

Corporate Valuation for Portfolio Investment

A Philosophical Framework

EQUITY SHARES must be valued—but how? It may seem that sophisticated financiers have taken over valuation. The phrase “equity valuation” may conjure up visions of financial specialists feeding numbers into algorithmic programs, relentlessly making buy, sell, or hold decisions unrelated to the operating realities of businesses or to understandable economic concepts such as replacement value.¹

A great deal of controversy surrounds the mathematicians and physicists (aka “quant jocks”) on Wall Street. Some blame them for the economic problems of the first decade, noting their complex trading programs that, once automated, accelerated doomsday events for markets.² Others say that the quant jocks boosted the overall intelligence of the market by introducing new and sensible ways of looking at risk and return, pointing out that they were among the first to warn against the crisis.³ In fact, sophisticated trading programs do have a role to play, but the programs must be based on sound principles. Sophisticated trading activities are the symptom, not the substance, of stock valuation.

In fact, valuation begins from the hour a company’s leaders find equity investors who believe so strongly in the company’s economic prospects that they are willing to provide capital for it, no strings attached. This belief in a company’s future—in a word, *hope*—is what makes the value of the stock something more than the current value of all its assets, if sold in a fire sale. Combined with the investor’s own time horizon for a return, hope is the key to securities valuation. Vision and time are the alpha and omega.

Valuable vision is what propels a company's stock into the marketplace; it is what preserves the value of the stock in spite of market chaos. Understanding this concept requires an integrated theory of valuation that includes consideration of assets offset by liabilities, of income, of cash (liquidity), of securities market dynamics, and of comparable pricing. Understanding also requires consideration of what we call *stories*—meaningful information beyond the financial statements and market prices. This book is structured accordingly.

Of course, not all investors base their trades on such an integrated framework for valuation. Some are index investors, some are algorithmic traders, and some are fund managers who buy assets based on classes of risk. In fact, fewer than half of all investors actually choose an investment based on the quality of a particular company.⁴ It is for these happy few volitional, value-minded investors that this book is intended.

Cost/Benefit of Information Gathering

There is also the issue (which I found out in the S&P strat⁵) of the price of gathering data. One of the reasons such simple strats exist is the cost of gathering the information you need to implement them is fairly high compared to the payout. Would I be better off screen scraping all the livelong day to implement some lousy subjective strat with a low Sharpe⁶ anyway? Or would I be better off getting a job at a bank, making a lot of money, and buying bonds?"

—Posted by Scott Locklin at the Algorithmic Traders Discussion Board on *LinkedIn.com*, April 19, 2009.

Valuation Defined

Valuation means determining a value for something. This book sets forth all the elements of a company that are to be valued and offers guidance on how to determine those values.

- *Corporate valuation* determines the worth of a corporation *today* (its present value); *valuation for portfolio investment* joins that

present value with a future value. As Al Rappaport said so succinctly in *Expectations Investing*, the key to successful investing is “to estimate the level of expected performance embedded in the current stock price and then to assess the likelihood of a revision in expectations.”⁷

- *Expectation* is indeed a fitting word for the process of valuation for investment. “Valuation” comes from the Latin word *valere*—to be worth something in an exchange.⁸ “Investment” derives from *vestire*—to clothe. It means exchanging money now for something that may offer more money in the future.

Valuation alone is relatively simple; *corporate valuation for portfolio investment* is complex. Valuation alone says A is worth X today. But valuation *for investment* says A is worth X today and *may be worth* Y at a future date. Valuation for investment means determining the present value of future worth.

Valuation is not a one-time event. It is a process. There is no one set of steps to value the stock of an existing public company, but it is generally agreed that the valuation journey proceeds with the following steps:

1. Select the item to be valued (the security).
2. Identify its current price (e.g., today’s closing price).
3. Evaluate whether the current price is low, correct, or high.
4. Make a corresponding buy, hold, or sell decision based on the investor’s own circumstances—including liquidity needs and the timing of those needs.

As part of step 3, the investor can adjust the values of price (step 2) based on six valuation matrices:

1. Time—Short term versus long term
2. Place—Market versus nonmarket
3. Slope—Level versus skewed playing field
4. Volition—Degree of willingness or unwillingness of the buyer or seller
5. Utility—Purpose (e.g., wealth versus liability collateral for a fund)
6. Quality—Level of certainty of return (high, medium, or low grade) based on investing standards

To get real value, one needs to pass each valuation through these six lenses. This paradigm appears throughout this book.

The Importance of Equity

Few financial topics matter more than equity valuation. Without the possibility of placing a reasonably accurate value on equity securities, there could be no equity marketplace. And without an equity marketplace, society would not have such a diversity of products and services. Some corporate undertakings are so long term and expensive that *only equity capital*—as opposed to operating capital or debt capital—can fund them.⁹ Societal commitments such as payments made out of defined pension plans simply cannot be honored unless the obligated payor (the company or union offering the pension) has access to funding that can beat inflation at the level that equities have achieved historically.¹⁰ It is no coincidence that these financial instruments are nicknamed “stock.” For an equity market to function, the economy at large must “put stock” (trust) in equities and continually “take stock of” (measure) their value.

The presence of the federal government as an investor (discussed in Chapter 2) raises new issues in equity valuation: as the holder of the shares, will a government entity's focus be on financial return, as in the past, or on matters of broad social significance, such as jobs? There is some precedent for this concern at the state level. Public pension plans have at times made political rather than economic decisions.¹¹ In general, however, the equity investment decisions of pension plans are based on universally recognized financial principles. One of the purposes of this book is to articulate those principles so that equity valuation maintains its integrity as a discipline.

Equity Defined

First invented by Dutch and English traders some 500 years ago, the term “equity” or “stock” as a form of corporate financing has been part of the business world for half a millennium.¹² *Equity* is created when companies offer ownership stake to buyers, giving stock certificates in return for cash. The value of a company's equity (the number of shares times the current price per share) is its *market value*.

There is another kind of equity. It's the *accounting* kind, namely the dollar-value number remaining on the balance sheet after liabilities are subtracted from assets. This version of equity is also known as “net worth” or “book value.” The accounting number is usually much lower than market value, but it can be used as a check on it because it is far less volatile.¹³

Regulators have done a good deal of hand-wringing over what equity is as opposed to debt. (See Appendix A.) In brief, equity represents ownership with potential for returns, while debt represents a claim entitling the holder to guaranteed payments.¹⁴

The issuance of equity securities brings two distinct values to an economy. For the company's management, the *sale* of equity securities can bring patient capital—funds that support growth without making fixed demands for return. To the company's investors, the *purchase* of securities can bring returns—a share in a company's total worth that grows in value as the company does.

Growth in share prices does not happen in each and every company, but it is common for all companies' stocks as a net total over any given 10-year period. Based on this general trend, Nobel Prize winners Franco Modigliani and Merton Miller asserted that the payment of dividends does not change the firm's market value: it changes only the mix of elements in the firm's financing. The Modigliani-Miller theorem has been true historically, but is it true today? If investors, over time, cannot count on share price appreciation, then the theorem would not hold; dividends would become indispensable for equity investors.

Articles of Faith Undermined: Securitization at Risk

When markets sustain shocks or experience long declines, it is hard for investors to maintain a reasonable expectation of share price appreciation. Such events not only undermine such expectations, but they also diminish faith in securities markets—and understandably so.

Take, for example, the turn-of-the-millennium scandals of Enron and WorldCom. Their share price decline was so rapid and unexpected that it fooled even fairly sophisticated investors.¹⁵ In the space of half a year, two giants—large in market capitalization, book value, and revenues—lost almost all their value virtually overnight upon declaring surprise bankruptcies in late 2001 and mid-2002, respectively.¹⁶

A decade later, a new series of giants has fallen, including several Wall Street titans felled by the devaluation of securities backed by weak mortgages that went into default—the so-called subprime mortgage crisis. Following severe financial stress, Bear Stearns became part of JPMorgan Chase, and Merrill Lynch part of BankAmerica. Lehman Brothers Holdings sold off multiple divisions and declared bankruptcy. Even Goldman Sachs got heat from the meltdown when SEC made allegations of fraud in an April 2010 lawsuit, triggering shareholder lawsuits and sparking a subpoena from the Financial Crisis Inquiry Commission (FCIC).¹⁷ By June 2010, Goldman's stock was trading at two-thirds its previous 52-week high, showing the heavy toll that companies pay for scandal.¹⁸

The events from Enron to Goldman bookend what has been called the “worst decade ever for equities,” with an overall negative return of –3.3 percent, according to one study.¹⁹ In this crisis, market prices experienced both artificial inflation and deflation, depending on circumstances. The securities of many companies that appeared to have high levels of capitalization, assets, and revenues should have been trading at *lower* prices, given economic realities. Conversely, in at least one case (Bear Stearns), short seller rumors (bordering on illegal activity) caused the firm's security price to plummet, even though the true value of those securities, absent false rumors, was arguably *higher* than their trading price.²⁰

It's a well-known statistic that U.S. equities lost more than a third of their value in 2008.²¹ Then, in 2009, the crisis continued for one quarter, dragged down by global financial stocks, and then began a slow recovery that continued into 2010.²²

But this recovery was punctuated with caution. In a report dated May 7, 2009, four key banking regulators released the results of a “stress test” administered to 19 major banks. The report showed that more than half of them needed additional capital to insulate themselves against adverse scenarios. This news was not as bad as many investors had feared—shares rose in response—but gloom about the financial system persisted, weakening confidence in equity securities, not only those of financial institutions but of other companies as well.²³ In 2010, the European Union followed with the publication of their own banking stress test results.²⁴

The subprime crisis and its seemingly endless aftermath undermined confidence in equity securities in general. Long an engine of liquidity and

growth in free economies, securitization is coming under unprecedented scrutiny today. Structured finance, once the darling of financial economists, is getting a bad name.²⁵

Speaking before the Council of Institutional Investors in April 2009, Federal Reserve Board Governor Kevin Warsh called the mortgage banking crisis a classic economic “panic.” His riveting speech distinguished between recessions and panics:

Fear. Breakdown in confidence. Market capitulation. Financial turmoil. These words are . . . indicative of *panic* conditions. In panics, once firmly held truths are no longer relied upon. Articles of faith are upended. And the very foundations of economies and markets are called into question.²⁶

A footnote in his prepared remarks elaborated: “A panic involves a more insidious set of events in which risk aversion rapidly displaces confidence and individuals and institutions are forced to reexamine fundamentally their world views.”²⁷

And in a *Wall Street Journal* op-ed that same month, mutual fund guru John Bogle cast aspersions on securitization by including it in a list of alleged causes of the economic crisis, stating that it “severed the traditional link between borrower and lender.”²⁸ Bogle may not have meant to tar all types of securities with the same brush he intended for mortgage-backed bonds. Nonetheless, his widely read column helped make securitization a taboo 14-letter word.

Whether their concern involves dollars and cents or broader issues of governance, by 2010 investors were still shying away from equities, despite the protections of a massive financial reform bill passed in June of that year.²⁹

To be sure, equities did not suffer greatly in some economies. For example, the loss of equity values in Scandinavian countries was less precipitous than in other places. But why? Does a societal element come into play? Are certain social conditions associated with fragile equity values?³⁰

This book helps investors ask and answer such questions as they analyze the value of corporate securities—starting with a look, right now, at the very *raison d’être* for equity securities in the first place.

Benefits of the Equity Marketplace

The issuance of equity securities brings two distinct values to an economy. For the company's management, the *sale* of equity securities can bring patient capital—funds that support growth without making fixed demands for return. To the company's investors, the *purchase* of securities can bring returns—a share in a company's total worth that grows in value as the company does. It may be useful to elaborate on each of these points.

- *Flexible funding.* Without equity capital, all companies would be forced to operate at a sustained level of profitability or seek debt funding, pledging regular repayment according to the terms of their loans or bond offerings. This type of discipline can be good for companies, but it limits their flexibility. Equity securities markets provide a uniquely flexible source of capital for companies with long-term vision, enabling them to employ and reward people for creating new technologies, products, and services that require a long start-up phase. Thanks to the ability to sell equity to choice-driven (or algorithm-driven), thinking investors,³¹ companies can generate the extra funds they need over time and under changing circumstances to pursue long-term goals—goals they might not be able to fund by making a profit on their sales, taking out loans, issuing bonds, or, exceptionally, selling troubled assets to the government.
- *Superior returns to shareholders.* At the same time, equity (or stock) investments represent a special financial opportunity for investors, especially institutional investors that need to generate relatively high returns over long periods of time in order to overcome the ravages of time,³² especially during periods of high inflation.³³ If institutional funds were limited to investments in debt securities, they would have less of a chance for high returns over time. Although some debt securities have a feature that guarantees a percentage return that exceeds the rate of inflation, not all do, and returns from such vehicles are still relatively low.³⁴

The Flexible Nature of Equity Capital

The flexibility of equity capital (compared to the obligations of debt capital) may be taken for granted after more than 500 years of use, but

it is a remarkably positive feature from a company's perspective. Consider that companies that sell stock are *under no legal obligation to pay back the capital*, much less offer a return on the stock. In fact, when companies reorganize due to insolvency, shareholders are legally among the last in line to be paid. Indeed, this back-of-the-line creditor status is fundamental to the very definition of equity.³⁵

The flexibility that equity offers to issuing companies does not come without strings attached: in many countries, such as the United States, equity issuers must adhere to a rigorous disclosure regime. A myriad of federal and state securities laws, stock listing requirements, and domestic and global accounting standards require U.S. public companies to disclose a great deal of detailed information to investors in order to help them determine the value of the securities they are buying, holding, or selling. There are even accounting standards for disclosing information about "securities within securities," that is, about the market value of other companies' securities held by a company that itself is issuing securities.

Long-Term Superiority of Equity over Debt— with a Caution about Volatility

The flexibility of equity makes it more attractive than debt as a source of funds for companies. If economics were merely a matter of trade-offs, the equity advantage for companies would translate into an equity disadvantage for shareholders. But this is not the case. Paradoxically, equity seems to provide stronger returns over time than debt.

The explanation for this paradox is complex.³⁶ Obviously, time is a critical dimension. If you can't wait a hundred years for a return on your investment, you won't care about the hundred-year average return. On the other hand, it is absurd to compare a single day's returns from two types of investment and expect to learn anything.

Let's look at the record of equity versus debt over different time periods in different regions. Given the variety of studies available, we can create a kind of patchwork quilt of findings that point to at least one general principle: it makes sense to invest in both debt and equity.

In any given region or period, debt securities may offer equal or superior returns and with less volatility. When in 2008, U.S. equities lost more than one-third of their value, their performance was obviously

inferior to the positive 2.2 percent rate paid by one-year Treasury bonds that year.³⁷ This was not a fluke. There have certainly been periods of time when bonds do as well or better than stocks—without the volatility associated with equity securities.³⁸

At the same time, despite the plunge in equity trading prices seen by investors in 2008 and early 2009, there is strong evidence that over the long reach of history, stocks outperform bonds. This is not to say that stocks will beat bonds by “divine right”; this theory is eschewed by even Jeremy Grantham, noted for keeping a level head about the value of equity when others panic.³⁹ A century-and-decade-long time horizon (for what it may be worth) puts equity in the lead over debt. The *Credit Suisse Global Investment Returns Yearbook 2010* shows that from 1900 through the end of 2009, global stocks averaged an annual real return of 5.4 percent, compared with 1.7 percent for bonds and 0.9 percent for bills.⁴⁰ (Australia has been the best performing equity market over the 110 years since 1900, with a real return of 7.5 percent per year, with South Africa and Sweden also performing well, with real returns of 7.2 percent and 6.2, respectively, on average since 1900.)⁴¹ All three markets have outperformed the United States over time; the average real return on U.S. equities since 1900 is 6.2 percent. But you will see mostly U.S. examples in this book, because nearly half of all equities (41 percent) are traded in U.S. markets.⁴²

Apparently, a single bad year is a drop in the bucket when it comes to a century. Thus the Credit Suisse 109-year finding is not much lower than studies that ended two years earlier:

- From 1909 to 2007, the Cowles Commission index, linked to the Standard and Poor's Composite Index (S&P 500), shows an *average real equity return of 6.0 percent per year*, compared to a real bill return of 1.6 percent per year and a real long-term government bond return of 1.8 percent per year.⁴³ From the start of 1941 to the end of 2007, equity returns averaged 6.9 percent per year, bill returns 1.4 percent per year, and bond returns 1.1 percent per year. Similar gaps between stock and bond and bill returns have typically existed in other long-term periods.⁴⁴
- Research conducted for the authors by a researcher within the Treasury of Sweden indicates that from 1900 to 2007, real returns from the shares of 18 major economies have ranged from 2.5 percent (Belgium and Italy) to 7.9 percent (Australia), with Sweden close

behind at 7.8 percent. Also beating the Cowles Commission average were South Africa (7.5 percent), the United States (6.5 percent), Canada (6.3 percent), and the United Kingdom (5.5 percent).⁴⁵

So even if we include the disastrous year 2008, long-term returns for equity look good. The problem is that most investors don't hold stock for a century long—and stocks are volatile over time. Another problem is that the returns include reinvested dividends. If dividends are spent rather than reinvested, returns are much lower—only 1.7 percent.⁴⁶

Caveat on Volatility

Even though returns from equity may be strong, they are not predictable. Recent research has shown the annualized 30-year variance from stocks is 1.5 times greater than the one-year variance, due to various kinds of uncertainty facing investors.⁴⁷

The main engine of volatility may be stock declines due to overleveraging. Recent research shows an economic reason for the negative correlation between volatility and stock returns. Stock return volatility is a function of the level of the stock price, which depends on the value of the firm. As a firm's stock value declines, the firm's leverage ratio increases; hence the equity becomes more risky and its volatility increases.⁴⁸

The Focused Nature of Valuation for Investment

The general superiority of equity over debt is *only a long-term average*, of course, and does not apply to all cases. Obviously, if one buys stocks that perform under the market average, returns will be lower than the market average. The hope of the value-minded investor is to select one or more stocks that will perform better than the market average. A middle course is to buy a random selection of stocks through a fund or index and to at least keep up with the market average.⁴⁹ This is the basic idea behind mutual funds or other funds that hold diverse stocks.

Some professional investors use indexes that are random in nature, but others want to exercise choice, selecting specific company stocks with a reasonable prospect of positive return over time—from the present to some specific future. Whether they hand-select stocks based on careful research, as many special purpose funds do,⁵⁰ or use an algorithmic program, these volitional investors apply some choice to their purchases.

Two Main Sources of Information about Equity

There are two main sources of information about the worth of a stock: financial reports about the company issuing the stock and the current trading price of the stock. Each poses challenges:

- *Financial reports* are written using conventional accounting standards—e.g., international accounting standards (IAS) to be required worldwide by 2014), or generally accepted accounting standards (GAAP) allowable currently in the United States). But many of these principles have become arcane; they must be decoded by the valuation-minded investor. (Financial reporting issues are discussed in Chapters 2 through 4.)
- *Stock prices* show the dollar values of trades at specific points in time, indicating what investors think (or have thought) of the equities at given moments in time. These investor opinions are influenced by many factors, including financial reports. (For more on the valuation of equities, see Chapter 5.)

Financial Reports: Issues with GAAP and IFRS/IAS

Company financial statements are prepared according to U.S. GAAP and its international counterpart, IFRS, or, more globally, IAS. Both are based in principles considered to be universal. (See Appendix B.)

U.S. GAAP standards are formulated by the Financial Accounting Standards Board (FASB) and available at its web site, FASB.org, which is overseen by the Securities and Exchange Commission (SEC) and publicly funded via levies from public companies.⁵¹ FASB standards, recognized as authoritative by the SEC and the American Institute of Certified Public Accountants (AICPA), cover some 90 general areas,⁵² such as when a company recognizes revenue or losses. GAAP currently has 2,000 pronouncements, which it has codified to make them easier to use. This codification is making it easier to align GAAP with International Financial Reporting Standards (IFRS) standards as the world moves toward a global standard.

A continual complaint against U.S. GAAP has been that it differs from prevailing standards outside the United States. For example, until the turn of the millennium, U.S. GAAP permitted a special accounting treatment, called “pooling” accounting (different from regular so-called

purchase accounting) for certain corporate acquisitions that used stock as a currency. The FASB abolished pooling, and now all transactions must be accounted for as purchases. Still, other differences between U.S. and non-U.S. accounting principles have remained. So the FASB and the International Accounting Standards Boards (IASB) have joined together to harmonize standards.

The FASB and the IASB are working on “an improved common conceptual framework that provides a sound foundation for developing future accounting standards.” The organizations want to develop standards that are “principles-based, internally consistent, and internationally converged and that lead to financial reporting that provides the information capital providers need to make decisions in their capacity as capital providers.” The Conceptual Framework project has eight phases, including notably measurement—arguably the most important for the purposes of valuation.⁵³

As we go to press, the goal of an international accounting standards is being achieved, one standard at a time. (See Appendix C.)

Sources of Complexity in Accounting for Company Value

Sources of complexity in GAAP and IFRS accounting include variation in accounting models, exceptions to rules, mixed attributes, and bright line standards.

Variation in Accounting Models

Accounting models complicate matters—so says an SEC group that studies accounting complexity.⁵⁴ Examples of competing models are:

- ▶ Different models for when to recognize impairment of assets such as inventory, goodwill, long-lived assets, financial instruments, and deferred taxes.
- ▶ Different likelihood thresholds for recognizing contingent liabilities, such as probability for legal uncertainties versus more-likely-than-not for tax uncertainties.
- ▶ Different models for revenue recognition such as percentage of completion, completed contract, and pro rata (models also vary based on the nature of the industry, as discussed in other sections).

- ▶ Various standards for “derecognition” of liabilities (i.e., taking them off the balance sheet).
- ▶ Different models for determining whether an arrangement is a liability or equity.⁵⁵

Exceptions to Rules, or “Scope Exceptions”

If accounting rules were applied universally, it would be relatively easy to use them. But many rules have important exceptions. The Securities and Exchange Commission’s Complexity Subcommittee (yes, there is one) has identified such so-called scope exceptions as problematic. For example, using the FASB’s new Accounting Standards Codification (ASC) followed by the pre-codified name of the standard:

- ▶ ASC 815, *Derivatives and Hedging* (SFAS 133), excludes certain financial guarantee contracts, employee share-based payments, and contingent consideration from a business combination, among others.
- ▶ ASC 820, *Fair Value Measurements and Disclosures* (SFAS 157), requiring mark-to-market accounting for certain equity holdings by corporations, excludes employee share-based payments and lease classification and measurement, among others.
- ▶ ASC 810, *Consolidation of Variable Interest Entities* (FIN 46R), excludes employee benefit plans, qualifying special-purpose entities, certain entities for which the company is unable to obtain the information necessary to apply FIN 46R, and certain businesses, among others.⁵⁶

Scope exceptions arise for a number of reasons, including cost-benefit considerations, the need for temporary measures to quickly minimize the effect of unacceptable practices (rather than waiting for a final “perfect” standard to be developed), avoidance of conflicts with standards that would otherwise overlap, and political pressure.

Mixed Attributes

Another accounting conundrum noted by the SEC Complexity Subcommittee stems from mixed accounting attributes. The carrying amounts of some assets and liabilities are measured at historic cost, others at

lower of cost or market, and still others at fair value. Several measurement attributes currently coexist in GAAP. They result in combinations and subtotals of amounts that make no real economic sense (or, as the Complexity Subcommittee says more tactfully, “are not intuitively useful”). This complexity is compounded by requirements to record some adjustments (to the value of an asset) in earnings, while others are recorded in equity. In preparing a comprehensive income statement, an issuer may choose among these approaches.⁵⁷

Bright Lines: “Either/Or”

Another complexity introduced by accounting is the notion of strict pass-fail thresholds that achieve an all-or-nothing recognition of an asset. Take, for example, lease accounting. Under current requirements, the lessee accounts for the lease in one of two significantly different ways: Either (1) reflect an asset and a liability on its balance sheet, as if it owns the leased asset, or (2) reflect nothing on its balance sheet. The accounting conclusion depends on the results of two quantitative tests, where a mere 1 percent difference in the results of the quantitative tests leads to very different accounting. The four-part pass-fail standard for recognition of revenue from software in some cases leads to zero recognition when in fact partial revenue is received.

The SEC’s Complexity Subcommittee notes that bright lines make financial reports less comparable. The accounting is not “faithful to a transaction’s substance.” Bright lines produce less comparability because two similar transactions may be accounted for differently.

Reforming GAAP and IFRS

Investors, creditors, auditors, and others all have opportunities to weigh in on standards through a comment process or other means. Since 2005, the FASB has sponsored an Investor Task Force (ITF) made up of the country’s largest institutional investors.⁵⁸ Task force members assign industry analysts at their firms to advise the FASB on standard-setting initiatives.

Despite the presence of investors in the setting of standards, GAAP is still prone to investor criticism. In recent years, some investors have complained that GAAP standards for reporting fail to capture

the information investors need to make investment decisions. The American Institute of Certified Public Accountants, the FASB, and others have been taking steps to correct this gap—along with global standard setters.

Enhanced Business Reporting (EBR)

In 2001, the AICPA launched the Enhanced Business Reporting (EBR) initiative, to propose additions to financial reporting, to be adopted on a voluntary basis by companies. This initiative grew out of work initially done by the AICPA (the so-called “Jenkins report”).⁵⁹

The recommendations of this group can help the valuation-minded investor. EBR suggests ways to report important intangible factors such as strategy, innovation, people, customer loyalty, market share, leadership, technological change, R&D, what competitors are doing, brand, patents, reputation risks—all obviously important contributors to the value of a company.

Much of the information envisioned for disclosure under the EBR framework is already required for U.S. SEC registrants in the Management’s Discussion and Analysis of Financial Condition and Results of Operations, the “MD&A” required under Regulation S-K. But the EBR framework contains useful classifications—taxonomies—for qualitative information. The disclosure requirements contained within the MD&A categories—liquidity, capital resources, results of operations, off-balance-sheet arrangements, and contractual obligations—do in fact cover many value-critical activities, but this information can get lost in the prose. The EBR initiative creates a reporting framework that organizes both quantitative and qualitative information in rational and consistent structure. In fact, the EBR group has already created a taxonomy for use in the new financial reporting software XBRL (a way of tagging electronic records so that they can be totaled, compared, grouped, and otherwise treated as data).⁶⁰ (For more on EBR, see Chapter 7.)

Emerging Issues Task Force (EITF)

The FASB has an Emerging Issues Task Force (EITF) composed of representatives of major accounting firms and corporations. This group strives to keep the FASB in touch with economic reality. If issues arise that do not seem to be receiving proper treatment under GAAP, the

EITF holds meetings to discuss them and publishes the findings. Eventually, EITF findings make their way into rules. Issues undergo debate that often pits accounting theory against real-world concerns. Observers note that some EITF members, as users of the standards, have conflicts of interest. One question is, do these conflicts of interest prevent the standards from being fair for and useful to all users?

The Problem of Fair Market Value: Reporting Values for Securities with No Current Market

Problems with the two main sources of information about a security—financial reports (which can be arcane) and market trading prices (which can be subjective)—increase geometrically when companies have to report the value of the *other* companies' securities they hold. And these problems relate to the dreaded concept of fair market value. During times of extreme market volatility, determining such a value is a difficult task, to say the least.

During the 2008–2009 financial crisis, the federal government took ownership of securities held by troubled financial institutions, under the Troubled Asset Relief Program (TARP) initiated under Public Law 110–343, a multipart piece of legislation that included a \$700 billion to repurchase troubled financial assets under the Emergency Economic Stabilization Act of 2008.⁶¹ TARP cast government into the role of a lender and investor, providing capital in the form of \$1.5 trillion in loans and purchases of government-sponsored enterprise (GSE) securities. The government wanted to be able to value the securities it was going to hold. So the Congressional Oversight Panel asked Duff & Phelps, a securities rating agency, to value preferred stock and warrants under the program, resulting in a report published in February 2009.⁶² Because the TARP preferred stock and the TARP warrants are not publicly traded, Duff & Phelps used data from the public debt, equity, and derivatives markets to estimate discount rates, volatility, and default assumptions. In Chapter 5, on valuation using stock prices, we will present Duff & Phelps' findings on the narrow but important issue of valuing a specific set of securities held by a company. (See also Appendix D.)⁶³

The Duff & Phelps valuation work gave the government a useful benchmark to use in its new role as an equity investor. In the end,

though, TARP program provided greater proof for equity valuation's difficulty than for its ease. Whereas the government had projected heavy losses from its investments, by mid-2010 it was making gains.⁶⁴

Value

At the end of the investor's 24-hour day, value comes down to whether the buyer wants to buy more than the seller wants to sell.

Robert A. G. Monks

Three Studies

Valuation studies like the Duff & Phelps valuation report are well and good, but an equally important question is how companies are “valuing” themselves on an ongoing basis. For example, how do boards of directors define performance when creating long-term incentive pay plans linked to long-term corporate performance? This is an important question, because pay benchmarks reflect values. If a board says to a CEO, “you will receive a bonus if you increase operating profits,” this implies (or should imply) a belief that the value of the company stems from its profits.

In 2010, three organizations (an association and two compensation consulting firms), published surveys on metrics used to determine pay. All three studies show *profits* as the dominant financial metric, with variable use of others. Also, all three studies showed that companies reward executives for *more than financial results*.

Here are representative results from one of the studies, the *2010 NACD Public Company Governance Survey* published by the National Association of Corporate Directors.⁶⁵ The two lists show what results, financial and nonfinancial, are being rewarded in pay plans (Multiple answers accepted.):

Financial results:

- Profits 66 percent
- Revenues 41 percent

- Cash flow 36 percent
- Stock prices 31 percent
- Ratios based in earnings or returns 31 percent
- Hybrid formulas (e.g. economic value added) 16 percent
- Assets 10 percent

Nonfinancial results:

- Customer satisfaction 54 percent
- Legal compliance 41 percent
- Employee morale 38 percent
- Product quality 34 percent
- Workplace safety 30 percent
- Employee retention 19 percent
- Workplace diversity 14 percent

The other two surveys showed a similar range of responses.⁶⁶

Investors apparently see corporate value differently. A study of investor views of performance metrics showed that the nearer a measure is to cash flow, the more investors consider it a valid measure of corporate performance.⁶⁷

The Need to Read between the Lines

The cumulative effect of these challenges is to make financial reports less transparent with regard to value. Investors must therefore “read between the lines” and conduct additional research to discover the real drivers of and threats to value. One purpose of this book is to show investors how to seek the additional company information they need to determine the true value of a security.

Human Nature Complicates (but Also Informs) Equity Valuation

Equity securities are difficult to value, in part because both companies and the markets that trade in their equity are living human systems prone to self-deceptive traits that militate against pure valuation logic. The human element runs deeper than just the market itself, affecting the instruments the market is valuing all along the value supply chain.

Before an equity security can be valued in a market, the security and the market must come to exist. And for this to happen, a number of people must decide or agree to do a number of things. One or more persons must:

1. Conceive of a product or service (entrepreneurs or management).
2. Expend effort producing, delivering, and/or selling the product or service (management and labor).
3. Provide capital for expanding these activities, including buying and selling securities (banks, investors, and venture capitalists).

These three groups are reminiscent of the classical economic categories of entrepreneurship, labor, and capital. They form a continuum of valuation. At each step along the way, the people involved make a judgment about value. How wise is each judgment? In each case, only time will tell.

It may be helpful to revisit the 1934 edition of *Introduction to Security Analysis* by Benjamin Graham and David Dodd. Like the authors and readers of that classic, the authors of this book had to ponder a crashed stock market. How could people attribute high value to stocks one day and little value the next? Certainly human nature plays an enormous role. We quote two sections from the Introduction to the 1934 text, which could have been written yesterday:

One of the striking features of the past five years has been the domination of the financial scene by purely psychological elements. . . . The “new era” doctrine—that “good” stocks (or “blue chips”) were sound investments regardless of how high the price paid for them—was at bottom only a means of rationalizing under the title of “investment” the well-nigh universal capitulation to gambling fever. We suggest that this psychological phenomenon is closely related to the dominant importance assumed in recent years by intangible factors of value, viz., good-will, management, expected earning power, etc. *Such value factors, while undoubtedly real, are not susceptible to mathematical calculation; hence the standards by which they are measured are to a great extent arbitrary and can suffer the widest variations in accordance with the prevalent psychology.* [Emphasis added.]

Then, in a section aptly titled “No Automatic Relationship between Value and Price,” Graham and Dodd opine:

There are a number of other factors involving human nature in Wall Street to which recent experience should lead us to pay . . . serious attention . . . Investment theory should recognize that the merits of an issue reflect themselves in the market price not by any automatic response or mathematical relationship but through the minds and decisions of buyers and sellers. *Further, the investors’ mental attitude not only affects the market price but is strongly affected by it . . .* Hence in selecting an investment . . . reasonable allowance must be made for such purely *market-price elements* as can be ascertained, in addition to the more primary consideration which is paid *to factors of intrinsic value*. [Emphasis added.]

The important point is that the trading price of securities can be affected by investors’ attitudes and in turn affect them. Equity values rise and fall with market tides, as every investor knows. The value of a security may be influenced by movements in the stock market in general—well beyond the scope of the company and its industries.⁶⁸

George Soros’s Concept of Reflexivity

World-class financier George Soros has a term for the effect of human behavior on valuation: *reflexivity*. He says that investors are inherently biased (not objective) about their investments because they are involved in investing, and their involvement in turn changes the value of what they invest in. More philosophically:

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. Therefore, the situation participants have to deal with does not consist of facts independently given but facts which will be shaped by the decision of the participants. . . . 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.⁶⁹

Complicating matters is the fact that the company fundamentals that investors may consider in setting a buy, sell, or hold price for stock are themselves complex. Even the formulas investors use to set their expectations for returns are influenced by subjectivity. Soros writes:

Earnings, dividends, asset value, free cash flow: all these yardsticks are relevant, as well as many others, but the relative weight given to each is subject to investors' judgments and is therefore subject to their bias.⁷⁰

Setting an expectation for return is ultimately subjective, and people can move in packs. Soros attributes boom-bust cycles to a flawed perception of fundamentals that is self-reinforcing until it becomes so out of touch with reality that it must reverse itself.

Other Paradoxes in Equity Investing

Reflexivity is no doubt the greatest paradox haunting equity investment, but it is not the only one. Mathematicians versed in game theory have identified many others. John Paulos, a brilliant mathematician who lost his shirt investing in WorldCom, blames his own human nature as an investor—not WorldCom managers or regulators! We highly recommend his book, *A Mathematician Plays the Stock Market*.⁷¹

Here are just a few of the paradoxes that made it difficult for this genius to invest profitably:

1. *Keynesian beauty contest.* John Maynard Keynes has said that the short-term investor is like a voter in a beauty contest who will win by picking not the most attractive contestant, but the one selected by most others. Research by W. Brian Arthur at the Santa Fe Institute, using a different experiment, has proven that the beauty contest approach leads to mediocre results.⁷²
2. *The winner's curse.* In opening bidding, some buyers will overestimate the value of an item, and some will underestimate it. The

- higher bidder will usually be one who overestimated it. Therefore, the winner is more likely to overpay.
3. *Cognitive bias*. People tend to be biased toward information that is available (availability bias). They also tend to pay attention to information that confirms rather than refutes their bias (confirmation bias). They tend to prefer what they already have, rather than a new alternative (status quo bias, and a correlative endowment effect—“It’s my stock and I love it”). People take far more risks and spend far more money to avoid losses than to achieve gains.
 4. *Loss aversion bias*. This kind of bias relates to the so-called Shubik’s auction, named after Yale University Professor Martin Shubik, who auctions dollars for higher amounts in class to prove the point that people would rather risk losing large amounts of money in order to avoid losing than walk away after a small loss.
 5. *Factoring out failure (survivorship bias)*. In studying the performance of any group (for example, a group of publicly listed companies), the study may leave out companies that have failed and no longer exist. This inflates the average performance of the group by weeding out failures.⁷³
 6. *The prisoner’s dilemma*. The two players in the game can choose between two moves: either cooperate or defect. Each player gains when both cooperate, but if only one of them cooperates, the one who defects will gain more. This dilemma was discovered by Princeton mathematician John Nash, subject of the book and movie *A Beautiful Mind*. His discoveries apply to stock market investing. Paulos argues that if every investor would cooperate by focusing on fundamentals, we would all be better off. But it is human nature to “defect” from this model by finding and exploiting an edge, even if that edge, by becoming common knowledge, benefits only the first investor who finds it.

All these sources of bias and others lead investors to paint themselves into cognitive corners. At the height of the financial meltdown of 2007–2009, one psychiatrist was able to build a practice working with hedge fund traders to help them stay out of their own way, that is, to avoid loss aversion and other foibles.⁷⁴ But the foibles that came out in the meltdown are timeless. Irrational investment behavior is so prevalent and persistent that it has become a branch of economics, called behavioral finance.⁷⁵

When you add it all up, as one theoretical physicist observed, “the economy does not compute.” It is no wonder that the greatest minds of our day are urging the use of computer simulations to understand market behavior.⁷⁶

The Observer Effect

There is something very human about all this—to a cosmic degree. We are all familiar with the uncertainty principle of Heisenberg, which sets limits on how precisely we may measure the position and momentum of a particle at the same time. (By increasing the precision in measuring one quantity, one is forced to lose precision in measuring the other.⁷⁷)

But a more relevant principle from physics is the so-called observer effect, which states that the act of observation will change the phenomenon being observed. A number of physicists, including John D. Barrow and Frank J. Tipler, Max Tegmark, and the late John Archibald Wheeler, have noted the necessity of observation for the very existence of the universe! (Seeing is not only believing; it is being itself.)⁷⁸

Human Nature as the Key to Equity Value

If stock markets exemplify reflexivity, and reflexivity exemplifies life in the universe, the study of stock market behavior can reveal keys to human prosperity. At the very least, the study of the stock market will tell us a lot about human nature, and vice versa.

Paradoxically, human nature, which makes the valuation of equity so difficult, may also be the fundamental cause of the superiority of equity. Think about it. The financial pundits say that greater risk brings greater returns, but this isn't really a given. Risk is merely the uncertainty of loss, as the insurers say;⁷⁹ there's nothing intrinsically rewarding about that. Knowing a risk level—or a proxy for it, such as a ratio out of line with peers—can give you a discount level, but it can't help you assess returns. Assets with similar risk levels can bring dissimilar rewards, as financial economist William Sharpe has noted.⁸⁰

Certainly in a world of unknowables, the equity investor's willingness to accept the risk of open-ended returns or losses *deserves* the higher returns accorded to equities. But, again, this willingness does not necessarily *cause* the returns. Certainly companies may take bold

risks to provide generous returns to shareholders, but those risks do not always pay off.

The financial returns from equity are made possible by multiple variables beyond the control of company managers, including stock market trends and macroeconomic factors such as interest rates.⁸¹ But the most important variable is in the hands of management. It's corporate genius in action—or, more explicitly, *long-term asset-enhancing vision realized through informed strategy, effectively implemented*.

But how can the value of vision be expressed in terms of dollars and cents? This leads to the important topic of monetization.

Need for Expression in Currency Values

Everything in financial reporting is expressed in currency amounts (e.g., dollars, euro, or yen). This makes it possible to compare amounts from category to category. Common language solves many problems, but it also creates some. Some values are difficult to express in currency amounts because they do not involve a cash transaction. And even when a cash transaction is involved, the amount recorded belongs to the past rather than to the future. Inevitably, the dollar amounts on company financials only approximate value and sometimes do so poorly. The mark-to-market requirement, mentioned earlier, has attempted to correct this problem with respect to securities on balance sheets, but when markets are in turmoil, this is not always a viable solution. In fact, some have argued that mark-to-market-accounting contributed to the 2007–2009 financial crisis.⁸² Being a value-minded investor means being able to think in terms of dollars and asking companies to make a greater effort to quantify elements of value. In the long term, investors want this quantification to occur under GAAP/IFRS. In the short term, investors can and do ask companies to report on it voluntarily—the way firms like General Electric have done (more later).

The valuation of options is a good example of putting a dollar number on an intangible—in effect, monetizing a value that has not previously been expressed in a currency amount. Prior to accounting standards that forced expensing of options, companies did not book options as expenses on the grounds that their value was impossible to quantify. But soon various methods to quantify options came to the fore, such as the Black-Scholes method. Today the quantification of options is a requirement under GAAP.

To some, the concept of expressing values in terms of money may seem like an affront to decency. Who can put a dollar value on the things that really matter, such as life, liberty, or the pursuit of happiness? Yet such values are quantified every day in courts of law.

From Science to Philosophy

For many purposes, value must be expressed as a number. For all important purposes, value is subjective and quantification is ultimately arbitrary. In his later years, Peter Drucker changed his description of the duty of corporate managers from maximizing shareholder value to optimizing shareholder value. This is a change from science to philosophy.

—Robert A. G. Monks

One goal of enhanced business reporting (ERB) and similar movements, such as intellectual capital, social responsibility reporting, and the like, is to quantify information that was previously considered nonquantitative. Because accounting must report everything in money (as discussed), ERB tries to help in this regard.

On Financial Mathematics

Valuation-minded investors who wish to put numbers on information need to know how mathematics are used in valuation. One goal of enhanced business reporting is to provide quantitative financial measures for items that are not traditionally expressed as money amounts, and mathematics can help.

Some believe that the use of advanced mathematics in investing over the last 40 years has gone too far, leaving common sense behind.⁵³ The phenomenon of securitization has created instruments of wealth that are too distant from the wealth-generating sources underlying them. The rise and fall of securities backed by subprime mortgages is a good example of a departure from common sense.

The Market as a CAS

The market is a complex adaptive system (CAS). One need simply reflect on such homilies as overbought, oversold, momentum, or cyclical to touch on this fertile soil. Indeed, most of what is now being expensively sold by hedge fund managers probably could be described as a subset of CAS. Each mathematical formula, each algorithm, is based on perception or guess as to characteristics of the great beast: the market itself.

—Robert A. G. Monks

Even the best of formulas fail if the values put into them are flawed. Valuation is more than formulas; it involves human judgment. Nonetheless, it is important to understand how math is used in the equity marketplace, not only by investors but also by traders.

Math matters, even if it is something as simple as a side-by-side comparison of a number or set of numbers—the precursor of a ratio. Not every decision maker wants to make the jump from comparison to ratio, but in the world of investment finance, such a leap is obligatory—at least for professional investors.⁸⁴

Based on our experience in valuation, there seems to be a hierarchy of complexity for mathematical tools used in valuation by an investor, progressing from an informal, intuitive realm into a more formal, mathematical realm.

From lowest to highest complexity, the stages are

- *Integers*—Numbers expressing a value—such as \$2 billion (in, say, operating earnings).
- *Ratios*. Relational comparisons of two or more different items through a single fraction or multiplier—e.g., earnings per share or price to earnings per share.
- *Multiples*. Numbers derived from ratios.
- *Averages* (of ratios or multiples). Averages of many ratios or multiples.

- *Algorithms.* Formulas composed of more than one ratio—often yielding a buy/sell or yes/no decision; sometimes expressed as decisional logic rather than as a formula.

Ratios and multiples weight one element of value against another, and use this comparison to indicate value. A ratio or multiple by itself tells investors little or nothing, but if they compare that same ratio across an industry, they can begin to scope out value.

Knowing these tools is helpful to investors valuing a company as they move from one financial statement to another. Therefore, the discussion of these valuation tools will follow the movement from one financial statement to another. For example, the discussion of the debt-to-equity ratio in Chapter 2 focuses on the assets on the balance sheet, while the interest coverage ratio is introduced in Chapter 3, which discusses earnings and the income statement. And obviously a ratio such as free cash flow to operating cash flow belongs in the discussion of the cash flow statement—all coming up.

Tools that combine attributes from multiple sources—balance sheet, income statement, cash flow statement, and/or market price—appear in Chapter 6.

(For more on the use of math in valuation, see Appendix E.)

In Closing: About This Book

This book is intended primarily for use by institutional investors—professionals who buy and sell equity securities on behalf of institutions. At the same time, we hope that others may find it of interest as well. We would be honored if professors of finance chose to recommend this book along the other classics on valuation we recommend at the end of this book, such as Graham and Dodd's *Security Analysis*. Furthermore, we believe that securities valuation is a broad-based competency needed by all participants in financial markets, including not only those who buy securities but also those whose work gives securities their value—managers and other employees. Indeed, investors and managers speak a common language when it comes to valuation: They both want to know what they will get for what they will give. Risk and reward considerations apply to both.

The coauthors hope to offer a set of valuation tools that combine two equally important aspects of valuation for investing: fundamentals and complexity.

Fundamentals

This book contains all the necessary *fundamentals* for valuation analysis. It takes the reader through the major financial statements of a company and shows how to assess key elements of value within them. Although a certain level of reader sophistication is assumed, the coauthors know that individuals have varied backgrounds. Some readers may be extremely sophisticated in equity instruments but have gaps in their knowledge of debt markets—or vice versa. Others may be financial accountants but lack a grasp of economics, or an investor trained in economics may find pronouncements of the FASB to be nothing short of Greek. Therefore, with apologies to the few readers who may in fact know all the fundamentals, the book is packed with basics. If you already know something, just skip over it.

Complexity

The book should make its greatest contribution by bringing discipline and meaning to the notion of corporate synergy—the undeniable fact that the corporation is more than the sum of its parts. Fundamentals can go only so far in helping investors assess the value of an investment in a security. Investors can calculate the market value of every asset, tangible and intangible, reported and nonreported. They can scrutinize the income statements over time for trends in profitability. And they can make cash flow statements their focus and gain an appreciation for the sustainability of cash flowing into the enterprise. But beyond all these fundamentals (presented chapter by chapter), the investor must be aware of other dimensions of corporate value. That is why this book, in addition to explaining fundamentals, will offer windows of insight—presented as boxed text—enabling investors to stretch beyond logic into other realms of possibility. This visual device is meant to convert experience into intuition for the reader.

The Authors

The senior author, Robert A. G. Monks, has spent a lifetime making sense of valuation for investment—a complex set of moving targets. Many in the business world know Bob Monks best as a shareholder activist who founded Institutional Shareholder Services and the Lens Fund after working on private pension fund issues at the U.S. Department of Labor. In his much earlier years, he was a securities runner for

Paine & Webber in the summer of 1950; served as a principal in his family money management business, Gardner Associates (a money management firm); and eventually became chairman of the Boston Company and Boston Safe Deposit & Trust Co. Many of the windows on valuation come from his vast experience as a direct risk-taking participant in the rough-and-tumble of financial markets.

The book's coauthor, Alexandra Lajoux, has spent three decades making technical financial material understandable to professional audiences through her own books or through books and reports prepared with and for others, including a variety of experts and task forces concerned about questions of corporate value. Her task in this book has been to construct its fundamental framework so that its new windows on valuation can let in the most light.

A Range of Approaches

Investors need to use a full spectrum of valuation approaches. At one end there are the tire-kicking skills of the old-fashioned appraiser—the value investor. At the other end of the valuation spectrum are the gambling instincts of those who can anticipate market moves—the technical investor. The best valuation practices span this full range, for good reason. As noted earlier, stock prices both reflect and influence the value of the securities being priced.

- *Tire-kicking.* There is an entire profession of business appraisers who focus on the value of assets and who base valuation estimates largely on those values. These professionals often serve as expert witnesses in cases concerning the value of privately held enterprises for which there is no securities market. Asset-based valuation of this kind is used in valuing natural resource companies. For example, a crude oil producer such as Petrobras (NYSE: PBR) may be valued based on the value of its current proven reserves, minus a discount for the costs and risks of extraction (such as an oil spill), and a forest industry company such as Weyerhaeuser (NYSE: WY) might be valued based on the value of the timber it controls.⁸⁵
- *Gambling.* The notion of an economy that operates like a casino for investors emerged out of the worldwide Great Depression following the 1929 stock market crash. Economist John Maynard

Keynes wrote, “Speculators may do no harm as bubbles on a steady stream of enterprise, but the position is serious when the enterprise becomes the bubble on a whirlpool of speculation. When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done.”⁸⁶

- ▶ Value lies somewhere between these two extremes of absolute and relative value—or, if you will, between economic value and market value. Throughout this book, the coauthors steer a middle course. The terrible consequences of valuation extremes have worn on all of us in recent years. May you invest within the golden mean and may this book be a helpful guide along the way.

Notes

1. Tobin’s Q ratio is an example. This ratio, invented by the late James Tobin of Yale University, is calculated as the market value of a company divided by the replacement value of the firm’s assets. Professor Tobin, a Nobel laureate in economics, theorized that the combined market value of all the companies on the stock market should be approximately equal to the sum of their replacement costs.
2. The role of algorithmic trading was a focus for the Financial Crisis Inquiry Commission (FCIC), chaired by former treasurer of the State of California, Phil Angelides. Formed in late 2009, the Commission has plans to deliver its final report in December 2010. See remarks Chairman Angelides made June 2, 2010, at <http://www.fcic.gov/hearings/pdfs/2010-0602-Angelides.pdf>. For questions Robert A. G. Monks has posed to the Angelides Commission, see his web site, RAGM.com.
3. For a balanced view on the role of algorithmic trading, including a reading list of books on the subject, see Dennis Overbye, “They Tried to Outsmart Wall Street,” *New York Times*, March 9, 2009. Interesting blogging and lively commentary appear at *Discover* magazine’s web site: <http://blogs.discovermagazine.com/cosmicvariance/2009/03/22/the-physicists-killed-wall-street/>.
4. See Robert A. G. Monks, “The Return of the Shareholder,” Harvard Law School Forum on Corporate Governance and Financial Regulation, February 2, 2009, <http://blogs.law.harvard.edu/corpgov/2009/02/02/the-return-of-the-shareholder/>.
5. S&P Strategy indexes.
6. *Sharpe ratio*. In 1966, and later in 1977, Professor William Sharpe introduced a *reward-to-variability ratio* to measure the performance of mutual funds. A low Sharpe ratio means high volatility. In a 1994 article, “The Sharpe

Ratio” (see *Journal of Portfolio Management*, Fall 1994, at <http://www.stanford.edu/~wfisharpe/art/sr/sr.htm>), he explained how to use the ratio before making an investment (ex ante): “Let R_f represent the return on fund F in the forthcoming period and R_B the return on a benchmark portfolio or security. In the equations, the tildes over the variables indicate that the exact values may not be known in advance. Define d , the *differential return*, as:

$$d \equiv R_{\tilde{F}} - R_{\tilde{B}} \quad (1)$$

Let d -bar

be the expected value of d and σ_d be the predicted standard deviation of d . The ex ante Sharpe Ratio (S) is:

$$S \equiv \frac{\bar{d}}{\sigma_d} \quad (2)$$

The S ratio indicates the expected differential return per unit of risk associated with the differential return.”

During the 2007–2009 financial crisis, the Sharpe ratio came under questioning, as some funds with a high Sharpe ratio (low volatility) failed (see *The Economist*, http://www.economist.com/business-finance/displaystory.cfm?story_id=12948575); and SeekingAlpha.com, <http://seekingalpha.com/article/171438-spotlight-on-the-sharpe-ratio-part-i>).

7. Alfred Rappaport and Michael J. Mouboussin, *Expectations Investing: Reading Stock Prices for Better Returns* (Boston: Harvard Business School Press, 2001), xv.
8. For an interesting discussion of value, see Michael Eldred, “Questioning the Earth’s Value—Including a Proposal for a Capitalist Carbon Sink Industry,” at the Conference on Climate & Philosophy, University of South Florida, September 14–16, 2006, industry (<http://www.webcom.com/artefact/untplcl/qstnerth.html#one>, delivered at 1st International). He notes, “The verb ‘valere’ is linked (via an Indo-European root *ual-) to the German ‘walten’ which means ‘to prevail,’ again from L. praevalere ‘to be very able,’ ‘to have greater power or worth,’ ‘to prevail’ . . . [Thus] there is an intimate interconnection between the powers of exchange (exchange-value) and productive powers/powers in use (use-value).”
9. For a definition of equity securities versus debt securities, see Appendix A.
10. Traditionally, at least half of all corporate funds has been invested in public equity. In the last part of the first decade, this proportion has changed, with some plans reducing their equity investments from half to a third. See

Mark Anson, “One-Two Punch to Pension Funds,” *Pensions & Investments*, January 22, 2009. Also, starting in 2000, pension funds began investing in private equity and hedge funds, as well as in traditional stocks and bonds. See “Defined Benefit Pension Plans,” Government Accountability Office, <http://www.gao.gov/new.items/d08692.pdf>.

11. Steven Malanga. “Public Pension Funds Become Political Playthings,” *Real Clear Markets*, April 22, 2009, http://www.realclearmarkets.com/articles/2009/04/public_pension_funds_become_po.html.
12. For commentary on the history of stock-issuing corporations, see the books by Robert A. G. Monks posted at RAGM.com.
13. The growth (or decline) in book-value equity can be measured through the impact of events that have changed the book value of an investor’s interest in a business from the start of a financial period to the end of the period. Here is the formula:

$$\begin{aligned}
 & \text{Shareholders' equity at beginning of period (per share)} \\
 & + \text{Dividends paid (per share)} \\
 & + \text{Shares buybacks (premium over book value per share)} \\
 & - \text{Share buybacks (premium over book value per share)} \\
 & + \text{Comprehensive income (per share)} \\
 & = \text{Shareholders' equity, end of period (per share)}
 \end{aligned}$$

14. Some instruments do not fall neatly into either category, even if they have the name equity or stock. For example, consider preferred stock instruments such as private investment in public equities (PIPEs). For a discussion of this type of instrument, see “PIPEs: What Issuers Are Thinking About Preferred Stock Investments,” Deloitte & Touche, June 2009. http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/MA/us_ma_Insights_PIPEs_102309.pdf. See also Appendix A.
15. See John Allen Paulos, *A Mathematician Plays the Stock Market* (New York: MJF Books, 2003).
16. The Enron example from December 2001 is particularly compelling. This was a company with a market capitalization of \$70 billion, equity of \$11.5 billion on booked assets of \$65.5 billion, and revenues of over \$100 billion. All these numbers plummeted as soon as Enron declared bankruptcy and investors got the chance to see what was really going on (such as questionable accounting practices that in some instances amounted to fraud). Enron’s stock went from \$90 to \$15 per share in a matter of weeks, and today Enron is a shell corporation with virtually no value by any measure. To realign dollars with value, regulators focused on governance and disclosure reforms. The U.S. Congress passed the Sarbanes-Oxley Act, the Securities and Exchange Commission passed some 50 new rules interpreting this

law, and the major stock exchanges set forth new governance standards for listed companies. The post-Enron era lasted until 2008, when a financial panic brought about a new set of reforms even more comprehensive than Sarbanes-Oxley.

17. For more on the Angelides Commission, see note 2. For insights on the Goldman Sachs matter, see “Goldman Sachs’ Role in Crisis at Stake, Defends Valuations that Helped Put AIG in Bind,” *Wall Street Journal*, July 2, 2010.
18. At the close of trading June 23, 2010, Goldman Sachs (GS) closed at \$135.07, down from its 52-week high of \$193.60.
19. Charles Jones, North Carolina State University, cited in Dan Burrows, “After Equities’ Worst Decade Ever, the 2010s Gotta Be Better, Right?” *Daily Finance*, <http://www.dailyfinance.com/story/investing/after-equities-worst-decade-ever-the-2010s-gotta-get-better-r/19298144/>.
20. An April 2008 client letter from Weil, Gotshal & Manges notes: “Spreading false rumors in order to induce others to trade in a company’s securities may constitute market manipulation under Sections 9 and 10(b) of the Securities Exchange Act of 1934. On the Self-Regulatory Organization front, NYSE Rule 435(5) and its FINRA corollary prohibit member firms from circulating ‘in any manner rumors of a sensational character which might reasonably be expected to affect market conditions on the Exchange’” (“Regulators Announce Investigation and Enforcement Priority with Respect to False Rumor Spreading by Short Sellers, or ‘Short and Distort’ Activities,” Weil, Gotshal & Manges, April 3, 2008, <http://www.weil.com/news/pubdetail.aspx?pub=6465>).
21. Jonathan Burton, “The Year of Investing Dangerously,” *Wall Street Journal*, January 5, 2009, <http://www.marketwatch.com/story/after-brutal-2008-beating-stock>. *Note:* The most dramatic losses occurred in the fall of 2008. From September 15, 2008, to July 15, 2009, the Dow Jones Industrials suffered a net loss of 3,062.50 points. It closed at 11,421.99 on September 14, 2008, and at 8,359.49 on July 17, 2009, after much volatility and a spring rally that continued throughout 2009.
22. The Dow Jones global index fell 15 percent from January 1, 2009, through March 31, 2009, and global financial institution indexes also fell: the United Kingdom’s FTSE 350 bank index (down 27 percent), Japan’s Nikkei 500 bank index (down 12 percent), and the Dow Jones Euro Stoxx Banks. Then losses seemed to level off. In the United States during 2009, the Dow Jones Industrial Index started at 8,776, plunged in January and February, but climbed back up to top 10,000 by the end of the year. As of mid-2010, the Dow Jones Industrial Stocks were still at the 10,000 mark.
23. David Enrich, Robin Sidel, and Deborah Solomon, “Fed Sees Up to \$599 Billion in Bank Losses: Worst-Case Capital Shortfall of \$75 Billion at 10 Banks Is Less Than Many Feared; Some Shares Rise on Hopes Crisis Is

- Easing,” *Wall Street Journal*, May 8, 2009. See also “Joint Statement by Secretary of the Treasury Timothy F. Geithner; Chairman of the Board of Governors of the Federal Reserve System Ben S. Bernanke; Chairman of the Federal Deposit Insurance Corporation Sheila Bair; and Comptroller of the Currency John C. Dugan: The Treasury Capital Assistance Program and the Supervisory Capital Assessment Program,” May 6, 2009, <http://www.federalreserve.gov/newsevents/press/bcreg/20090506a.htm>.
24. Jan Strupczewski, “EU to Publish Bank Stress Test Results in July,” Reuters, June 17, 2010. <http://www.reuters.com/article/idUSLDE65G23720100617>.
 25. Joshua D. Coval, Jakub W. Jurek, and Erik Stafford, “The Economics of Structured Finance,” Harvard Business School Finance Working Paper No. 09-060: “The essence of structured finance activities is the pooling of economic assets (e.g. loans, bonds, mortgages) and subsequent issuance of a prioritized capital structure of claims, known as tranches, against these collateral pools. As a result of the prioritization scheme used in structuring claims, many of the manufactured tranches are far safer than the average asset in the underlying pool. We examine how the process of securitization allowed trillions of dollars of risky assets to be transformed into securities that were widely considered to be safe, and argue that two key features of the structured finance machinery fueled its spectacular growth. *At the core of the recent financial market crisis has been the discovery that these securities are actually far riskier than originally advertised.*” [Emphasis added.]
 26. Kevin Warsh, governor, Federal Reserve Board, “The Federal Reserve Agenda,” Keynote Luncheon Speech of April 6, 2009, at Council of Institutional Investors. http://www.cii.org/events/2009_spring_meeting.
 27. Ibid.
 28. John Bogle’s point is that “[t]he proximate causes of the crisis are usually said to be easy credit, bankers’ cavalier attitudes toward risk, ‘securitization’ (which severed the traditional link between borrower and lender), the extraordinary leverage built into the financial system by complex derivatives, and the failure of our regulators to do their job. But the larger cause was our failure to recognize the sea change in the nature of capitalism that was occurring right before our eyes. That change was the growth of giant business corporations and giant financial institutions controlled not by their owners in the ‘ownership society’ of yore, but by agents of the owners, which created an ‘agency society.’” Robert A. G. Monks has been saying this in books, articles, and speeches for more than 20 years.
 29. The Wall Street Reform and Consumer Protection Act of 2010 has been hailed as the most significant piece of financial legislation since the 1933 Securities Act and 1934 Securities Exchange Act, although it does not replace those laws or even modify them to any great extent. The law

would strengthen the regulation of derivative securities, hedge fund advisors, impose stricter oversight of credit rating agencies, and expand SEC enforcement powers and funding.

30. See Carmen M. Reinhart and Kenneth S. Rogoff, "The Aftermath of Financial Crisis," *Money Science*, January 27, 2009, http://www.moneyscience.com/Finance_Focus/Research_-_The_Aftermath_of_Financial_Crises.html. Professor Reinhart is at the University of Maryland and Professor Rogoff is with Harvard University.
31. The word *thinking* merely emphasizes the fact that investors make choices. It does not suggest that their choices are always correct. See the discussion of irrationality later in this chapter.
32. The U.S. Treasury defines the inflation rate as the percentage change in the Consumer Price Index for all Urban Consumers (CPI-U) over a six-month period ending prior to May 1 and November 1 of each year, <http://www.treasurydirect.gov/forms/savpdp0039.pdf>.
33. Inflation rates can be mild (4 percent or less), moderate (5 to 9 percent), or severe (10 percent or more).
As we go to press, the inflation rate in the United States is 3.2 percent, based on the Consumer Price Index, a target measure (<http://www.statistics.gov.uk/cci/nugget.asp?ID=19>).
34. The U.S. Treasury states that the Long-Term Real Rate Average (the unweighted average of bid real yields on all outstanding TIPS with remaining maturities of more than 10 years) can be a proxy for long-term real rates, http://www.ustreas.gov/offices/domestic-finance/debt-management/interest-rate/real_ltcompositeindex.shtml.
35. During their deliberations on the Financial Instruments with the Characteristics of Equity in April 2007 and for the following year, the joint meeting of the International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB) proposed that "the distinction between equity (risk capital) and liabilities is based exclusively on the ability or inability of capital to absorb losses incurred by the entity with losses being tentatively understood as accounting losses." However, at the joint board meeting in October 2008, the IASB used a new definition of equity based on the perpetual approach (that is, *no settlement feature* and entitlement to pro rata share on liquidation of the issuing entity) and the basic ownership approach (that is, *most subordinated instrument* and entitlement to percentage of net assets), <http://www.iasplus.com/agenda/liabequity.htm>. For more details on equity versus debt, see Appendix A.
36. Researchers have found "nonlinearity in the relationship between U.S. excess stock and bond returns and macroeconomic predictor variables, finding evidence of multiple regimes and time varying covariances and

- demonstrate the superior out-of-sample predictive accuracy of such a model to a comparable, single-state linear [value at risk]" (Massimo Guidolin, Stuart Hyde, David McMillan, and Sadayuki Ono "Non-Linear Predictability in Stock and Bond Returns: When and Where Is It Exploitable?" Working Paper 2008-010A, April 2008, Federal Reserve Bank of St. Louis, Research Division, <http://research.stlouisfed.org/wp/2008/2008-010.pdf>).
37. The Dow Jones dropped 36.2 percent, the biggest decline since 1931 when aftershocks from the crash of 1929 sent stocks down 40.6 percent (Joe Bel Bruno, "Wall St. Closes Out on 2008, Year of Record Losses," *Associated Press*, December 28, 2008).
 38. In the G7 countries, between 1979 and 2007, bond returns were comparable to stock returns and yet displayed considerably lower volatility—the same bang for a smoother buck. During the 1900–2007 period, U.S. equity returns were subject to a standard deviation of 20 percent, for example, with most major nations having even higher volatility. According to research conducted for the authors by a source within the Treasury of Sweden, standard deviations in that period were United Kingdom, 19.8 percent; United States, 20.0 percent, Italy, 28.9 percent, Japan, 23.8 percent, and Germany 32.3 percent—the last three no doubt affected by losing World War II. According to one study, bonds have lower volatility. See Massimo Guidolin et alia, "Non-linear Predictability in Stock and Bond Returns: When and Where Is It Exploitable?," *International Journal of Forecasting*, 25, Issue 2, April-June 2009. Overall, for the period from 1900 to 2009, volatility of equity investments per year for the average country was 23.5 percent. Credit Suisse Research Institute, *Credit Suisse Global Investment Returns Yearbook 2010*, February 2010, http://www.london.edu/newsandevents/news/2010/02/Credit_Suisse_Global_Investment_Returns_Yearbook_2010_1077.html.
 39. Grantham calls the idea that equity automatically returns more than debt "dangerous," dismissing it as no better than the theory of "divine right" that once supported inherited monarchies, <http://www.scribd.com/doc/21673022/Jeremy-Grantham-Third-Quarter-2009-Letter>.
 40. Credit Suisse Research Institute, *Credit Suisse Global Investment Returns Yearbook 2010*, February 2010+p. 47, Figure 3. http://news.morningstar.com/pdfs/CS_Year_Book.pdf. The introduction to this source notes that its indexes "represent the long-run returns on a globally diversified portfolio from the perspective of an investor in a given country. The charts opposite show the returns for a U.S. global investor. The world indexes are expressed in U.S. dollars; real returns are measured relative to U.S. inflation; and the equity premium versus bills is measured relative to U.S. treasury bills."
 41. *Ibid.*

42. Ibid.
43. J. Bradford DeLong and Konstantin Magin, "The U.S. Equity Return Premium: Past, Present and Future," Coleman Fung Risk Management Research Center, Paper CFRMRC07-010, February 1, 2008, <http://repositories.cdlib.org/iber/cfrmrc/CFRMRC07-010> or http://www.j-bradford-delong.net/2008_pdf/20080228_jep_submit.pdf.
44. DeLong and Magin (see note 41), citing Ranjish Mehra (2003) reports an annual equity return premium of 4.6 percent in post–World War II Britain, 3.3 percent in Japan since 1970, and 6.6 percent and 6.3 percent respectively in Germany and Britain since the mid-1970s. Mehra's paper, "The Equity Premium: Why Is It a Puzzle?" *Financial Analysts Journal*, January/February 2003, pp. 54–69, received a Financial Analysts Foundation Graham and Dodd Scroll for excellence in financial writing.
45. *Credit Suisse Global Investment Returns Yearbook 2010*.
46. *Credit Suisse Global Investment Returns Yearbook 2010*.
47. "Conventional wisdom views stocks as less volatile over long horizons than over short horizons due to mean reversion induced by return predictability. In contrast, we find stocks are substantially more volatile over long horizons from an investor's perspective. This perspective recognizes that parameters are uncertain, even with two centuries of data, and that observable predictors imperfectly deliver the conditional expected return. We decompose return variance into five components, which include mean reversion and various uncertainties faced by the investor. Although mean reversion makes a strong negative contribution to long-horizon variance, it is more than offset by the other components. Using a predictive system, we estimate annualized 30-year variance to be nearly 1.5 times the 1-year variance" (Lubos Pastor and Robert F. Stambaugh, "Are Stocks Really Less Volatile in the Long Run?" Social Science Research Network, May 22, 2009, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1136847. Note: Pastor is with University of Chicago–Booth School of Business, the Centre for Economic Policy Research [CEPR], and the National Bureau of Economic Research (NBER). Stambaugh is with the University of Pennsylvania–The Wharton School and the National Bureau of Economic Research [NBER].).
48. See Robert Geske and Yi Shou, "Capital Structure Effects on Prices of Firm Stock Options: Tests Using Implied Market Values of Corporate Debt," Social Science Research Network, November 2007, revised January 2009, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1341993.
49. It is not easy to get a random sample of stock, as noted by Eugene Fama, in "Random Walks in Stock-Market Prices," Graduate School of Business, University of Chicago, <http://www.chicagosb.edu/faculty/selectedpapers/sp16.pdf>. The classic article by Fisher and Lorie on equity stock returns

was not from a random sample; they actually measured the rate of return for each and every stock in their sample (common stocks listed on the New York Stock Exchange for various time periods from 1926 to 1960). The basic assumption in all their computations is that at the beginning of each period studied, the investor puts an equal amount of money into each common stock listed at that time on the Exchange. This amounts to random sampling where the sampling is, of course, exhaustive. (L. Fisher and J. H. Lorie, "Rates of Return on Investments in Common Stocks," *Journal of Business* 37, no. 1 (January 1964): 1–21, <http://www.crsp.com/50/images/rates%20of%20return%20paper.pdf>.)

50. The authors interviewed representatives from several funds that put extensive research into stock selections. For a complete list of interview subjects, please see the Acknowledgments.
51. The Sarbanes-Oxley Act requires public companies to pay mandatory fees to fund the FASB. Prior to this federally mandated funding, FASB was funded by voluntary contributions, making it prone to special interests. For this history and its implications for accounting rules, see Jack Coffee, *Gatekeepers: The Professions and Corporate Governance* (Oxford: Oxford University Press, 2006). There is some concern that IASB will be prone to the same conflicts, since the IASB is not publicly funded. See William W. Bratton and Lawrence A. Cunningham, "Treatment Differences and Political Realities in the GAAP-IFRS," April 28, 2009, Accepted Paper Series, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1375617.
52. The principles have developed over time as needed. Now they are being organized into a codified scheme for easier use. The subjects in the codification scheme will become tags for data management under XBRL language, discussed elsewhere in this chapter and in Chapter 7. For more about the GAAP codification, see http://www.fasb.org/project/codification&retrieval_project.shtml.
53. The phases of the project are A: Objectives and Qualitative Characteristics; B: Elements and Recognition; C: Measurement; D: Reporting Entity; E: Presentation and Disclosure; F: Purpose and Status; G: Application to Not-for-Profit Entities; and H: Remaining Issues. As of late 2009, Phases A through D have begun, whereas phases E through H are pending, http://www.fasb.org/project/conceptual_framework.shtml and <http://www.iasplus.com/agenda/agenda.htm>.
54. <http://edocket.access.gpo.gov/2008/E8-11276.htm>.
55. Source for discussion of competing models: <http://sec.gov/rules/other/2008/acifr-scsupdate-050208.pdf>. For more about equity versus debt securities, see Appendix A.

56. The FASB Accounting Standards Codification (ASC or the “Codification”), which organizes U.S. GAAP into 90 general topics. Each topic contains at least one subtopic; subtopics have sections and sections have paragraphs. Full FASB citation style requires topic, subtopic, section, and paragraph. However in this book we are using a short form of citation, namely the new name (topic only) followed by the old name. Note: Effective July 1, 2009, changes to the source of authoritative U.S. GAAP, the *FASB Accounting Standards Codification*TM (FASB Codification), are communicated through an Accounting Standards Update (ASU). As of June 25, 2010, the FASB had issued 36 updates. Note: This new nomenclature does not affect the numbering of FASB *Statements*. Although the American Institute of Certified Public Accountants has codified them (Codification of Statements on Auditing Standards, February 2010), their names remains the same. See http://www.cpa2biz.com/AST/Main/CPA2BIZ_Primary/AuditAttest/AuditPreparationandPlanning/PRDOVR~PC-057205/PC-057205.jsp A number of organizations have prepared charts juxtaposing the new and old nomenclature. See, for example, this one from the GBQ audit firm, <http://www.gbq.com/SiteObjects/2C7663414A9BA0AC4EBFA488512D857C/Codification%20Quick%20Reference%2009%2009.pdf>.
57. Comprehensive income is defined by the FASB as “the change in equity [net assets] of a business enterprise during a period from transactions and other events and circumstances from nonowner sources. It includes all changes in equity during a period except those resulting from investments by owners and distributions to owners.” (FASB Statement 130, *Reporting Comprehensive Income*, June 1997.) In other words, comprehensive income is the sum of net income, and other items that cannot be included in the income statement because they have not been realized. They unrealized holding gains or losses from available-for-sale securities or foreign currency translation gains or losses. According to ASC 220 (SFAS 130), Comprehensive Income, three alternative formats are allowed for presenting OCI and total comprehensive income:
- ▶ Below the line for net income in a traditional income statement (as a combined statement of net income and comprehensive income).
 - ▶ In a separate statement of comprehensive income that begins with the amount of net income for the year.
 - ▶ In a statement of changes in stockholders’ equity.

Under ASC 220, FASB encourages reporting entities to display the components of OCI and total comprehensive income using the first or second of these formats. Cumulative total OCI for the period should be presented on the balance sheet as a component of stockholders’ equity, separate from additional paid-in capital and retained earnings. See Ganesh J. Panditt

- and Jeffrey J. Phillips, "Comprehensive Income: Reporting Preferences of Public Companies," *CPA Journal*, November 4, 2004, <http://www.nyssscpa.org/epajournal/2004/1104/essentials/p40.htm>.
58. Current task force members are The Capital Group Companies, Fidelity Investments, General Electric Asset Management, Mellon Financial Corporation, Putnam Investments, T. Rowe Price, and Wellington Management.
 59. See <http://www.aicpa.org/Professional+Resources/Accounting+and+Auditing/BRAAS/EBR.html> and <http://www.aicpa.org/Professional+Resources/Accounting+and+Auditing/Accounting+Standards/ibr/chap1.htm>.
 60. For the SEC's new rule, see <http://www.sec.gov/rules/final/2009/33-9002.pdf>.
 61. Emergency Economic Stabilization Act of 2008 (Division A of Pub. L. 110-343, enacted October 3, 2008). <http://www.gpo.gov/fdsys/pkg/PLAW-110publ343/content-detail.html>.
 62. *Valuation Report: Congressional Oversight Panel*, Duff and Phelps, February 4, 2009. <http://cop.senate.gov/documents/cop-020609-report-dpvaluation.pdf>
 63. See Appendix D, "Duff & Phelps February 2009 Report to the Congressional Oversight Panel."
 64. "Total bank investments of \$245 billion in FY2009 that were initially projected to cost \$76 billion are now projected to bring a profit. Taxpayers have already received over \$16 billion in profits from all TARP programs and that profit could be considerably higher as Treasury sells additional warrants in the weeks ahead." ("Treasury Receives \$45 Billion in Repayments from Wells Fargo and Citigroup —Tarp Payments Now Total \$165 Billion," December 22, 2009, http://www.financialstability.gov/latest/pr_12232009b.html.)
- For 2010 performance, see "Secretary of the Treasury Timothy F. Geithner Written Testimony before the Congressional Oversight Panel," June 22, 2010 (TG754). <http://www.treas.gov/press/releases/tg754.htm>.
65. Surveys by the National Association of Corporate Directors (NACD), an association of 10,000 corporate directors and board advisors, show that boards are concerned about corporate financial performance, which ranks along with strategy as a top board concern year after year. In 2010, NACD included a question about corporate performance definition in its annual survey. The NACD also convened a Blue Ribbon Commission on performance metrics that year. See *Report of the NACD Blue Ribbon Commission on Corporate Performance Metrics* (Washington, DC: NACD, 2010).
 66. The findings from the other two surveys, regarding long-term performance measures, were as follows:

PM&P On Point: 2010 Executive Pay-for-Performance Survey, Pearl Meyer & Partners, 2010.

- Profits or earnings ratios 62 percent
- Revenues 48 percent
- Ratios showing returns 45 percent
- Profit ratios 31 percent

This survey also specified customer satisfaction/experience as a criterion, cited by more than one quarter of respondents.

Study of 2008 Performance Metrics Among Top 200 S&P Companies, James Reda and Associates, February 2010.

- Profits or profit ratios 49 percent
- Total shareholder return 44 percent
- Return ratios 29 percent
- Revenue 15 percent
- Cash flow 8 percent

This survey also cited quality assurance and customer satisfaction as metrics.

67. Jan Barton, Bow Hanson, and Grace Pownall, "Which Performance Measures Do Investors Value the Most—and Why?" "A factor capturing nearness to cash flows is positively associated with a performance measure's value relevance; a factor reflecting the measure's persistence, predictability, smoothness and conservatism is negatively associated." January 23, 2009. <http://ssrn.com/abstract=1230562>.
68. For an advanced mathematical discussion of this fact, see Per Frederiksen, Frank S. Nielsen, and Morten Ørregaard Nielsen, "Local Polynomial Whittle Estimation of Perturbed Fractional Processes," Center for Research of Econometric Studies of Time Series, CREATES Research Paper 2008-29, ftp://ftp.econ.au.dk/creates/rp/08/rp08_29.pdf.
69. George Soros, "The Theory of Reflexivity," lecture delivered April 26, 1994, MIT Department of Economics World Economy Laboratory Conference, Washington, D.C.
70. Soros, note 60.
71. John Allen Paulos, *A Mathematician Plays the Stock Market* (New York: MJF Books, 2003).
72. W. Brian Arthur, "Inductive Reasoning and Bounded Rationality (The El Farol Problem)," Stanford University and Santa Fe Institute. Paper given at the American Economic Association Annual Meetings, 1994 Session: Complexity in Economic Theory, chaired by Paul Krugman and published in *American Economic Review* (Papers and Proceedings), 84 (1994), 406–411.
73. Sometimes, to avoid survivorship bias, analysts can overcorrect, leading to reverse survivorship bias, argues Juanni T. Linnainmaa in "Reverse Survivorship Bias," November 26, 2009, <http://faculty.chicagobooth.edu/workshops/finance/pdf/RSB20091126.pdf>.

74. Joseph A. Giannone, "Hedge Fund Shrink Says Success Is All in Your Head [profiling psychiatrist Ari Kiev]," *Reuters*, March 19, 2009.
75. See, for example, Andrew Lo, "Reconciling Efficient Markets with Behavioral Finance: The Adaptive Markets Hypothesis," http://web.mit.edu/alo/www/Papers/JIC2005_Final.pdf.
76. See Mark Buchanan, "This Economy Does Not Compute," *New York Times*, October 1, 2008. Mark Buchanan, a theoretical physicist, wrote this from Notre-Dame-de-Courson, France.
77. The uncertainty principle says that you can't measure position and motion at the same time. The amount by which a measurement errs is called the observer effect; the lower limit to that error is called the uncertainty principle. A mathematical statement of the uncertainty principle is that every quantum state has the property that the root-mean-square (RMS) deviation of the position from its mean (the standard deviation of the X -distribution)

$$\Delta X = \sqrt{\left\langle \left(X - \langle X \rangle \right)^2 \right\rangle}$$

times the RMS deviation of the momentum from its mean (the standard deviation of P)

$$\Delta P = \sqrt{\left\langle \left(P - \langle P \rangle \right)^2 \right\rangle}$$

can never be smaller than a small fixed fraction of Planck's constant:

$$\Delta X \Delta P \geq \frac{\hbar}{2}$$

Any measurement of the position with accuracy ΔX collapses (reduces to a single state) the quantum state, making the standard deviation of the momentum ΔP larger than $\hbar/2\Delta x$.

See W. Heisenberg, "Über den anschaulichen Inhalt der quantentheoretischen Kinematik und Mechanik [On the actual contents of quantum theoretical kinematics and mechanics]," *Zeitschrift für Physik*, 43 (1927): 172–198, and W. Heisenberg, *The Physical Principles of Quantum Theory* [translation of *Physikalische Prinzipien der Quantentheorie*] (Chicago: University of Chicago Press, 1930).

78. One way to assert the relationship between life and observation is to imagine life without observation. According to Max Tegmark: "Abstract: Some superstring theories have more than one effective low-energy limit corresponding to classical spacetimes with different dimensionalities. We argue that all but

the (3 + 1)-dimensional one might correspond to ‘dead worlds,’ devoid of observers, in which case all such ensemble theories would actually predict that we should find ourselves inhabiting a (3 + 1)-dimensional spacetime. With more or less than one time dimension, the partial differential equations of nature would lack the hyperbolicity property that enables observers to make predictions. In a space with more than three dimensions, there can be no traditional atoms and perhaps no stable structures. A space with less than three dimensions allows no gravitational force and may be too simple and barren to contain observers.” (Max Tegmark, “On the Dimensionality of Spacetime,” *Class. Quantum Grav.* 14 (1997): L69–L75.)

79. This definition has been around for at least 40 years. See Robert I. Mehr and Emerson Cammack, *Principles of Insurance* (Homewood, Ill.: Richard D. Irwin, Inc., 1961).
80. The Sharpe ratio, or reward-to-variability ratio, is named after financial economist William Sharpe. It measures excess return (or risk premium) per unit of risk in an investment. The simplest version of it is

$$S = \frac{E[R - R_f]}{\sigma} = \frac{E[R - R_f]}{\sqrt{\text{var}[R - R_f]}}$$

where R is the return on the target investment, R_f is the return on a benchmark asset, such as the risk-free rate of return (such as a T-bill), $E[R - R_f]$ is the expected value of excess of the asset return over the benchmark return, and σ is the standard deviation of the asset excess return. The Sharpe ratio shows how well the return of an asset is expected to compensate the investor for the risk taken by investing in the asset. When comparing two assets, each with the expected return $E[R]$, against the same benchmark with return R_f , the asset with the higher Sharpe ratio gives more return for the same risk. Investors are often advised to pick investments with high Sharpe ratios.

81. When it comes to macroeconomic variables, “interest rates are the most consistent and reliable predictors of stock returns,” say researchers. See Massimo Guidolin, Stuart Hyde, David McMillan, and Sadayuki Ono, “Non-Linear Predictability in Stock and Bond Returns: When and Where Is It Exploitable?” Federal Reserve Bank of St. Louis, Research Division, Working Paper 2008-010A, April 2008, <http://research.stlouisfed.org/wp/2008/2008-010.pdf>.
82. See Chris Chiovacco, “Pet Rocks and Mark-to-Market Accounting,” March 13, 2009, <http://www.ciovaccocapital.com/sys-tmpl/petrocks/>.
83. “The once ‘gentlemanly’ business of finance has become a game for ‘players.’ These players are increasingly technically sophisticated, typically having PhDs in a numerate discipline. The roots of this transformation

have their foundation in the 1970s. Since then the financial world has become more and more complex. Unfortunately, as the mathematics of finance reaches higher levels so the level of common sense seems to drop. There have been some well-publicized cases of large losses sustained by companies because of their lack of understanding of financial instruments. In this article we look at the history of financial modeling, the current state of the subject and possible future directions. It is clear that a major rethink is desperately required if the world is to avoid a mathematician-led market meltdown.” (Paul Wilmott, “The Use, Misuse and Abuse of Mathematics in Finance,” *Philosophical Transactions: Mathematical, Physical and Engineering Sciences* 358, no. 1765 (2000): 63–73.)

84. This very simple approach is favored by many decision makers. See Shih-Kung Lai, “An Empirical Study of Equivalence Judgments vs. Ratio Judgments in Decision Analysis,” *Decision Sciences* (April 2001): “Two commonly used elicitation modes on strength of preference, equivalence and ratio judgments, were compared in an experiment. The result from the experiment showed that ratio judgments were less effective than equivalence judgments. Based on an iterative design for eliciting multi-attribute preference structures, equivalence judgments outperformed ratio judgments in estimating single-attribute measurable value functions, while being nearly more effective than ratio judgments in assessing multi-attribute preference structures. The implications of the results from the experiment are that multi-attribute decision-making techniques should take advantage of the decision maker’s inclination of making effective equivalence trade-off judgments, and that useful techniques should be devised to incorporate different commonly used techniques, such as multi-attribute utility theory and the Analytic Hierarchy Process, to elicit and consolidate equivalence trade-off judgments.” Lai’s hypothesis: “Ratio judgments on attribute gains are more difficult to express than equivalence judgments because the former presumably require the decision maker first to transform the attribute levels into strength of preference values in a transformed attribute space, and then make ratio judgments based on the transformed scale, which needs more cognitive effort than the latter that require only trade-off judgments in the original attribute space.” Further, “strength of preference judgments within attributes are easier to make than those among attributes because no trade-off judgments across attributes are needed in the former case.” For these two reasons, investors don’t always use rigid ratios or formulas to make their decisions.
85. This example is based on one given in John D. Stowe, *Equity Asset Valuation* (Hoboken, New Jersey: John Wiley & Sons, 2007), 20.
86. John Maynard Keynes, *The General Theory of Employment, Interest, and Money* (New York: Harcourt, Brace & Jovanovich, 1936).

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