



## Book Reviews

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Daniel Badger and Robert Belgrave, *Oil Supply and Prices: What Went Right in 1980?*

One important function of economic and policy analysis is to help us learn from the past. The world oil market of the 1970s and 1980s has been plagued by shocks that have not only wrought havoc in international oil trade, but delivered large macroeconomic costs to the industrialized world in terms of lost output and increased inflation and unemployment. The conduct of macroeconomic policy in the face of supply shocks has accordingly received considerable attention. Analysis of the impact of oil market conditions and the structure of the world oil market on oil prices is likewise important, both to clarify the nature of the shocks and suggest "oil policy" responses (e.g., use of public stockpiles, tariffs, or price controls).

Daniel Badger and Robert Belgrave have provided part of that analysis in *Oil Supply and Price: What Went Right in 1980?* The book is short, though informative. Focusing on the chaotic years of 1979 and 1980, the Badger-Belgrave volume provides a detailed history of the economic and institutional events, with emphasis on the roles played by oil inventories, the spot market, OPEC, and deliberations of the International Energy Agency. They note that both the 1979 oil shock (following the Iranian revolution) and the 1980 oil shock (coincident with the outbreak of the war between Iran and Iraq) produced a 5 percent net reduction in supply to the world oil market (about 2.5 million barrels per day). World oil prices rose by 150 percent in the first case, while the second shock had little or no long-run effect on prices.

Badger and Belgrave's historical description is designed to provide evidence for their principal conclusions. The 1979 price increase is described as "a 'self-inflicted' wound on the part of industrialized countries, caused by a faulty perception of events, panic by consumers, and poor response by governments." The failure of the 1980 shock to generate large price increases is attributed to lagged demand responses to the 1979 price increases, large stock levels, and government action. While they claim that "market theory is neither a sufficient explanation nor a sufficient excuse for what happened in 1979," they conclude that "in the end, we return to the market as the dominant reason for what went right in 1980."

Despite its narrative style, the Badger-Belgrave volume provides some economic analysis. The attention paid to stockpiling is particularly noteworthy. To optimize private inventory behavior, stocks shall be built when prices are expected to rise by more than the cost of carrying stocks. Inventories were built during 1979; stocks were drawn down in 1980, when holding them became more expensive. To the extent that inventory speculation drives up oil prices, government policy intervention may be warranted. Badger and Belgrave do not directly draw the connection between the role of private inventory behavior during oil shocks and the use of public stockpiles (either by one country or by several nations acting in concert). Stockpile policy may be an effective instrument for future crisis management. The

authors indicate that they are preparing a companion study to focus on responses of consuming countries.

Oil supply shocks cannot be predicted, but there is no reason to believe that the oil market of the 1980s will be immune to further disturbances. By carefully analyzing the dynamics of past shocks and the conditions surrounding them, and by noting changes in market structure, we can prepare ourselves. The book by Badger and Belgrave suggests some useful ways in which *economic analysis can proceed in that preparation.*

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*Petroleum Tax Analysis: North Sea* (London: Financial Times)

*Petroleum Tax Analysis: North Sea* is a very thorough study of the petroleum tax systems of the four primary North Sea petroleum producers: the United Kingdom, Norway, Denmark, and the Netherlands. The report can be divided into five separate sections. The first section (Chapter 1) describes the tax systems of each of these producers. The description includes not only the direct tax system, but also royalties and state participation, if any. A chronology of changes in the tax system is also provided. The latter is quite important since the tax system for a given block may depend on the date at which the license was granted.

The second section of the report describes the models of North Sea oil fields to which a country's tax system is applied in order to simulate various possible outcomes. Four typical fields are selected, of 500, 250, 100, and 50 million barrels respectively. A particular drilling, development, and production profile is associated with each of these fields. In addition, there are four possible development costs for each field: \$6000, \$15,000, \$20,000, or \$30,000 per peak daily barrel of production. Thus each country's tax system can be applied to a total matrix of 16 possible field-size/development-cost combinations.

The third section of the report applies each country's tax system to this matrix of field-size/development-cost combinations under the assumption of constant real oil prices. The tax systems are then compared in terms of government revenues as a percentage of cash flow generated by the fields. It appears that the Norwegian tax system provides the highest government share of total cash flow generated by a field, in both nominal and discounted terms. In other words, the Norwegian tax system appears to be the harshest from an investor's point of view. No country's tax system always produced the lowest government share in cash flow under all field-size/development-cost combinations. For the smaller fields, the U.K. system tends to produce the lowest government share, while for larger fields it is usually either

the Danish or Dutch system, depending on field development costs and whether the license is assumed to be granted under the 1967 or 1976 sets of Dutch license regulations. In terms of the progressiveness of the tax system—its ability to automatically lower the government's revenue share on high-cost fields and increase the government's share on low cost fields—the U.K. and Danish tax systems did best.

The fourth section of the report comprises several chapters analyzing the effects of varying assumptions on the government's share of total cash flow. The main assumptions varied are the price terms. Instead of remaining constant in real terms, prices are allowed to rise steadily, fall and remain constant, and fall continuously.

The report ends with a brief chapter on the effects of tax systems on exploration incentives (as distinct from development incentives), a discussion of risk sharing, and a statement of conclusions.

This report is well done and would be quite useful for explorationists, government officials involved with designing or implementing petroleum tax systems, petroleum tax lawyers, and others interested in the economics of exploration and development, especially in the North Sea. It is, however, somewhat technical, and unless the reader has some acquaintance with the subject, he or she may find it hard going. However, for those interested in this subject, it is well worth reading. The cost is \$225 per copy from Financial Times Business Information Ltd., Bracken House, 10 Cannon St., London, EC4P 4BY.

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Ragaei El Mallakh, Oystein Noreng, and Barry W. Poulson, *Petroleum and Economic Development: The Cases of Mexico and Norway* (Lexington, Mass.: D. C. Heath, 1984).

The twin hearts of this book are two fact-filled, frequently insightful case studies examining the impact of the recent rapid growth in petroleum output and exports on the economic development of Mexico and Norway. Both case studies are brief (about 60 pages each, excluding footnotes), and each is followed by a 25-page appendix describing econometric models of the country's economy; mid-1982 appears to be the date chosen for "closing the books" on incorporating new information into the case studies. Although the authors maintain that there are important parallels between the two case studies, they explicitly refrain from providing a comparative examination.

The case studies share a similar, two-part format. Part One presents an overview of the national economy focusing heavily on its post-1970 economic performance and providing a structural analysis of its principal sectors as well as a review of the government's economic planning and policymaking. Even though Norway enjoyed a far higher per capita income than Mexico throughout the 1970s, the case studies contend that expanding petroleum production became the dominant force influencing each country's economic growth and development as well as the evolution of its social and political institutions. Specifically, as awareness of the huge size of potential oil revenues became widespread, Mexico and Norway both borrowed heavily against future oil revenues to finance a higher level of current expenditures. Their debt burdens soared and during periods of weak oil prices, especially since late 1980, both nations were plagued with serious balance-of-payments difficulties and domestic revenue shortfalls.

Part Two of each case study examines very briefly the constraints on absorptive capacity. Although they contend that Mexico and Norway were both high-absorber countries during the 1970s (in the sense that the resources required to finance imports and domestic expenditures exceeded the accrued revenues generated by oil exports), the authors make very different projections for the two countries in the near future. Because Mexico will remain desperate for oil revenues to finance both its domestic consumption and its huge foreign indebtedness, its oil production could far exceed 5 million barrels per day by 1985, if worldwide oil demand revives. Even more grandiose, in the context of 1983 reports downgrading the size and productivity of Mexico's proved oil reserves, is the suggestion that 1990 production may reach 10 million barrels per day.

Norway's oil production, in contrast, is expected to grow only modestly for the rest of this decade. Nevertheless, the authors project that Norway is now on the road to accumulating a large financial surplus and will become a net capital exporter. The authors fear that this trend could result in a resumption of upward pressure on the Norwegian currency and lead to excessive domestic liquidity.

The two appendices represent nearly a third of this short book. Unfortunately, they add little that is useful. The Norwegian appendix simply summarizes two of four basic types of macroeconomic models currently used as aids in Norwegian macroeconomic planning. No attempt is made to link the appendix material with the corresponding case study.

The appendix providing a macroeconomic model for Mexico initially promises to be more rewarding. The Mexican case study advanced an interesting hypothesis: that nationalization of Mexico's oil industry imposed a burden on the Mexican people that has been a major factor in the country's alleged economic, political, and social instability. Although this hypothesis is not tested, a corollary is. Specifically, the authors claim that they will provide a macroeconomic model to test the proposition that a more stable growth path for the petroleum sector would have contributed to a more stable development path for the Mexican economy. Tantalized by this advertising, I eagerly turned to the appendix, where I discovered the barebones specification of a 31-equation macroeconomic model and some simulation results based on highly outdated assumptions about likely future oil prices. Some of the principal conclusions of this exercise are that Mexico's oil sector is very sensitive to fiscal and monetary policy and that the Mexican government turns to the oil sector

to generate the revenues needed to finance higher levels of expenditure. We also learn that the petroleum sector is a modern enclave with close links to foreign markets but insulated from the rest of the Mexican economy. It is questionable whether the econometric model was of value in gleaning these insights.

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Mohan Munasinghe and Gunter Schramm, *Energy Economics, Demand Management and Conservation Policy* (New York: Van Nostrand, 1984).

This easily accessible book is intended as a planner's guide to energy demand management, primarily for an oil-importing developing country. Mohan Munasinghe and Gunter Schramm provide not only a comprehensive presentation of the analytical basis for policy formulation, but also a discussion of alternative policy instruments and forecasting methodologies of demand analysis. Case studies from six different regions give the book a nice combination of theory and application.

Part A, "Theory and Methodology," begins with a brief overview of the role of energy in the world's economies, emphasizing the macroeconomic and balance-of-payments effects of increases in real energy prices. Current estimates of various energy stocks and future supply capabilities are juxtaposed against consumption patterns and substitution possibilities. The authors conclude that future energy supplies will be forthcoming, but only at higher prices. Consequently, they see an immediate need for fully integrated national energy planning (INEP), in order to maximize social welfare and attain desired sociopolitical objectives in the face of the continuing "energy crisis."

Basic economic concepts of welfare optimization and pricing in energy markets are given a clear, well-referenced presentation in both static and dynamic frameworks. The authors recommend that energy policy decisions be based on cost-benefit analysis using the principles of long-run marginal-cost pricing. They emphasize that the externalities and distortions inherent in most energy markets vitiate market solutions and that planners must look instead to shadow prices that reflect true economic opportunity costs.

A variety of "hard" and "soft" energy conservation policy options are discussed and evaluated from the viewpoint of national (not individual) welfare. For example, hard policy options that mandate lower thermostat settings or lower highway speed limits are seen as justifiable and effective, with only "the expense of some loss in personal comfort or convenience" (p. 86). Such direct physical controls are the preferred conservation measures for the short run and may even entail outright prohibition of certain energy uses. Soft policy options such as propaganda, educa-

tion, and pricing are better suited to the long run, since, in the authors' view, their effects are less immediate. Price-dependent conservation measures might also violate equity objectives of existing or proposed energy rate structures (e.g., lifeline rates).

Recognizing that effective energy demand management requires accurate demand projections, the authors evaluate four forecasting procedures: trend analysis, econometric simulation, input-output modeling, and user surveys. They maintain that trend analysis combined with survey research will provide the most reliable, useful, and easily obtainable results, especially in developing countries. The more sophisticated econometric simulations and macroeconomic input-output models are rejected because of their greater data requirements and overly aggregate results. Finally, investment analysis methods are presented to ensure that optimal supply system decisions will be made to meet projected demands.

The remainder of the book, Part B, contains case studies of real world situations with which the authors have had personal experience—in Sri Lanka, Thailand, Bangladesh, Alaska, Costa Rica, and Brazil. The cost-benefit methodology developed in Part A is used to examine the particular energy problems of each region. Specific policy recommendations are made that are expected to improve social welfare or help to meet certain equity objectives.

How valuable is this book as a planner's guide? If written in the mid-1970s, this volume would have been well received by most commentators, for it reflects the thinking of that era. From today's perspective, however, its contribution is less clear. A fundamental question not considered by the authors is whether it is possible to develop, implement, and administer an energy master plan via INEP at a cost less than or equal to the resultant benefits. The significant fixed costs associated with the creation of the additional bureaucratic machinery needed for INEP must be included in any complete cost-benefit analysis.

Assuming that all relevant costs of INEP have been properly assigned, one must then ask whether the proposed policy measures can reasonably be expected to produce the benefits intended of them. The authors seem to recommend nonprice conservation measures, such as quantity rationing and regulation of energy use, since locked-in effects associated with existing production and consumption capital stocks prevent significant reductions in demand in the short run. This argument is reminiscent of the disastrous U.S. energy policies of the early and mid-1970s, which assigned little weight to price-induced conservation measures, under the assumption that demand was determined primarily by the level of economic activity rather than by price. Prices were prevented from signaling true economic opportunity costs—largely for equity reasons—causing severe resource misallocation and costly overconsumption of imported supplies. Ironically, the equity, conservation, and security objectives of U.S. energy policy began to be achieved only after the earlier measures were largely reversed so that world market prices could directly affect domestic supply and demand. Perhaps most revealing in this regard is the authors' assertion that "the significant reduction in petroleum consumption in the U.S. from an average of 18.5 MMBD in 1979 to 17.1 MMBD in 1980 is largely attributed to oil energy conservation measures" (p. 86n; emphasis added), rather than simply being due to a near doubling of petroleum product prices during that period. From today's vantage point, can one seriously make such a claim?

Similarly, the authors' recommendation of simple trend analysis and survey research as a forecasting methodology seems somewhat dubious in view of the record of trend-based demand projections during the 1970s. Curiously, the authors feel that econometric forecasting is "nothing more than a special form of trend analysis if the projections of the selected determinants [of demand] themselves are based upon historical trends in turn" (p. 217). Such a statement overlooks the ability of econometric demand models to generate quite different patterns of energy consumption under alternative hypothesized price and income paths. It is interesting to note that private industry forecasters relied extensively on simple trend analysis until the mid-1970s, but thereafter made widespread use of econometrically estimated price and income elasticities.

In many developing countries the pursuit of equity objectives or regional development strategies severely distorts the energy price structure, and may well limit the effectiveness of price as a conservation measure. Efforts directed toward removing many of these existing price-distorting energy policies (which make second-best decisions necessary) would not only improve the efficacy of INEP, but would help policymakers improve on the disappointing record of most attempts at energy demand management since 1973.

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