Book Review

Olsen Bjerkholt and Vislie Bjerkholt, *Recent Modelling Approaches in Applied Energy Economics* (New York, NY: Routledge, Chapman & Hall, 1990), 268 pages.

It is refreshing to see an edited volume in energy economics that manages to present new and innovative methods and analyses of energy markets. That is why I welcome the publication of this book. Although the title suggests a broad sweep it terms of subject matter, the book is really very focused, particularly on economic issues of interest to small, developed energy exporting countries such as Norway. I believe it would have been more appropriate to use a title that more closely matched the book's content.

The first part of the book is concerned with the operation of the European natural gas market. (Norway is a significant player in that market.) The European gas market is dominated by a few large players and as such has resisted conventional competitive analysis. The focus in this book is on game theoretic issues, a most appropriate way to view this market, in my opinion. The second part of the book is concerned with how a small country can best manage large oil resources, in terms of the timing of extraction and "disposal" of oil revenues. This is a non-trivial issue for Norway (and other countries, like Kuwait), involving production paths, consumption/investment decisions and stimulation of non-oil sectors, avoiding the Dutch disease. There is one additional chapter that ends the book that does not fit into this two-part breakdown. That chapter concerns the macroeconomic effects within the OECD of oil-price fluctuations.

Although it is difficult to summarize a volume of distinct contributions by separate authors, I will attempt to give the flavour of some of the chapters in the book. The first part of the book, concerned with the European gas market, begins with a good chapter (by Bjerkholt, Gjelsvik and Olsen) on the structure of the market, including estimates of costs, reserves and historic consumption. The authors then go on to discuss some of the policy issues facing the EEC, including the question of open access to pipelines; ie making gas pipelines common carriers. The authors end their chapter by presenting a dynamic oligopoly model of the European market. Although not much detail is presented in the chapter, the model is a repeated game among three players: Norway, Algeria and the USSR. Strategies consist of large, lumpy investments in compressor capacity. An interesting feature of this model (as well as other game-theoretic models of natural resource markets) is that both high-cost and low-cost producers have significant shares rather than the low-cost producer dominating the market, as would be the case in a purely competitive market. The mix of producers is much closer to reality and as such the game-theoretic representation is a more satisfying way of viewing the market, particularly considering the small number of large players in the market.

Two other chapters in the natural gas section of the book similarly use game theory to derive insights on the operation of the gas market. A chapter by Hoel, Holtsmark and Vislie computes the core of a bargaining game between two producers (Norway and the USSR) and two consumers (continental Europe and the U.K.). In another chapter, Vislie sets up a bargaining model involving Norway and the USSR as producers, a single transmission company (e.g. Ruhrgas) and local distribution companies. Unfortunately, no computational results are presented. One criticism I have of both of these later chapters is that the authors introduce a diversification constraint that consumers will take no more than 30 percent of their imports from the USSR. In effect, economic forces are being overridden by an exogenous constraint, perhaps in order to yield results that are more consistent with beliefs about how gas will move around the market. This diversification assumption has been made in other markets that have imperfectly competitive elements (e.g. see the discussion on the international coal market in Kolstad and Abbey, 1984). I would much rather see the authors endogenize the economic decision processes so that something like diversification is a result of the model, not an assumption.

The second half of the book is concerned with the management of Norway's oil revenue. While this may sound like a very specific issue, not of wide interest, the chapters are very well done and introduce new analytic methods and insights that have significance far beyond policy applications to Norway. In the first paper of the section, Aslaksen et al examine the question of the optimal use for oil revenue between the alternatives of consumption and wealth formation. They develop an intertemporal planning model using as a social welfare function the sum of utility of wealth and utility of consumption. While it is not clear what policy implications emerge from the analysis, the model does show how the optimal consumption changes with expectations on oil prices and would appear to be an appropriate policy analysis framework.

One of the most interesting chapters in the second half of the book is by Golombek and Hoel and involves the calculation of the Hotelling rent for Norwegian gas. This is significant primarily because resource rents are frequently cited but rarely estimated. The approach of the chapter is a standard one, integrating demand with supply. Interestingly, under a wide variety of assumptions about market structure, the calculated rent is remarkably stable, ranging from Nkr 0.074 to Nkr 0.229 per scm (approximately US$ 0.34-1.08 per mcf or million Btu).

Space limitations have restricted my discussion here to but a few of the many worthwhile chapters from this book. In my opinion the book is a significant contribution to analysis of two important energy economics issues: understanding the operation of the European natural gas market, and understanding the energy production strategies for a resource rich small developed economy. However, the book's significance goes beyond its contribution to understanding these important empirical issues. Its methodological contribution is most significant and as such the book should find a wide readership.

Charles D. Kolstad
Associate Professor of Economics, University of Illinois