1

INTRODUCTION

"In War more than anywhere else in the world things happen differently to what we had expected, and look differently when near, to what they did at a distance."

—Carl von Clausewitz[1]

Federal Reserve Rate Cut Announcement

At approximately 1:14 in the afternoon of January 3, 2001, the Federal Reserve announced a 50 basis point cut in the targeted Fed funds rate.[2] The announcement was intended to surprise market participants, and it did—coming almost four weeks before the next regularly scheduled meeting of the Federal Reserve Open Market Committee on January 30, 2001. The impact on the stock market was immediate. Stock prices rose sharply in reaction to the news. Many large Nasdaq-listed stocks soared. JDS Uniphase closed up 36.6%. Sun Computers

closed up 29.9%. Amazon closed up 26.5%. Adobe Systems closed up 23.9%. Oracle closed up 21.3%. Even Microsoft managed to eke out a double-digit gain and closed up 10.5% for the day. Not surprisingly, the Nasdaq Composite Index reflected the broad gains enjoyed by many of its component stocks.

The performance of the *cubes* or *QQQs*—the tracking stock for the Nasdaq 100 stock index—also mirrored the rally in the underlying stocks of the index.[3]

Perhaps, the strength of the rally is best illustrated by the reaction of Nasdaq 100 stock index futures contract prices to the announcement.[4] At one point, the price of Nasdaq stock index futures contracts—which usually leads the underlying Nasdaq 100 stock index—was up more than 20% in response to the announcement.

Nasdaq 100 stock index futures contracts are traded on the Chicago Mercantile Exchange. For many commodities, the most actively traded futures contract is the *nearby* or *front month* contract (i.e., the contract closest to expiration).[5] This was certainly true for the Nasdaq 100 stock index futures contract on January 3, 2001, when the March 2001 futures contract was the most actively traded Nasdaq 100 stock index futures contract.[6]

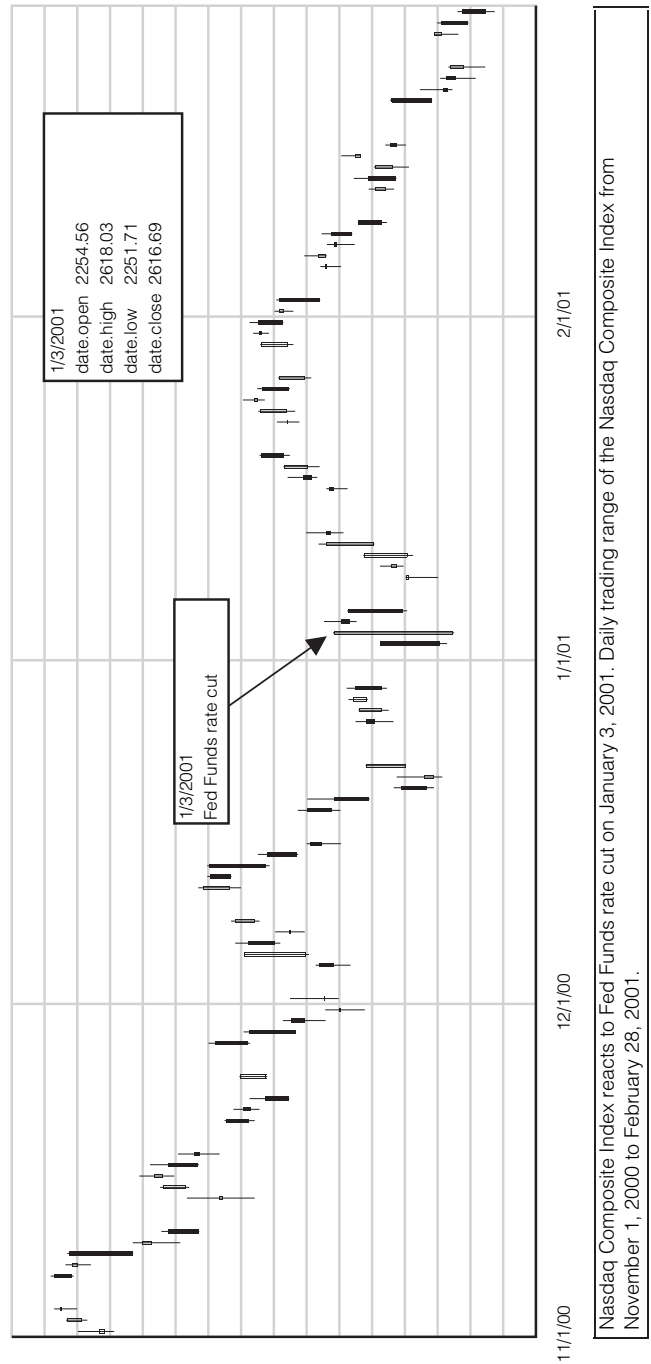
Prior to the Fed announcement, Nasdaq 100 stock index futures were trading in 1 to 2 full point increments—that is, the change in notional value of the contract when futures prices changed ranged from $100 to $200. The Nasdaq 100 stock index futures contract traded at 2173 immediately before the announcement. Immediately after the announcement, the Nasdaq stock index futures price jumped by 5 full points to 2178. This was only the beginning of the move. For the next 48 seconds, the contract largely moved up (but sometimes down) in 5-point increments rising to 2240. The reaction then accelerated. For the next 75 seconds, the contract largely moved in 10-point increments rising to 2340. The reaction continued. Over the next 34 seconds, the contract had a 30-point move followed by 20- and 10-point moves.

All of this occurred within three minutes of the announcement. Then, incredibly, the reaction intensified even further, and the market started moving in 50-point increments up or down. The market continued to bounce between 2400 and 2650 largely in 50-point increments over the next minute and one half. That is, the market went from bouncing $100 to $200 between price changes before the Fed announcement to bouncing $5,000 between price changes a few minutes after the Fed announcement. The bid ask spread was not recorded. However, if one regards the bounce as a proxy for the bid offer spread, then it widened by as much as 25 to 50 times its pre-announcement amount after the Fed announcement. At this point, the Nasdaq stock index futures market was up a stunning 22% *intraday* (i.e., during the trading day).

To put the size of this price move in perspective, on Black Monday, October 28, 1929—the first day of the two-day 1929 stock market crash—the Dow Jones Industrial Average (DJIA) was down 13.5%. On Black Tuesday, October 29, 1929, the DJIA was down another 11.5%.[7] The percentage decline in the DJIA on Monday, October 19, 1987—another stock market crash—was more than 23%. Stock market crashes are considered extreme events, yet the Nasdaq index was up in a few minutes almost the same percentage amount as these indexes fell in one or two days. Another way of looking at it is that the average *annual* return earned on a diversified portfolio of stocks of large U.S. companies over the 1926 to 1999 period was 13.3% and 17.6% for a portfolio of small company stocks according to Jack C. Francis and Roger Ibbotson.[8] Yet, the intraday move in the Nasdaq 100 spot and futures exceeded both of these *annual* stock returns. Clearly, this was a large reaction in stock prices by any measure.

The initial reaction, however, apparently entailed a substantial *overreaction* as the futures price subsequently fell from the high of 2650. The size of the price changes narrowed to mostly $25 moves over the next two minutes as the market fell to 2425. This was followed by a period of largely 5-point moves and some 10-point moves

over the next 21 minutes as the market rose back up to 2480. The Nasdaq 100 stock index futures contract closed up for the day approximately 16.7%, whereas the underlying Nasdaq 100 index closed up 18.77%.[9] The more widely reported and related Nasdaq Composite Index closed up 324 points, or about 14%. In contrast, the S&P 50 stock index closed up 64 points, or 5%, whereas the Dow Jones Industrial Average closed up 299 points, or 2.8%, for the day.[10] Figures 1.1, 1.2, and 1.3 depict the daily trading range (high to low) of values for the Nasdaq Composite Index, Nasdaq 100 stock index futures contract, and the Dow Jones Industrial Average for a number of days before and after the surprise cut in the targeted Fed Funds rate.[11]

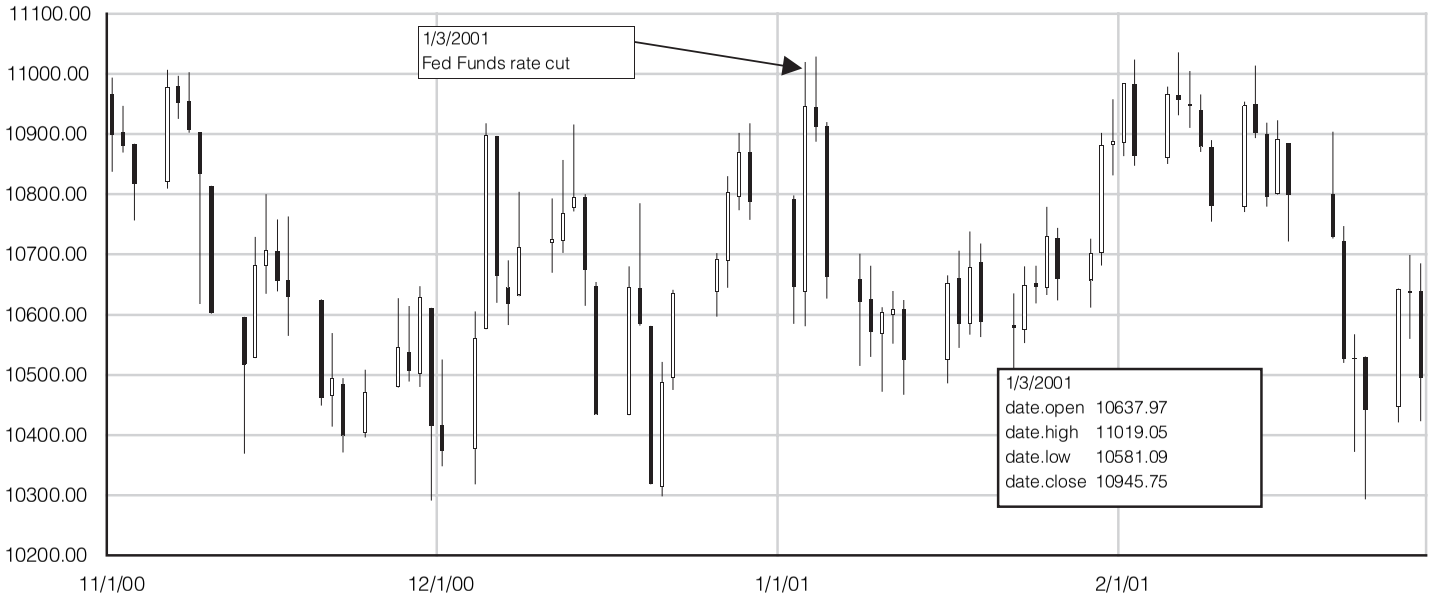


Nasdaq Composite Index reacts to Fed Funds rate cut on January 3, 2001. Daily trading range of the Nasdaq Composite Index from November 1, 2000 to February 28, 2001.

FIGURE 1.1 The Fed sparks a rally on Nasdaq.

CME Nasdaq 100 stock index futures prices react to Fed Funds rate cut of January 3, 2001. Daily trading range of the front month CME Nasdaq 100 stock index futures contract from November 1, 2000 to February 28, 2001.

FIGURE 1.2 Nasdaq futures soar higher than the Nasdaq Composite.



The Dow Jones Industrial Average reacts to the Fed Funds rate cut of January 3, 2001. Daily trading range of the Dow Jones Industrial Average from November 1, 2000 to February 28, 2001.

FIGURE 1.3 Blue chips rally but not as much as the Nasdaq in percentage terms.

Analyzing the Market Reaction

The financial market reaction to the Federal Reserve announcement is both fascinating and puzzling. It illustrates the powerful impact that a trading catalyst can exert on financial market prices. To be sure, the size of the market's reaction was likely exacerbated by the expectation that this rate cut would be the first in a series of rate cuts by the Federal Reserve and by the fact that the announcement came as a surprise to most market participants. The reaction may also have been exacerbated by the fact that the Nasdaq Composite plunged 7.23% the day before. However, the size of the reaction in the Nasdaq spot and futures markets was enormous. And, other potential trading catalysts were not readily apparent.

The market's reaction to the announcement also raises some disturbing questions. Was the reaction of Nasdaq stocks and futures a case of euphoria or a logical response to the arrival of new information? Why did the Dow Jones Industrial Average and the Nasdaq spot and futures markets react so differently in magnitude to the same piece of news? Why did the Nasdaq futures market apparently overreact to the Fed announcement? Was the reaction of market prices to the catalyst alone or did the market feed on itself? What role did the electronically traded Nasdaq e-mini futures contract play in impounding the news of the rate cut?

The behavior of financial market prices in response to trading catalysts is of keen interest to traders, investors, and policymakers alike. Traders are less interested in whether the response of market prices to a particular trading catalyst accords with what financial economic theory would predict than with how the response impacts their trading opportunities and affects their trading strategies.

Traders have a different, but related, set of questions to answer when an unexpected trading catalyst occurs.

1. Which market or markets are most likely to be affected? The answer to this question depends on the prevailing *trading*

thesis (i.e., the perceived relationships between the catalyst and financial market prices). The belief that an unexpected increase in employment would cause the overall bond market to tumble is an example of a trading thesis.

2. What is the likely direction of the price move? (The answer to this question depends, in turn, on what market consensus expectations, if any, were before the catalyst occurred.) For instance, many participants believe that a larger than expected increase in employment would cause bond prices to fall, whereas a smaller than expected increase in employment would cause bond prices to rise.
3. What is the likely magnitude of the price move?
4. What is the likely speed of response of market prices to the catalyst? Although many academics would regard a market reaction lasting several minutes as exceedingly quick, most traders would not. A minute can be a lifetime in the world of trading. A few seconds is often more than enough time to enter, exit, or even reverse a position. The relevant question is do you have enough time to execute a trade?[12]
5. What is the likely duration or half-life of the trading catalyst's effect on market prices?
6. Will the price move intensify or deteriorate as time passes?
7. Will prices overshoot?

Given the answers to the preceding questions, the trader must then determine the size of the position to put on. The more uncertain the answers to these questions, other things equal, the smaller the position size the trader will put on.

Many traders think in terms of what might be called *event time*—that is, the market's reaction to similar events in the past is used as a guide to how the market will likely respond to similar events in the future.[13] Thus, a trader's prediction of how the market will react to a second U.S.-led war against Saddam Hussein's Iraq is influenced by

how the market reacted to the first such war. Although such an approach is understandable, the market need not be *consistent* in its response to similar trading catalysts over time. The principal problem with the use of event time to forecast market reactions to trading catalysts is that it inevitably entails the use of a small number of observations from which valid statistical inferences cannot be drawn. This drawback is unlikely to stop many traders from using event time. Another problem with using event time as a predictor of how the market will respond to a trading catalyst is that the timing of the impact might be off as more traders attempt to exploit the same perceived relationship. Sometimes in the rush to simplify the analysis to use event time as a guide for trading decisions, traders miss potential offsetting factors that make the analogy inexact.

Notice that the impact of the Fed rate cut announcement was not limited to affecting the level of market prices alone. Rather, the Fed announcement affected both the bid/offer spread (as noted previously) and the volatility of financial market prices. This illustrates two other ways that some trading catalysts (particularly those whose timing can be anticipated) influence trading decisions. In this way, scheduled or anticipated trading catalysts facilitate bets on changes in volatility. Finally, the volume of trading often rises sharply after a trading catalyst occurs.

The Nature of Trading Catalysts

Volatile financial markets create both risk and opportunity—that is, the risk of substantial losses and the opportunity for substantial gains. However, not all volatility is created equally. Sudden jumps or breaks in prices can impart a roller-coaster-ride quality to trading or investing in financial markets. This book examines the catalysts that spark large changes in prices suddenly or over time. These include the following, among other factors: ill-advised comments by policymakers,

news of natural disasters, elections, certain economic reports, company-specific announcements, and factors internal to the market itself.

The *direction*, *magnitude, speed*, *duration*, *intensity*, and *breadth* of influence of trading catalysts on market prices are important to understand. It is also important to understand how trading catalysts differ in their influence on market prices and how the same trading catalyst may differ in its influence on market prices over time. Part of the difference in the influence of trading catalysts on market prices at any point in time, as well as over time, is a function of *market conditions* and *sentiment*, both of which are discussed in detail in Chapter 2, "Market Conditions and Sentiment."

The identification of which market or markets are most likely to be impacted by a trading catalyst seems easy but may sometimes be difficult as the preceding Fed rate cut example shows. Again, from a trading perspective, a trader wants to take positions that will achieve maximum benefit from the occurrence of the trading catalyst at minimum risk. Imagine a trader who anticipated the surprise Fed rate cut announcement shortly before it occurred or had advance knowledge of it. Which market or markets would the trader have placed his bet or bets on? It is not apparent that most traders would have selected the Nasdaq as the market most likely to have the largest reaction to the Fed rate cut announcement. Yet, in retrospect, it is clear that a long position in the Nasdaq 100 stock index or Nasdaq 100 stock index futures was the place to be immediately following the Fed rate cut announcement on January 3, 2001.

A trader needs to know the direction of the likely response to a trading catalyst to determine whether he should go long or short. Determining the likely direction of market prices in response to a trading catalyst seems easy. However, the implicit simple assumption that markets always behave a certain way in response to arguably the same trading catalyst is also not true. Sometimes, there is a shift in

how a given trading catalyst is interpreted. Sometimes, the information content of the trading catalyst is simply ignored. For example, the Merchandise Trade Balance is a monthly report issued by the U.S. Department of Commerce. Yet, as discussed in Chapter 7, "Periodic Economic Reports," the conventional interpretation of the information content in the report changed 180 degrees between 1986 and 1987. Other times, the market seemingly ignores a trading catalyst. During most of the 1990s, the merchandise trade balance report—which was so important during the late 1980s—was largely ignored by bond market participants.

Financial and economic theory provides only limited guidance in how market prices should react to various trading catalysts. More important than financial or economic theory are traders' perceptions of both economic theory and how other market participants will react to the catalyst.

The *speed* of response in market prices ranges from immediate to extensive delays. The speed of a market's response to a given trading catalyst is usually fairly fast. However, as will be shown later in this book, sometimes there is a perceptible delay in the market's response. In any event, the relevant question for a trader is whether there is sufficient time after the trading catalyst occurs for the trader to position herself and profit from it. Other things equal, the speed of the market's response tends to increase the greater the liquidity and transparency of the market.

Consider once again the Fed's January 3, 2001 rate cut discussed previously. Most traders, of course, did not anticipate the surprise Fed action and may not have been positioned to take maximum advantage of it. Yet, a trader who was *flat* (i.e., had no position on) in Nasdaq futures before the Fed rate cut announcement still had time to put on a long position and profit from the attendant rise in prices sometime after the announcement came out. To be sure, prices moved quickly, but there was sufficient time to place a trade if one was willing to tolerate the risk associated with it.

A closely related issue is the *duration* of the response—that is, how long the trading catalyst continues to impact financial market prices. The length of the impact of a trading catalyst ranges from transitory to permanent. The impact of many trading catalysts is fairly short-lived. Indeed, sometimes the impact of a trading catalyst is entirely erased in the course of a single trading session, even in the absence of the arrival of any other trading catalysts. Consider, for instance, the following example reported in the January 11, 2005 issue of *The Wall Street Journal*.

> Energy prices have turned volatile again, driven up by the impact of production outages and unfavorable weather that have prompted traders to snap up oil and gas contracts…
>
> Crude oil surged to a five-week high of $47.30 a barrel during trading yesterday before retreating to end moderately lower, as a broad rally in oil-related futures markets stalled. Analysts said the various production problems, combined with forecasts of cold U.S. temperatures, spurred the nearly $2 rally, but the supply snags were overshadowed by a sense that the market had gotten ahead of itself. February crude oil fell 10 cents on the day to settle at $45.33 a barrel on the New York Mercantile Exchange…[14]

The preceding example illustrates how two different trading catalysts—production outages and the weather—combined to impact crude oil prices on the upside. Although a single "fuzzy" factor—the "sense that the market had gotten ahead of itself"—caused a price break. In this case, the effects of two trading catalysts on market prices were short-lived because the market reversed course due to other concerns. Notice that the entire gain and some 10 cents more were supposedly wiped out by fears "that the market had gotten ahead of itself."

Another dimension by which to measure the influence of a trading catalyst is the *intensity* of trading in the reaction to market prices

that they induce. The intensity of trading varies from infrequent trading at one extreme to a *trading frenzy* at the other extreme. The intensity of trading refers to the frequency as well as size of individual trades.

A trading frenzy might arise from either panic buying or panic selling—euphoria or despair. At first glance, one might suppose that trading catalysts that precipitate either panic buying or panic selling must be very significant because of the large price changes they induce. However, there is no necessary relationship between the significance of the trading catalyst and the panic buying or panic selling that ensues. Simply stated, panic selling or panic buying need not be precipitated by a momentous event. The trigger for episodes of panic buying or selling may be seemingly innocuous enough. It is also important to point out that trading frenzies need not start out as such—that is, trading may accelerate sometime after the trading event occurs, as it did in the Fed rate cut example discussed previously.

Consider another example. News of the assassination of President John F. Kennedy on Friday, November 22, 1963 sparked a sell-off in stocks and a sharp decline in stock prices that threatened to turn into a selling panic. The initial sell-off prompted the New York Stock Exchange (NYSE) to stop trading and close early. When the market reopened on Tuesday, November 26, stocks not only quickly recovered but rallied sharply higher. Indeed, in his book, *101 Years on Wall Street: An Investor's Almanac*, John Dennis Brown characterizes the trading activity on Tuesday, November 26, 1963 as a "buying panic" that resulted in a 4.5% gain in the value of the Dow Jones Industrial Average.

This episode is interesting from another perspective: namely, how a news-oriented trading catalyst, the assassination of President Kennedy, which was only partially responded to because the market was closed early, can be quickly followed by a larger, and arguably, *reflexive* trading catalyst. Although it is impossible to know how far

the Dow Jones Industrial Average would have fallen if the NYSE had not halted trading early, the sharp rally on Tuesday, November 26, 1963 illustrates the powerful impact that purely reflexive trading catalysts can exert on market prices.

At the other extreme is a slow market with infrequent trading following the occurrence of a trading catalyst. These catalysts are relatively rare but may occur when prices jump to reflect the impact of the trading catalyst without inducing additional trading activity. A variant of this is sometimes observed in satellite or related markets where there is a considerably more muted reaction than occurs in the primary market, even after adjusting for any differences in risk.

Another dimension of the impact of trading catalysts is the *breadth* of the market's reaction—that is, whether the response to a trading catalyst is *localized* (i.e., limited to one market or one sector) or *generalized* (i.e., affects multiple markets). In other words, a trading catalyst in one market can act as a trading catalyst for prices in another market. A frequent example in this regard is the impact that changes in oil prices have on equity prices and the impact that price changes in the equity market have on other markets. The reaction of other markets may be quick or slow.

Consider the following example reported in the Thursday, October 28, 2004 issue of the *Financial Times*.

> World oil prices dropped sharply yesterday after the US reported a bigger than expected rise in crude stocks…sending equity prices scurrying higher.
>
> The dollar climbed broadly…as the fall in oil prices alleviated the threat to the US economy posed by further rises in energy prices.
>
> Nymex crude oil futures fell swiftly as news of a bigger-than-expected rise in stocks of crude oil and gasoline outweighed a fall in heating oil stocks…

> Nymex December crude fell almost 5 per cent to $52.46 per barrel…
>
> …The Dow Jones Industrial Average gained 1.2 per cent to 10,002.30…The Nasdaq Composite put on 2.1 per cent.
>
> Yet while oil was the clear catalyst for yesterday's gains, next week's presidential election, the result of which is too close to call, is casting an uncomfortable pall over financial markets…[15]

There are several lessons to be gleaned here. First, it is important to understand that every trading day new catalysts can impact the marketplace. Consequently, some trading catalysts may have short lives. Second, other trading catalysts—like the impending presidential election in the U.S.—could exert an influence on day-to-day trading and otherwise color the market environment for some time. The underlying concern—in this instance, the uncertain outcome of the impending U.S. presidential election—could dampen the overall sensitivity of equity prices to oil price changes. Third, notice that the market seemingly chose to ignore certain information, namely the drop in heating oil stocks.

Trading catalysts can be defined in a number of different ways. The approach taken in this book is to divide trading catalysts into two principal categories: those external to the market and those internal to the market. *External* trading catalysts can be further subdivided as follows: the comments of policymakers and politicians; domestic and geopolitical risk; weather and natural disasters; scheduled economic reports; unscheduled economic news; earnings announcements, court or regulatory decisions, and other company-specific news; rumors; and noise—non-fundamental factors that affect prices among others. *Internal* catalysts can be subdivided into the following: reflexive catalysts; cases where trading feeds on itself and exacerbates the price move (i.e., *positive feedback trading*) because of stop loss orders being hit, margin calls being made, or perceived technical barriers violated; and cases where price changes in one market spill over and affect price actions in other markets.[16] The latter category

includes cases where the price action in foreign markets affects the subsequent price action in domestic markets as well as cases where the price action in one commodity, say crude oil, affects the price action in the stock market. Other ways of categorizing trading catalysts also exist.

One might classify reflex rallies as being precipitated by internally generated trading catalysts. However, the spark that causes the rally is more frequently a change in market perception rather than a specific event marking the end of the panic and a reversal of opinion. This is illustrated in the historic behavior of U.S. stock prices as measured by changes in the Dow Jones Industrial Average. Significant price reversals oftentimes seemingly come out of nowhere. John Dennis Brown, who examines the behavior of the Dow Jones Industrial Average from 1890 (the first full year that statistics were available) through 1990 in his book, *101 Years on Wall Street*, includes a list of important one-day buying panics.[17] These days are associated with substantial positive percentage changes in the Dow Jones Industrial Average ranging from a low of 4% to a high of 15.3%. Brown categorizes the rallies as "news-oriented," "war-influenced rallies," and "reflex from panic conditions." Of the 29 examples listed, 12 are classified as reflex rallies from panic conditions.[18]

Two examples of reflex rallies are the 12.3% rally on October 30, 1929 following the market crash of October 28 and 29, 1929 and the 10.1% rally in the Dow on October 21, 1987 following the market crash of October 19, 1987. As noted earlier, one problem with using event time to predict future market sensitivity to trading catalysts is the small sample sizes that one has to deal with. The idea that prices should recover some of their losses from a major sell-off or market crash seems reasonable but, once again, the sample size is too small to draw valid statistical inferences from. Nevertheless, when the next market crash occurs, many traders may be looking for a major short-term rally following the crash based on what has happened in response to previous market crashes.

Probably most individuals would argue that news-oriented rallies or sell-offs would exert more impact on market prices than reflex rallies or breaks would. However, that need not be the case. Another interesting aspect of John Dennis Brown's list of important one-day buying panics is that many of the news-oriented rallies had a smaller impact on market prices than the reflex rallies did. This highlights the danger of relying on the arrival of new information to explain large moves in market price.

The preceding division of trading catalysts into external and internal factors is sometimes problematic. Consider, for example, a situation in which crude oil prices surge due to production disruptions also results in equity prices falling because of the fear that higher oil prices may have on the overall economy. Under the preceding definition, the trading catalyst for the oil price move would be classified as an external factor but the trading catalyst for the equity price move would be internal—namely the rise in crude oil prices. The relevant issue is whether the price changes in one market are driving the price changes in another market or whether fear has simply spread to other markets.

Another way of categorizing trading catalysts is to decompose them into informational and noninformational factors. A proponent of the efficient capital markets hypothesis would argue that only the first category should impact market prices. However, both types of trading catalysts exist. And, noninformational factors sometimes have a larger impact on market prices than fundamental news.

Do Perceived Trading Catalysts Really Influence Market Prices?

Most observers would regard a surprise Fed announcement of a targeted Fed funds rate cut as an unambiguous trading catalyst. This is not always the case for all trading catalysts. Sometimes, the trading

catalyst that sparks a large move in prices may be a matter of contention. Other times, trading catalysts that have regularly sparked large price moves in the past occur without any appreciable response in market prices. An example in this regard is the inconsistent impact that large changes in crude oil prices have on the equity market.

Trading catalysts that spark large and sudden changes in market prices are more readily identified than trading catalysts that spark small changes. However, sometimes trading catalysts spark small changes in market prices immediately but accumulate to a large change over time. This category of trading catalyst may also have an effect on market prices by reinforcing market sentiment and thereby help create the conditions for a more abrupt change in prices later.

There is a natural human tendency to impose order on apparent chaos. This tendency applies to attempts to explain financial market behavior as well. This is especially true for large price changes. Intuition suggests that there must be a *reason* for a large price change. Most of the time there is. For instance, few observers would dispute that news of the Federal Reserve rate cut sparked a rally in equity prices on January 3, 2001. However, sometimes large price changes occur for no apparent reason. This occurs more frequently than one might think. During 2000 and 2001, there were a number of instances where the Dow Jones Industrial Average or the Nasdaq Composite changed by 3% or more from the previous trading day. Yet, there is no readily identifiable source for many of these price moves. These large price moves may be the result of internal trading catalysts discussed in Chapter 8, "Size Matters," and Chapter 9, "Bubbles, Crashes, Corners, and Market Crises."

The lack of a readily identifiable source for many large price changes may explain the sometimes seemingly inconsistent behavior of market prices in response to certain trading catalysts over time. It may also explain how seemingly innocuous events can precipitate large price changes.

The preceding discussion assumes that there is only a single trading catalyst affecting the market at a given moment in time. It is possible that there may be several competing trading catalysts of which the news media only highlights one or two. Multiple trading catalysts could reinforce or offset one another. This may also explain apparent inconsistencies in the impact of the same trading catalyst on market prices over time. Isolating the individual market impact of multiple conflicting trading catalysts would likely be difficult. In any event, perhaps more important than the potential existence of multiple trading catalysts is whether most traders perceive (correctly or incorrectly) that trading activity is being driven by a single trading catalyst.

The question naturally arises as to whether the attribution by journalists of a large price move to a given trading catalyst is accurate. After all, journalists are expected to provide their readers, viewers, or listeners with informative explanations of what prompted a market move. Are the explanations in media accounts accurate descriptions of the causes of price moves, or are the reported catalysts simply rationalizations or excuses traders use for doing what they intended to do all along? There are two aspects to this question. First, is the reported trading catalyst the correct reason for the price action? Second, if so, what fraction of the price move is explained by the presumed trading catalyst?

To be sure, news media stories typically try to account for the price action of the entire trading day rather than focus on the immediate reaction to the trading catalyst. In addition, news media accounts of the impetus of a given price change may also be biased by the choice of whom the media interviews or obtains its information from. In any event, it is often impossible to determine the fraction of a market's reaction that can be attributed to a given trading catalyst. That said, contemporary news media accounts of the apparent causes for large changes in prices, although not perfect, provide a good summary of the perceived causes of large price changes during the day.

If the reported causes of large price moves are simply rationalizations by traders for doing what they already intended to do, the market-moving power comes not from the arrival of the trading catalyst but from the acquisition, hedging, or unwinding of trading positions and the trading they induce. Although it is possible to "explain" virtually any price change, it is worth noting that the puzzling behavior of financial prices is not confined to cases with ambiguous trading catalysts. As the opening example in this chapter demonstrates, the behavior of financial market prices in response to unambiguous trading catalysts is also sometimes puzzling. Moreover, there are numerous examples of puzzling market reactions to various trading catalysts that will be discussed in this book.

Trading Catalysts and Market Efficiency

The perceived influence of trading catalysts on market activity is intimately intertwined with the notion of market efficiency. In an informationally efficient financial market, prices change only with respect to the arrival of new information.[19] There are varying degrees of market efficiency that reflect differences in the amount of information available to market participants. This decomposition is due to Eugene F. Fama, who divides market efficiency into *weak form*, *semi-strong form*, and *strong form*.[20] Weak form market efficiency refers to a market whose current prices reflect any information contained in the series of past price changes. The principal implication is that certain forms of technical analysis, such as trend following, should not be profitable. Semi-strong form market efficiency refers to a market where prices fully and correctly reflect all publicly available information. In such a market, an individual cannot profit from investing on publicly available information. Strong form market efficiency refers to a market where prices fully and correctly reflect all available

information public or private. In such a market, it is not possible to consistently earn a superior return. Market efficiency does not suggest that it is impossible to earn superior returns. Rather, it suggests that it is not possible to *consistently* earn superior risk-adjusted returns.[21]

There are several implications for trading catalysts if the market is informationally efficient. First, true trading catalysts would be limited to the arrival of new information in the marketplace. Prices would not respond to *noise*—non-fundamental factors that influence market prices. Second, the impact of trading catalysts on market prices would be immediate and complete. Prices would jump or fall instantaneously upon the arrival of new information. Third, the market would interpret any information content of trading catalysts correctly. Prices would not react to a trading catalyst and then a few minutes later return to where they were before the announcement unless new information entered the marketplace during the interim.

There is a considerable amount of evidence in the financial economic literature that suggests that changes in financial market prices do not follow a *normal* or *lognormal* distribution. Rather, changes in financial market prices seem to be drawn from a distribution that is *leptokurtic*—a distribution that has more probability mass in the center and in the tails than the normal distribution does. This means that large price changes should occur more frequently than they would under a normal distribution. A stock market crash of the magnitude of either the 1929 or 1987 crashes should almost never occur if changes in stock prices are normally distributed. Even mid-single-digit daily returns are exceedingly rare in a normal distribution.[22] The observation of two stock market crashes in U.S. equities during the twentieth century and numerous days with high single-digit percentage price changes serve as a useful reminder of the practical importance of the distribution of changes in stock prices. It is also a potent reminder of the power of trading catalysts.

There is also a considerable amount of evidence in the financial economic literature that suggests that the volatility of changes in

financial market prices tends to both cluster and persist. This leads to the question of whether trading catalysts also cluster. The answer to this question depends on one's view of what causes prices to fluctuate. Individuals who subscribe to the efficient markets hypothesis would argue that trading catalysts cluster because the arrival of new information, and hence volatility, clusters. Market participants who do not subscribe to the efficient markets hypothesis would tend to disagree. They might argue that the more frequently trading catalysts occur, the more potential there is for trading catalysts to reinforce one another and increase perceived volatility.

Trading Is a Game

Active financial markets are invariably dominated by traders and trading activity. Although traders and investors share the same objective—to make money—they frequently differ in their approach to decision making. These differences matter and can influence the short-term behavior of market prices. It is important to understand that trading is essentially a game. The objective—to make money—remains constant, but the "rules" change over time. John Maynard Keynes put it this way:

> [P]rofessional investment may be likened to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces which he himself finds prettiest, but those which he thinks likeliest to catch the fancy of the other competitors, all of whom are looking at the problem from the same point of view. It is not a case of choosing those which, to the best of one's judgment, are really the prettiest, nor even those which average opinion genuinely thinks the prettiest. We have

> reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who practice the fourth, fifth and higher degrees.[23]

When viewed as a game, some of the apparent inconsistencies and anomalous behavior in the reaction of market prices to trading catalysts appear more understandable. There may not be a rational explanation for all market reactions. The point is, to paraphrase legendary trader Richard Dennis, markets need not make sense.[24]

Trading Off of Catalysts

The timing of certain potential trading catalysts is known in advance. Examples include the release of periodic economic reports, elections, and certain presentations by politicians and policymakers. This allows traders the opportunity to position themselves in advance of the potential trading catalyst. It also provides more time for consensus expectations to form. And, it is the forecast error (the difference between consensus expectations and the actual results) that the market will respond to. One consequence of more precise consensus expectations is a smaller forecast error. In turn, this suggests a smaller market response for scheduled potential trading catalysts, other things equal, than for unscheduled potential trading catalysts.

Scheduled potential trading catalysts have another impact on trading activity, and that is to alter the timing of entry or exit of positions *unrelated* to a bet on the potential trading catalyst. For instance, the release of the monthly employment report by the U.S. Department of Labor often affects the bond, stock, and currency markets. A trader who wants to enter or exit some market might delay or accelerate doing so in order to avoid being stopped out from a position because of an adverse move caused by the release of a report that he does not have an opinion on.

In contrast, the timing of other potential trading catalysts may be unknown, but the outcome is fairly well-known. An example in this regard would be the invasion of Iraq during 2003. It was readily apparent to many observers that the Bush administration had already decided to invade Iraq months before it did. However, the timing of the action was uncertain to market participants. Another example would be the decision to end the 1:1 peg of the Argentine peso to the U.S. dollar. By late 2001 it was clear that the link would be broken; however, it was not clear as to when the peg would be ended.

The timing and content of many trading catalysts is unpredictable so that a trader cannot position herself in advance to take advantage of the perceived opportunity. Is it too late to profitably trade after a trading catalyst occurs? Not necessarily. Trading opportunities also exist after a trading catalyst occurs. Again, the nature and extent of the trading opportunities depend on the magnitude and duration of the market's reaction to a trading catalyst. In some cases, the market reaction may allow plenty of time to put a position on (albeit at less favorable prices than before the trading catalyst occurred). As noted earlier, a trader does not need a lot of time to put a position on or take a position off.

Not only is the *timing* or *content* of certain trading catalysts unpredictable but sometimes so is the market reaction. The Federal Reserve's cut in the targeted Fed funds rate illustrates the conventional view of the impact that a surprise central bank rate cut would have on equity prices. As will become apparent in this book, the market's reaction to trading catalysts is not always so predictable. As will be shown in the next chapter, market conditions and sentiment bias can influence the magnitude and duration of the market's response to a given trading catalyst. This adds a dimension of risk when trading off of scheduled economic reports and other potential trading catalysts whose timing is known in advance.

The opening example of a cut in the targeted Fed funds rate by the Federal Reserve illustrates a case where the price reaction is both

relatively quick and large. Yet, as was noted, there is still time to put a position on. Sometimes, the reaction to a trading catalyst may not be as quick. Indeed, in some cases, the timing of the trading catalyst may not provoke an immediate reaction in market prices—that is, the reaction may be significantly delayed. Several examples of delayed reactions to events are discussed in the book. Delayed reactions create confusion over what the proper reaction to a trading catalyst should be but also create opportunities to put a position on.

In the January 3, 2001 Fed rate cut example, the impact on Nasdaq stock index futures prices grew as time passed during the first few minutes rather than declined in amplitude as time passed. This phenomenon is sometimes observed for trading catalysts that induce a delayed market reaction where the effect grows as time passes rather than diminishes. Another example in this regard is the reaction in the Indian stock market to news of the Congress' party's apparent victory in 2004. Yet another example is the reaction of Japanese markets to news of the Kobe earthquake in 1995. Both of these examples are discussed in more detail in Chapter 4, "Geopolitical Events," and Chapter 5, "Weather and Natural Disasters" respectively.

This book primarily focuses on trading catalysts that induce or seemingly induce large changes in prices. However, it also considers trading catalysts that may seemingly start a new trend in prices or reinforce an existing one. Basically, it is recognized that the impact of a trading catalyst may not be limited to a single trading day. Sometimes, there is a small reaction that accumulates into a large reaction over time. For instance, buying or selling frenzies or panics may extend and accelerate over time before climaxing. Most trend-following traders wait for the price action in the market to dictate when to enter or exit a position. The example that opens this chapter also illustrates a situation in which a positive short-term trend followed the Federal Reserve action.

Trading catalysts occur with great frequency. However, only a few induce large changes in prices immediately or cumulatively over

time. Most daily changes in financial market prices are relatively small in percentage terms. Thus, large percentage price moves are of interest because they are both less common and because they tell us something about the process that generates changes in prices.

It would be wrong to think of traders as waiting for a trading catalyst to occur before responding to it by taking positions. To be sure, large price moves are often accompanied by large trading volumes. However, as explained in the next chapter, knowledge of market conditions and sentiment bias can create the conditions where the market can be subject to all manner of potential trading catalysts. Simply stated, a trader can react to a trading catalyst after it occurs or anticipate the market's reaction prior to the occurrence of the catalyst or catalysts and position herself accordingly.

Trading catalysts can affect the short-term liquidity of the market, as was shown by the dramatic impact the Fed rate cut had on the effective Nasdaq 100 stock index futures bid/ask spread on January 3, 2001. An increase in volatility may also be considered a trading catalyst by stimulating trading volume. It is also a factor that is internal to the market. Increased volatility leads to increased demand for vehicles to hedge the volatility. The additional trading may also create more short-term trading opportunities.

As will be discussed in more detail in later chapters, the market's reaction to a trading catalyst need not be consistent over time. Sometimes, the market focuses on one potential trading catalyst to the exclusion of other trading catalysts that might be announced at the same time. It seems that the market acts as if it has a one-track mind. Sometimes, it is not clear what the market really reacts to.

The price changes that trading catalysts induce are often transitory. This means that a trader seeking to position himself in advance of a potential trading catalyst will have to determine the appropriate time horizon for any prospective trade. Strong money management rules might keep a trader in a profitable position longer than the trader anticipated when he entered the trade. However, the trader is

still subject to the risk of a sudden price reversal before the trader exits his position. For example, a trader who entered a buy order for the Nasdaq futures contract a few minutes late and was filled at 2650 on January 3, 2001 would find that he bought at the high of the day. All of this makes trading off of trading catalysts both difficult and risky.

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Endnotes

[1] Carl von Clausewitz, *On War*.

[2] The announcement was released at approximately 1:14 P.M. Eastern Standard Time. An examination of the wording of the announcement is interesting for what it says and what it does not say. The text of the announcement follows:

> The Federal Open Market Committee decided today to lower its target for the federal funds rate by 50 basis points to 6 percent. In a related action, the Board of Governors approved a 25-basis-point decrease in the discount rate to 5-3/4 percent, the level requested by seven Reserve Banks. The Board also indicated that it stands ready to approve a further reduction of 25 basis points in the discount rate to 5-1/2 percent on the requests of Federal Reserve Banks.
>
> These actions were taken in light of further weakening of sales and production, and in the context of lower consumer confidence, tight conditions in some segments of financial markets, and high energy prices sapping household and business purchasing power. Moreover, inflation pressures remain contained. Nonetheless, to date there is little evidence to suggest that longer-term advances in technology and associated gains in productivity are abating. The Committee continues to believe that, against the background of its long-run goals of price stability and sustainable economic growth and of the information currently available, the risks are weighted mainly toward conditions that may generate economic weakness in the foreseeable future. In taking the discount rate action, the Federal Reserve Board approved requests submitted by the Boards of Directors of the Federal Reserve Banks of New York, Cleveland, Atlanta, St. Louis, Kansas City, Dallas and San Francisco.

[3] The Nasdaq 100 index consists of the 100 largest nonfinancial companies in terms of market capitalization listed on Nasdaq, whereas the Nasdaq Composite reflects almost every firm traded on Nasdaq. Tracking stocks allow market participants to trade an index just like they would an individual stock.

[4] Stock index futures contracts allow market participants to bet on the future value of the index.

[5] This is not the case for some agricultural commodities. Another exception to this rule occurs during rollover periods when the trading volume of the futures contract that is the second closest to expiration exceeds the trading volume of the contract that is closest to expiration. Essentially, the second closest to expiration contract displaces the closest to expiration futures contract as the effective front month contract. The front month contract is *not* the futures contract that is closest to expiration for some commodities like Eurodollar futures.

[6] The *notional* or dollar value of the Nasdaq 100 futures contract is $100 times the Nasdaq 100 index value. Thus, an index value of 2000 would imply that the futures contract had a notional value of $200,000. In other words, one Nasdaq 100 stock index futures contract would be equivalent to buying a $200,000 diversified portfolio of Nasdaq stocks whose performance mirrors the Nasdaq 100 index. The minimum price move, or *tick,* on the contract is .50 point. Each tick has a value of $50 ($100 times .50).

[7] As John Dennis Brown points out in his book, *101 Years on Wall Street*, the high on the DJIA for 1929 was reached on September 3, 1929 when it hit 381.17. It should also be noted that the stock market had declined significantly from the high before the crash occurred in late October of 1929.

[8] Jack C. Francis and Roger Ibbotson. *Investments: A Global Perspective*. Upper Saddle River, New Jersey: Prentice Hall, 2002, p. 25. Francis and Ibbotson report that the *compound* annual return for large company and small company stocks over the same period was 11.3% and 12.6%, respectively.

[9] The Nasdaq 100 stock index futures contract settled at 2529.50 or 362 points higher than the previous day. The spot Nasdaq 100 index closed at 2528.38 or 399.60 points higher for the day. The Chicago Mercantile Exchange also lists an electronically traded version of the Nasdaq 100 stock index futures contract that is one-fifth the size of the pit-traded Nasdaq 100 stock index futures contract. It might be argued that the behavior of the e-mini futures prices were more representative of the market's reaction to the Fed rate cut trading catalyst. However, such an argument ignores the fact that the daily price change was essentially the same for both contracts. Moreover, the pit-traded Nasdaq 100 contract exceeded the trading volume of the Nasdaq e-mini futures contract on a size-adjusted basis. Note that the pit-traded volume was 35,677 contracts on January 3, 2001, virtually all of which were March 2001 futures contracts. The Nasdaq e-mini futures contract had record trading volume of 115,139 contracts on January 3, 2001, virtually all in the March 2001 contract.

[10] *Marketplace*. January 3, 2001.

[11] These and most other figures in this book are presented in Japanese Candlesticks format, where open, high, low, and close data are used to construct simple bar charts.

[12] The trader would also be interested in the position size that he could put on and the expected slippage associated with the prospective trade. Slippage measures the difference between the price at which the trader can actually execute the trade at and the price quote he observes when he submits the trade.

[13] Expectations of the future are often a function of individual past experiences or perceptions of the past experiences of others. To the extent that memory plays a role in formulating expectations of the future, the question arises as to how individuals weight past observations in formulating expectations about the future. Put differently, what is the rate of forgetfulness of individuals? This is not merely a function of calendar time. Nobel Laureate economist Maurice Allais discusses the rate of forgetfulness and argues that individuals form expectations adaptively.

[14] Bhusan Bahree and Chip Cummins. "Energy-Price Volatility Returns Due to Output Outages, Weather." *The Wall Street Journal*, January 11, 2005, p. C5.

[15] Michael Morgan. "Crude Prices Dip Boosts Stocks." *Financial Times*, Thursday, October 24, 2004, p. 28.

[16] Positive feedback trading refers to cases where a rise in prices spurs additional buying, which drives up prices even further, and a fall in prices spurs additional selling, which drives prices down lower.

[17] John Dennis Brown. *101 Years on Wall Street: An Investor's Almanac*. New York: Prentice Hall, 1991.

[18] Of course, this assumes that Brown's classification is correct. It is possible that other observers would identify other trading catalysts associated with the large percentage price changes on those days.

[19] An exception is changes in the value of default free discount securities (e.g., Treasury bills), which increase in value as time passes if the interest rate remains the same or lower.

[20] Eugene F. Fama. "Efficient Capital Markets: A Review of Theory and Empirical Work." *Journal of Finance*, XXV, No. 2, May 1970, pp. 383-417.

[21] Proponents of market efficiency argue that the observation of individuals who consistently beat the market is simply a product of chance. Proponents of market inefficiency argue that such observations are evidence that the market is inefficient.

[22] In a fascinating article, Jens C. Jackwerth and Mark Rubinstein use option prices to ascertain the relevant (risk-neutral) probability distribution that U.S. stock market participants face. They argue that large one-day returns of the magnitude earned or lost on the stock market crash of October 1987, for example, would be virtually impossible if security returns were lognormally distributed. They state (on pages 1611 and 1612):

> On October 19, 1987, the two month S&P 500 futures price fell 29 percent. Under the lognormal hypothesis, this is a -27 standard deviation

> event with probability 10^{160}, which is virtually impossible. Nor is October 1987 a unique refutation of the lognormal hypothesis. Two years later, on October 13, 1989, the S&P 500 index fell about 6 percent, a -5 standard deviation event. Under the maintained hypothesis [of lognormality], this has a probability of 0.00000027 and should occur only once in every 14,756 years.

The fact that extreme price moves occur with greater frequency means that the relevant return distribution for traders and investors has fatter tails than a normal distribution does. J.C. Jackwerth and M. Rubinstein, *Journal of Finance*, 1996, "Recovering Probability Distributions from Option Prices," pp. 1611-1631.

[23] John Maynard Keynes. *The General Theory of Employment, Interest and Prices*. 1935, p. 156.

[24] Jack Schwager [1989] reports Richard Dennis' response to his question, "What is the biggest public fallacy about market behavior?" as "That markets are supposed to make sense" (p. 106).