Indicators of Production

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Introduction

The Federal Government Outer Continental Shelf (OCS) leasing program has been a major source of revenue and of energy for the nation. This paper will examine the historical record of the leasing program. The paper will examine six attributes of the leasing: Tract Decision Rule (criteria for accepting a bid); The size of the bonus bid; Number of Bids for the leases; How many times this tract has been lease; The Term which is a proxy for the water depth; and Previous Production. It will examine the relationship of these attributes and rate of entering production. That analysis provides a basis for the creation of a simple algorithm to project which leases will or will not enter production.

Data Set Examined

The data set for this study will be Gulf of Mexico OCS leases from Sale 166 (Central GOM 1997) to the present. The starting point was determined due to availability of the Tract Decision Rule (TDR) data. Those tracts bid on but were Rejected, Not Issued or still in Primary Term were excluded. This analysis will look production from these leases.

Single Attribute Analysis

Tract Decision Rule Perspective

The Fair Market Value process is complicated. A complete description can be found at (http://www.boem.gov/uploadedFiles/BOEM/Oil_and_Gas_Energy_Program/Energy_Economics/Fair_Market_Value/FMV174-3.pdf). It is a two phase process. The initial reviews are in Phase I and if needed a more detailed review conducted in Phase II.

Tract Decision Rule	Description
A	Non-Viable in Phase I
B	Three Bids accepted in Phase I
C	Bid Amount exceeds government assessment of value in Phase II
D	(Sale 166 only)
E	Non-Viable in Phase II
F	Confirmed & Wildcat 3 Bid
M	ADV >= Bid Amount >= RAM
V	(Sale 166 only used)

The statistics associated with categories for the analysis will be:

Statistic	Description
Producing	Number of leases in category with a non-null FIRST_PROD_DATE, which is an indicator (not perfect) of production
Leases	Count of leases in this category
Percentage	100 * Producing / Leases

TDR	Producing	Leases	Percentage
A	148	2238	6.6
E	352	4918	7.2
C	185	1206	15.3
D	5	24	20.8
B	22	97	22.7
V	21	92	22.8
M	29	31	31.0
F	4	5	80.0

A and E codes (non-viable) had the lowest rate of entering production. They represents most of producing leases. Code C (Bid above government value) had rate of entering production about twice as high as the non-viable. The remaining codes were much rarer, but had an even higher rate of entering production.

The next attribute of these lease to be examined is TERM (Primary Lease Term in Years). TERM is a proxy for water depth. 5 is shallow and 10 is deep water.

TERM	Producing	Leases	Percentage
5	642	4339	14.8
7	0	1	0.0
8	20	664	3.0
10	84	3605	2.3

With increasing TERM (water depth) the rate of leases entering production declines.

The next attribute is the number of bids for the lease.

Number of Bids	Producing	Leases	Percentage
1	390	6525	6.0
2	175	1289	13.6
3	85	466	18.2
4	45	179	25.1
5	22	75	29.3
6	10	28	35.7
7	6	16	37.5
8	7	15	46.7
9	2	8	25.0
10	2	3	66.7
11	0	3	0.0
13	2	2	100.0

As the number of bids increases, so does rate of entering production increases. Most producing leases had a single bid.

The next attribute is the number of leases issued for this area block. This variable is SEQ_NUM. A value of 3 means this is third lease issued for this area block.

SEQ_NUM	Producing	Leases	Percentage
1	40	3090	1.3
2	194	2200	8.8
3	221	1745	12.7
4	204	1112	18.3
5	61	386	15.8
6	20	84	23.8
7	5	20	25.0
8	0	10	0.0
9	1	2	50.0
11	0	1	0.0

Initial leases rarely produce. Generally as SEQ_NUM increases, so does rate of entering production.

The BID_AMOUNT also influences the probability a lease will produce. This has values has a wide range up to tens of millions of dollars. To compress the range the natural log of the BID_AMOUNT was computed and then rounded to a whole number. This computed value is called L_Bid. As an example the natural log of 3,000,000 is 14.91. Rounded to a whole number is 15.

L_Bid	Producing	Leases	Percentage
6	0	1	0.0
8	0	4	0.0
9	0	12	0.0
10	1	41	2.4
11	7	138	5.1
12	219	3497	6.3
13	214	3045	7.0
14	158	1113	14.2
15	105	575	18.3
16	28	133	21.1
17	14	48	29.2
18	0	2	0.0

As one might expect, larger bids correspond to increase rate of entering production.

The final attribute to be examined is there previous production on area block.

Prior Production	Producing	Leases	Percentage
No	442	7350	6.0
Yes	304	1259	24.2

Previous production is associated with a four fold increase in rate of entering production.

Multiple Attribute Analysis

In the previous section multiple lease attributes are associated with the rates leases entering production. Using statistical analysis a simple rule was found to create categories of increasing likelihood of entering production.

Indicators (Flags) of Production

- Has this lease have a lease term of 5 years?

- Has this area block has previous production?

- Is there 2 or more bids for this lease?

- Is the high bid over three million dollars?

The flag count is number of answers which are yes.

Flag Count	Producing	Leases	Percentage
0	32	3123	1.0
1	227	3360	6.8
2	306	1638	18.7
3	158	440	35.9
4	23	48	47.9

Four yes has near a 50% rate of entering production. Four no leases enter production at 1% rate.

Findings

- Non-viable leases have a low rate of entering production

- 5 year term (shallow water), higher number of bids, higher bid amount, prior leasing and prior production all are associated with larger rates of entering production.

- There is a simple rule that can categorized leases at the time of sale into groups low and high future rates of entering production.

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