

# Fundamentals of Trading Energy Futures and Options

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# PREFACE

Since the previous edition, markets evolved significantly and numerous books have been written on energy futures, swaps, and options. The objective of this edition is not only to update the previous version but also to provide a more comprehensive overview of what traders or investors can look at when entering into the business of energy trading. When considering trading energy futures and options, agents have to take into consideration all factors influencing the price of the commodities traded. Consequently, this edition has substantially revised the book: chapters have been updated and new concepts have been introduced.

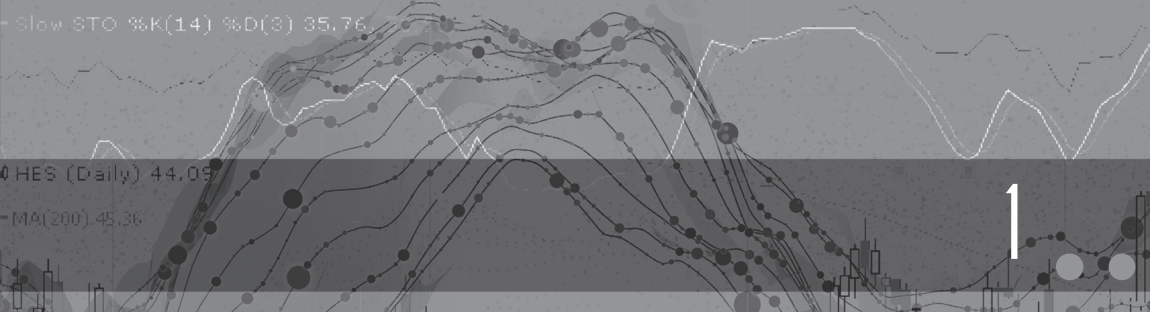
Some of the chapters introduce notions that are general for all financial markets, not just for energy markets, but they are elements that beginners or students have to include when trading energy markets. For example, there is a new chapter on market efficiency. It is relatively abstract and can be applied for all financial markets: the idea is to show the different ways to explain the evolution of prices in financial markets. It may seem abstract, and practitioners may want to skip this chapter. However, it is in reality critical because it influences the strategies that investors adopt, and it may explain how markets evolve, which is one of the primary concern of a trader. As a consequence, depending on the belief of traders, they may adopt a kind of passive approach using portfolios or they may be very active looking for superior returns. Accordingly, a new chapter on the introduction of energy and other commodities in Modern Portfolio Theory is provided for passive investors. Particularly, the roles of ETFs and ETNs in the market are described, as they became very important.

Another example is a new chapter on fundamentals. A part is allocated to fundamental analysis of energy markets but another part is about business cycles in general. Issues such as the peak oil theory, technology, and structure of the industry have to be examined because it influences the price of oil. These themes are directly related to the energy market. Furthermore, prices of commodities are partly influenced by the economy, so it is essential to try to understand the underlying mechanism explaining business cycles. The descriptions of business cycles may appear general and a little bit complicated. In addition, some history of theories are shown for general educational purposes. Traders may skip some of the content, but it is nonetheless an important part of the analysis that a trader must do: the key is to recognize the link between commodity markets and economic fluctuations.

The chapter on technical analysis is greatly expanded. A wide range of strategies are presented, and they are valid for any financial markets, not just for energy-related securities. It should be emphasized that no miracle strategies are offered.

Rather, ideas are introduced and it is the mission of the trader to find its own approach. Furthermore, emphasize is on psychology: how traders have to develop a plan and have self-discipline. A new chapter on swaps is included; it is an important tool for hedging not only in energy markets but also in all financial markets. The chapters on options are expanded to incorporate valuation and other strategies for trading. Finally, parts on the evolution of energy derivatives markets incorporate new features such as the creation of Clearport and other clearing processes.

The book can be used as a textbook for students as it deals with all critical issues of trading in energy markets. Also, it can be a guide for new professionals that engage in careers related to finance in the energy industry so they can be aware of the different ways to look at trading. The general approach of the book is to give basic concepts that beginners and students should consider when trading energy futures and options. References are provided for readers who want more details about the topics. Nevertheless, in the same spirit as the first two editions, the book is written in a way that describes and analyzes concepts and practices in a clear fashion.



# FUTURES AND OPTIONS

## CONTRACTS AND MARKETS

**COMMODITY FUTURES** contracts are legally binding and negotiable contracts that call for the delivery of agricultural, industrial, or financial commodities in the future, hence the term *futures contract*. Options are also legally binding and negotiable contracts that give the holder the right, but not the obligation, to purchase or sell the underlying futures contract at a specified price and time for a one-time premium payment. Futures and options contracts are traded on futures and options markets, which are composed of exchanges and brokers that facilitate the buying and selling of contracts. Commodity futures and options markets are central marketplaces, once located primarily in Chicago and New York, although markets have also developed in such diversified locales as London, Tokyo, Beijing, Frankfurt, Paris, and São Paulo. Today there are around 40 futures exchange places trading energy derivatives worldwide where trading in futures or options contracts occurs.

Futures markets are primarily financial markets that trade commodity futures and options contracts. Even though futures contracts may involve actual delivery of physical commodities, such delivery is a relatively rare occurrence in mature futures markets.

Commodity futures markets in the United States, Canada, Europe, and Asia serve an important economic function. The markets facilitate the transfer of risk among various market participants and, in the process, reduce risk for producers and processors and improve the flow of commerce.

Commodity futures contracts are traded for a variety of commodities. Agricultural commodities such as wheat and corn have been traded in Chicago since about 1860. During the last 50 years, futures contracts have been developed for industrial commodities such as platinum and copper. There are also well-developed futures markets for foreign currencies such as the British pound and the Japanese yen. Contracts on financial instruments such as Treasury bonds and

authority to trade the market with expanded daily trading limits. The supervisor, in turn, reports to a hedge or trading committee. The committee, comprised of management, should evaluate hedging and/or trading positions as well as price risks associated with the company's operations.

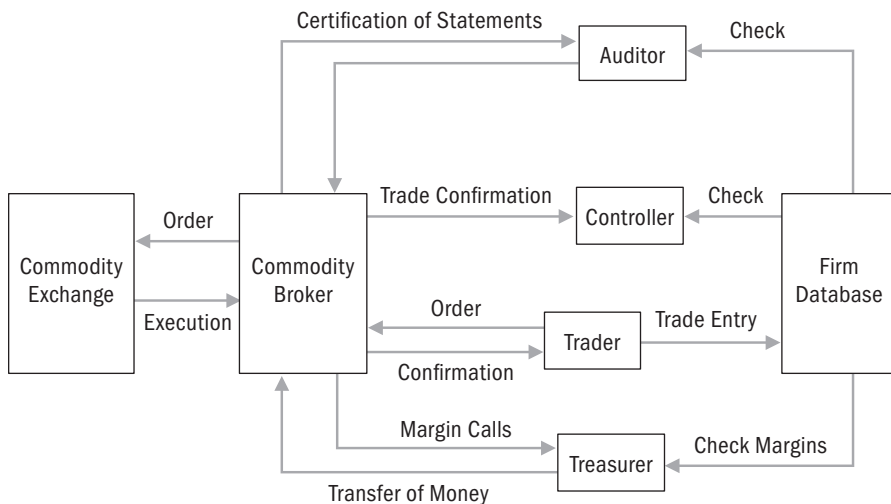


Fig. 2-2. Trading controls

A trade is initiated when the trader gives the commodity broker an order. Trades are mainly ordered through electronic platforms but can also be made by phone. The broker then executes the trade. Once the transaction is completed, the broker informs the trader of the order's execution and relays all the pertinent data (i.e., price, quantity, and type). If the trade was ordered by phone, the trader then prepares trade entry information for the company's database. The broker sends a statement of transaction to the controller's office. It is essential that the confirmation be sent in a timely manner so that if any error existed the controller could quickly call attention to the matter before the market opened. The controller's daily contact with the FCM could catch unauthorized trades promptly before prices could adversely affect the company.

The commodity broker should contact the treasury department daily, if necessary, to discuss shortages or excess margin money. The commodity broker should never discuss money transfers with the trader. Thus, if the treasurer believes that a margin call is excessive, a quick check against the trader or database and will reveal whether the trader has exceeded the position limits established by the board of directors.



ETNs have similar characteristics to stocks or index funds in the sense that they are traded on an exchange market so they can be bought or sold short like any stock. Contrary to ETFs, ETNs don't create a fund trying to replicate an index; they just track it to evaluate what the fund will pay the investor when the bond is redeemed. Thus, ETFs own the securities they use to build the fund while ETNs don't own anything as they just use the index as a benchmark to reward investors. An ETN can be liquidated before maturity by selling it on the stock market. Also, the investor can redeem it directly to the issuer. This is usually done on a weekly basis and a redemption fee could be applied, depending on the contract.

The first ETNs appeared in the 2000s. As this structure provides favorable characteristics, one advantage of using ETN is the tax efficiency associated with the security. There is no interest payment so no annual tax. Taxes are paid only on capital gain obtained when the investor sells the note or when it matures. It is beneficial in the sense that long-term capital gain is taxed more favorably than short-term capital gain. In addition, the investor doesn't have to deal with a K-1 that would have been necessary if investing in an ETF.

Moreover, ETNs are not subject to tracking errors. As described above, ETFs are funds that try to replicate an index, so they buy futures of the different commodities that compose the index and using the same proportions. However, due to regular changes, the ETF generally cannot exactly reproduce the index chosen so there is a discrepancy, which is measured by the tracking error. This problem doesn't exist for ETNs as they only observe the change of the value of the index, they don't try to replicate it.

Furthermore, this structure has allowed investors access to products that are difficult to acquire (such as those from foreign countries) or not easy to build. Finally, ETNs offer the possibility to leverage on their position. For example, certain ETNs return two or three times the return of an index, not just the return itself. Of course, the danger may come from a situation in which the price of commodities declines, so investors could double or triple their losses.

A disadvantage associated with an ETN is the introduction of credit risk. As in the bond market, the credit of the issuer is a risk concern. The risk may not seem very important as the issuers of ETNs are usually large banks such as Deutsche Bank, Goldman Sachs, and Barclays, but the collapse of Lehman Brothers in 2008 should remind investors that risk is still present. Thus, investors would get a return depending on the evolution of the value of the index but it may also be affected by the credit rating of the issuer. An issuer may not be able to fulfill its obligation to pay and any downgrade from rating agencies would have a negative impact on the price of the ETN on the stock market.

bad news. Change in mood can be very rapid and also the swings can be exaggerated as people take profits quickly.

## NOTES

1. Hotelling, Harold. "The Economics of Exhaustible Resources." *The Journal of Political Economy*. 39 (2): 137–175.
2. The literature on entrepreneurship or theory of the firm is too vast to mention all major authors in that field.
3. See Yergin (1992) for a historical perspective of the role of oil in geopolitical events.
4. See Yergin (1992).
5. For descriptions of the different business and financial cycles see Haberler (1962), Leijonhufvud (1981), Rogers (1989), Phelps (1990), Hall (1990), Garrison (2001), Arnold (2002), and Knoop (2008, 2015).
6. Keynes' book *The General Theory of Employment, Interest, and Money*, which was published in 1936, has been the basis of many other works on economics.
7. See Salerno (2008).
8. The IS-LM model was created to represent mathematically the Keynesian macro-economic theory. The IS curve is the "investment – saving" curve and the LM curve is the "liquidity preference – money supply" curve. It is beyond the scope of this book to explain in details the concept. For more detailed explanation, see Barro (1990), Blanchard (2003), Gordon (1998), and Hall and Papell (2005) (fig. 5–12).

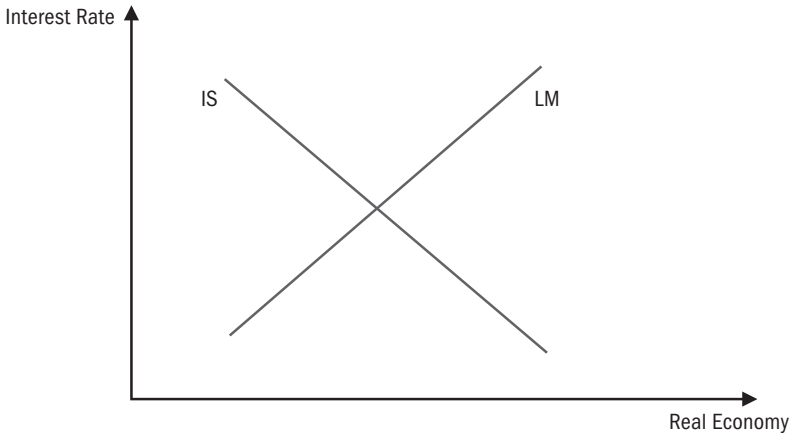


Fig. 5–12. IS/LM Curve

9. The Phillips curve represents the trade-off between inflation and unemployment. Higher inflation is correlated to lower unemployment. See Barro (1990), Blanchard (2003), Gordon (1998), and Hall and Papell (2005) (fig. 5–13).

## Basis and hedging

There is a very close relationship between basis and the effectiveness of hedging. If basis does not change substantially when large cash price changes occur, then changes in cash prices experienced by hedgers will be offset by approximately equal changes in futures prices and hedgers will be effectively insulated from price risk. Systematic changes in basis related to storage costs will generate corresponding systematic profits or losses to hedgers. The reduction of storage basis over time may be to the hedgers' advantage or disadvantage depending on whether they are long or short in the cash market and whether futures markets are inverted or carrying charge markets when the hedge is initiated.

## Basis changes

Figure 6–8 presents an abstract and idealized picture of changes in basis. In it, the futures price is held constant and the cash price is shown as converging from below, and thus basis narrows. In fact, due to market forces and random shocks, both cash and futures prices change continuously.

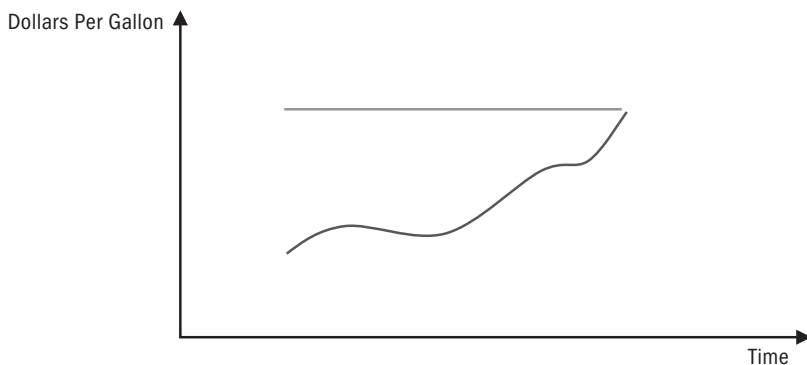


Fig. 6–8. Convergence of cash and futures with futures held constant

Basis changes may be conceptually split into two components: systematic and unsystematic basis changes. Systematic changes in basis are also represented in figure 6–8.

Systematic changes in basis are caused by the lessening of carrying charges over time. As the futures contract nears expiration, the cost to carry inventory until expiration decreases. In a full carrying charge market, the cash and futures prices will converge at a rate approximately equal to carrying costs per unit of time. For instance, if it costs \$0.015 per month to store heating oil, then in a full carry market basis will narrow by approximately \$0.015 per month. If the difference between cash and futures prices is not full carry, basis will still narrow over time but at a slower and less predictable rate. In an inverted market, cash and