

PREFACE

As the first word on a set of quantitative studies of natural gas markets, the preface should indicate who it is intended for, what those readers will find, and what they should take away. All of that is provided in the following five chapters in the context of quantitative studies that intend to be current and topical on certain energy markets, policy and their effects on the economy.

This book contains five semi-independent analyses of aspects in the performance of natural gas markets in Canada and in the United States in the recent past decade. The technology of natural gas, interacting with the economics of

costs and demands for services to deliver gas to the consumer's burner tip, determines the first level of industry activity in inground gas discovery, development, and production. The second level, at the wellhead, consists of gathering, refining, and transfer of the product to pipeline nodes for transport to other intersecting nodes and ultimately to the third level, that of the distribution system at the point of use. At each point of transfer, there are buy-sell markets and also state and national agencies to regulate the buy-sell process. We carry out analyses of the response of service suppliers at these levels to changes in the extent of regulation in the early 1990s. Our results are intended to inform readers concerned with the effects on gas prices at various points in the networks as a result of such changes known as regulatory "reform", or "partial deregulation".

We do not account for the effects of all such changes inherent in "partial deregulation" in the last decade and a half. Instead, we concentrate on what we consider to be the building blocks for changing the performance of the supply side of sales markets. Decisions of the Federal Energy Regulatory Commission (FERC) required the separation of gas ownership from pipeline transportation services, the development of exchange markets for gas and (separate) transportation at hubs that were between field intake and city gate delivery. FERC also required the elimination of price

controls on all transactions in product or line space except on firm contracts for delivery space. We seek the “facts” on changes in the geographic dimensions of the markets for line space, and on the extent of storage either at the wellhead or in reservoirs close to final sales locations. The focus, however, is on what happens to gas prices, both in the year-to-year markets and in the long run relative to what would have happened without this partial deregulation.

Our intention is to provide the reader with “economic knowledge” on how in supply/demand equilibrium the representative gas price changed because of modifications in the regulatory constraints on supply. This calls for testing models of price behavior in monopoly or oligopoly (supplier interactive) transportation markets with data on prices and volumes. The readers will encounter summary statistics for voluminous data on gas shipped, basis differentials in spot prices on sales at different hub locations, and pipeline charges, costs and earnings. These data are used to test hypotheses that pipelines increased their interaction with other lines, and increased short term and season-to-season space to meet volatile demands for services after partial deregulation. These hypotheses have been tested using various statistical measures, commonly referred to as “low brow” econometrics. The reader will encounter attempts at rigor in testing, of the form of co-integration techniques to

define markets, and regression analysis to distinguish regulated monopoly service provision from partially deregulated Bertrand oligopoly service provision. The emphasis throughout is on tests to support a statement that gas sales and transportation have become less monopolistic in character, with prices lower but more volatile over the summer to winter heating seasons.

The quantitative studies cover some of the major impacts of FERC deregulation initiatives of the 1990s. There were earlier initiatives as a result of the Natural Gas Policy Act of 1978 which phased out FERC price controls of well-head gas. The impacts of this earlier decontrol carried over into the later period (particularly, as will be seen, in the behavior of storage markets). And the 1990s deregulation also affected the performance of large industrial gas consumers, and local distributors at retail, on the buying side. We do not undertake quantitative studies of all these effects. The analyses here of price-cost margins and profitability of the major pipelines only allow us to state stylized facts about transportation and gas sales markets becoming more oligopolistic and less profitable.

What is encountered here, however, is more than what is found in the energy trade magazines on two dimensions. It is statements about the “type” of prices and services likely to be found in current markets — prices that have been

driven below levels that would have been quoted by a single pipeline subject to 1950s style regulation. This lower level of prices is sustainable only if it generates margins over fixed and variable costs sufficient to lead to capacity expansion necessary to meet future increased demands. The magazines do not discuss, never mind document, such matters; their focus is on week to week pipeline space excesses or shortages, gas price spikes at retail, and so forth. Thus, the reader should take away unique “facts” on market definition, oligopoly pricing, capacity expansion, long run supply-demand equilibrium.

The semi-independent studies here were undertaken at the Yale University School of Management and Economics department by Professor Paul MacAvoy and PhD students Vadim Marmer, Nickolay Moshkin, and Dmitry Shapiro. Research grants necessary to provide the financial resources for quantitative work were provided by the John M. Olin Foundation. Graduate students in the MBA program, as Olin Fellows, compiled the databases; in particular Gene Agashin and Carlos Reyes set up the methodology to compile statistics for all major pipelines; Fellows Gene Agashin, Rumundaka Winodi, and Marni Rapaport set up and/or compiled price data for the basis differentials analysis; and Fellow Reyes with Winodi developed the data foundations for the analyses of pipeline financial

performance over the 1990s. The chapter studies themselves were undertaken by the authors so designated. This does establish independency for each study and to a certain extent the value attached to authorship goes to those named; but all those on the title page read and edited all the pages in this book and the results of repetitive critiques by all four of us can be found on each chapter. We dedicate this work to the culture of interactive scholarship that marks economics and management education at Yale University. And we thank Jessica Lather Washburn of the Technical Support Staff of Mt. Ascutney Hospital and Health Center for turning the pages into a finished book manuscript.

Paul MacAvoy