The Art and Science of Bidding for Offshore License Blocks

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Abstract:

A company's performance in a lease sale can have serious implications for future growth and sustained value. Therefore it makes sense to approach each sale armed with the most powerful tools available. Surprisingly few firms go beyond spreadsheet analysis when it comes to such an important event, most likely because it is the most familiar method. Perhaps this is why we see bid levels with a significant amount of spread, representing "money left on the table" or skewed perspectives on the value of the block.

Firms that wish to move to the next level take a different view. They choose to engage their best talent in a *simulation* of lease sales – mythical auctions that are run thousands of times – the collective output yielding insights into the best bid strategies at appropriate levels of risk. While simulation represents the science – setting a bid strategy based upon simulation represents the art. It has been our experience that the top performers in lease sales get the balance of these two dimensions just right.

Building a bid strategy capability using simulation as a centerpiece is challenging, complex work, requiring key data sets and a mastery of the underlying technology simultaneously. That does not mean that best in class bid strategy is not attainable – it comes about with a focus on execution.

We will touch on many of the lessons we learned in working side by side with an aggressive lease sale bidder, and their journey from unsatisfactory auction performance to a place among the top tier of bidders:

1. Use the talent you already have, but provide the team with an analytical system to translate knowledge into bidder intelligence.
2. Build a serious blueprint of the bidding system before implementation
3. Use the simulations to "steer" the bid strategy

We will focus on the practical, actionable steps to build a better bid strategy through analytics, sustainable across a range of lease sales, both in the US and abroad. As of this writing, Mexico had recently announced plans to conduct auctions on offshore license blocks starting in 2015, and the US BOEM announced a major lease sale each in the Central and Eastern GoM regions scheduled for March 2014.

Introduction

Bidding for offshore license blocks is difficult, tedious work – months of analysis leading up to the lease sale. The auction can be kind or cruel to the bidders. Luck – both good and bad – play a part.

The common wisdom about lease sales is that proprietary knowledge about the block wins the day and it is nearly impossible to increase your odds of winning short of having an edge with special information. As a result, many companies prepare their bids with a small dose of analysis and a large portion of intuition. This perhaps explains why no one particular firm masters many cycles of lease sales.

Our experience with lease sales suggests that there is a better way – the combination of intuition and analysis in a meaningful process through the creation of a simulation model of the lease sale. The simulation model allows the bidding company to codify its expertise, collect and use proprietary information, and perform more consistently at lease sales. We will use our past work with bidding firms as a basis for discussing a simulation-based approach to constructing bids for offshore lease sales. Most of our experience is in the US GoM, although many of these same principles apply outside of the US as well.

Winning and Losing?

Let us first define what success and failure in lease auctions means. Failure comes in two colors: first, overbidding for a block – winning the auction where the next highest bidder is substantially below the winning bid, often termed "leaving money on the table". Doing this repeatedly can be costly for the winning firm, reducing the net value of its assets and constraining budgets for future lease sales.

The second aspect of failure is losing the bid by a (relatively) small amount. Your competitor just gained an asset by paying an incremental step above your bid.

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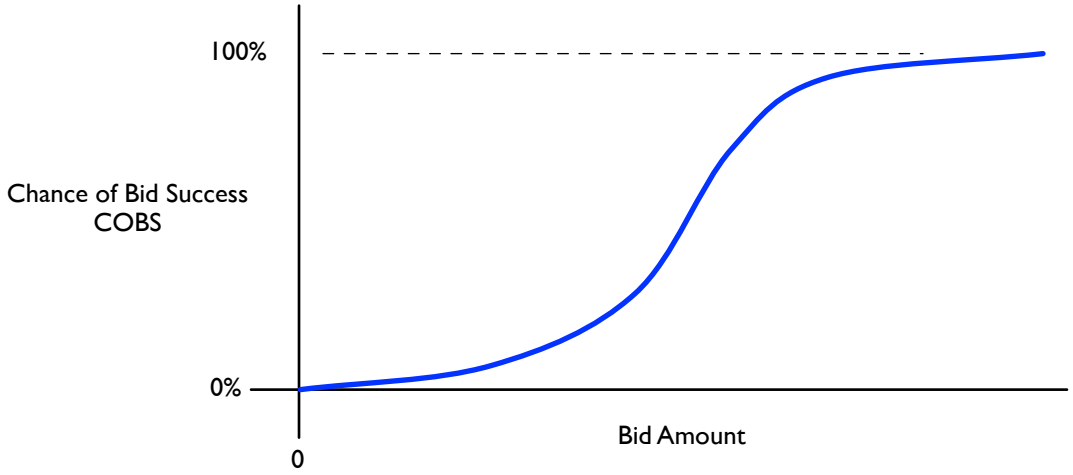
Success, on the other hand, means that there is some systematization to the bids, wins and losses to be sure, but the collection of wins generates an intentionally designed portfolio of assets that are in keeping with the company's growth and development objectives without overpaying.

Errors in Thinking

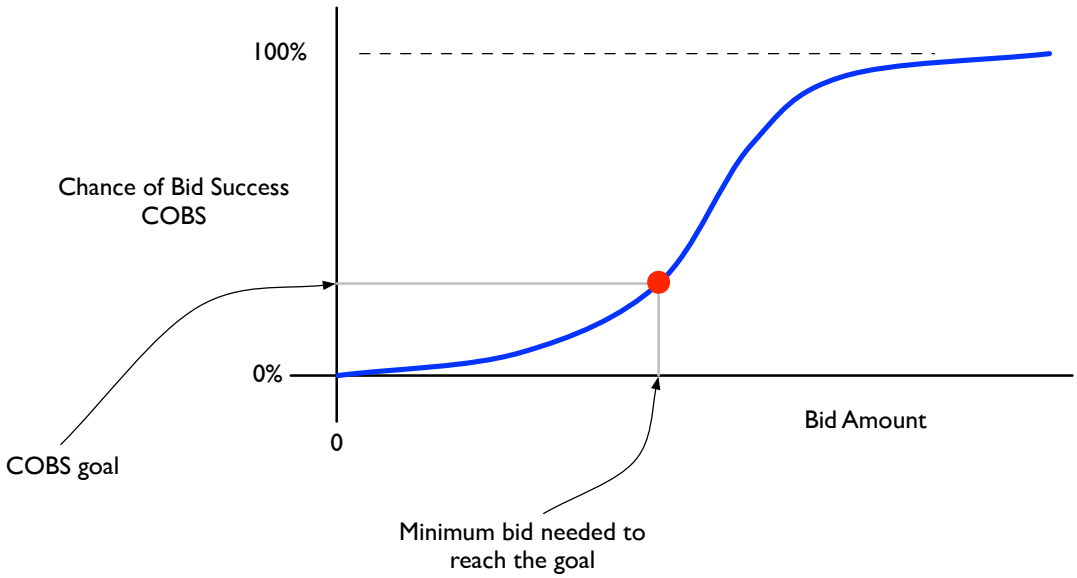
Many times bidding teams are required by leadership to "just give a number" when it comes to particular blocks in play. Often this number represents the mean of a distribution that can be either wide or narrow – this information is hidden by the

provision of a single number. Any meaningful strategy for bidding must recognize the Chance of Bid Success (COBS) as a continuous distribution and to resist attempts to "dumb down" the information by distilling it into a single number.

In looking at COBS, bidding $1 for a given block will almost certainly result in a near 0 COBS. Bidding a very, very large number will ensure a new 100% COBS. In between is a cumulative distribution curve that sets the stage for discussing bid strategy. We call this the "COBS curve".



Bidders often get things backwards – they come to the table with a particular bid level in mind and hope for the best outcome. Rather, they should set an expected COBS and see where that goal maps to the bid amount on the curve.

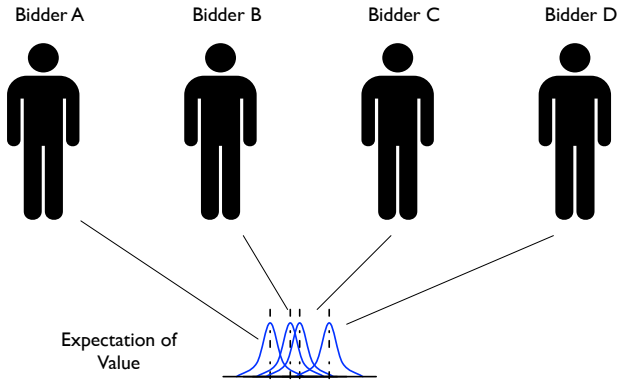


Fine, but how does one know *a priori* what the COBS curve looks like? The COBS curve is in essence an expression of every plausible state of the auction for a particular block in play, and this is where simulation can serve an important function. By simulating the auction many times in Monte Carlo fashion using the probability distributions of other bidder's behaviors, a COBS distribution can be formulated.

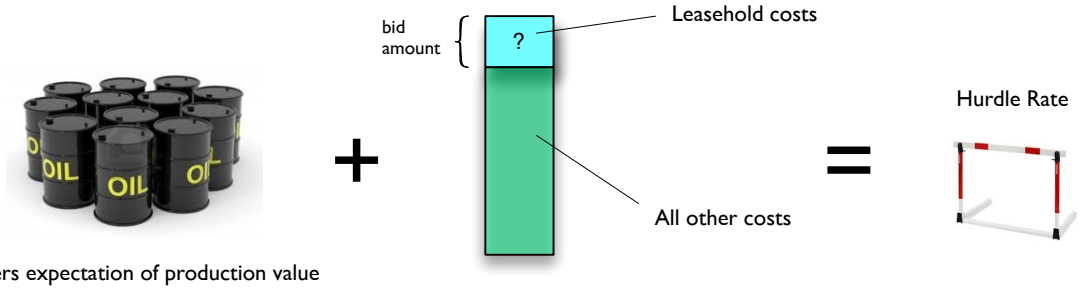
Walking in the Other's Shoes

Our first step at constructing the model is to gather the information about potential bidders. Generally speaking companies do know with some level of confidence which companies are likely to be bidders for given blocks. Best in class companies supplement this with research on past activity and trends in the region. Central to the information is the "expectation of value" for each bidder, most often measured in units of production.

Professional judgment and assumptions are part of every model, and it is perfectly acceptable to rest on these pillars when constructing expectations of value for companies that are not your own. Absolute precision is not required in order for the model to present useful insights to the user.



Once we have an expectation of value for a variety of bidders, we can back-calculate the bid amount via a financial model:



Bidders expectation of production value

Industry knowledge can help a firm get remarkably close to another bidder's hurdle rate and operating costs. This leaves us to solve for the single unknown – leasehold costs – closely tied to the bid amount.

Putting The Whole System Together

Each component of the financial model comes with a level of uncertainty some high, some low, and everywhere in between. No matter the level of uncertainty, each

element can be expressed as a probability distribution, with the ranges derived from the professional judgment of the bidder's technical talent.

Once specified, the model can be run in Monte Carlo fashion with thousands or perhaps hundreds of thousands of individual runs across all of the possible scalar values that make up the financial model. The bid level is thereby generated as a probability distribution outcome.

Our core methodology here is Monte Carlo Simulation, but there is an analogous rating system that was originally developed for sports teams competing in round robin-style tournaments (such as World Cup soccer). The system is called Elo, and it is a rule-driven skill assessment that uses probability distributions in much the same way we have described above. Game theory and agent-based modeling (ABM) have often been integrated to understand bidding behavior in situations outside of the energy industry, but much of that science is likely to apply.

Case Example, Step by Step

Let us illustrate the concept of a bidding model by using a realistic business case. This case is drawn from an actual project we conducted for a bid team but the numbers have been changed to protect any confidential information.

Imagine we are given a potential well on a block with a 10 year life with various estimates of the nature production by the bidders. Appendix A shows the step by step progression of the model.

Summary and Conclusions

By engaging in a modeling process that leverages human insight, companies will be driven to have the right debates over the bidding decisions, which should in turn lead to better, more consistent bid decisions and improved outcomes. We should not, however, expect the model to "get the answer right" on the first try, but rather put in place the steps necessary to tighten the distributions around the model so that it slowly but continuously improves with each new cycle.

Moreover injecting data-driven discipline into the bidding process is not simply about building a model. It is equally important to build a placeholder for a company's institutional knowledge about any subject, especially important business knowledge with regard to bidding and bidder behavior. Over time, companies will learn to curate this knowledge in an deliberate, orderly way through the mechanism of modeling.

Taking it Further

We have only scratched the surface with this simplified and stylized example. We encourage bidding firms to take this much further by institutionalizing the process of bidding. That means a permanent facility to bring a given lease sale into a "laboratory" of sorts. In so doing, firms can engage in a holistic approach whereby subject matter experts from geology to engineering to finance can interact with each other using the model as the central organizing principle.

Appendix A. Code listing for bidding model