

# CHAPTER 1

## Microeconomic Perspectives

### TO EQUILIBRIUM OR NOT?

*The most interesting, and profitable, times to be involved in investment management are when Mr. Smith's invisible hand is visibly broken.*

—Paul A. McCulley

In this opening chapter, we begin our discussion of the various lenses that prove useful in the study of booms and busts by focusing upon a critically important and far-reaching element of traditional microeconomic theory: supply and demand-driven financial equilibrium. Two competing and seemingly contradictory theories are presented and discussed—the efficient market hypothesis and the theory of reflexivity.

There are many ways in which to illustrate the concept of equilibrium, but it is perhaps best analogized with a ball on a curved shape (see Figure 1.1). A situation in which equilibrium is possible is one in which over time, if left to its own devices, the ball will find one unique location. Overshooting and undershooting this unique location is self-correcting. A situation of disequilibrium, however, is one in which the ball is unable to find a unique location. A ball in such a state does not generate self-correcting moves that dampen its moves toward a theoretical “equilibrium” or resting spot; rather,

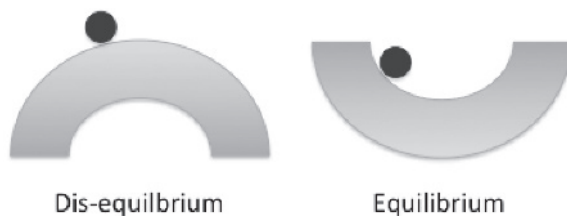


Figure 1.1 Equilibrium in Pictures

disequilibrium generates motion that is self-reinforcing and accelerates the ball's move away from any stable state.

The application of these concepts to the financial arena is very straightforward. The concept of a stable point is best analogized with a price or valuation level in the financial arena. The general idea behind price equilibrium stems from the powerful forces of supply and demand. Inherent in most equilibrium-oriented approaches is a belief that higher prices generate new supply that tends to push prices down. Likewise, it is believed that lower prices generate new demand that tends to push prices up. In this way, deviations from an appropriate price level are self-correcting.

We begin with the traditional economic lens that adopts an equilibrium-oriented view of the financial world. In addition to being based on intuitive supply (the higher the price, the more will be produced) and demand (the higher the price, the lower the demand) logic, the argument in favor of equilibrium is seductively simple. Following a discussion of the efficient market hypothesis and its implications for financial equilibrium, the chapter then turns to the theory of reflexivity. Developed by billionaire George Soros, the theory states that misperceptions about reality may become self-fulfilling, driving prices to ever-greater distances from any supposed stability point.

The careful reader will complete this chapter with the tools to consider financial developments as being equilibrium-oriented or not—which in and of itself should prove valuable in the study of and participation in financial markets. The chapter concludes with a plausible framework for combining the usefulness of both equilibrium and reflexivity lenses.

### **“Random Walks” and Accurate Prices: The Efficient Market Hypothesis**

Adam Smith observed in 1776 that individual, selfish pursuits are able to achieve optimal group outcomes better than if individuals

selflessly pursued what they each deemed best for the group. It was as if the self-interested individual is “led by an invisible hand to promote an end which was no part of his intention . . . [B]y pursuing his own interest, he frequently promotes that of society more effectually than when he really intends to promote it.”<sup>1</sup>

Economic thinking has been profoundly influenced by this early idea that selfish pursuits allocate scarce resources more efficiently than any individual might, despite the noblest of intentions. The laws of supply and demand drive the most efficient allocation of resources, and prices provide accurate signals for the increasing (or decreasing) of supply, with demand rising as prices fall or falling as prices rise.<sup>2</sup> An analogous construct in finance is the efficient market hypothesis, a theory that posits prices of financial securities embody all known information and therefore only move randomly.

The early origins of the efficient market hypothesis can be traced back to George Rutledge Gibson, who in 1889 asserted that the prices of shares that were well known in an open market embodied “the judgment of the best intelligence concerning them.”<sup>3</sup> The statement captures one of the two key building blocks upon which the efficient market hypothesis was built, namely that prices “contain” or “embody” all available public information. This assertion, which was later developed with greater rigor and precision in the twentieth century, was combined with early econometric work asserting that security prices move in a random manner. This latter claim, developed primarily by MIT economist Paul Samuelson and University of Chicago economist Eugene Fama, essentially stated that stock prices were not predictable based on their prior movements.

Fama and Samuelson, who were both building upon an unpublished dissertation by Louis Bachelier written in 1900 titled “The Theory of Speculation,” provided a compelling framework for understanding the behavior of stock prices through further conceptual development of the efficient market hypothesis.<sup>4</sup> In particular, Fama extended, refined, and further developed the theory by articulating three forms of efficiency that exist in the financial markets: weak, semi-strong, and strong.

Before describing each of these three forms of efficiency in greater detail, it is useful to consider the market conditions (i.e. assumptions) on which the theories of efficiency are based. In particular, the efficient market hypothesis requires that participants

(in the aggregate) are on average correct and that information is immediately and without friction incorporated by these participants. There is no explicit requirement that individuals be rational or even correct. The only requirement is that individual participants not systematically be irrational in the same manner. This means that any irrationality exhibited at the individual level must be offset by contrary irrationality among other individuals such that the “average” individual is not irrational.

As will be questioned below and again in Chapter 3, one of the root underlying assumptions or beliefs in efficient pricing is that all information is interpreted by all participants in exactly the same way. In reality, however, each individual participant may interpret data differently or come to unique conclusions about its importance. To say that all individuals have the same information does not necessarily imply that all individuals come to the same conclusion. In fact, as described below, misinterpretations can compound upon themselves as differing conclusions from common data might reinforce themselves.

Now, let us turn to the three forms of efficiency. The weak form of market efficiency describes a situation in which prior security prices provide no predictive value with respect to future security prices. According to weak form efficiency, evaluating historical stock price movements proves futile in the search for outperformance in the long run. In the language of today’s financial analysts, weak form efficiency is a theory that technical analysis—the study of prior price movements as the basis to predict future price movements, independent of any fundamental developments—does not work. Weak form efficiency does not imply that fundamental analysis is not fruitful, just that price movements exhibit no predictable pattern. Stock prices stumble through time in what Fama describes as a “random walk.”<sup>5</sup>

The semi-strong form of market efficiency describes a scenario in which publicly available information fails to provide any predictive value with respect to future security prices. Thus, semi-strong efficiency is really a statement about the rapidity of information incorporation. It implies that share prices instantaneously adjust to new information such that consistently profitable trading on the revelation of such information is not possible. Semi-strong efficiency builds on the weak form’s belief that technical analysis is useless and implies that fundamental analysis is also useless.<sup>6</sup>

Finally, the strong form of the efficient market hypothesis suggests that all information (private, public, and otherwise) is fully reflected within the prices of securities, and as such, prices are always correct in that there is no information that provides predictive value with respect to future security prices.<sup>7</sup> Table 1.1 summarizes these three forms of efficiency.

Although the theory of market efficiency was clearly intended to be a simplifying construct and a model useful in helping to explain reality, it was extremely well received by those seeking to understand the volatile (and range-bound) equity markets of the 1960s and 1970s. Specifically, corporate America, Wall Street, and regulators greeted the efficient market hypothesis with a warm reception—resulting in its deep burrowing into the fabric of finance.

### *Implications of Financial Efficiency*

The rapid acceptance of the efficient market hypothesis in financial and regulatory communities was a result of its elegance. The seemingly simple idea that security prices fully reflect all available information meant that markets were “right,” and that price moves were accurate reflections of changing fundamentals. Although this logic imbued many facets of the financial industry, the most important manifestations of it are found in the realm of regulatory philosophy and money-management practices.

**Table 1.1 The Three Forms of Market Efficiency**

	Weak	Semi-strong	Strong
Price Information	Prices move in random ways	Prices incorporate all publicly available information	Prices fully reflect all public, private, and other information
Role of Technical Analysis	Not useful	Not useful	Not useful
Role of Fundamental Analysis	Useful	Not useful	Not useful
Role of “Inside”/ Non-Public Information	Useful	Useful	Not useful
Method for generating outperformance	Traditional fundamental research	Seeking a nonpublic “edge”	None

*Time* columnist Justin Fox, in *The Myth of the Rational Market*, succinctly summarizes the impact of this warm reception:

It was a powerful idea, helping to inspire the first index funds, the investment approach called modern portfolio theory, the risk-adjusted performance measures that shape the money management business, the corporate creed of shareholder value, the rise of derivatives, and the hands-off approach to financial regulation that prevailed in the United States from the 1970s on.<sup>8</sup>

If one believes that security prices are right and completely reflect all available information and expectations, then there is absolutely no room for the consideration that prices are excessively depressed or overly ebullient. Bubbles do not exist in this world, and as such, asset prices are not and should not be a consideration for policymakers. Further, securities regulations need only focus on the creation of a level playing field vis-à-vis insider information, the protection of the public from untrue and unscrupulous marketing, and the prevention of illegal manipulation. Matters such as margin rates, counterparty risk, disclosure requirements, and other mechanical considerations become secondary. This overarching philosophy that “markets know best” has been the guiding light behind much of western-style democratic capitalism since the 1970s, due largely to the broad intellectual appeal and elegant simplicity of the efficient market hypothesis.

Another dramatic implication was that efficiency obviates the need for active portfolio management, whereby investors attempt to outperform the market. After all, if security prices already reflect all available information and there is no predictive value in any information, what value is there in conducting analysis using available information? Better instead to simply “buy the whole market” in a passive manner and not pay the fees associated with active management. The growth of passive money management (primarily manifested in the rapid rise of index funds) has been enormous since the 1970s and at least partially reflects the mass appeal of this efficiency argument.

### ***The Boom and Bust of Efficiency***

The common sense critique of the efficient market hypothesis is best captured by the often-quoted joke about the economist and a friend

walking down the street. After stumbling upon a \$100 bill lying on the ground, the economist's friend reaches down to pick it up, marveling at her good fortune. Before she actually picks it up, however, the economist says, "Don't waste your efforts. If it were a genuine \$100 bill, it would already have been picked up by someone else."

The absolute domination of the efficient market hypothesis over economic affairs around the world cannot be overstated. In fact, the 1997 Nobel Prize in Economic Sciences was awarded to Robert C. Merton and Myron Scholes for "a new method to determine the value of derivatives."<sup>9</sup> At the very root of their contribution was a belief that rational, efficient pricing of assets was inevitable and prices would tend toward identifiable equilibria. These two academics were also moonlighting as financiers helping to manage what at the time appeared to be one of the most successful hedge funds of all time, Long-Term Capital Management (LTCM).

LTCM employed a strategy of identifying small inefficiencies in which prices had deviated from their model-derived equilibrium price. The fund then used massive amounts of borrowed money to magnify their bets. In some instances, their bets were magnified through the use of more than \$100 of borrowed money for each \$1 of invested capital.<sup>10</sup> Although complicated, Nobel-prize winning, mathematically advanced formulas were behind the fund's strategies, one basic underlying premise served as the foundation of their worldview on which the whole firm's approach was based: Prices tended toward identifiable equilibria. The firm had billions and billions of dollars (some argue almost a trillion dollars) at risk behind a belief that prices operated according to the right-hand picture in Figure 1.1.

Despite the enormous leverage involved, LTCM had never had a monthly loss of greater than 3 percent prior to 1998.<sup>11</sup> Global economic uncertainty driven by the Asian financial crisis and the Russian debt default, however, were enough to cause not one, but two days (August 21, 1998 and September 21, 1998) of more than \$500,000,000 in losses.<sup>12</sup> According to the LTCM equilibrium-oriented financial models, the likelihood of having one such day was 1 in 50 million. The likelihood of two such days was incalculably small. Needless to say, the revelation of the flawed framework, as well as the huge monetary losses, were shocking to the LTCM financial wizards in Greenwich. Not surprisingly, author Michael Lewis described August 21, 1998 as "the worst day in the young history of scientific finance."<sup>13</sup>

The most ironic element of the story, of course, is that a team of efficiency-committed, Nobel prize-winning “equilibriumists” effectively undermined their intellectual position by first demonstrating it was possible to generate excess returns (i.e., that markets were not in fact efficient) and then by blowing up due to massive market inefficiency.

More recently, Alan Greenspan, “a card-carrying member of the free market brigade”<sup>14</sup> and Ayn Rand devotee, testified to the U.S. Congress that “I do have an ideology. . .that free, competitive markets are by far the unrivaled way to organize economies.”<sup>15</sup> In response to later questioning about how his philosophy might reconcile with regulation, his response was straightforward: “We’ve tried regulations. None meaningfully worked.”<sup>16</sup> As a result of this philosophy, the Chairman of the Federal Reserve took an extraordinarily (but not entirely) hands-off approach to the financial markets. I say “not entirely” because the very existence of a central bank is in fact contradictory to a free market perspective. By basically setting the short-term interest rate in America, the Federal Reserve is effectively a central planner that dismisses supply and demand fundamentals in the money market and chooses a price for money that it deems appropriate. As we will see in Chapter 2, a small group of economists (collectively known as the Austrian school of economics) have argued that such meddling in the money markets is perhaps *the* root cause of booms and busts.

Nevertheless, by the fall of 2008, amid one of the most severe economic downturns since the Great Depression, Greenspan indicated to Congress that he had found a flaw in his model of how the financial world works. In fact, he went on to describe the greater impact of the credit crunch on the philosophy of market efficiency, saying, “The whole intellectual edifice collapsed in the summer of last year.”<sup>17</sup> For this devout free-marketeer and devotee of market efficiency, such a statement was equivalent to serving pork for lunch during Ramadan in the holy mosques of both Medina and Mecca.

### **Constant Instability and Inefficiency: The Theory of Reflexivity**

George Soros, the hedge fund manager famous for speculating on the dynamics of financial markets, is more known for his financial wizardry than his philosophical musings. Nevertheless, his theory of reflexivity provides a tremendously powerful lens through which

to (re)consider market efficiency. Using a “reflexive” lens to view booms and busts proves quite useful, and this section will explain the theory of reflexivity and its primary implications for financial markets.

At its roots, Soros’ theory of reflexivity is a theory on the limits of human knowledge. If this is not a grandiose enough topic, the underlying focus of the theory is on the determination of reality and truth in complex social phenomena (like financial markets). The theory is a product of his intellectual devotion to Karl Popper, the early twentieth-century Austrian philosopher and author of *Open Society and Its Enemies*.

Popper’s primary philosophical contributions relate to the asymmetry in the development and falsification of theory. The fundamental problem of science, claimed Popper, is that it cannot prove anything. Rather, virtually all efforts to produce knowledge are based on induction and induction is inherently problematic. The “problem of induction,” relates to the fact that while all confirmatory evidence cannot prove a fact, one contrary piece of evidence can indeed falsify a supposed fact. Thus, although the sun has risen and set every day (thereby leading to a theory that the sun is on a cycle of rising and falling every 24 hours), the mere fact that it has occurred does not mean that it will continue to occur. However, if the sun were to ever not rise and set in a 24-hour period, the theory would be proven false.<sup>18</sup>

Soros goes on to identify two primary “functions” in the social arena. The first, called the cognitive function is the act through which a participant observes the social situation in which he finds himself. The second, the participating function, is the act by which participants participate in (and therefore affect) the social situation. The operation by which these two functions interact is reflexivity. He summarizes: “Reflexivity is, in effect, a two-way feedback mechanism in which reality helps shape the participants’ thinking and the participants’ thinking helps shape reality in an unending process in which thinking and reality may come to approach each other but can never become identical.”<sup>19</sup> This delta between reality and thinking is known as the participants’ bias.

A key implication of this two-way feedback mechanism is that social phenomena have an indeterminacy not present in the natural sciences. There is, according to Soros, no objective truth, and perceptions affect reality as much as reality affects perceptions.

While many have suggested that observers might affect the reality they seek to observe, Soros is unique in suggesting that observers actually change the reality that they are diligently trying to observe, and that this changed reality in turn affects their perception, creating a self-reinforcing cycle that compounds misperceptions.

Rather than suggesting an additional or alternative lens through which to view reality, Soros actually goes further to suggest that the scientific method and the basis on which supposed knowledge has been generated is not applicable to the social sciences. Given that economics is the social science that most emulates the natural sciences (thought by many to be the result of “physics envy”), Soros is effectively attacking the supposed rigor of the economic approach. The theory of reflexivity suggests that when it comes to events that have thinking participants, there is no such thing as objective knowledge. Participants act based on their beliefs, which are derived from observing the actions of participants, which are based on their own beliefs, and so on.

Soros bluntly stated his conclusion in a 1994 speech to the MIT Department of Economics: “Thinking participants cannot act on the basis of knowledge. Knowledge presupposes facts which occur independently of the statements which refer to them, but being a participant implies that one’s decisions influence the outcome.”<sup>20</sup> Soros fully admits that reflexivity does not occur in every case, but that when it does occur, the dynamics of the situation make traditional scientific approaches (meaning those based on observation) less useful. Figure 1.2 demonstrates how reflexivity is not merely a different way of observing, but rather a radically different process through which reality unfolds.

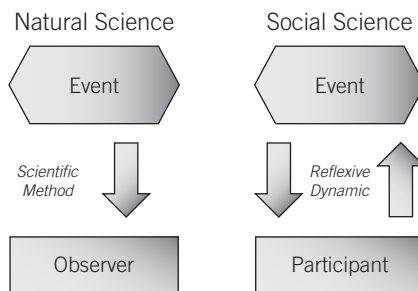


Figure 1.2 Natural vs. Social Science: Key Observational Distinctions

The key point, then, is that reflexivity is significant because it describes a situation in which misperceptions can be self-reinforced into reality. For this to occur, a strong interaction between the participant and the event must exist to transform the misperception into reality: “What renders reflexivity significant is that it occurs only intermittently. If it were present in all situations all the time, it would merely constitute a different way of looking at events and not a different way for events to evolve.”<sup>21</sup>

### *Implications of Reflexivity*

For Soros, a Hungarian-born Jew whose family had avoided Nazi persecution through wily tactics such as name changing and secretive movements, it was virtually impossible to believe that truth was knowable or even useful as a concept. The implications of reflexivity on financial markets are quite profound, particularly with regard to the existence of an equilibrium price. Soros describes these implications in his own words quite succinctly:

Instead of a tendency towards some kind of theoretical equilibrium, the participants’ views and actual state of affairs enter into a process of dynamic disequilibrium, which may be self-reinforcing at first, moving both thinking and reality in a certain direction, but is bound to become unsustainable in the long run and engender a move in the opposite direction.<sup>22</sup>

In fact, his 1994 testimony to the House Banking Committee eloquently summarizes his theory of reflexivity and how it can occasionally rear its head in financial markets:

I must state at the outset that I am in fundamental disagreement with the prevailing wisdom. The generally accepted theory is that markets tend towards equilibrium and on the whole discount the future correctly. I operate using a different theory, according to which financial markets cannot possibly discount the future correctly because they do not merely discount the future, they help to shape it. In certain circumstances, financial markets can affect the so-called fundamentals which they are supposed to reflect. When that happens, markets enter into a state of dynamic disequilibrium and behave

quite differently than what would be considered normal by the theory of efficient markets. Such boom/bust sequences do not arise very often, but when they do, they can be very disruptive, precisely because they affect the fundamentals of the economy.<sup>23</sup>

Soros goes on to claim that financial extremes are characterized by two primary components: a prevailing trend that exists in reality and a misconception relating to it. He often uses real estate as an example to illustrate this point. The prevailing trend in reality is that there is an increased willingness to lend and a corresponding rise in prices. The misconception relating to this trend is that the prices of real estate are independent of the willingness to lend.<sup>24</sup> Further, as more banks become willing to lend, and the number of buyers therefore rises, the prices of real estate rise—thereby making the banks feel more secure (given higher collateral values) and driving more lending.

### ***The Reluctant Recognition of Reflexivity***

George Soros has used his theory of reflexivity to make billions of dollars for his investors and himself. This does not imply, however, that he has been completely accurate in his predictions. Rather, Soros has been good at managing risk. At the very root of his philosophy is an understanding that he does not know (actually, that he cannot know) anything with 100 percent certainty.

Soros has been glaringly wrong (or perhaps just very early) in some of his predictions. In his 1998 book, *The Crisis of Global Capitalism*, Soros boldly predicted “the imminent disintegration of the global capitalist system.”<sup>25</sup> In 2001, he later admitted during a seminar in New York that he “got carried away” and that he now has “egg on his face.”<sup>26</sup> Despite the bold (and at the time wrong) prediction about the implosion of capitalism, recent events have turned in favor of his arguments. In fact, his 2008 testimony to Congress captures the essence of his current thinking:

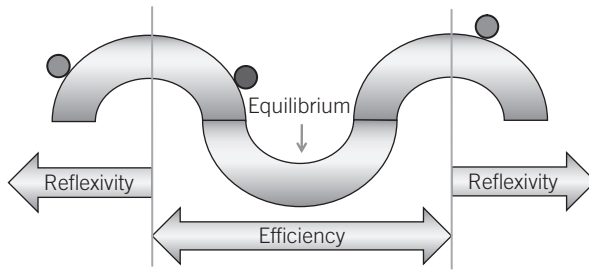
The salient feature of the current crisis is that it was not caused by some external shock like OPEC raising the price of oil or a particular country or financial institution defaulting. The crisis was generated by the financial system itself. This fact—that the

defect was inherent in the system—contradicts the prevailing theory, which holds that financial markets tend toward equilibrium and that deviations from the equilibrium either occur in a random manner or are caused by some sudden external event to which markets have difficulty adjusting. The severity and amplitude of the crisis provides convincing evidence that there is something fundamentally wrong with this prevailing theory . . . Usually markets correct their own mistakes, but occasionally there is a misconception or misperception that finds a way to reinforce a trend that is already present in reality and by doing so reinforces itself. Such self-reinforcing processes may carry markets into far-from-equilibrium territory. Unless something happens to abort the reflexive interaction sooner, it may persist until the misconception becomes so glaring that it has to be recognized as such . . .<sup>27</sup>

The fact that the theory of reflexivity has been so effective at explaining the most impactful events in financial markets (i.e., the extremes) has been the basis of its recent, albeit reluctant, recognition by practitioners and academics. While it has yet to be fully-accepted, the glaring failures of the efficiency arguments over the past 20 years have resulted in an increasing openness to alternatives. Simply put, the existing efficiency framework is not always accurate, and reflexivity helps fill in the holes when it fails. Stability is not ensured by simple supply and demand dynamics. Rather, there are times in asset markets when higher prices generate more demand (not more supply) and when lower prices generate more supply (not more demand). As noted by Soros above, these self-reinforcing processes can generate instability from within the system.<sup>28</sup>

### **Reconciling Efficiency and Reflexivity**

By attempting to reconcile the seemingly incompatible approaches of the efficiency and reflexivity lenses, this chapter concludes by suggesting a contingent approach to using the lenses. Even though Soros adamantly opposes the logic of efficiency, he does concede that markets usually correct themselves. Thus, the efficiency argument for a stable equilibrium that results in events tending toward it seems viable—most of the time. However, it also seems likely that



**Figure 1.3 Reconciling Efficiency and Reflexivity**

events that occur far from equilibrium or are reinforced beyond a certain distance from that equilibrium are unlikely to return to it.

Figure 1.3 attempts to capture these two distinct phases using the balls and hills logic utilized earlier in the chapter. In the figure, one can notice that events transpiring in the efficiency band will tend toward an equilibrium point. The same is not true, however, for the balls that have entered the realm of far-from-equilibrium reflexive developments. These balls are unlikely to stabilize in any specific condition unless assisted by an external force.

Most of the time, efficiency logic works and deviations from equilibria tend to self-correct. However, there are instances in which reflexive dynamics are able to overcome the self-correcting force and create self-fulfilling extremes. The investment implications of this efficiency/reflexivity duality are that Adam Smith's invisible hand, which normally drives an appropriate price discovery process, occasionally breaks down. It is precisely when such dynamics take over that extremes become increasingly likely.