Auto Dealer Loan Intermediation: Consumer Behavior and Competitive Effects

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*The views expressed are those of the authors and do not necessarily reflect those of the Consumer Financial Protection Bureau, the Federal Reserve Bank of Chicago, the Federal Reserve System, or the United States.

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Research Question:

How does intermediation affect consumers?

Motivation

Bundling Loans and other Financial Products

Auto loan market is large:

- Over $1 trillion, third-largest debt market in US

Cars are typically bundled with loan:

- Around 85% of car loans in the US are intermediated by dealers.

Bundling is important for dealers:

- 2011: $>$ 50% of dealer profit from F&I department.

Bundling w/ financial contracts common in other retail markets:

- Consumer durables with financing and warranties.
- Flights/hotels with travel insurance.
- New construction mortgages.

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   - *Imposing only supply-side optimal behavior.*
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4. **Counterfactual exercises**
   - *Imposing demand + equilibrium model.*

The Market

The Setting (for Prime Consumers)

The Typical Financing Process

1. Consumer chooses make, model etc.
2. Dealer checks credit, collects "buy rates" from lenders through e.g. *Dealer Track*, *Route One*, or *Credit Union Direct Lending*.
3. Dealer makes loan offer, including markup over buy rate.
4. Dealer receives payment ("dealer reserve") from lender.
   - Payment = (fixed payment) + (share of markup revenue)
   - Average fixed payment is \$70; average share is .75

78% of loans marked up. Average markup is 108 basis points.

Using Dealers' Problem to Quantify Consumers' Price Responsiveness

Quantification

Intuition

Why do dealers mark up loans?

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- Charging $1 extra on the loan yields 75 cents.

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Intuition

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- Charging $1 extra on the car yields $1.
- Charging $1 extra on the loan yields 75 cents.
- Explanation: Some consumers respond less to finance charges.

One-Period Model

Dealer's Optimal Markup Choice

Consumer i:

- Down payment d_i, car price p_i and interest rate r_i.
- Disutility of p_i is p_i; disutility of finance charges x is $M_i(x) \in \mathcal{C}^2$.
- Requires utility $\bar{u}_i$ to buy car.
- Can finance the car through the dealer or an outside lender.

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Dealer:

- Exogenous buy rate b_i and costs for a car c_i.
- Set p_i and r_i.
- Dealer reserve has slope α and intercept β.

One-Period Model

Dealer's Optimal Markup Choice

Constrained dealer's **maximization problem**:

$$
\begin{aligned}
\max_{r_i, p_i} \quad & (p_i - c_i) + (p_i - d_i) \cdot (r_i - b_i) \cdot \alpha + \beta \\
s.t. \quad & -p_i - M_i((p_i - d_i) \cdot r_i) \geq \bar{u}_i \\
& -M_i((p_i - d_i) \cdot r_i) \geq -\int M_i((p_i - d_i) \cdot r^L) \cdot g_i(r^L) \cdot dr^L - s_i, \\
& r_i \geq b_i, p_i \geq 0
\end{aligned}
$$

Propositions

Details and Proofs in Paper

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3a. Diff. btwn finance charges & disutility of finance charges, $B^O(\$)$

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3a. Diff. btwn finance charges & disutility of finance charges, $B^O(\$)$

3b. Diff. btwn markup charges & disutility of markup charges, $B^M(\$)$

Results

Population Estimates

Table: Summary Statistics of Estimates

Variable	Mean	p10	p25	p50	p75	p90
$M_i'(\cdot)$	0.86	0.77	0.80	0.86	0.91	0.95
$B^O(\$)$	380.12	105.71	186.81	324.33	510.73	721.56
$B^M(\$)$	96.16	0.00	16.56	72.09	145.21	228.07

Note: Selected summary statistics of measures of consumers' sensitivity to finance charges. $M_i'(\cdot)$ and B_i^O condition on positive markups. B_i^M are derived for the full sample.

Interpretation of our Results

Some potential explanations:

1. Sales tax: do the calculations with sales tax τ. ✓
2. Default risk: only prime consumers with default risk $\approx 0.5\%$. ✓
3. Credit constraints / impatience?
4. Prepayment risk?
5. Dealer $\Rightarrow$ lender cooperation?
6. Suboptimal consumer decisionmaking?

Is it Consumer Impatience / Constraints?

Auto loans have fixed payments that fully amortize.

If total costs for a 72-month loan are \$36,000, then consumer pays:

- \$500 a month for 72 months, if p_i is \$1 and loan price is \$35,999
- \$500 a month for 72 months, if p_i is \$35,999 and loan price is \$1

Division of costs between car and loan has no effect on payment schedule!
$\Rightarrow$ Impatience/constraints do not affect p_i/r_i tradeoff

What About Prepayment Risk?

Prepayment risk means markups:

- Lower cost for consumers...
- But lower benefit for dealers, who bear "early" prepayment risk

Empirically, higher prepayment risk predicts *smaller* B^O and B^M!

One explanation: dealers care about prepayment risk but consumers focus more on monthly payments (Argyle *et al.* (2019))

What About Dealer-Lender Cooperation?

Do dealers mark up loans to increase lenders' profits, in exchange for future favors?

On average, markups are just 3 basis points higher for lenders that finance $> 20\%$ of a dealer's sales vs. $< 1\%$

Suboptimal consumer decisionmaking?

"Standard industry practice is to [avoid alerting the customer that the dealer] has the ability to control the customer's price of credit. [... This] is particularly successful when used in conjunction with the sale of an automobile, because the credit applicant's attention is naturally focused on the price of the automobile [...]."[1]

CFPB, FTC, FCA, and CRL have all found supporting evidence.

[1] Expert Report of Edward Ford Jr. in the matter of Addie T. Coleman et al. vs GMAC, August 21, 2003.

Suboptimal consumer decisionmaking?

Interpretation consistent with our data as well.

Table: OLS Regressions of Bounds on Observables

	Overall Bound B_i^O		**Markup Bound** B_i^M	
	(1)	(2)	(3)	(4)
Log Monthly Income	-9.277***	−8.688***	−1.847***	−1.528***
	(0.262)	(0.261)	(0.135)	(0.135)
Credit Score, 100 points	-29.99***	-30.02***	-3.576***	-3.588***
	(0.386)	(0.386)	(0.197)	(0.198)
Mileage, Tens of Thousands	5.054***	5.014***	-0.602***	-0.625***
	(0.081)	(0.081)	(0.039)	(0.039)
New Car	-4.931***	-4.915***	-8.058***	-8.058***
	(0.411)	(0.411)	(0.232)	(0.232)
Log Loan Amount	393.8***	393.4***	87.72***	87.51***
	(0.951)	(0.950)	(0.324)	(0.324)
Average Years of Education		-3.734***		-1.028***
		(0.336)		(0.208)
Internet Access Quality		-8.425***		-8.531***
		(1.469)		(0.895)
Fixed Effects				
Lender	Yes	Yes	Yes	Yes
Model	Yes	Yes	Yes	Yes
State	Yes	Yes	Yes	Yes

Full Equilibrium Model

Full Model Setup

Overview

Model:

- BLP Differentiated Product Bertrand.
- Dealers set prices and interest rates for each model j.
- Lenders compete for loans (d, j)
- Convex functional form, $M_i(x)$, estimated separately.

Estimation:

- Comprehensive market share data from AutoCount.
- Market defined as county. On average 7 dealers per county.

Counterfactuals

Two Experiments

No Wedge:

- Consumers treat charges the same, $M(x) = x$.

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No Wedge:

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No Discretion:

- Dealers take interest rates as given.
- **Effects:**
  1. Lenders have less information $\Rightarrow$ less price discrimination.
  2. Double marginalization.

Counterfactuals

Two Different Experiments

Outcome Measure	**Baseline**	**No Wedge**	$\Delta\%$	**No Dealer Discretion**	$\Delta\%$
Total Price $(p \cdot (1+r))$ **($ 1000)**	30,688	30,518	-0.55	30,406	-0.92
Car Price ($ 1000)	27,071	27,524	1.67	27,862	2.92
Interest Rate (r)	12.61	9.99	-20.76	9.15	-27.4
Cons. Surplus ($\hat{\rho}$) ($ Billion)	41.54	42.23	1.67	41.79	0.62
Cons. Surplus ($\rho = 0$) ($ Billion)	36.97	38.55	4.26	38.17	3.24
Dealer Profits ($ Billion)	3.61	3.19	-11.58	3.48	-3.67

Note: This table shows counterfactual outcomes for two different scenarios. In scenario **No Wedge** $M(x) = x$. In scenario **No Dealer Discretion** lenders set interest rates directly and dealers compete downstream in prices taking them as given. All numbers are averages across all markets, which according to our definition are counties.

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Summary

Use contracts to quantify buyers' disutility for loan vs car:

- Average "disutility" from finance charges at least $380 less than cost
- Difference between disutility and cost larger for consumers with lower income, credit scores, education, internet access
- **No Wedge** & **No Dealer Discretion** $\Rightarrow$ large decreases in prices & increases in consumer welfare, whether or not consumers care less about finance charges.

Thank you!