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BOOK REVIEWS

Supply and Costs in the U.S. Petroleum Industry: Two Econometric Studies

By

FRANKLIN M. FISHER

Baltimore: The Johns Hopkins Press for Resources for the Future, Inc. 1964.

Pp. xiii, 177, \$5.00

Econometric studies are especially valuable in areas where large bodies of "conventional wisdom" have accumulated, since it often turns out that much of this "wisdom" is highly suspect. In his two studies—"The Supply Curves of Wildcat Drilling and of New Petroleum Discoveries in the United States" and "Measuring the Effects of Depth and Technological Change on Drilling Costs"—Professor Fisher has focused his analysis on two frequent petroleum industry assertions: (1) that the volume of oil discovered in the United States per unit time period is very sensitive to the crude petroleum price level, and (2) that real drilling costs have been almost continuously increasing since World War II.

In the first study regression analysis is used in an attempt to determine the relationship between the dependent variables—the number of wildcat wells drilled, the success ratio, the amount of oil found per successful wildcat, and the amount of geophysical and core drilling crew time employed—and the explanatory variables—the results of the previous year's drilling as measured by lagged dependent variables, the price of oil, and variables measuring production restrictions. Annual data for each of the five Petroleum Administration for Defense districts for the period 1946 through 1955 are used, the data sources being the *Bulletin of the American Association of Petroleum Geologists*, National Petroleum Council publications, *The Oil and Gas Journal*, *World Oil*, and *Petroleum Facts and Figures*.

The author concludes that, while industry expenditures on wildcat drilling do seem to rise substantially when crude prices increase, the volume of new oil discovered seems not nearly so sensitive to crude price changes, since both the percentage of successful wildcats and the average new field size tend to decline with price in-

creases. This behavior can be explained, Professor Fisher hypothesizes, if one assumes that, at any given price level, there exists an inventory of slightly submarginal prospects. A rise in crude prices may cause some of these prospects to become supramarginal and thus be drilled. But the results from these tracts will be poorer, on the average, and the mean success ratio and new field size lower.

Unfortunately, such a hypothesis does little to explain the long run supply of discovery, for such an inventory of near-marginal prospects must be created as a byproduct of the continuing search for new oil. The price sensitivity of this search is the factor of prime importance for long run supply, not the disposition of slightly submarginal tracts that may be drilled if the crude price rises.

Professor Fisher has amply demonstrated that, over the time period studied, crude prices tended to increase while the success ratio and the volume of new oil found per wildcat tended to decrease. The case for a relationship between these two trends is less clearly established.

The second study develops a function for area per-well estimated drilling cost in dollars as dependent upon the depth of the well and two parameters that reflect drilling difficulty in the area. Nonlinear regression is used to estimate these parameters for each area, using the Joint Association Survey of Industry Costs statistics for 1955-1956 and 1959, and the two resultant functions for each area, one for each time period, are compared. There appears to be considerable evidence of reduction in real drilling costs per well, despite the tendency to drill deeper wells. This is a very interesting finding; even more interesting would have been a comparison of drilling costs per barrel of oil discovered. Since, unfortunately, data do not exist to make the latter estimate feasible, those concerned with drilling costs must be content with per-well rather than per-barrel cost comparisons, at least for the present. The author also clearly points out how the Joint Association Survey could make its data even more useful for studies of this type without compromising the secrecy of cost figures for individual companies or wells.

Both of these studies are very carefully conceived and carried out. Of particular clarity and merit are the introduction and summary of each study. However, in a book with over ninety pages of tables, it seems regrettable not to have printed the primary data. Perhaps the Joint Association Survey data was too bulky, but surely a table of the variables used in the regressions of the first study

would not have taken more than a very few pages and would be a great convenience to anyone wishing to update or extend the study.

This book reports one of the first major attempts to apply econometrics to the petroleum industry; hopefully it is a precursor to other badly-needed econometric studies of the industry. Professor Fisher has assayed his problems carefully, marshaled the best available data, handled them with skill, and arrived at provocative results. If his conclusions can be confirmed and extended, the case for import controls is seriously weakened. This book deserves the careful attention of both the petroleum industry and its critics.

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