# Goodwill Can Hurt: A theoretical and experimental investigation of return policies in auctions

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## ABSTRACT

Will generous return policies in auctions benefit bidders? We investigate this issue using second-price common-value auctions. Theoretically, we find that the symmetric bidding equilibrium is unique unless returns are free, and when returns are free there exist multiple equilibria with different implications for sellers. Moreover, more generous return policies mitigate the winner's curse, but also push the bids higher, thus hurting bidders by eroding their surplus. In the experiment, bids increase and bidders' earnings decrease with more generous return policies as predicted. With free returns, many bidders bid above the highest possible value, subsequently returning the item regardless of value. Though consistent with equilibrium behavior, this is not optimal for sellers.

## 1. Introduction

The rapid growth of Internet commerce has resulted in the development of online auctions as a popular trading method over the past decades. Return policies are widely available in such online auctions. Return policies permit auction winners to change their minds by paying a pre-specified penalty fee when they receive relevant ex-post information after the auction concludes. A recent search for antique auctions on eBay.com yielded 35,758 such auctions with 23,014 (64%) of the sellers offering a 7-day or 14-day money-back guarantee. The percentage of art auctions offering refunds on eBay.com was even higher, with 131,944 out of 175,329 sellers offering a money-back guarantee, representing 75% of art auctions.

Return policies are sometimes observed in traditional auctions as well. For example, deposits required in auctions for valuable objects such as spectrum licenses, oil field leases, and mineral and gas rights can be treated as fixed-fee return policies. If an auction winner fails to pay his/her full bid upon winning, then the deposit is not refunded. For example, shortly after the conclusion of the 1996 "C-block" radio frequency spectrum auction in the U.S., the bidders re-evaluated the market values of the licenses they had just won and determined that the values were far less than the 10-billion-dollar winning bids that they were required to pay. As a result, several bidders declined to make their payments to the Federal Communications Commission, and thus forfeited their deposits.

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How would a return policy affect bidders' behavior and what kind of return policy would most benefit them? What kind of return policy would most benefit sellers? How should a revenue-maximizing seller select the optimal return policy? These are some of the issues we will investigate in this paper. We focus on the common-value model in Wilson (1969), which fits reasonably well with auctions for oil field leases, gas and mineral rights, and spectrum licenses. Our model should also be informative for auctions of objects with a major common-value component, such as art and antiques.[1]

We analyze the behavior of bidders in second-price auctions and focus on linear return policies under which the seller can charge a percentage fee in addition to a fixed fee. Linear return policies are very popular because they are, like linear pricing, easy to implement in practice. We provide a closed-form solution for the unique symmetric equilibrium when returns are not completely free. When returns are free, there exist multiple equilibria, all of which yield zero payoffs for the bidders, but have different implications for the seller.

Results from the literature on return policies offered by retail stores, such as Che (1996), predict that consumers will be better off with a more generous return policy. However, perhaps surprisingly, it turns out that a more generous return policy actually hurts consumers in auctions. This counterintuitive result arises from the fact that a more generous return policy not only protects consumers from bad shocks, but also reduces bidders' fears of falling prey to the winner's curse. This induces them to bid more aggressively in the auction, resulting in higher bids and lower consumer surplus.[2]

We also examine how return policies affect the seller's revenue. On the one hand, with a more generous return policy, bidders bid more aggressively, which enhances the seller's revenue. On the other hand, a more generous return policy makes it more likely that the winner will return the object. By selecting an appropriate return policy, the seller can achieve higher revenue by balancing the trade-off between higher bids and fewer returns.

We find that the optimal (linear) return policy should always be in the form of a fixed fee (or subsidy), implying that the seller should not charge a percentage fee. This resembles many return policies in reality: deposits on oil field leases, mineral and gas rights, and spectrum auctions are usually specified in fixed amounts, and many sellers on eBay provide money-back guarantees with fixed shipping subsidies or shipping and handling fees.

We conduct an experiment to test the predictions of our theory. In the experimental setting, items may have a high value of 100 or a low value of 0, with an *a priori* 50% probability of each outcome. We focus on return polices with fixed fees since our theory predicts that proportional fees are suboptimal for seller revenue maximization. There are four experimental treatments: No Return (NR), High Fee (HF), Low Fee (LF) and Free Return (FR). We observe that bids increase and bidders' earnings decrease when return policies are more generous as predicted by theory. Correspondingly, sellers' revenues increase with more generous return policies as long as some positive fee is charged for a return. However, when returns are free, many bidders bid above the highest possible value for the good, and subsequently return the item regardless of the revealed value. While this is consistent with theoretical equilibrium behavior, it is not an equilibrium that is optimal for the seller who receives zero revenue when such an outcome occurs.

This paper is related to the literature on the theory of public ex-post information. When ex-post information is public and can be contracted on, its effect has long been recognized in the auction literature pioneered by Hansen (1985). In general, it has been shown that ignoring such information is sub-optimal, and adopting a mechanism conditional on the realization of the information is revenue improving. Riley (1988) demonstrates that royalty bidding is better than cash bidding. Abhishek et al. (2011) show that by charging an initial amount plus requiring a profit-sharing contract, the seller can generate more revenue. DeMarzo et al. (2005) examine bidding with securities and show that it can enhance revenue. However, all these mechanisms require the seller to track down the realized value implied by the ex-post information, which could be quite costly. In addition, sometimes the ex-post information may be unobservable, and this is common for objects sold through online auctions. In such cases, mechanisms conditional on ex-post information may not be feasible. In contrast, return policies do not require the seller to observe any ex-post information; it is solely up to the winning bidder to decide whether or not to return the object.

This paper is also related to the dynamic mechanism design literature in which agents learn additional private information over time. As shown in Eső and Szentas (2007), Courty and Li (2000), and Zhang (2013), the seller can utilize a handicap system or a menu of refunds to discriminate dynamically among the agents and to extract more revenue with ex-ante participation constraints.[3] This literature usually assumes private values and independent signals. Instead of adopting a mechanism design approach, we consider a specific mechanism, namely a second price auction with a linear return policy, and focus on the effect of alternative return policies on consumers.

There is a huge literature on auctions. However, few papers consider return policies. Hafalir and Yektas (2011) consider second-price auctions under independent private values that are subject to shocks after the transaction and compare the revenues among spot auctions, forward auctions, and forward auctions with a full return policy. Our current paper considers

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[1] Resale can introduce a common-value component to a private-value good. See Cheng and Tan (2010) and Haile (2003) for examples.

[2] It can be shown that under independent private values with signals and valuations distributed independently across bidders, a more generous return policy causes bidders to bid more aggressively, but has no effect on consumer surplus. Thus the driving force behind our result is the common-value feature of the auction and the winner's curse effect. The proof is available upon request. With only one buyer in Che (1996), the winner's curse effect is absent as there are no other competitors. Che's paper allows buyers to be risk-averse. A full return policy insures such buyers against ex-post risk, thus making them better off.

[3] Krähmer and Strausz (2015) show that if instead the participation constraint is an ex-post one, the value of eliciting the agent's information sequentially is eliminated, and it is optimal to design a simple contract conditioning only on the agent's final information.