Oil & Gas Lease Auctions: An Economic Perspective

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Bidding for Oil & Gas Leases

- This is a complex process, involving:
  - Auction Theory
  - Economics
  - Statistics
  - Financials
- Significant fixed costs exist (exploration) for the winner before profit --- if any --- can be realized. The possibility of total financial loss exists (“dry-hole risk”), although federal tax treatment regarding subsequent expensing becomes a factor.
  - More uncertainty than is typically present in an auction.
  - Greater risk causes bids to be discounted (deflated).
  - Studies have shown that there is as an inverse relationship between the perceived level of risk and the bid level.
- If the perceived risk is too great, the auction will fail.

Auction: Definition and Benefit

- **Definition:** Essentially, an auction is "...an economic mechanism whose purpose is the allocation of goods and the formation of prices for those goods via a process known as bidding."
- **Competitive Benefit:** Economists typically favor auctions over other methods for allocating licenses to operate in a market. Studies have shown that an auction without a reserve price, as long as it attracts at least one more bidder than a negotiation, raises more expected revenue than any negotiation procedure. Generally, the seller's revenue goes up with increases in the number of bidders --- the more competition the better.
  - However, there are typically few bidders for lease sales.
  - Oil & gas leases somewhat complicate the general rules.

Goal, Success and Objective

- **Goal:** To get bidders to reveal their valuation of the item under consideration and raise maximum revenue. The economic theory is that "the parties in the market are much better informed than the government with respect to the economic value of the goods offered."

- **Success**: The highest bidder is the one that values the item the most.

- **Specific Objective:** Currently under development.
  - As a starting point, to have the State of Florida allocate the right to oil & gas exploration and drilling in specified areas in a manner that optimizes the revenue to the state.
  - If an additional goal is to manage price fluctuations and disruptions in the supply of natural gas that might affect Florida's well-being, then low-cost production (within an adopted policy framework) might also be an objective.

Environment

- **Environment:** Post-auction, the outcome is a non-competitive market where the “lease” operates as an exclusive exploration and drilling franchise for that territorial area --- assuming all permitting and regulatory requirements are met. The lease value is generally related to the future (albeit *highly* uncertain) income stream expected from the lease.

  The primary differentiation among the bidders will be:

  - Available financial capital for investment in exploration and development (effectively a binding budget constraint on individual bidders).
  - Perception / evaluation of the future income stream, factoring in the real possibility of a negative return on investment.

Four Forms, Many Variants

Auction Types			
ENGLISH AUCTION (Ascending-Bid, Open or Oral)	**DUTCH AUCTION** (Descending Bid)	**FIRST-PRICE, SEALED-BID AUCTION**	**SECOND-PRICE, SEALED BID AUCTION**
* Auctioneer starts with the lowest price he is willing to accept (the reserve price) * Price is raised in incremental amounts by bidders * This continues until no one is willing to bid higher * Auction is closed with the highest bidder winning	* Auctioneer starts with a price that is higher than he thinks the item will get * The price is lowered in incremental amounts by the Auctioneer * This continues until someone is willing to accept that price * Auction is closed with the highest bidder winning	* Each bidder submits a single, sealed bid * No information is shared between bidders * All the bids are opened at one time * Auction is closed with the highest bidder winning	* Each bidder submits a single, sealed bid * No information is shared between bidders * The highest bidder wins the item, but at the price offered by the next highest bidder

KEY ASSUMPTIONS FOR THE DIFFERENT TYPES TO PRODUCE EQUAL RESULTS

1. The item being auctioned has an independent, private value to all bidders – no bidder is estimating resale value or a benefit equal to all.
2. All bidders are risk-neutral.

Key Assumption #1 does not hold for oil & gas lease auctions.

Auction Preference

Auction Type: Of the four general auction classifications, only one is typically used for auctioning oil & gas leases in the United States:

- **First-Price, Sealed-Bid Auction…**The complicated financial and risk projections required in bid development would likely constrain some of the interactive benefit from the English Auction. In addition, the exclusive nature of the award (monopolistic or quasi-monopolistic) could push up bids even though they are sealed (typically, a suppressant). Studies have shown that this mechanism is the best when there is the possibility of collusion, asymmetry among bidders, and risk aversion on the part of the seller --- all three of which are present in the auctions of oil & gas leases.

- To make sure the state gets the best possible deal (maximizes revenue), the auction should be structured to require at least two bids per auctioned territory to be valid.

(Excluded from initial consideration: English, Dutch and Second-Price, Sealed-Bid)

Policy Considerations

- The answers to the questions on the next pages are the key policy levers or tools that are available to legislators to influence the outcome.
- The process needs to be designed in accordance with the policy objectives deemed most important to decision-makers.
- All decisions must be made on the front-end to enable a direct comparison between the bids --- a rank ordering. If that is not possible, the auction mechanism will not work.

What is being bid?

Key Policy Questions...

- How much monopoly power is at stake?

  The amount of granted monopoly power influences the value. The award will likely grant a quasi-monopoly; the license will be exclusive (i.e. for a single geographic area).

  - Information from exploration.
  - Profits from drilling and sale.

- What is the unit?

  Typically, the lease of specified “tracts.” However, this is somewhat arbitrary --- the “good” is not naturally divisible.

- What is the term or length of the property right?

  - A lease that lasts only through the exploration stage would not generate a return for the bidder, so must include the potential drilling stage.
  - Capital investment also argues for a longer period of time.

Who can bid?

Key Policy Questions...

- What is the bid mode?

  Treatment of joint bidding ventures vs. solo bids: it is unclear whether the prohibition of joint bidding ventures increases the government's take, or lowers the number of bidders.

- Will there be entry fees?

  Entry Fees should be at least sufficient to cover the cost of the auction. At some level, they serve as a deterrent to potential bidders ("barrier to entry").

- Will there be prequalification of bidders?
  - Is there a need for minimum quality conditions or capacity to develop?
  - Do concerns about the use of the lease exist --- that is the rate at which purchased leases must be developed? Generally, the expectation is that there is a three-year limit on the amount of time that a lessor has to develop its lease before the property is relinquished back to the state. In this case, additional time will likely be needed for the exploration phase.

What will be the flow of funds?

Key Policy Questions...

- What is the bid instrument (the rate at which the purchase price of leases must be paid by the lessors)? Front-loaded or staggered through time? The first two of the three primary methods (there are a few others) have been used in combination:

  - **Cash Bonus...**immediate, up-front and certain. Under cash bonus bidding, firms' bids represent the cash value of each lease. Different firms will have different financial constraints. This mechanism requires the winning firm to absorb most of the risk --- firms take this into account with a premium (deflated bid). A variant includes the use of installment payments.

  - **Royalty Rate...**over time and uncertain; either on a quantity basis or as a fixed percentage of the market price. This approach may distort long-run behavior and decision-making. (Longstanding: 16 and 2/3rds percent)

  - **Profit-Sharing...**over time and uncertain; a fraction of the profits go to government. Since the government absorbs more of the risk, bids tend to be higher --- but harder to measure bid differentiation <u>AND</u> increased monitoring and gaming costs may outweigh the value of higher bids.

[If payments are made over time, then ability to operate and time to commencement become factors, arguing for limited entry into the auction. In these cases, the "use of the lease" becomes very important.]

What are the Auction’s mechanics?

Key Policy Questions...

- What are the key considerations for the auction framework?

  Typically, a simultaneous, first-price, sealed-bid auction is used in the United States. However, allowance for package or linked bids could be important. This would allow a single bidder to participate in more than one lease “auction” and enable bidders to factor in economies of scale, complementarities and substitutes.

- What would be a desirable auction format?

  A simultaneous ascending-bid auction format, modified to allow package bids on combinations of leases. It would consist of multiple rounds of sealed bids, with the bids and identities of bidders being announced after each round. An example of a slightly different modified structure is AUSM (Adaptive User Selection Mechanism).

- Will there be a reservation price?

  Setting optimal reservation prices (the lowest price the seller is willing to accept) in this type of auction is extremely difficult because key information for the seller is missing and costly to obtain (number of bidders; likelihood of collusion; expected value for the winning bidder, etc.). Usually, set higher than the seller’s own personal valuation. Some studies suggest that they be set on the royalty rate bid, rather than on the cash bonus.

- Are there any future resale or subleasing possibilities for the successful bidders?

  If not, a premium for lock-in will be built-in by the bidders.

Auction Complexity: Winner’s Curse

- Common Value Product --- bidders perceive the value exists in the resale of the item itself or as a by-product of the item.
- The lease has uncertain future value to the bidder. The value is predicated not only on personal valuation, but the valuation of prospective future markets that would be faced by all of the prospective bidders.
- This may cause a “Winner’s Curse” where the winner is the bidder who most overestimates the true value of the lease (overbidding).
- In the worst case scenario, this may cause bid discounting by prospective bidders (i.e. less money for the seller).

> *“Winning the auction is itself an information event --- [Assuming equal access to capital] it conveys the information that all other participants obtained tract value estimates which induced them to enter lower bids.”*

Other Considerations...

- Government generally benefits financially from a decrease in uncertainty and should favor policies which place as much information as possible in the public domain prior to the auction.

- If capital markets are dysfunctional, the state could generate "too little" for the resource rights it offers. The firms could be collectively capital-constrained and bid too low relative to the actual value.

Next Steps for Auction Design...

If a decision is made to proceed with the auction, the next steps are:

- The procurement of academic auction expert(s) to write the detailed auction design proposal (one party to develop and a separate party to critique is ideal).
- During the development phase, conduct an extensive effort to receive input from the public and potential bidders regarding the specific design and details of the auction, including the identification of desirable tracts and the development of "diligence clauses" if the bids are other than a strict cash bonus. All of this should be accomplished within parameters established by the legislature.
- Perform empirical testing of the auction mechanism by experimental economists if unproven techniques are to be incorporated.