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## Abstract

Using data from the eBay car auction market, we test several predictions related to warranty, seller reputation, and buyer experience in determining the final prices. The existence of a warranty significantly generates a price premium, but the magnitude decreases when the seller has a more established reputation. Further, in contrast to private sellers, professional dealers, who are the “repeated-game players” in the market, benefit less from a warranty, and moreover its substitutability for seller reputation becomes insignificant. In addition, a more established buyer with greater experience is willing to pay less for a warranty or for a professional dealership.

## Introduction

Information asymmetry is one of the most serious ‘frictions’ in markets, reducing confidence in trading between sellers and buyers. An extensive amount of literature has discussed the use of different market-signalling instruments to signal quality of products and services and to improve trading opportunities. Most of the previous studies have only looked at the signalling effects of a single instrument. However, it remains unclear when there exist multiple signalling instruments.

To provide some insights, in the current study we examine seller reputation and warranty, which are commonly used as signalling instruments. More specifically, we look at the following **questions**: (a.) How does price premium of a warranty change with varying levels of seller reputation? (b.) How does the substitutability of warranty for seller reputation change across different seller types? (c.) How do buyers with different levels of market experience respond to both instruments?

This study is related to two strands of previous work: The literature on the effects of warranties on buyer demand and seller revenue, see Choi and Ishii (2010); Lewis (2011) for examples. The literature on online reputation systems: Houser and Wooders (2006), Bolton, Greiner, and Ockenfels (2013) for examples. The study is closely related to two studies: Roberts (2011) studied that a market-level warranty cannot substitute for an individual sellers reputation. Elfenbein, Fisman, and McManus (2012) studied that charity donations can accelerate the speed of reputation development.

## Data and Matching Strategy

**eBay Car Auction Markets:** Auction format is a variant of a second-price auction with a specified ending time. Sellers can customize their listings by choosing start price, secret reserve, listing days, shipping, etc. For cars, some standardized and mandatory information are required to provide, like maker, year, mileage, etc. (a.) Warranty Dummy:  $W=1$  if “Existing warranty” or any specified warranty information under “Enter your own choice;”  $W=0$  if “NO existing warranty” or “Unspecified” or the lack of a warranty under “Enter your own choice.” (b.) A feedback score is the record of overall responses for a market participant. The higher feedback score of a buyer or a seller reflects the more trading experience. Seller feedback score (SFeed) can be used as the measurement of seller reputation.

**Data:** The usable data consist of 9005 successfully sold car auction listings, with 92150 bidders. On average, cars are relatively new (2.65 years and 29040 miles) and each listing attracts 10 bidders. Start and final prices are 3774 and 20328, respectively. 1000 professional dealers and 1333 private sellers offer 7358 and 1647 car auction listings, respectively. Professional dealers (mean feedback scores of 1151) have more experience than private sellers (mean feedback scores of 151). Approximately 52% have a warranty status equal to one, or 4668 auctions.

**Matching Strategy:** auctions are matched into groups with the same seller identity, body type, start price but with variations in the warranty status. We use eBay usernames for professional dealers as seller identities, and geographic location (state level) and feedback score quartile for private sellers as seller identities. In the matched sample there are 3722 auction listings and each group has 18 car auction listings on average. 3476 auctions matched into 130 groups are listed by professional dealers, and 246 auctions matched into 76 groups are listed by private sellers.

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## Results

Our baseline model:

$$\ln(\text{Final Price}_{ig}) = \alpha_g + \beta W_{ig} + \gamma W_{ig} \times \ln(\text{SFeed}_{ig}) + \delta \text{Controls}_{ig} + \varepsilon_{ig},$$

where  $g$  indexes a group of matched listings and  $i$  indexes a specific listing within the group.  $\alpha_g$  captures the group fixed effect and  $\varepsilon_{ig}$  is an error term that captures unobserved characteristics varying with the group. Controls contain the natural log of car age, the natural log of mileage, whether the car is used, the number of photos, who pays shipping costs, secret reserve status, listing duration, ‘Buy-It-Now’ option, whether the listing ends with the ‘Buy-It-Now’ option, number of entering bidders, and the week-fixed effects.

Our **main results** can be summarized as follows: A warranty as a signal of quality increases buyers’ willingness to bid; a seller with a more established reputation (higher seller feedback score) will obtain a relatively lower premium from a warranty; compared to professional dealers, private sellers enjoy more benefits from warranties; there exists a significant substitution between warranties and feedback scores for private sellers but not for professional dealers; a buyer with more experience is less willing to pay a premium for the presence of a warranty or for a professional dealership.

**Table 1.** The Impacts of Warranty and Substitution for Seller Feedback Score

	Ln(Final Price)	Ln(Final Price)	Ln(Final Price)
W	0.109*** (0.03)	0.602*** (0.16)	0.527*** (0.09)
W x Ln(SFeed)		-0.088*** (0.03)	
W x Dealer			-0.481*** (0.09)

**Table 2.** Different Sellers, Bidder Experience, and Willingness to Pay

	Ln(Final Price) Private	Ln(Final Price) Professional	Ln(Final Price)	Ln(Final Price)
W	1.267*** (0.39)	0.232* (0.13)	0.359*** (0.03)	
W x Ln(SFeed)	-0.155* (0.08)	-0.032 (0.02)		
W x Ln(BFeed)			-0.015*** (0.01)	
Dealer				0.164*** (0.06)
Dealer x Ln(BFeed)				-0.044*** (0.01)

## Robustness Checks

- A similar pattern is observed when the final price is replaced by the third, fourth, and fifth highest bids received in the auction listings.
- There exist no impacts of a warranty on bidders’ entry and bidding times.
- A similar pattern is observed with specified warranties, including “Day and/or mileage,” “Parts,” “Existing Warranty.”
- Across the four sub-categories of “Sedan and Hatchback,” “SUV,” “Coupe and Convertible,” and “Van”, most of our empirical findings still hold.

## Conclusions

We focus on eBay’s car auction market and examine seller reputation and warranty. Our findings show (a.) A sellers enjoys a price premium from the warranty. But this benefit decreases as the seller’s feedback score increases. (b.) The substitution is significant for private sellers (one-shot players) but not for professional dealers (repeated-game players). (c.) A more experienced buyer would rely less on signalling mechanisms to determine his or her willingness to pay.

## References

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