

STUDY TITLE: Modeling the Structure and Performance of Integrated and Independent Producers in the Gulf of Mexico OCS Region

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BACKGROUND: How persuasive is the evidence that the majors are leaving the development of domestic oil and gas reserves in favor of foreign opportunities? Will the magnitude of this exodus expand the independents share of domestic exploration and production (E&P) significantly--especially on the OCS? The apprehension is widespread within both industry and government circles that such a shift from the majors to the independents could cause domestic oil and gas resources to be developed less from the majors to the independents could cause domestic oil and gas resources to be developed less aggressively and/or less efficiently. This project addresses such concerns by attempting to analyze the trend in domestic and foreign (E&P) activity and outcomes, and to discern and quantify differences in behavior and success among firms of different sizes (majors, large and small independents) operating on the Gulf of Mexico OCS Region.

OBJECTIVES: To develop econometric models capable of ascertaining if there are significant differences between the majors and independents as reflected in drilling efficiency and drilling success. To exercise these models to make estimates of the consequences of the shift in exploratory and development focus among firms of

different sizes.

DESCRIPTION: For analytical purposes, oil and gas operators operating in the U.S. have been classified into three groups--the majors, large independents and smaller independents. Definitions of these groups vary among different sources of information, but we have used the following definitions: Majors are integrated companies with more than 1 billion BOE in petroleum reserves worldwide. Large independents are those firms cited in the *Oil and Gas Journal (OGJ)* list of the largest 100 firms that are not majors, but have assets of at least \$500 million. Smaller independent firms are those appearing on the OGJ list of the largest 300 firms but do not have assets of \$500 million or more.

Operating and performance data on domestic and foreign exploration and development expenditures (E&D), oil production, gas production, oil and gas reserve additions, hydrocarbon replacement ration, reserve purchase cost, finding costs and expenditure effectiveness for individual domestic oil and gas companies were analyzed to characterize the trends in domestic and foreign E&P activity and success over the 1987 to 1992 period. In addition we derived, organized and analyzed industry activity indicators and performance measures to characterize the behavior and performance of majors and different groups of independents over the past decade. Subsequently, each group of operators was compared in terms of its share in a) permits issued, b) wells drilled, c) footage drilled, d) successful wells completed, and e) footage of successful wells completed. Where appropriate we also compared these indicators by a) well category (exploration or development), and b) well type (oil or gas) to identify any significant differences among the groups.

SIGNIFICANT CONCLUSIONS: Majors and large independents appear to have been about equally enamored of foreign E&P prospects and have responded to them in a similar way. Both descriptive and econometric analyses provided little evidence to support the apprehension that hydrocarbon resources would be less aggressively or less efficiently developed if the role of independents in resource development in the region increases. Empirical estimates from our hydrocarbon model suggest that the growing maturity of the Gulf of Mexico more negatively affected reserve additions per effort among the majors than it affected the independents. The results also provide evidence of a negatively elastic drilling response to taxes among the independents but a negatively inelastic drilling response among the majors. We found no evidence of significant differences in the responsiveness of drilling effectiveness to technical progress and our results indicate that the independents respond to economic incentives in the same way as do the majors.

STUDY RESULTS: The trends in E&D expenditures, which have been frequently used to describe the apparent "take over" of domestic oil and gas activities by the independents seem clear and dramatic. Over the period 1987 to 1992, the domestic E&D expenditures by the majors declined 34 percent while those by the independents increased by about 12 percent. However, data on E&D spending on foreign prospects indicate that both the majors and the independents have responded aggressively to

opportunities abroad. Foreign E&D expenditures by the majors increased by an impressive 113 percent, while expenditures abroad by the independents also increased by a healthy 73 percent. The differences in expenditure effectiveness between the two groups of firms seem to narrow with time and the averages have become too close over the last three years to support any generalizations about differences in effectiveness-- regarding domestic and foreign activity.

The simple descriptive statistics of upstream oil and gas industry indicators we developed indicate that independents have been both more aggressive and more successful than the majors in exploration, while the majors have only been moderately more successful than independents in development drilling on the OCS. In the aggregate, both the large and smaller independents have been at least marginally more effective than the majors in adding hydrocarbon reserves per successful foot drilled. On average for every foot of successful well drilled by the majors on the OCS, 227 barrels of oil equivalent (BOE) of new hydrocarbon reserves were added to original recoverable hydrocarbons in place during the period 1983-1992. Whereas the independents added 265 BOE (large independents added 242 BOE while smaller independents added 312 BOE) of hydrocarbons for every foot of successful wells drilled during the same period. However, if drilling effectiveness were calculated using total footage drilled in the denominator rather than successful footage drilled, the difference narrows. Majors added 106 BOE per foot drilled while independents as a group added 111 BOE. But within the independent classification, large independents added 104 BOE per foot and smaller independents 125 BOE per foot drilled.

We found that the large independent firms on average have a negatively elastic drilling response of -1.62 to changes in the average effective tax rate compared to negative inelastic drilling response of -0.86 by the majors to taxes. The smaller independents have a negative elastic drilling response of -1.33 to taxes. A point estimate of drilling elasticity with respect to economic incentives among firms of different sizes was found to be statistically identical (0.42) in the Gulf OCS region. The effectiveness of the majors in adding new reserves per drilling effort seems to be more negatively affected by resource depletion than is the case for either the large or smaller independents. The response of drilling effectiveness to depletion among the majors is significantly elastic, whereas the effectiveness among the large and smaller independents is significantly inelastic in the region.

STUDY PRODUCTS: Pulsipher, Allan G.; Iledare, O. O.; and Baumann, R. H. (1994), Modeling the structure and performance of integrated and independent producers; implications for offshore oil and gas development. Annual Report Submitted to Minerals Management Service, New Orleans, LA. November 16.

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