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Multidimensional quality sorting between online and offline auctions: The role of attribute transparency☆

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ABSTRACT

We analyze how sellers of used construction equipment sort products between online and offline auctions based on the quality and transparency of different machine attributes. Sellers are more likely to offer machines online if quality is high for attributes whose integrity can be measured via photo (e.g., appearance) and more likely to offer machines offline if quality is high for attributes whose integrity is more reliably evaluated in person (e.g., engine). Quality averaged across all attributes is unrelated to auction choice, meaning standard tests of adverse selection can mask the subtle but significant effects of asymmetric information in this market.

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1. Introduction

Consumers purchase goods from a variety of outlets, ranging from in-person venues that allow for detailed product inspection to online platforms in which product inspection must rely upon photos or other noisy quality signals. In markets where quality is heterogeneous, like used cars, one might imagine an Akerlof-style sorting result with sellers directing lower quality goods online where consumers find quality verification difficult. However, the persistence of online sales of used cars, equipment and other goods of heterogeneous quality suggests that, rather than completely unraveling due to adverse selection, consumers are willing to risk lower quality and interpret noisy quality signals in order to enjoy enhanced search efficiencies, lower transactions costs and the other conveniences offered by online platforms.

In this paper, we ask the following question: for multi-attribute products where detailed photography makes some aspects of quality transparent in both online and offline platforms, will equilibrium outcomes necessarily result in lower quality products being sorted online? For example, for used cars, a seller can post photos online to capture the appearance of a car's interior and exterior in detail similar to that available to the in-person buyer. Of course, detailing the condition of an engine or transmission to online audiences in such a credible fashion is more difficult, leaving one to wonder whether the symmetry of information concerning the car's general appearance across platforms can offset the asymmetry of information about other systems and reverse lemons-style sorting tendencies across platforms.

In our empirical investigation, we analyze how sellers of used skid steer loaders, complex machines used in construction and farming, sort products between online and traditional offline auctions based on the quality and transparency of different machine attributes. Mechanics assess attribute-specific quality through detailed inspection of a random sample of machines offered for sale in a single regional market. We then estimate the probability that a machine is offered online rather than offline as a function of machine attributes requiring simple verification (e.g., age, size) and attributes requiring complex assessment of vertical quality (e.g., general appearance, engine). Sellers are more likely to offer machines online if quality is high for systems whose integrity can be measured via photo (e.g., general appearance) and are more likely to offer machines offline if quality is high for systems whose integrity is more reliably evaluated in person (e.g., engine). The seller's choice of auction is unrelated to quality averaged across all systems, meaning tests of adverse selection based upon global quality measures mask the subtle but significant effects of asymmetric information in this market.

The findings correspond to predictions from our novel model of a seller's choice of auction platform. Sellers have a good with two attributes where the transparent attribute has quality that is observed regardless of the platform (e.g., general appearance) while the opaque attribute has quality that is opaque to online bidders but transparent to offline bidders (e.g., engine). Sellers offer the good in either an online or offline auction. We model the seller's sorting decision as an informative signal that bidders use to update

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