

**“One discriminatory rent” or “double jeopardy”:
Multi-component negotiation for new car purchases**

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“One discriminatory rent” or “double jeopardy”: Multi-component negotiation for new car purchases, Meghan R. Busse and Jorge Silva-Risso*

About half of new car transactions actually consist of two transactions, one in which the customer buys a new car from a dealer, and the other in which the customer sells his or her existing car to the dealer as a trade-in. At most dealerships, both the price of the new car and the price of the trade-in are negotiated. In such negotiations, as a general rule, car dealers are willing to trade off profits made on the new car versus profits made on the trade-in. To an economist, this suggests that the dealer may see the new car customer as the source of a certain amount of extractable profit—“one discriminatory rent”—that can be subdivided into two arbitrary buckets, the new car margin and the trade-in margin. Economic models of bargaining tend to use a similar paradigm, modeling the amount of total economic surplus created by the transaction, and supposing that each party will get a share of that surplus that is determined by the party’s bargaining power. It is usually recognized that there are multiple price mechanisms that could convey the same division of surplus to the two parties.

If this is indeed a good description of how new car negotiations unfold, then an observer comparing a similar set of transactions should expect new car and trade-in profit margins to be negatively correlated. The better the deal the customer gets on a new car, the less good deal one should expect the customer to get on the trade-in.

An alternative view of this multi-component negotiation is that customers or dealers—or both—view the transaction as two separate negotiations, and that customers are exposed to “double jeopardy.” Car dealers are generally believed to make inferences about how big a profit opportunity a particular customer is likely to be based on their interactions with the customer. If that inference corresponds to what economists would think of as the customer’s type, or the degree of bargaining power that the customer has, then it may be that customers tend either to do

well in both the new car and the trade-in negotiations, or to do poorly in both. If this is the case, then one should expect to see new car and trade-in margins be positively correlated, among similar transactions.

In this paper, we investigate empirically which of these two patterns is more prevalent by using a large dataset of detailed information on individual new car transactions. Our results yield insights on how car dealers and new car customers think about new car negotiations, and what the implications are for the division of surplus between the two parties.

I. Data

We use detailed data on individual automobile transactions from a sample of 20% of all dealerships in the U.S. from July 1, 2005 to December 31, 2007, a time period that corresponds roughly to the 2006 and 2007 model years. The data were collected by a major market research firm, and include every transaction that occurred within the time period for the dealers in the sample. For each transaction we observe the exact vehicle purchased, the price paid for the car, the dealer's cost of obtaining the car from the manufacturer, information on any vehicle that was traded in, and (census-based) demographic information on the customer.

We are interested primarily in the relationship between two variables: the dealer's profit margin on the new car and the dealer's profit margin on the trade-in car. The dealer's profit margin on the new car is measured as the purchase price for the new car negotiated between the buyer and the dealer *minus* the invoice price paid by the dealer to the manufacturer to obtain the car *minus* the costs of any after market options (such as upgraded tires or sound system) installed by the dealer. We measure the dealer's profit margin on the trade-in as the "actual cash value" of the trade-in as booked by the dealer *minus* the price of the trade-in negotiated between the new car buyer and the dealer. (In industry jargon, this would be the negative of the trade-in-

overallowance.) We have good reason to believe that the “actual cash value” is indeed the dealer’s best assessment of the market value of the trade-in car. It is an internal number for the dealership’s use; it is not seen by the buyer, and therefore has no relevance to the negotiation.

III. Empirical approach

We would like to use an empirical approach that implements the following experiment. Suppose that we could observe two different customers negotiating with a dealer over prices for two identical new cars and two identical trade-ins. Suppose that we observed that the agreed-upon new car price was higher in one of the transactions than in the other. We then would like to compare the two trade-in prices. If the trade-in margin were lower in the transaction with the higher new car margin by exactly the amount that the new car margin was higher, then the difference in the two margins would be exactly offsetting, and the dealer’s total profits (and consumers’ surpluses) would be the same in the two transactions. This would be evidence for “one discriminatory rent” in car negotiations. Alternatively, if the dealer trade-in margin were also higher in the transaction with the higher new car margin, then that would suggest that the worse a customer does in one negotiation, the worse he or she will do in another. This would be evidence for “double jeopardy.” Finally, there is an intermediate case: if the trade-in margin were lower in the transaction with the higher new car margin, but not by as much as the new car margin is higher, then that would be evidence that buyers are able to *partially* substitute a lower trade-in margin for a higher new car margin, but that the dealer gains to the extent that the two margins do not completely offset each other. This intermediate case might be called “incomplete substitution.”

Because our data contain a large number of individual transactions, we can implement something quite close to the above by using carefully matched pairs of transactions. Specifically,

we start with the subset of transactions that involve a trade-in. Among these, we group transactions by calendar month, dealer, the “car type” of the new car (where “car type” is the interaction of make, model, model year, trim level, doors, body type, displacement, cylinders, and transmission), and the trade-in car.

Grouping by trade-in cars requires several judgment calls. In any given month, there is much greater heterogeneity in the pool of trade-in cars transacted than in the set of new cars transacted. Thus, if we try to group by trade-in “car type,” we get many small—even singleton—groups. We consider two alternative approaches. One approach is to group based on the make, model, and model year of the trade-in car. (This approach will group together trade-in cars that have different mileage and different states of wear-and-tear.) The other approach is to group according to the actual cash value (rounded to the nearest \$500) of the trade-in car. (This approach will put different kinds of trade-in cars into a single group, but will keep the trade-in cars within a group to cars of very similar value). In the results presented below, we group on the basis of actual cash value since it ultimately yields more matched pairs, and since the results (unreported) when matching on trade-in make, model, and model year are almost identical.

Within each group defined by calendar month, dealer, new “car type” and trade-in actual cash value, we match the transactions randomly into pairs (drawing without replacement). This gives us more than 90,000 transaction pairs. In each pair, we label the transaction with the higher new car margin as *Transaction A* and the transaction with the lower new car margin as *Transaction B*. We calculate $NewCarMarginDiff = NewCarMargin_A - NewCarMargin_B$ which—by construction—is always positive. We then calculate $TradeInMarginDiff = TradeInMargin_A - TradeInMargin_B$. We will investigate how this difference in trade-in margins compares to the difference in new car margins.

III. Results

We begin by estimating the following regression:

$$(1) \quad TradeInMarginDiff = \alpha_0 + \alpha_1 NewCarMarginDiff + \varepsilon.$$

If α_1 equals -1, then new car margin increases are associated (on average, across customers in our data) with one-for-one decreases in trade-in margins. If α_1 is between -1 and 0, then trade-in margin decreases are associated with new car margin increases, with the extent of the substitution being lower (and dealers being better off) the closer α_1 is to 0. If α_1 is greater than zero, then increases in new car margins are associated with increases in trade-in margins.

Table 1

	1	2
	<i>TradeInMarginDiff</i>	<i>FinanceMarginDiff</i>
<i>NewCarMarginDiff</i>	- 0.856 (0.00434)	0.0636 (0.00241)
<i>Constant</i>	421.081 (5.807)	38.478 (4.358)
<i>Number of observations</i>	90,472	86,674
<i>R²</i>	0.615	0.0154

Column 1 of Table 1 reports the results of estimating Equation 1. The estimated α_1 coefficient is -0.856. This suggests that customers who pay dealers higher new car profit margins (for the same new “car type” at the same dealer in the same month using a trade-in of very similar actual cash value) give dealers lower profit margins when they sell dealers their trade-ins. However, the lower profit margins on the trade-ins don’t fully offset the higher new car profit margins that they pay. One way to interpret this is that customers do recognize that the profit margins on the two components of the transactions are linked, but that they fail to negotiate prices that reflect their being fully substitutable.

While Equation 1 measures the relationship between new car margins and trade-in margins in the data, there may well be significant heterogeneity across customers in this relationship. Most people's anecdotal experience is that some customers like negotiating, are good at it, and tend to get good prices, while the opposite is true for other customers. Previous research has shown more systematically that this is true (Fiona Scott Morton, Florian Zettelmeyer, and Jorge Silva-Risso, 2006). Evidence that suggests the existence of such heterogeneity can be seen in a histogram of the ratio of *TradeInMarginDiff* to *NewCarMarginDiff*, presented in Figure 1 of the online appendix. The distribution of this ratio, which is closely related to α_i is quite broad and flat, with a gentle peak that coincides (more or less) with the coefficient estimate of -0.856.

Next, we consider an additional profit margin for dealers, which is the profit margin from financing and insurance. This profit margin comes from three sources. First, if a customer obtains financing through the dealership, the dealer can try to mark up the interest rate at which the financing institution is willing to fund the loan. For example, the financing institution may be willing to lend money to the customer at 6%; the dealer can instead offer the customer a rate of 8%. If the customer agrees, the dealership keeps the difference as profits. This profit margin also contains the profit the dealer makes on life and accident insurance, and on service contracts.

We re-estimate Equation 1, substituting the financing and insurance margin for the trade-in margin. Specifically, we estimate:

$$(2) \quad \text{FinanceMarginDiff} = \gamma_0 + \gamma_1 \text{NewCarMarginDiff} + \eta.$$

The coefficient estimates are reported in Column 2 of Table 1.

In these results, we find a dramatic contrast to the trade-in margin results. While the trade-in margin results suggested that car buyers are pretty good at making sure that new car

margin increases are compensated by trade-in margin decreases, they fail to do this in the financing margin. In fact, the higher the profit margin the dealer earns on the new car, the higher the profit margin the dealer earns on financing. Specifically, the coefficient estimate is that for every \$100 increase in new car profit margin, the financing profit margin rises by \$6. (Note that this is not a scale effect. It is not driven by the amount financed increasing as the new car price increases, but by the profit *margins* increasing together). This suggests that while customers manage to hold dealers to “one discriminatory rent” (at least to some extent) when they negotiate new car and trade-in prices, they are exposed to “double jeopardy” when negotiating financing.ⁱ

One might ask why customers appear to do better in negotiating prices for their trade-ins than they do in negotiating financing terms. A simple explanation might be that customers do not realize that financing terms are negotiable. Another possibility is that customers negotiate prices with the salesperson and financing terms with the “F&I guy.” The commission structure within dealership may lead these two employees to care about their individual margins rather than about the total profits of the dealership. An alternative explanation is posed by Rui (Juliet) Zhu, Xinlei (Jack) Chen, and Dasgupta (2008). They hypothesize that customers keep a “mental account” with regards to their cars. The purchase of a car opens an account, with a negative entry equal to the purchase price. The sale of the car as a trade-in closes the account, and Zhu, Chen and Srabana Dasgupta (2008) hypothesize that a customer will want to get as high a price for the trade-in as possible, in order to minimize the losses in their mental account, even if it means paying a higher price for their new car. Such behavior is consistent with the beliefs of car dealers that some customers care a lot about the trade-in price of their cars.ⁱⁱ

We can examine whether there is any evidence for this behavior in our data by dividing the sample into two subsets, one containing transactions in which customers sell their trade-ins at

prices *above* the actual cash values of the trade-ins, and one containing transactions in which customers sell their trade-ins at prices below their actual cash values. A customer who maintains a mental account for his or her car or who is emotionally attached to it is much more likely, presumably, to be in the first group than the second. We then redo the entire analysis on these two groups separately: we group transactions within these two subsets on the basis of new “car type,” dealer, month of sale, and actual cash value of trade-in; we randomly match transactions within these groups; we calculate the new car and trade-in margin differences, and we re-estimate equation 1.ⁱⁱⁱ

Table 2

	1 <i>TradeInMarginDiff</i> (Trade-in price > Actual cash value)	2 <i>TradeInMarginDiff</i> (Trade-in price < Actual cash value)
<i>NewCarMarginDiff</i>	- 0.902 (0.00555)	- 0.134 (0.0378)
<i>Constant</i>	269.775 (10.565)	114.663 (33.972)
<i>Number of observations</i>	22,081	8,531
<i>R²</i>	0.720	0.036

The results are reported in Columns 1 and 2 of Table 2 and differ starkly between the two subsamples. For customers who are paid more than the actual cash value of their trade-in (namely, customers whom we infer are more likely to care a lot about getting a good trade-in price), the estimated α_1 coefficient is -0.90, which suggests that among these customers, if one customer pays a higher new car margin than another customer, the trade-in margin the first customer negotiates is, on average, lower than the trade-in margin negotiated by the second customer by 90% of the difference in new car margins. For customers who are paid less than the actual cash value of their trade-in (namely, customers whom we infer are less likely to care about

the trade-in price), the estimated α_l coefficient is -0.13. Among these customers, if one customer pays a higher price for the new car than another customer, the first customer, on average, recoups very little of that by negotiating a higher trade-in price than the second customer.^{iv}

These results are consistent with an overall model of bargaining behavior in which individual customers vary a lot in how they deal with negotiating over multiple components at once. Customers appear to do better the more they realize that individual components are negotiable (trade-in vs. financing), and the more attuned they are to obtaining favorable terms on each component of the negotiation.

IV. Conclusion

We investigate the correlation in the profit margins negotiated between automobile customers and dealers for separate components of a new car transaction. We find that the dealer's profit margin on the new car and on the trade-in are generally negatively correlated, which suggests that customers recognize that these are two substitutable components of the dealer's overall profit margin. However, the two profit margins do not reflect one-for-one offsets, suggesting that when the dealer is able to push up one of the profit margins, customers do not manage to negotiate a decrease in the other profit margin that is large enough to offset the increase. There is heterogeneity in this effect, however, some of which may be related to how much the customer cares intrinsically about the price of the trade-in.

We find a very different pattern for new car profit margins and financing and insurance profit margins. For these margins, we find that higher new car margins are associated with higher financing profit margins, which suggests that customers are less successful in holding dealers to "one discriminatory rent" with respect to these two margins, and may be more exposed to "double jeopardy."

References

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ⁱ There is heterogeneity in this result, as there is in the trade-in result. Figure 2 in the online appendix presents a histogram of the ratio of *FinancingMarginDiff* to *NewCarMarginDiff*. As for trade-ins, the distribution is broad and flat, with a gentle peak located roughly at the estimated coefficient.

ⁱⁱ "In the carefully choreographed dance that is taught to car salesmen all over the country, the key element is to identify which of these elements is the most important to the customer. They can then use this information to meet the customer's goals while making their profit from other areas." Simon Duffy, "The Art of Negotiating the Best Car Deal" posted at <http://www.buyingadvice.com/negotiating.html>, accessed January 10, 2008.

ⁱⁱⁱ Note the variables in the regression are margin differences between customers, not margins themselves. As a result, even though we divide transactions into those with positive trade-in profit margins and those with negative trade-in profit margins, the *differences* between the margins for two transactions in either set can be either positive or negative

^{iv} The estimate of γ_1 in the financing and insurance margin specification is very similar in the two samples: 0.072 for customers who negotiate trade-in prices above the actual cash value of their trade-ins, and 0.097 for customers whose trade-in prices are below the actual cash value.