

Table of Contents

I. Commodity Risk Basics

- 1.1 The Commodity Risk Landscape
- 1.2 History of Commodity Risk Management
- 1.3 Recent Commodity Derivative Debacles

II. Commodity Risk Management Concepts

- 2.1 Measuring Risk and Exposure
- 2.2 Optimal Risk Management Decisions
- 2.3 Strategic Risk Management

III. Risk Management Applications

- 3.1 Base Metal Mining
- 3.2 Oil and Gas Exploration and Development
- 3.3 Airlines and Jet Fuel Hedging

APPENDICES

INDEX

Preface

This book aims to raise an alarm bell about the current state of commodity risk management and to suggest some helpful improvements. In particular, the rise of commodity-related exchange traded funds (ETFs) and other commodity-based securities traded on stock markets has extended the scope of commodity trading to include a large class of traders not directly involved in the cash commodity market. These largely long side traders operate under the motivation that purely speculative commodity transactions constitute ‘investments’ within an efficiently diversified portfolio of assets. After an initial period of commodity price increases driven by the increase in long side participation of these ‘new’ traders, the underlying speculative motivation for the commodity transaction surfaces. The inevitable collapse in prices induces dis-hoarding of the commodity ‘investment’ positions, often resulting in sustained periods of distressed commodity prices. Real losses are imposed on actual commodity producers created by the excess stocks and flows of the commodity that were encouraged by the increase in prices. Historically, the commodity markets have often suffered severe systemic disruptions in the price discovery process when the hoarding and dishoarding activities of traders not involved in the cash market become too significant a proportion of commodity stocks and flows.

Despite claims to the contrary, e.g., ITFCM (2008), available historical evidence supports the view that there has been substantive disruption in the price discovery process in specific commodity markets from the ‘excessive’ participation of traders not directly involved in the cash market. For example, consider the debacle in the natural gas market precipitated by the hedge fund Amaranth Advisors LLC (sec. 1.3) in 2006 or the excess speculation in the wheat market by commodity index traders identified by United States Senate Permanent Subcommittee on Investigations (2009). Less obvious is the unprecedented rise in gold prices from 2005-2010 that has coincided with the rise of gold ETFs trading on stock markets. The globally destabilizing volatility in oil prices coincided with the appearance and increasing use of oil ETFs. Sustaining these market developments is the view that commodities are an ‘asset class’. Investment bankers, financial advisors and leading academics all recommend the inclusion of this ‘asset class’ in a ‘well-diversified’ investment portfolio. Risk management programs such as those associated with the Global Association of Risk Professionals treat ‘commodity risk management’ as a special case of financial risk management.

Properly defined, commodities are fundamentally distinct from equity securities and fixed income securities. Unlike a share in General Electric, which represents a claim against real assets which produce goods and provide employment, commodities do not earn a physical or pecuniary return. Those not directly involved in the cash market that are purchasing a commodity for ‘investment’ purposes are fundamentally confused. By definition, such transactions are ‘speculative’. More precisely, a transaction that is undertaken for the purposes of benefitting solely from price changes is speculative, *by definition*. Attempts to portray such purchases as ‘risk management’ through ‘efficient diversification’ are misplaced. Given the central role of commodities in economic life, such views promote economically destabilizing behavior. This is not intended as a neo-Luddite argument against the use of ETFs and other innovative exchange traded products. Quite the contrary. Modern markets are blessed with the liquidity and sophistication to provide products that significantly expand the commodity risk management universe. However, the ill-advised use of such products diminishes the potential social benefits such products can provide in terms of enhanced market liquidity and stability of the price discovery process.

With this background in mind, this book develops and assesses theories for evaluating and

managing commodity risk. This involves describing the use of derivative securities in commodity risk management, both theoretically and by examining commodity risk management practice in specific commercial situations. The primary academic contributions of the book are: the explicit development of the often overlooked and misunderstood distinction between speculation and risk management; and, to demonstrate commodity risk management decisions can be improved with an in depth understanding the strategic character of decisions involving commodity prices. This book aims to provide a unified treatment of important concepts and techniques that are useful in the management of risk arising in commodity markets. Some of the techniques examined are well known, such as the replication strategies associated with put-call parity arbitrage. However, extensions to specific situations and the connection to speculative trading strategies are not. In actual situations, commodity risk management often involves dealing with uncertainty arising from both price and quantity, an aspect that is either ignored or given too brief a treatment in conventional risk management texts that typically overemphasize the application aspects of derivative security contracts and risk measurement methodologies, often treating commodity risk management as a special topic in financial risk management.

This book is not intended to provide a comprehensive introduction to commodity risk management. There are many excellent academic sources that contain the relevant background material. Rather, this book aims to provide a constructive critique of both the received theory of commodity risk management and the real world practices arising from that theory. By design, this involves approaching the subject matter from a somewhat different perspective. Considerable discussion revolves around the impact that uncertainty has on the optimal solution to the risk management decision problem. More precisely, it is demonstrated that optimal risk management decisions involve a speculative component. Following a line of thought going back at least to Frank Knight (1922), the resolution of the uncertainty associated with the speculative element is a fundamental source of economic profit and, as such, directly impacts a need to integrate 'risk and uncertainty' management into the corporate decision making process. Practical illustrations are provided of the strategies employed by firms facing commodity risk in the base metal mining, airline and oil and gas industries.

The book is divided into three parts. The first part deals with the general framework for commodity risk management; the second part focuses on theoretical impact of speculation in commodity risk management decisions; and, the third part deals with three specific practical commodity risk management situations from publicly traded corporations in: base metal mining; airlines; and, oil and gas exploration and production. A considerable amount of Finance background is assumed at various points up to, say, the level of standard introductory texts such as Bodie, Kane and Marcus, *Investments*. Where specialized mathematical knowledge is assumed, this is delegated to appendices. In general, only basic algebra and calculus are sufficient to understand the discussion. While the bulk of this book is aimed at providing material relevant for academic presentations of commodity risk management, the material in part three is selected with the practitioner in mind. A substantial amount of the material in that part illustrates by practical example how commodity risk management can involve exceedingly complicated strategic business decisions.