

Information Disclosure as a
Matching Mechanism:
Theory and Evidence from a
Field Experiments

Dong-Mao Wu (吳東懋)

Lukas Gandajaya (顏恩文)

Uchu Suzuki (鈴木宇宙)

Outline

- Introduction
- Experimental Design
- Result
- Conclusion

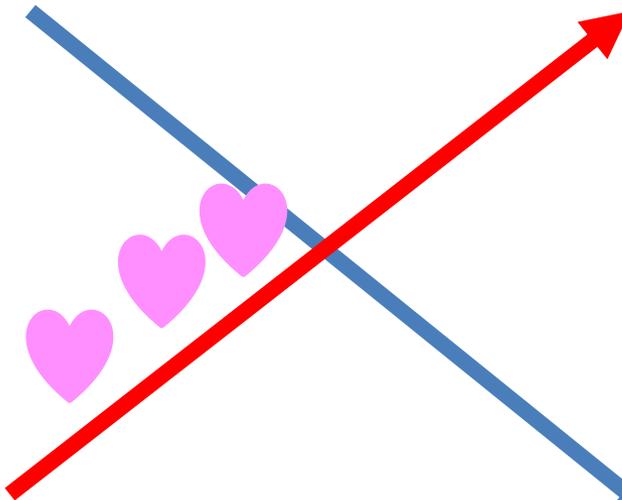
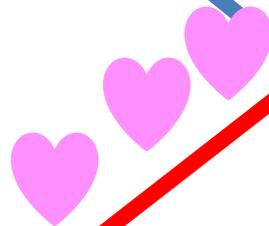
Motivation

- Information disclosure could help bidders in the auctions as the matching mechanism to show them which auction is the right one to participate

How Information Disclosure Works?



How Information Disclosure Works?



Used-Car Wholesale Auctions in U.S.

- Sellers provide used-cars of different qualities
- Bidders with different tastes
- Asymmetric information between sellers and bidders
- Simultaneous English auctions in different “lanes”
- Seller can reject selling to the highest bid without any cost

Why Bidders' Tastes differ?

- Dealer-bidders will resell to customer in their own neighborhoods
- Local tastes shape their values for different qualities of vehicles
 - Consumers in **low-income neighborhoods** prefer **low-quality cars**
 - Dealer-bidders from low-income neighborhoods wants more low-quality cars

Low-quality cars



High-quality Cars



Bidders from **low-income** outbid

Bidders from **high-income**



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Bidders from **high-income** outbid

bidders from **low-income**



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Hypothesis

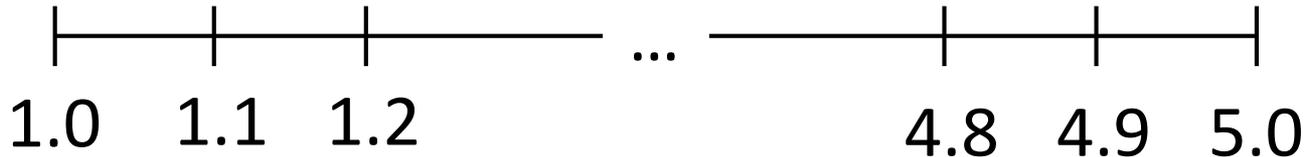
- Information disclosure...
 1. Helps bidder target the cars they choose to bid on
 2. Increases the probability of sale for any given quality level, even larger for qualities at the extremes of the distribution
 3. Affects little on prices of sold cars if reserve prices are adequately set by a patient seller

Experiment Design

- What information was disclosed and withheld?
- What were the treatment and control groups?
- How was the experiment conducted?
- What were the outcomes? How to measure the outcomes?

Standard Condition Score (SCR)

- It covered vehicle's exterior condition, all imperfections, interior condition, but did not cover mechanical condition



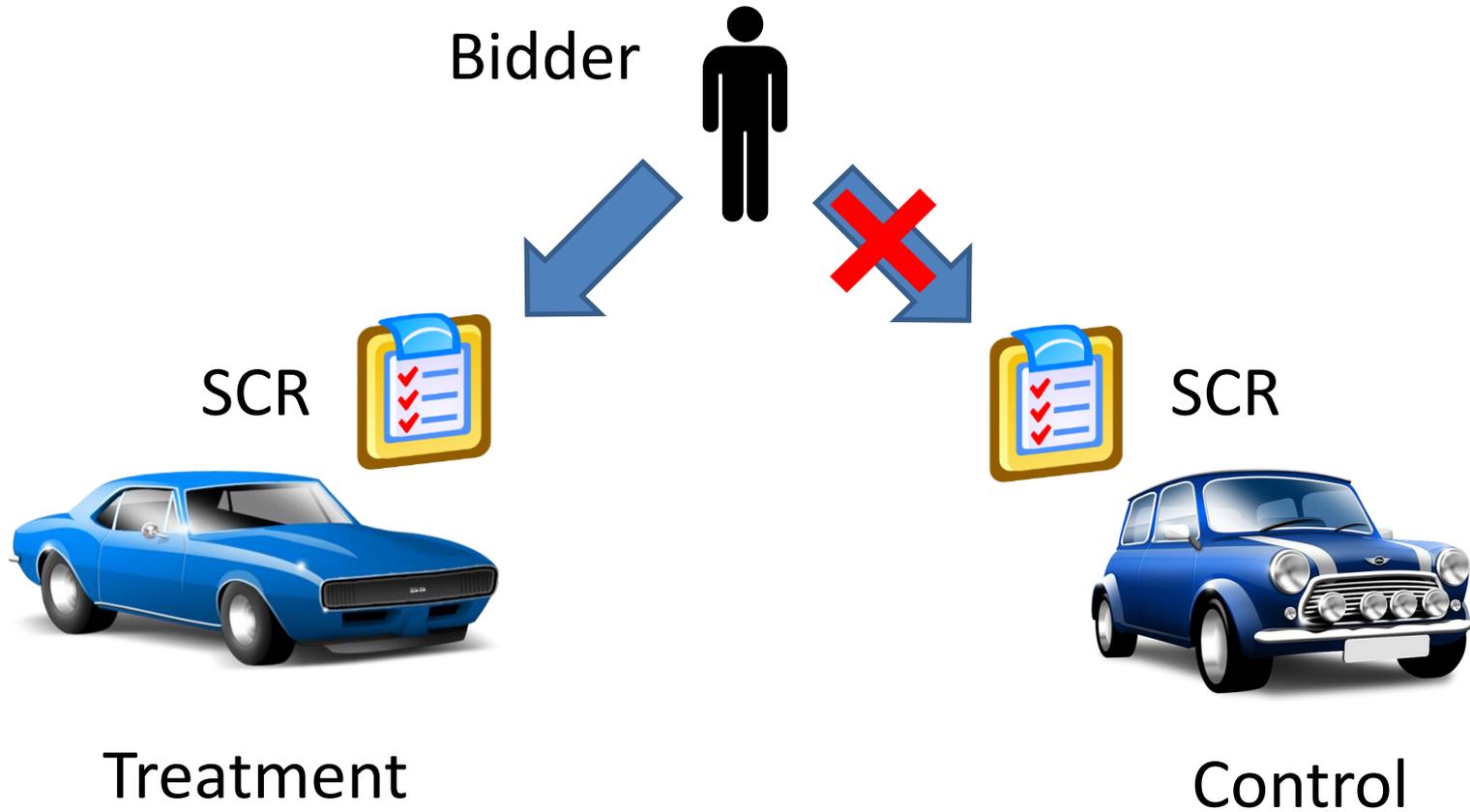
- Estimated costs to correct the reported damages (exterior and interior)



Experiment Design

- What information was disclosed and withheld?
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What were the treatment and control groups?

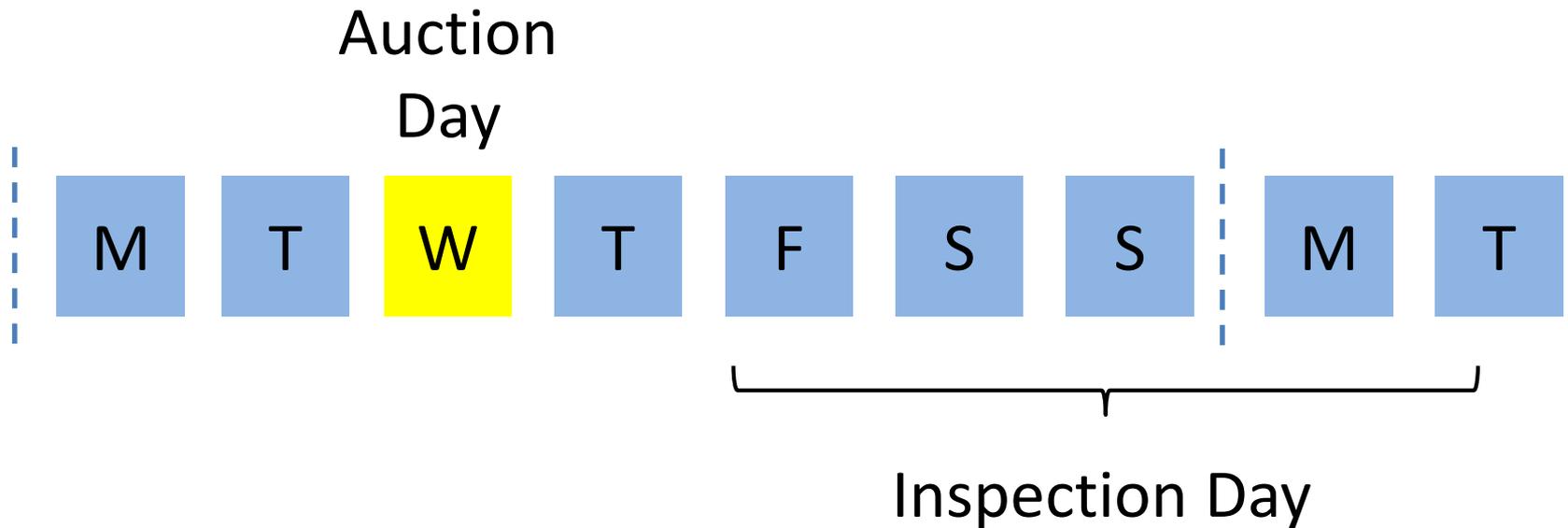


Experiment Design

- What information was disclosed and withheld?
- What were the treatment and control groups?
- How was the experiment conducted?
- What were the outcomes? How to measure the outcomes?

How was the experiment conducted?

- 19-weeks observation was made with one auction within one week



How was the experiment conducted?



Each week, approximately 1500 cars were registered for the auction

How was the experiment conducted?



Each week, approximately **150 – 600** out of 1500 cars were inspected

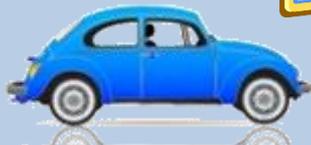
How was the experiment conducted?



The inspected cars were randomly assigned to treatment or control group

How was the experiment conducted?

Treatment



4118 cars



VS.



Control



3980 cars

How was the experiment conducted?

- Randomization check between treatment and control group on their:
 - ✓ Condition score
 - ✓ Repair cost*
 - ✓ Mileage
 - ✓ Model year
 - ✓ National Auction Price

How was the experiment conducted?



10 weeks

9 weeks



Experiment Design

- What information was disclosed and withheld?
- What were the treatment and control groups?
- How was the experiment conducted?
- What were the outcomes? How to measure the outcomes?

What were the outcomes?

- Proportion of cars sold
- Transaction price

Type A



National
Auction
Price
(NAP)

Type B



NAP

Type C



NAP

Type D

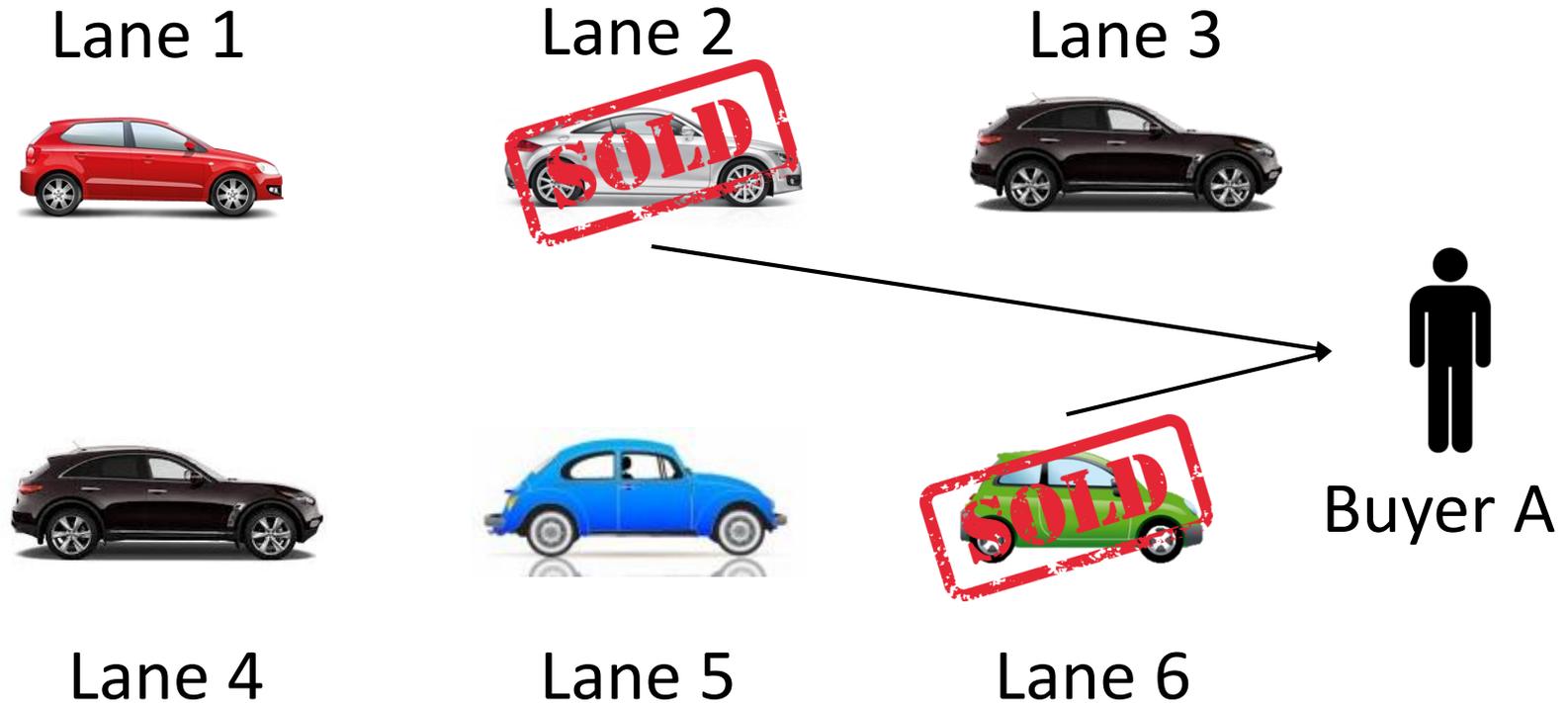


NAP

standardized price = sold price / NAP

What were the outcomes?

- Bidder's behavior



Outline

- Average effect on sales probability
- Average effect on transaction prices
- Hypothesis 1
- Hypothesis 2
- Hypothesis 3
- Conclusion

Average Effects of Information Disclosure

- The effect on sales probability

TABLE 3—SALES PROBABILITY BY EXPERIMENTAL CONDITION

	No posted SCR	Posted SCR	Difference	Percent difference	z-statistic	p-value
Weeks 21–30	0.43 2,605 cars	0.436 2,797 cars	0.006	1.39	0.43	0.66
Weeks 31–39	0.392 1,375 cars	0.455 1,321 cars	0.063	16.1	3.31	0.001

Weeks 21- 30: **not- sufficient** information disclosure

Weeks 31- 39: **sufficient** information disclosure

Average Effects of Information Disclosure

- The effect on auction prices

TABLE 4—TRANSACTION PRICES/NAP BY EXPERIMENTAL CONDITION

	No posted SCR	Posted SCR	Difference	Percent difference	<i>t</i> -statistic	<i>p</i> -value
Weeks 21–30	1.064 1,106 cars	1.058 1,202 cars	−0.006	−0.5	−0.56	0.58
Weeks 31–39	1.035 531 cars	1.055 590 cars	0.02	1.9	1.61	0.11

Weeks 21- 30: **not- sufficient** information disclosure

Weeks 31- 39: **sufficient** information disclosure

Result of Hypothesis 1

- Hypothesis 1
 - Information disclosure **helps** bidders target the vehicles they choose to bid on
 - It is **supported**

Result of Hypothesis 1

- Model

$$Y_i = \alpha + \beta_1 X_i + \beta_2 D_i + \beta_3 X_i D_i + \varepsilon_i$$

Y : the number of lanes where buyers purchased cars

X : the number of cars purchased

D : the dummy term for weeks 31 - 39

XD : the interaction between

the number of cars and the dummy term

ε : the error term

i : weeks (21 ~ 39)

Result of Hypothesis 1

Lane No.	1	2	3	4	11	12
Bidder A							
1 st Car		✓					
2 nd Car		✓					
Y = 1							
Bidder B							
1 st Car	✓						
2 nd Car				✓			
Y = 2							

Result of Hypothesis 1

TABLE 5—NUMBER OF LANES USED BY DEALERS PER WEEK

	All cars	SCR cars	Non-SCR cars
Number of cars	0.47*** (0.05)	0.42*** (0.075)	0.49*** (0.076)
Weeks 31–39	−0.21*** (0.067)	−0.31** (0.12)	−0.17* (0.1)
Weeks 31–39 × Number of cars	0.17*** (0.055)	0.25** (0.098)	0.13 (0.082)
Buyer fixed effects (837)	Yes	Yes	Yes
Constant	0.58*** (0.062)	0.64*** (0.096)	0.55*** (0.096)
Observations	2,690	1,401	1,289
R^2	0.779	0.796	0.843

Notes: Robust standard errors in parentheses. An observation is a dealer-week conditional on the dealer having made any purchases during a week. If a dealer makes any purchases during a week, on average a dealer purchases 1.47 cars per week.

*** Significant at the 1 percent level.

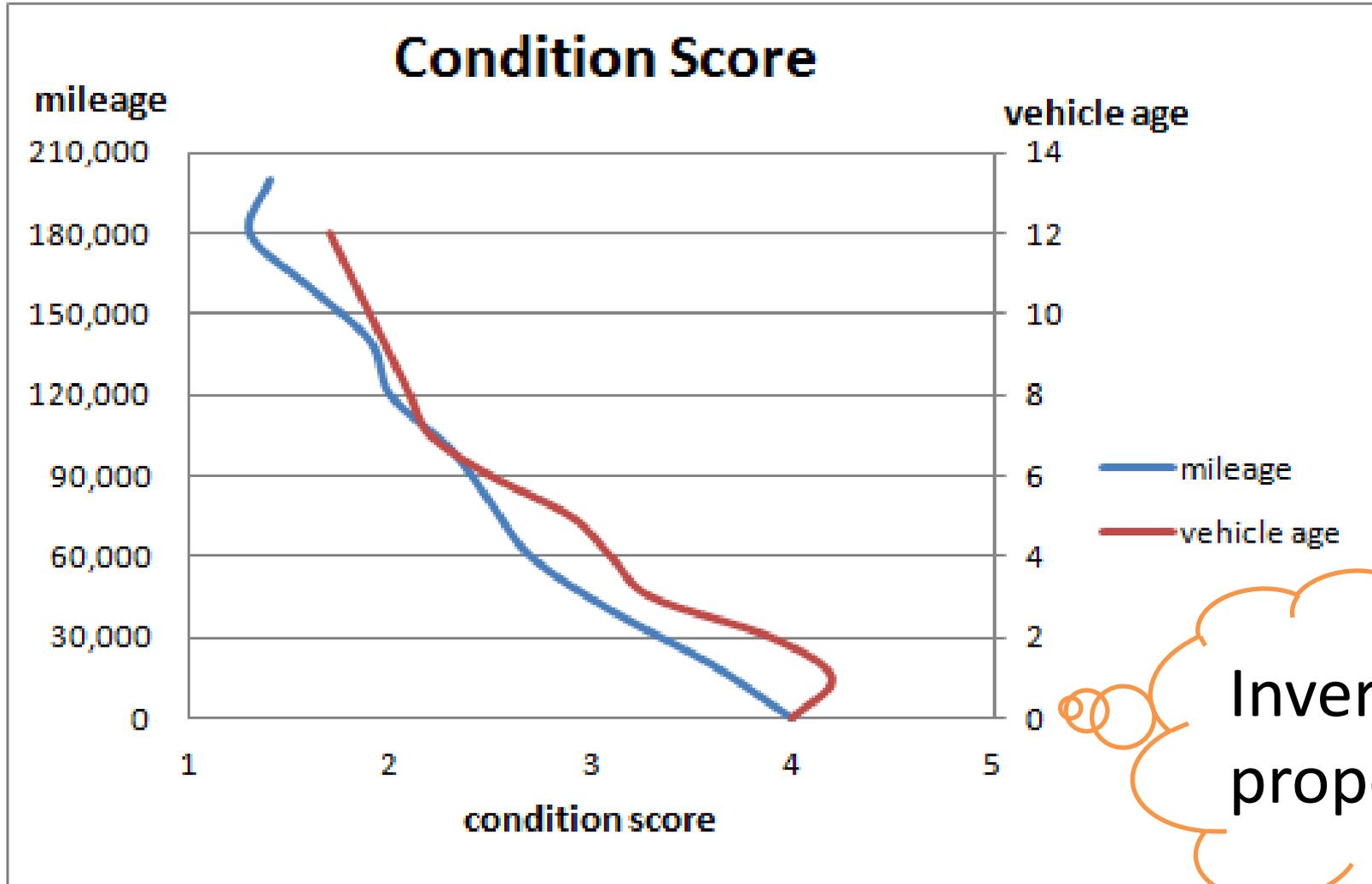
** Significant at the 5 percent level.

* Significant at the 10 percent level.

Result of Hypothesis 2

- Hypothesis 2
 - Information disclosure **increases** the probability of sale **for any given quality level**
 - And, the impact is **larger** for qualities at the extremes of the quality distribution
 - It is **supported**

Result of Hypothesis 2



Inverse proportion

Result of Hypothesis 2

TABLE 7—SALES PROBABILITY BY DIFFERENCE OF EXPECTED CONDITION SCORE (CS), WEEKS 31–39

Tercile of difference from expected CS	Number of cars	No posted SCR	Posted SCR	Difference	Percent difference	z-statistic	p-value
Worse-than-expected	899	0.327	0.411	0.084	25.7	2.61	0.009
Close-to-expected	899	0.429	0.418	-0.011	-2.6	0.34	0.74
Better-than-expected	898	0.419	0.529	0.109	26.1	3.28	0.001

TABLE 8—SALES PROBABILITY BY DIFFERENCE OF EXPECTED CONDITION SCORE (CS), WEEKS 21–30

Tercile of difference from expected CS	Number of cars	No posted SCR	Posted SCR	Difference	Percent difference	z-statistic	p-value
Worse-than-expected	1,802	0.385	0.384	-0.001	-0.3	-0.04	0.97
Close-to-expected	1,800	0.425	0.439	0.014	3.2	0.60	0.55
Better-than-expected	1,800	0.479	0.488	0.008	1.7	0.36	0.72

Car category: actual CS – expected CS

Result of Hypothesis 3

- Hypothesis 3
 - If reserve prices are adequately set by patient sellers, then the impact on prices of cars sold will be **small across all quality levels**
 - It is **supported**

Result of Hypothesis 3

TABLE 9—PRICE/NAP BY DIFFERENCE OF EXPECTED CONDITION SCORE (CS), WEEKS 31–39

Tercile of difference from expected CS	Number of cars	No posted SCR	Posted SCR	Difference	Percent difference	z-statistic	<i>p</i> -value
Worse-than-expected	331	0.978	0.999	0.022	2.2	1.05	0.30
Close-to-expected	381	1.04	1.08	0.035	3.3	1.58	0.11
Better-than-expected	428	1.07	1.08	0.006	0.6	0.31	0.76

Car category: actual CS – expected CS

Conclusion

- Information disclosure gives benefit to all participants
 - It **helps** bidders to choose their car
 - It **increases** sales probability

Thank you for listening!!

謝謝您的聆聽

Terima kasih

ご静聴ありがとうございました