

# An Analysis of the Forest Service Timber Sale Auctions: Pacific Northwest Region, 2001-2015

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*The Findings and Conclusions in This Presentation Have Not Been Formally Disseminated by the U.S. Department of Agriculture and Should Not Be Construed to Represent Any Agency Determination or Policy*

## US Forest Service Timber Sale Auctions

**Timber** represents one of the most important outputs from **National Forests** managed by US Forest Service and mandated under several legislative Acts.

**Major issue** is whether timber from National Forests is allocated efficiently, considering that some of the sales are designated as small business **set-asides** and sold to small (logger and mill) firms.

For a standard set aside sale, eligible timber firms must meet two criteria:

They must have **no more than 500 employees**, and

They must **manufacture the timber themselves or resell it to another small firm**, with the exception of a specified fraction of timber for which no restrictions apply.

**The Pacific Northwest Region**, Region 6 of the US Forest Service, consists of **16 National Forests**, all within the States of Oregon (11) and Washington (5).

**In the period of 2001-2015**, **60.7%** of the total timber volume harvested in the FS Pacific Northwest Region was sold through open bid, **19.0%** through sealed bid, and **20.3%** through IRTC auctions (source Timber Data Company).

## Modeling Sealed and Open Bid Auctions

We adopt the **theoretical model** developed by Athey, et al. 2013, Athey, et al. 2011, and Guerre, et al. 2000 to frame our empirical analysis.

In an **open auction**, the price rises from the reserve price until all but one bidder drops out (bidder **collusion** is of concern due to "face to face" bidding and response).

In a **sealed bid auction**, bidders independently submit bids, the highest bid wins. Sealed bid auctions can be **less efficient** than open auctions (where the bidder with the highest true valuation wins).

**In open auctions**, all bidders have a dominant strategy of bidding up to **their true valuations**.

**In sealed bid auctions**, larger firms have incentives to **shade** their bids more than smaller firms

## Preliminary Analysis and Results

Our **preliminary analysis** involves estimating determinants of the winning bids in sealed bid, open bid, and IRTC sale auctions (using panel data methods with fixed forest, species, and temporal effects).

**Sealed Bid Auctions:** Our results indicate that the reserve price, number of bidders, large firms entering have a positive and significant effect on the winning bids; the contract length and contract costs have a negative and significant effect; other effects (average lumber prices, total volume harvested, total haul miles, logging costs, small business set-aside sales, salvage sales) are not significant.

**Open Bid Auctions:** Our results indicate that the reserve price, average lumber prices, number of bidders, total volume harvested, housing starts have a positive and significant effect on the winning bids; the contract length, total haul miles, small business set-aside sales have a negative and significant effect; the logging costs, large firms entering, contract costs, salvage sales are not significant.

**IRTC Sale Auctions:** Our results indicate that the reserve price, large firms entering, scale sales have a positive and significant effect on the winning bids; the logging costs have a negative and significant effect; other effects are not significant.

## Final Analysis and Estimation Methods

Our final analysis involves estimating an **econometric model of entry and bidding behavior of large and small (heterogeneous) firms** in US Forest Service timber sale auctions in the Pacific Northwest Region, and using the model to simulate the revenue, efficiency, and welfare effects.

Final analysis provides detailed information on **importance of endogenous participation (number of bidders) and bidders heterogeneity in different formats of auctions**.

We expect to find that with **endogenous participation**, sealed bidding will favor smaller (weaker) bidders and differences across auction formats will be even more apparent.

## Bibliography

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