

**Dealer Price Discrimination in New Car
Purchases: Evidence from the Consumer
Expenditure Survey.**

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Ayres (1991), Ayres and Siegelman (1995): relationship between dealer prices and buyer specific attributes: race, gender.

Dealer's initial offer to white females: \$200 higher than those of white males. Final offer: \$130 higher.

Black females: Initial offer: \$450 higher than those of white males. Final offer: \$400 higher

Black males: Initial offer: \$1,100 more than white males. Final offer: \$1,100 higher.

Pairs of testers visit various dealerships in the Chicago area and bargain about the price of the same car. Testers have the same characteristics (age, education, appearance)

Testers are instructed to do the same bargaining strategy.

This paper: use CES (Consumer Expenditure Survey), 1983-1987. Regress discounts on various household characteristics, vehicle characteristics.

Variables such as race and sex have no explanatory power.

Potential reasons for the difference between Ayres' results and those of this behavior.

In the experiments, testers are instructed to adopt the same bargaining strategy. In reality, buyers of different background may have different bargaining strategy.

Blacks may have reservation prices that are more dispersed than whites. Then, the optimal strategy of the seller is to initially offer a high price, and negotiate towards the reservation price. This is not captured when testers are instructed to have the same bargaining strategy.

Quantile regressions: despite equal average prices, the prices of blacks are more dispersed than whites.

II Empirical Framework

CES: Consumer Expenditure Survey: 1983-1987 Households who bought a car from the dealer, who has consistent responses: 1,300 observations.

Automotive News Market Data Book (ANMDB): information on suggested retail prices and options.

$$D_{ijt} = \alpha + \beta H_{it} + \gamma Z_{it} + \delta X_t + \epsilon_{ijt}$$

D_{ijt} : discount for consumer i , model j , time t .

Dealer discount = list price - transaction price.

Dealer discount = [list price - transaction price] / [list price]

Model i consumer j

$$T_{ij} = EXP_{ij} - EX_{ij} - S_i + TRD_i$$

T_{ij} : Transaction Price

EXP_{ij} : net expenditure for purchase

EX_{ij} : extra charge

S_i : sales tax

TRD_i : amount received for trading in an old car.

$$L_j = LB_j + \sum_k O_k \times PO_{kj} + DF_j + DPF_j + C_d$$

L_j : list price

LB_j : suggested retail price of base model

O_k : options

DF_j : destination fee

DPF_j : dealer preparation fees

C_d : dealer specific cost

H_{it} : household characteristics:

- age, race, sex of household head (don't know whether it is the household head who bargained or not).
- asset holdings, after tax income, permanent income: education of household head, white, blue collar, location
- financing: receive loans? Dummy
- prior purchase: first time buyers have higher price elasticities. Trade-in dummy.

Z_{it} : model specific characteristics. Foreign or domestic origin, size, model (standard, SUV, truck), brand.

X_t : time dummies.

OLS Regression Results of discount equation.

Coeff.	estimate	t	Coeff.	estimate	t
age	4.02	1.06	NE	57.00	0.45
minor	-274.62	-1.04	MW	444.23	3.92
female	-129.62	-1.10	WE	-70.87	-0.56
minfem	-21.96	-0.05	finan	63.24	0.49
asset	-0.15E-2	-0.91	dealerf	294.97	2.58
ataxinc	-0.82E-5	-0.33	firstb	444.29	2.51
educ	-25.23	-0.25	tradin	-597.77	-6.84
Whitec.	-117.12	-1.12	Same brand	-20.98	-0.20
rural	-216.89	-1.90			

$$R^2 = 0.180$$

III Estimation Results

- Socioeconomic characteristics are statistically insignificant.
- Cars in Midwest area sell at a discount.
- Discounts are lower in small towns.
- Local competition is an important factor.
- First-time buyers get better deals. Higher price elasticity, lower brand loyalty.

- Tradein: Consumer received lower discounts when they trade in used cars. Less transparent transaction when combined with new car purchase and tradein?

Discrepancy between Ayres and Siegelman (1995) study and this study.

1. Ayres and Siegelman only studies the Chicago area dealerships.
2. Measurement error: Only household info available in this study. It is not known who negotiated.
3. Minorities select different stores: Ayres and Siegelman's results are robust to store location differences.

4. Sample selection bias. Regression only on individuals who purchased an automobile. No sample selection bias is found after reestimating the model. The ML estimates are very similar to the OLS estimate.
5. Dealer bargaining strategy depends not on first moment but on second.

Minority reservation prices are more dispersed than those of whites. Hence, dealer offers higher initial price to minorities, and then through successive bargaining (takes longer for minorities, on average), final offer corresponds to the reservation prices. Ayres and Siegelman cannot capture the above differences because they ask the testers to adopt the same bargaining strategy.

Quantile regression: minorities at the higher end of the discount distribution should receive larger discounts than whites, and vice versa.

Quantile regression equation:

$$Pr(y \leq x\beta) = \tau, \tau = 0.1 \text{ or } 0.9$$

$\tau = 0.1$: looks at the individuals at the lower end of the discounts.

$\tau = 0.9$: looks at individuals at the higher end of discounts.

	$\tau = 0.1$	t-stat	$\tau = 0.9$	t-stat
Age	4.04	0.90	7.72	1.74
Minor	-784.35	-2.87	453.14	1.81
female	190.00	1.52	1.11	0.08
minfem	445.97	1.06	-379.54	-0.86
asset	0.13E-2	0.80	-0.11E-2	-0.66
ataxinc	-0.44E-2	-1.87	-0.17E-2	-0.71
educ	62.04	0.56	-120.69	-1.01
whitec	-232.37	-2.07	48.75	0.39
rural	-222.44	-1.91	-166.03	-1.30
Ne.	311.31	2.43	164.35	1.19
Mw	1,054.67	8.37	361.21	2.57
We	126.39	0.89	-145.66	-1.00

	$\tau = 0.1$	t-stat	$\tau = 0.9$	t-stat
finan	-45.23	-0.30	251.83	1.75
dealerf	251.41	2.06	128.65	0.98
firstb	652.19	2.92	34.57	0.14
tradin	-845.28	-8.97	-359.55	-3.38
Same brand	-208.60	-1.93	49.56	0.45

Minority at 10% quantile: lower discounts than whites, and at 90% quantile, higher discounts than whites.

The variance in deals of minorities is 1.45 times larger than that of whites in the raw data and 1.30 times larger than whites in the OLS residuals.