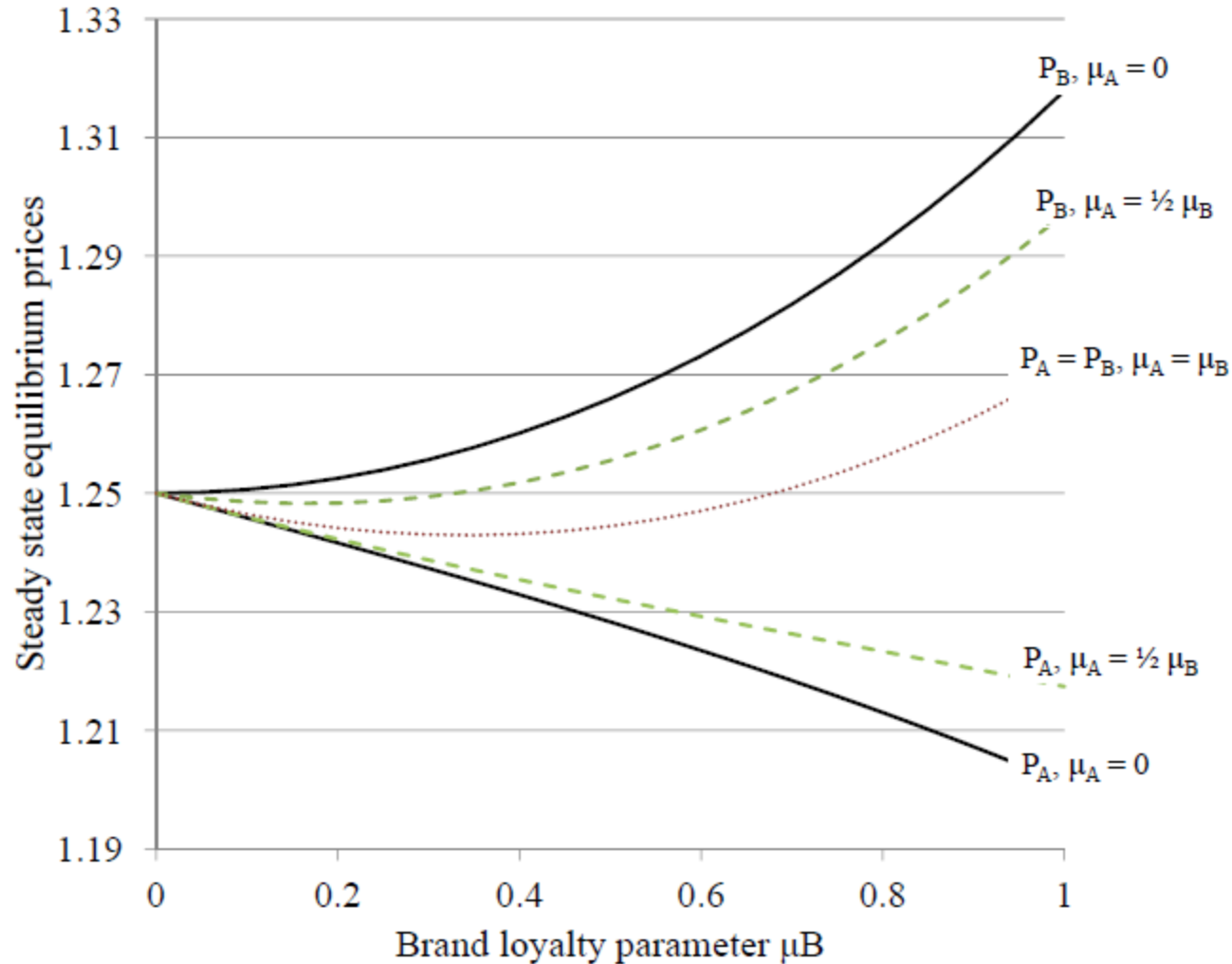
Evidence suggests “choices” matter

- Stronger correlations for vehicles that family members owned a long time vs. ditched early
- Stronger correlations for vehicles that parents purchased while child was still living at home
- Implies parent choices are shifting the child’s preferences (i.e., relevant for auto pricing)

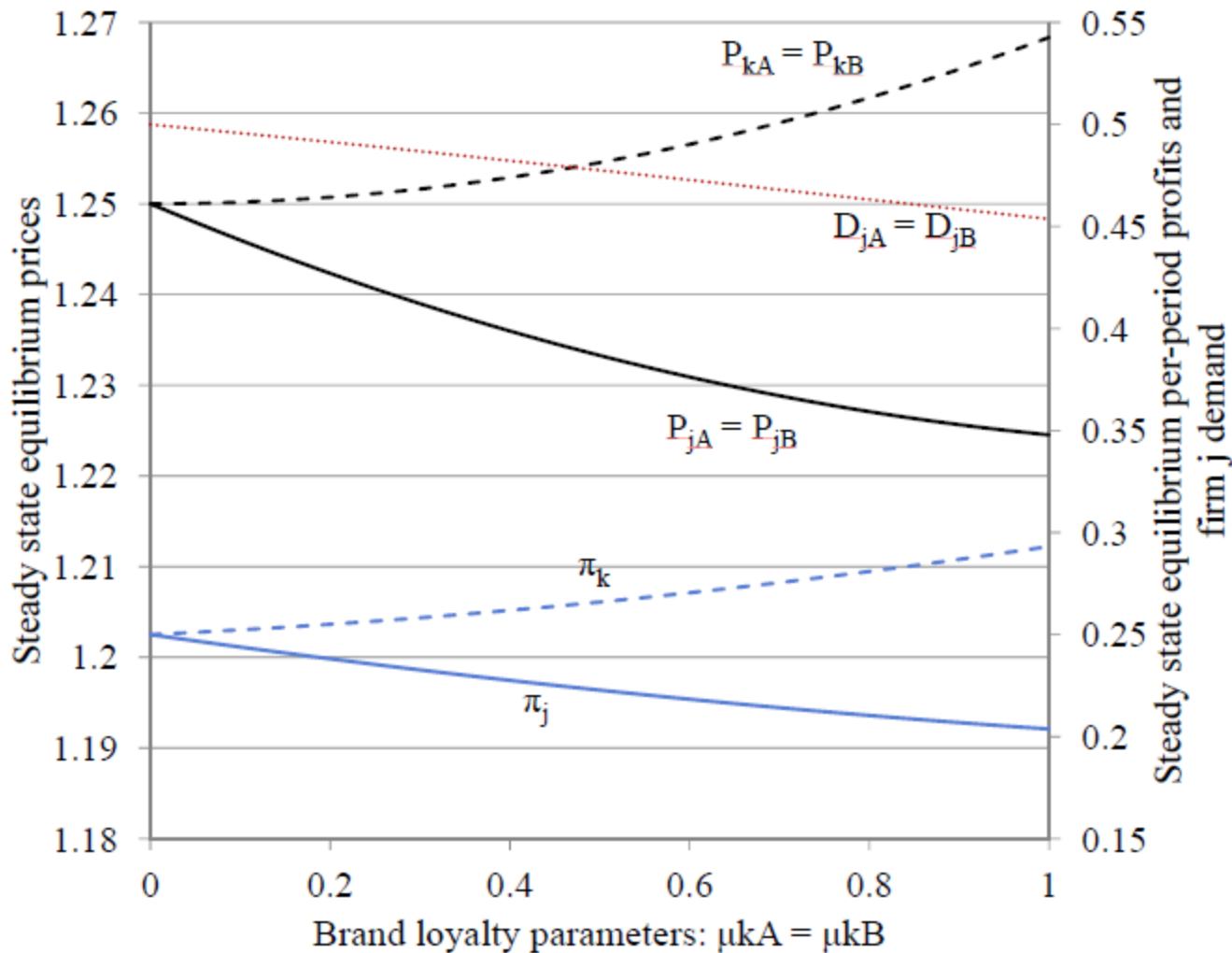
Simple model of optimal pricing

- Market structure and demographics
 - Two identical firms: j and k (e.g., Ford and GM)
 - Two car segments: A and B (i.e., young and old)
 - Consumers live 2 periods: buy in A, buy in B (die and have kids)
- Consumers maximize utility (myopic)
 - Get less utility from brand that has higher price
 - Type B (old): get more utility from brand chosen while young
 - Type A (young): get more utility from brand that parents chose
- Automakers maximize stream of profits (forward-looking)
 - Set prices on Type A and Type B cars given this period's loyalty
 - Prices influence market share and therefore next period's loyalty
 - Tradeoff: lower prices today vs. higher loyalty in future

Loyalty leads to lower prices as firms compete for future customers



But both firms have unilateral incentive to encourage loyalty



Conclusions

- Novel evidence that vehicle choices are driven by choices and/or preferences of family
- Implications for pricing and marketing strategies
- Reinforces desire to have broad product lines?
- Future work will examine fuel economy and related attributes, which are focus of policy