MODERN ENERGY MARKET MANIPULATION

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BY

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INVESTOR IN PEOPLE

To Stuart Kleit, the best friend a son could have

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About the Author

Andrew N. Kleit is a Professor of Energy and Environmental Economics and MICASU Faculty Fellow at the Pennsylvania State University. He is the Founding Chair of the Energy Business and Finance Program, the largest undergraduate major in Penn State's College of Earth and Mineral Sciences. Professor Kleit is the author of over 70 refereed academic articles in the areas of energy, environment, antitrust, regulation, and health care. He is also the author or editor of five books published prior to this work, including *Electricity Restructuring: The Texas Story* (2009) and *Electric Choices: Deregulation and the Future of Electric Power* (2006).

Prior to becoming an academic, Professor Kleit was a Staff Economist at the President's Council of Economic Advisors, Economic Advisor to the Director, Bureau of Competition, Federal Trade Commission, and Senior Economic Adviser to the Director for Investigation and Research, the Chief Antitrust Official of Canada. He has also been a Visiting Scholar at the Commodity Futures Trading Commission and the Federal Energy Regulatory Commission. In addition, he has been a Visiting Scholar at three universities in China. Professor Kleit holds a PhD in Economics from Yale University, and a BA in Mathematics and Political Science from Middlebury College.

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Preface

The idea for this book came to me in April 2016 when I was a visiting scholar at the Federal Energy Regulatory Commission (FERC). FERC has an enviable record in the area of restructuring electricity and natural gas markets. It also has a large number of intelligent and motivated staff dedicated to serving the public interest. Unfortunately, I gained the strong impression that FERC's mission had become so broad and complicated that it was hard for the agency to do anything other than follow previous precedent. In some ways, it appeared that the agency was largely on autopilot, despite the best intentions of all concerned. I also had the opportunity to review some manipulation cases from the inside, an experience I found fascinating.

The motivation for the book came from a large number of sources. The books by Bork (1976) and Posner (1976), using individual cases for motivation, had a large impact on antitrust policy. My own work (e.g., Butz & Kleit, 2001) comes from an interest in exploring important cases and showing what "everyone knows to be true" is not, in fact, true. This applies in particular to the analysis of the Hunt Brothers silver episode in Chapter 3.

I shaped this work based on two other important books. The very successful book edited by Kwoka and White, *The Antitrust Revolution*, now in its sixth edition, is has been published for over a quarter of a century. These volumes show how to present antitrust case studies from scholars and consultants in a book format. I wish to add to this genre by writing case studies that are in one voice, where the author is in a position to critique both sides of a legal matter.

A recent work by Taylor, Ledgerwood, Broehm, and Fox-Penner (2015) was crucial for this book. Taylor and his colleagues lay out many important theoretical concepts in market manipulation, which I am able to build upon in the introductory chapters here.

This book starts by describing the relevant financial issues and offering a definition of "manipulation." Chapter 2 introduces the basic economics of manipulation, while Chapter 3 describes historical cases in this area. Chapter 4 presents the relatively simple *DiPlacido* matter, which was badly argued and decided. Chapter 5 examines the basic structure of restructured electricity markets, whose understanding is critical for understanding the electricity market cases examined in the book. Chapters 6 through 12 examine particular energy manipulation cases in depth, while Chapter 13 contains some conclusions.

I note that in several places the book is critical of FERC. That does not mean, however, that I hold FERC in disrespect. Indeed, my hope is that FERC responds positively to at least some of my critiques. Every government agency needs to have its actions examined closely. This is my attempt to do so with respect to energy market manipulation.

Andrew Kleit
University Park, Pennsylvania
April 2018

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Chapter 1

What is Manipulation? What is Not Manipulation?

I. Introduction

Any book about market manipulation needs to define what market manipulation is. Surprisingly, there is no agreement about what market manipulation is. It is clear, however, that often what is called "manipulation" is not, in fact, manipulation.

To start on our journey, we will first examine what a commodity market is. Given this, we will then set out some definition of market manipulation and apply them to events that are often referred to as manipulation. We will then define speculation and market power, two phenomena that are often mistaken for manipulation. Later in the book, these distinctions will be used in our examination of assorted manipulation cases.

II. A Commodity Market

Manipulation cases take place in commodity markets. Therefore, to understand manipulation requires a basic understanding of what a commodity market is. Thus, this chapter will start by explaining a commodity market from the point of view of buyers, sellers, exchange officials, and traders.

A. Selling to the Commodity Market

You are a successful corn farmer in Iowa. Surprised? Look around you. It is March, and you are standing in an extremely large field covered by snow. You have a comfortable warm home, and some nice barns and other buildings. While you are cold now, you know (or at least are fairly confident) that in a few weeks it will warm up, the snow will disappear, your field will dry, and you will be planting corn for harvest in September and/or October.

Since you are successful you are no doubt good at growing corn. Farming, however, is about more than growing. Farming is also about managing financial

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risks, and you are good at that as well. In particular, you are planning to plant corn soon. Planting corn costs money, and while you are financially well off (on paper), most of your wealth is actually invested in the land, and not that easy to get in the form of cash. Thus, you are likely to go into the nearest decent sized town, and borrow money from your favorite banker.

Despite what one might infer from the 1890s and 1930s populist literature, the banker is your friend. You may have known him or her all your adult life. S/he agrees to loan you the money you need for planting in exchange for you paying the money back when your crop is harvested, plus a market rate of interest.

Your friend the banker is now (just like last year) your partner. If you do not have the money to pay back the loan, his/her life is going to get rather difficult. Certainly, the bank could foreclose on your land and get some (though unlikely all) of its money back. But the bank really does not want to do this. Foreclosure is a great way to make enemies, which the bank does not need. Further, the bank does not really know what to do with your land.

At this point, both you and your partner, the bank, are interested in reducing your risk. One risk you have is that, while you can observe the price of corn on the "spot" market for delivery today, you really have little idea on what the price of corn will be when you are ready to deliver it in the Fall. It could be high (good for you!) or it could be low (bad for you and your banker). Thus, you have "price risk" that you and your banker will want to reduce.[1]

It is for the problems like this that the Chicago Mercantile Exchange has a commodity market for the type of corn you grow. Therefore, you call your financial agent (you have one of those as well) and put in instructions to sell your expected corn crop. You might order your agent to sell one million bushels of corn for October delivery. In about an hour (or less) your agent tells you that your October corn has been sold, say at a price of $3.50 per bushel. You have entered into what is called a "futures" contract, because you have promised to deliver a good in the future. Since you now owe the exchange the corn, you are said to be "short" in corn. By contract, your corn must be delivered to warehouses in Chicago (or perhaps other specified delivery points) on or near a specified date in October.

Now the commodity exchange owes you one million bushels times $3.50 per bushel equals $3.5 million in October (minus relevant financial fees, of course). You owe the exchange one million bushels in October. Of course, the exchange is not planning on what it is going to do with your bushels. For, when you sold the exchange your bushels, the exchange simultaneously sold those bushels to someone else, who now owes the exchange money. You do not know whom your bushels were sold to, and you do not care. (Unless, perhaps, you do not think

[1]For many reasons, including several plagues listed in the Old Testament, you also do not know how much wheat your plantings will result in. You have serious "quantity risk." Fortunately, you are also an expert in the use of crop insurance, which is not a topic of discussion here.

that exchange is selling the bushels to parties of good credit.) Trading is thus anonymous.

Trading with the commodity exchange did more than solve your liquidity problem. The amount of corn you plant in the spring is not fixed. In terms of a standard introductory economic textbook, you have diminishing returns. What that means is that the larger your (expected) production, the higher the marginal cost of that production, that is, the incremental cost of the last bushel of corn you will produce. Since you understand basic economic theory quite well (whether or not you had to sit through that boring five hundred-person lecture class at the university), you will do your best to choose the amount of corn to grow such that the marginal cost of producing that corn equals the price you received from the Chicago exchange.

The price of corn also sends you a signal about what type of investments you should make. You are considering purchasing some land close to your current farm. The land might grow corn, or it might grow soybeans. Before you consider whether you should buy the land, you (and again, the bank loaning you most of the needed money) will try to figure out what this land is worth. The value of this land is, of course, directly related to the price of corn. While you do not know what the price of corn will be in the future, the best estimate of that is likely to be contained in the prices for the future delivery of corn.

As stated above, you are now legally committed to deliver your corn to the Chicago exchange. While you could in fact deliver that corn, doing so might be fairly difficult and complicated.[2] In any event, there are plenty of buyers for your product who will take delivery from your grain silo, or that of your cooperative. There is no need to ship corn to Chicago exchange.

Thus, when you draw close to harvest, and you have a good idea of how much corn you will be producing, you agree to sell your corn to one or more of these buyers in exchange for a price no doubt influenced by the price at the Chicago exchange. At this point, you might think you have a problem. You have sold your crop of corn twice.

There is, however, no real problem. Your obligation to the exchange is what is termed "fungible." This means that, from the point of view of the exchange, you can eliminate your obligation to the exchange by buying one million bushels of corn. To do this you now "go long" one million bushels of corn at the exchange, perhaps in terms of a futures contract that will expire in a few days.

Now you might think you are one million bushels long and one million bushels short. But since these contracts are fungible, one short bushel is simply the opposite of one long bushel. In other terms, corn is a "commodity." One unit of corn is just as good as another unit of corn. Thus, your long bushels and your short bushels completely cancel each other out. Congratulations! You have now "flattened" your position. You do not owe the exchange anything, and the exchange does not owe you anything.

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[2]For a description of how to deliver corn, see https://www.cmegroup.com/rulebook/CBOT/II/14/14.pdf.

Table 1: Your Actions as a Farmer.

Time	Action	Long	Short
March	Sell one million bushels of corn long at $3.50 per bushel for October delivery	$3.5 million to be delivered in October	One million bushels of (fungible) October wheat
Early October	Sell and deliver one million bushels of wheat at a price equal to the price of October delivery plus a small amount (which can be either positive or negative)	One million times (October delivery price + small amount which can be negative or positive)	One million bushels of October wheat
Slightly later in October	Buy one million bushels of wheat from the exchange for the October delivery price	One million bushels of (fungible) October wheat	One million times the October delivery price
Total		$3.5 million plus one million times the small amount from early October	One million bushels of wheat

At this point, you have sold your harvest in March for a price, sold it again in the beginning of October, and then bought it back in the beginning of October. The two prices of October, however, are likely to be close to each other. Thus, when you sold your corn in March, you, in effect, "locked in" your price for October. This action makes both you and your banker happy. You have eliminated your financial risk. The net effect of your actions is described in Table 1.

There is, however, one assumption in this story that has not been examined yet. The story assumes that when you want to flatten your short position at the beginning of October, there is someone else who wants to flatten their long position. If there is not, you might have to buy corn from warehouses in Chicago to meet your obligations to the exchange. As we will see later on, this could be very costly to you.

B. Buying from the Exchange

You are no longer standing in a field in Iowa, breathing fresh air, and wondering where your toes went. Instead, you are in a nice heated office in a medium sized city. You are a purchaser of corn for a major food processor. Since most of the corn that your firm wants is harvested in the Fall, you plan to buy your corn during that period. Your firm can store the corn for later use.[3]

While you know that you will be buying corn in the Fall, you do not know what the price will be for your firm. This poses apparent financial risks for your firm. I say "apparent" because while you took a course in risk management while gaining your business degree at the university, the course probably did not bother to explain to you why a firm like yours would want to engage in risk management. You do not think your firm is like your former self the farmer, living from harvest to harvest.

There are perhaps two relevant theories why your firm is engaged in risk management. First, there is always the chance that your firm could go bankrupt. Bankruptcy involves a great deal of legal fees,[4] and a large number of restraints on your firm. Perhaps worse, the senior managers of the firm, the people you report to, are likely to be replaced should bankruptcy occur. They would not like this, so they instruct you to take steps to decrease the possibility that this might happen. To reduce the threat of bankruptcy to your firm from corn prices that might skyrocket, you are ordered to get a fixed price for the Fall delivery of corn.

Yet, truth be told, bankruptcy for your firm seems unlikely. There might be another reason why your firm wants you to fix a price for its future purchase of corn. Perhaps that reason is that your firm is always worried about having enough cash on hand to take advantage of what business opportunities might arise. Your firm is aggressive about looking for new investments. These opportunities will require cash if your firm wants to take advantage of them. Certainly, there are other ways for your firm to get cash. It could float a bond, or get a loan from a bank. These actions, however, will take time, and allow outsiders to further scrutinize the firm. Having a "war chest" on hand makes the firm more flexible. If the price of corn does soar and the firm has not already fixed in a price, the amount in that war chest could decline.

Thus, you make many purchases of corn from the exchange in Chicago. You are now "long" with respect to the exchange. In one of these, you buy one million bushels of corn from the exchange for delivery in October. While it may turn out that the (notional) bushels you bought were from your previous farming self, you do not know this, and you do not care. What you do care about is that the bushels you have bought are fungible, and you can sell them back to the exchange before you are required to take delivery of them.

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[3]Storing wheat is relatively easy. Storing natural gas, however, is difficult, and storing electricity is, for all practical respects, impossible.

[4]One nice thing about being a bankruptcy lawyer is that you are the "senior claimant." That means, you get paid first, before all the other parties who made the poor choice of loaning money to the firm in question.

Of course, you are not that eager to actually take delivery of the corn in Chicago. Instead, however, you send your buyers out across the American Midwest to buy corn at good prices from farmers and farmer cooperatives near or immediately after the time of harvest. Your firm has developed specialized methods of picking up this corn and taking it to your factories and storage facilities.

The price your firm pays for corn that it takes delivery on will be closely related to the price of corn at the exchange. Once your firm has bought physical corn in the countryside, it is now time to close out your position. You sell your futures contract at the exchange (again, you do not know and do not care who buys your contracts) and flatten your position.

You have now bought the corn you needed twice, and sold it once. The price you bought the corn for the second time, however, is very close to the price that you sold the corn. Thus, the price that you paid for the corn futures in March is the final cost of the corn to your firm. By buying corn on the exchange, corn that you did not intend to take delivery on, you fixed in the price your firm will pay for corn.

There is, however, one underlying assumption here. You assume that when you want to flatten your long position, there will be someone, most likely a "short," willing to buy it.

C. Challenges for the Exchange

Once again, you have changed positions in the world. You are now an executive at the corn exchange in Chicago. You face a number of challenges.

Perhaps the most important challenge you face is that the future contracts represent a lot of promises for future behavior. If this future behavior does not occur as promised, your exchange is liable for making the difference. You carry cash reserves for this contingency. But this is not something that you want to happen a lot. If it does, you will soon be bankrupt and out of business.

To reduce your financial exposure, you require the trading firms on your exchange to "mark to market." For example, when the buyer purchases grain for $3.25 per bushel, s/he does not actually pay $3.25. The buyer has an account with the exchange where some funds are placed in escrow. At the end of each day, the exchange calculates the gains or losses of the buyer's position. For example, if the price of the future goes down to $3.22, the value of the buyer's position declines by 3 cents for every bushel it is long. If there is not enough money in the escrow account, then the exchange will ask the buyer to add funds to the account. If the buyer does not do so, the exchange has the right to liquidate that buyer's assets that the exchange controls.[5] (You do something similar for the parties selling futures.)

You have also heard many complaints from your traders about making and taking delivery. They do not see why any form of delivery should be required.

[5]This is what happened to the evil Duke brothers in the classic 1983 movie "Trading Places." If you have not seen this film and you are reading this footnote, you should.

Furthermore, as we will discuss below in this section, requiring delivery exposes the trading parties to manipulative strategies. What your traders want is to be able to cash out their positions at a market price.

To meet the requests of your traders, you create a cash-settled index. Now, instead of the shorts being required to make delivery of the corn, they simply must pay to the index the average of some prices during the final periods of trading in a futures contract. Similarly, the longs receive this average price per unit.

You may find that defining this "average" price, however, is harder than you might have expected. Rather than eliminating the possibility of manipulation, you have simply created the opportunity to manipulate your market in another way.

Your exchange's website promotes how your exchange is dedicated to efficient and "fair" trading, designed to increase the wealth in financial and physical markets. You are certainly in favor of these things. You know, however, that like all human institutions, your exchange is subjected to politics. In particular, there may be times when a number of traders at your exchange have economic interests that differ from the interests of the public at large. These situations are painful, but you understand what your incentives are. You may have been born yesterday, but not, it seems, yesterday night.

D. Challenges for the Commodity Trader

You are not a commodity trader. Here is why. You like to sleep at night. A commodity trader is a slightly unusual person. Traders are typically males in the thirties who profess to thrive on the tension of commodity trading. With one move, they can gain or lose hundreds of thousands or even millions of dollars for their client or for themselves. Living under such tension, they often engage in profane braggadocio with their trader friends. They may make statements that aggressive prosecutors later may take out of context, since most of their conversations while trading will be recorded. One might hope that a trader paid close attention to what the boring corporate lawyer said one can and cannot say while on microphone.

Naturally, a commodities trader is envied by the people in the "back office," the people who do the extensive paperwork that results from commodity trading. A commodity trader is bold, daring, and often makes a lot of money. Two more things about a typical commodity trader may be relevant. First, it is hard to be a commodity trader for decades at a time. The tension is too much. Second, commodity traders are unusually good at playing cards. Sixty years ago, traders played bridge. Today bridge is for old people, and traders play poker, just like on ESPN.

Until the turn of the (twenty-first) century, traders traded in "open pits." They stood around a designated area, wearing colorful clothes so that they could be easily recognized. Traders shouted out the trades they wanted to make, and moved across the pit to meet traders who would take the other side of trades. Today, traders usually sit in rooms with a great deal of electronics, making and offering to make trades through computer keystrokes. The tension is the same, but traders no longer need to wear bright clothes, shout loudly, or be able to forcefully make their way across a crowded trading pit.

Traders can trade for clients or for themselves. The first type of clients are "hedgers," like the farmer and the representative of the corn processing company discussed above. The second type of traders are "speculators." Speculators believe that they can tell when the prices of commodities are above or below and what they will be in the future. Most people do not like speculators, and very bad things are said about them. Economists, however, like speculators. If speculators have valuable information, they bring that information to the market through their actions. For example, if a speculator learns that the price of corn will rise, they will purchase corn. This will increase the price of corn, making that price more "efficient." The price will more accurately represent the true scarcity value of corn, and allow for better planning by the hedgers discussed above. Speculators also add liquidity to markets, which helps markets to operate better.

The third type of traders are "arbitrageurs." Arbitrageurs attempt to make money by supplying liquidity in the market. For example, a trader or trading firm may hold themselves out as a "market maker." A market maker will offer to buy and sell the relevant product at the same time. For example, a market maker may simultaneously offer to buy corn at $3.24 per bushel and sell it at $3.26 per bushel. The profit, tiny for one bushel, is the difference between the buy and the sell price, here being 2 cents. Arbitrageurs supply "liquidity" (that word again) to the market. Before, when discussing hedgers, liquidity meant having cash available to spend. Here, liquidity means something different.

In his excellent book on trading stocks and commodities, Harris (2003, p. 394) defines liquidity as "the ability to trade large size quickly at low cost, when you want to trade." He follows this up by describing (p. 398) the three attributes of liquidity: (1) immediacy, or how quickly a trade of a given size can be arranged; (2) width, the cost of doing business for a trade of a given size. Usually, this refers to the width of the bid-ask spread; and (3) depth, the size of a trade that can be arranged at a given cost. As we will soon see, manipulation cases are based in large parts on the limits to liquidity in stock or commodity markets.

To understand what traders do, a small discussion of the mechanics of trading are necessary. In particular, it is necessary to understand what a "trading book" is. A trading book describes what offers are available at any one time. Table 2 gives a hypothetical example of what a trading book might look like.

The left side represents the current offers to buy. At the top is the best offer, at $3.24, 200 units are available. At $3.23, 400 units are available, at $3.22, 100 units, and at $3.21, 150 units are available.

The right side represents the selling side. At the top of the book, 150 units are available at $3.26. Then there are 50 units available at $3.27, 200 units are available at $3.28, no units are available at $3.29 (no mistake), and 50 units are available at $3.30.[6]

[6]A unit is defined by the exchange. For the Chicago wheat market, a unit is 5,000 bushels of wheat. See http://www.cmegroup.com/trading/agricultural/grain-and-oilseed/wheat_contract_specifications.html. Accessed on August 23, 2016.

Table 2: Hypothetical Trading Book for Corn (Price/Bushel).

To Buy		To Sell	
Price	**Amount**	**Price**	**Amount**
$3.24	200	$3.26	150
$3.23	400	$3.27	50
$3.22	100	$3.28	200
$3.21	150	$3.30	50

Note that there is a difference between the best bid (offer to buy) and ask (offer to sell). This is naturally referred to as the "bid–ask spread." Here the bid-ask spread is $3.26–3.24 = $0.02 per bushel.

Now assume that a trader has been given an order to buy 300 units of corn. What should the trader do? If the trader has to execute this order immediately, s/he has little choice but to take what the book offers. So, looking at the offers to sell, she takes 150 units at $3.26, 50 units at $3.27, and 100 units at $3.28 (leaving 100 units remaining at $3.28). Taking what the market offers is referred to as a "market bid."

Good traders, however, pride themselves on "good execution." This means getting the best price for their customers. Thus, if their customers are willing, traders may take a chance and hope for better offers than the ones currently available. They could take only part of their desired trades from the bids currently offered in the trading book. They could offer their own "limit" bids at various prices, adding to the left side of the book in the table above. Or, they could hold their offers off the market for the time being, hoping that the market will become more liquid soon. Each of these strategies has its own risks and rewards.

III. Defining Manipulation

You might think that for something discussed so much over the last two centuries that there would be a good widely acknowledged definition of market manipulation. There is not. As Kolb and Overdahl (2007, p. 58) explain, "[a]ttempts to precisely define the term [manipulation] inevitably dissolve into circular logic: a manipulated price is an artificial price; an artificial price is one that has been manipulated."

It is important, however, to define manipulation if we are going to analyze it. In a valiant attempt, Pirrong (2010, pp. 3–6) spends a good deal of effort describing manipulation based on the exercise of "market power," and manipulation based on fraud. In the same issue of the same journal, Gebhardt and Mongoven (2010) use a long law review article to explain the meaning the Federal Trade Commission's definition of manipulation.

Long and vague definitions are prone to be mischief, legal, and otherwise. What is needed is a compact definition that can be used for analysis. Taylor, Ledgerwood, Broehm, and Fox-Penner (2015) have recently written a series of pieces on energy market manipulation. According to them (Taylor et al., 2015, p. 16),

manipulative behavior consists of "intentionally losing money on transactions that set (or make) a price to benefit the value of related positions that tie to (or take) that price."

In part, this definition focuses on "uneconomic trading." In the economic paradigm of profit-maximization, there is certainly something peculiar going on if an economic agent is actually trying to lose money on a transaction. What occurs in some manipulation cases is that firms attempt to lose (or not make as much as they could) money on one set of transactions that they enhance the value of their positions in assets whose prices are a function of the price of the first asset.

I contend that the Ledgerwood definition is slightly too vague and too narrow. First, "losing money" is actually a somewhat unclear concept. The probable applicable definition here is for parties not to make as much money as they otherwise would, say by selling at below the market price. "Losing money," requires a reference to opportunity costs, which can be hard to define. Second, as discussed below, it is not necessary for a manipulative party to engage in losing transactions.

I suggest that manipulation be defined as "profiting by changing the price of financial assets." In doing so, the manipulator creates an "artificial price," a price different than what would occur given the normal forces of supply and demand. This "Kleit definition" will be shown below to fit well with various manipulative strategies. It also fits in well with proposed definitions of speculation and market power mentioned below.

Markham (2014, pp. 3–7) begins his extensive history of market manipulation by listing the known methods of market manipulation. Perhaps the easiest to think about is the time-honored strategy of "pump and dump." Our manipulator takes a long position in the asset in question. He then releases allegedly the factual information that increases "artificially" the price of the asset. Once the information has been released, and before market participants realize the information is false, the manipulator sells off its position.

For example, in 1997 the Canadian company Bre-X Minerals Limited announced that its geological survey had found unusually rich deposits of gold in the wilds of Indonesia. To make a short story shorter, the price of Bre-X stock rose, and the Indonesian government and the Freeport-McMoran Corporation entered into a deal to buy Bre-X's mining claim from the original owners. As you have likely guessed, there was no gold. The stock price collapsed and charges from the Securities and Exchange Commission followed.[7]

In the energy fields, a little more imagination may be required to describe a similar strategy. For example, in the United States at Palo Verde, Arizona, 40 miles west of Phoenix, there is the largest nuclear electric generating site with three nuclear generators. Not coincidently, there is also an electricity trading exchange based at that point.

Imagine now that a manipulator buys electricity futures for delivery in the next month at Palo Verde. The manipulator then somehow (in a manner I cannot specify)

[7]See, for example, http://geology.about.com/cs/mineralogy/a/aa042097.htm. Accessed on August 11, 2016.

convinces market participants that each of the three nuclear reactors at Palo Verde will close in less than a month for previously unanticipated repairs. The market price of Palo Verde electricity futures rises, and our manipulator sells off its position. The market then realizes the information about the plants' closure was false, and the price of Palo Verde electricity falls to its previous level.

Note here that this manipulative story involves changing the price of a financial instrument, as implied by the Kleit definition of manipulation. It does not, however, imply taking a loss on a financial transaction as implied by the Ledgerwood definition.

Now, let us consider the second type of manipulation. Our manipulator is long (or short, reversing the actions below) an index of natural gas traded at, for example, Waha, Texas. This index price is determined by an average of the trading spot price for gas on a three-hour period. The average, however, is not determined by records of the actual trade. Rather, it is determined by a price-reporting agency phoning traders after trading has closed and asking them what their average price was.

Now imagine that one or more of the traders is long in the index about to be settled. The trader then simply overstates the average price of their trades, creating an "artificial" price. Since there are not a large number of traders, this serves to increase the settlement price of the index, increasing the value of the trader's position. Here again is a type of manipulation that fits the Kleit definition of manipulation but not the Ledgerwood definition.

You might wonder who would be silly enough to invest money in a price index that is so simple to manipulate. This type of manipulation, however, appears to have been rampant in the early years of electricity and natural gas markets in the late 1990s, at least if the US Commodity Futures Trading Commission (CFTC) is to be believed. Markham (2014, pp. 276–277, footnote 88) lists 28 legal actions the CFTC took against such behavior in the early 2000s. The market appears, however, to have learned from such actions, and indexes settled, on surveys are now rare.

The third type of manipulation takes us to "squeezes" or "corners." (The difference between the two is uncertain and not important here.) As discussed above, futures markets are often based on the idea that parties can flatten their positions with making or taking delivery. A manipulator, therefore, takes advantage of this assumption. Assume, for example, that a manipulator starts buying long[8] positions in a contract for delivery of natural gas at Henry Hub Louisiana. In a surprise to the shorts, however, our manipulator does not liquidate much of its position as the closing date draws near. As a result, the spot price of natural gas rises artificially, as the shorts desperately start looking for other suppliers of natural gas. The manipulator makes money by refusing to sell to the shorts much of its position, and therefore raising the price of flattening the rest of its position. Thus, not all shorts will be forced to make delivery. Rather, from the

[8]The manipulator goes long here for expositional purposes. A manipulator can also go short, reversing the scenario in the rest of the paragraph.

manipulator's point of view, there is optimal number of shorts who are required to make delivery to maximize profits. Note how this manipulative scheme fits the Kleit definition of market manipulation, and, if you assume the manipulator is taking a loss somewhere in this strategy, as well as the Ledgerwood definition.

This strategy turns on a couple of factors. First, the manipulation must be a surprise. If the would-be holders of short positions know what is going on, they are not going to enter into the short contracts. Second, acquiring the extra natural gas contracts must not be too costly. The additional demand for the contracts must be met by additional supply. For example, if you were trying to squeeze contracts for October corn delivery, your additional supply would likely come from parties who were looking to short nearby contracts, that is, contracts for September and November delivery. While the manipulator can have a length of time to take its long position, it still depends on liquidity (that word again) in the October delivery market.

Third, the supplies available for delivery must be limited. Another way of looking at this is that the market for delivery lacks liquidity. If the shorts can easily find their October corn elsewhere, the spot price of corn will not rise.

Finally, at the end of the sequence the manipulator finds itself holding a good deal of corn. The manipulator must hold this corn at a cost, and then sell it in following markets, hopefully not driving the price of corn down too far (again, the manipulator needs liquidity). Pirrong (2010, p. 8) refers to this problem as "burying the corpse."

The fourth type of manipulation relates to contracts that are settled not by the delivery of goods but by financial payments through cash settled indexes, as discussed above in Section II-C of this chapter. For example, assume that a manipulator long a good deal of corn contracts, which are financially settled. The settlement price here is, for example, the average price of all trades on the spot market for corn on the first Monday of October.

To enhance its position, the manipulator now buys a great amount of corn during the settlement period. On a tactical level, the manipulator buys the corn in such a manner as to not get the lowest price, as a buyer typically would want, but to pay the highest price. This can be done by bidding through market rather than limit bids. Note how this strategy now fits both the Ledgerwood and Kleit definitions of manipulation. The manipulator is losing money (or not making as much as it could) by buying the corn during the settlement period in order to profit from changing the settlement price on the corn contract.

This strategy has similar weakness to the squeeze strategy as discussed above. Most importantly, the manipulation must be a surprise. Again, no one will go short if they think the corn price will be manipulated upwards. The scenario also depends on liquidity when buying, and illiquidity during the index settlement period. This scheme also requires that the corpse be buried. Here, however, the manipulator must determine how to get rid of the excess product it purchased during the settlement period. This is in contract to the problem of how to get rid of the product that the manipulator stood for delivery in the traditional squeeze scenario.

Markham (2014, pp. 7–8) also lists "wash trading" as a type of manipulation. Wash trades are basically fraudulent trades. For example, you could instruct one

of your traders to buy corn from another one of your traders. Or, you could work with another company to sell them corn, and then to buy the corn right back from them. (Though note that wash trading observationally may not be that distinct from "market making" discussed in Section II-D.)

Wash trading certainly is suspicious. Markham (2014), however, does not spell out how wash trading constitutes manipulation, and I am not familiar with any other explanation. Williams (1995, pp. 7–8) suggests that wash trading may be manipulative because it implies that there is trading interest in a stock, and therefore parties might think that the stock is more valuable than it truly is. I feel somewhat uncomfortable with this theory. Wash trading may convey that there is more interest in a stock than there actually is. I do not see any reason, however, why a belief in such interest would imply the stock is more likely to be underpriced than underpriced.

I can, however, offer another scenario where wash trading is part of a manipulative scheme. Wash trading could be used to create "churn" (turnover) in trades to move the trading average in the desired direction. Imagine that our manipulator is long corn contracts and desires that the settlement price be as high as possible. Also, assume that the settlement price is the average (mean) price of all trades that occur during the settlement period. Continuing assumptions, assume that prices are higher during the second part of the settlement period than in the first part. Given this, the manipulator would engage in wash trading during the second part of the settlement period to raise the index (average) price.

An example may be helpful here. To simplify, assume that during the first part of the settlement period, 100 contracts sell at $3.00 per bushel, while during the second period, 100 contracts sell at a price of $3.10 per bushel. If the manipulator does nothing, the settlement price will be $3.05. Now, however, assume that right at the end of the settlement period the manipulator engages in wash trades for 50 units at the second period price of $3.10. The (weighted) average will now be $((100 \times 3) + (150 \times .310))/250 = \$3.06$. Wash trading has allowed the manipulator to increase the value of its position.[9]

Manipulation harms the efficiency of commodity exchanges. The parties trading in the exchange expect that when they go to flatten their positions, they will be paid or will pay the price that the forces of supply and demand generate. In this way, trading entities can effectively flatten their positions while effectively hedging their risk. Manipulation reduces the ability of parties to hedge, and therefore can be expected to drive traders away from the relevant commodity product. This is the economic reason why there are sanctions against manipulation.

IV. Speculation, Arbitrage, and Market Power

One of the problems of analyzing manipulation is that it is often confused with speculation (a good thing to some, but not to all), arbitrage (a good thing), and

[9]Of course, if this churning took place at prices below the average, it would result in a lowering of the settlement price, and would contradict any theory of long manipulation. This becomes important in the *DiPlacido* decision discussed in Chapter 4.

the exercise of market power (generally a bad thing). Thus, definitions for these three are needed.

Here I define *speculation* as "attempting to profit by anticipating changes in the price of financial instruments." As discussed above, economist like speculators, while no one else seems to. When a speculator buys an asset, it would not be unusual for the price of that asset to rise. There are (at least) three reasons for this.

First, the market may be illiquid. In this case, the increased demand has a short run impact, increasing price.[10] Second, market participants may observe the speculator buying the asset in question. These participants may infer that the speculator knows something about the value of the relevant asset, and increase their valuations accordingly. Third, the speculator may be acting on information that will become widely known shortly after it makes its purchases. Once the information that the speculator is acting on is widely known, the market will react accordingly.

This power to affect price has led to some confusion, as we will see in the discussion of *Minorco* v. *Hunt* in Chapter 3. For now, let me simply point out that, for the speculator, this effect on price is a curse, not a blessing. Once again, an example may be helpful.

Assume the price of oil is $45 per barrel. Our speculator (somehow) learns that for sure for sure the price will rise to $50 per barrel in the next month. The speculator then buys a great deal of oil for delivery in one month. Unfortunately, the speculator's actions have a positive impact on price. Thus, instead of getting the oil for an average of $45 per barrel, the speculator is only able to acquire the oil at an average price of, say, $45.80 per barrel. Of course, this increase of $0.80 per barrel reduces the speculators eventual profits. To steal a phrase, this price increase is a bug, not a feature.

To say that speculators have been received poorly in the last 200 years would be a strong understatement. For example, former US Secretary of Labor and current Distinguished Professor Public Policy at the University of California, Berkeley, Robert Reich recently stated the following[11]:

> Buying and selling stocks and bonds in order to beat others who are buying and selling stocks and bonds is a giant zero-sum game that wastes countless resources, uses up the talents of some of the nation's best and brightest and subjects financial market to unnecessary risk.

Arbitrage is more precisely defined, but the differences in definitions can be important. For example, Ross, Westerfield, Jaffe, and Jordan (2007, p. 395) define arbitrage as "the simultaneous purchase and sale of different but substitute assets." Hull (2009, p. 773) defines arbitrage more broadly, as "a trading strategy

[10]This is referred to as "price slippage," "market impact," or "price impact." See, for example, Harris (2003, pp. 72–73).
[11]Reich (2016).

that takes advantage of two or more securities being misprices relative to each other." This difference will become important in Chapter 6, when we discuss the alleged manipulation that occurred in the California electricity meltdown.

Arbitrage helps market prices reflect supply and demand conditions. In explaining this, I cannot do better than Judge and the famed law and economics scholar Richard Posner:

> Arbitrageurs are traders who identify and eliminate disparities between price and value. . . . By doing this, arbitrageurs promote the convergence of market and economic values that [is] the central objective of securities regulation. . . .Arbitrage is not market manipulation. The opposite of a practice that creates artificial prices, it eliminates artificial price differences. (*Sullivan & Long* v. *Scattered*, 47 F.3d 857 (7th Cir., 1995)

Consistent with the above definitions of manipulation and speculation, I define the exercise of market power as "profiting by changing the price of physical assets." For example, assume you become the monopoly gasoline service station owner in Altoona, Pennsylvania by buying up all your rivals. You now have the ability to profitable reduce output below the competitive level, resulting in increased prices to consumers.

Some commentators refer to manipulation strategies that affect the price of financial instruments as "market power manipulations" (see, e.g., Pirrong, 2010). I suggest, however, that this terminology is a little awkward. First, as the above discussion implies, there are a large number of parties who could potentially impact the price of a financial product. For a physical product, however, affecting the price profitably can be rather difficult. In our example on market for gasoline in Altoona, however, there are only a few players who would have any chance at exercising market power. Second, as the US Department of Justice Horizontal Merger Guidelines point out, the exercise of market power is "nontransitory."[12] This is of course different from financial market manipulation, which can occur for a short period of time.

This is not to say that one cannot combine the exercise of market power with financial manipulation. For example, if you were manipulating a corn market by insisting on the delivery of corn, your strategy would be based on the difficulty of the shorts to gain corn in other ways. You could augment your strategy by acquiring the available warehouse for the storage of corn near the exchange delivery point, reducing the usage of those facilities.

Now that we have defined our terms, we can begin to discuss the historical examples of the ligation of alleged cases of manipulation. First, however, it is necessary to present something of the economics of manipulation.

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[12]See Department of Justice Horizontal Merger Guidelines, Product Market Definition. Retrieved from https://www.justice.gov/atr/11-product-market-definition. Accessed on August 23, 2016.

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