Dealing with Anomalies, Confusion and Contradiction in Fraud on the Market Securities Class Actions

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Recommended Citation

Dealing with Anomalies, Confusion and Contradiction in Fraud on the Market Securities Class Actions*

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"For every complex problem, there is a simple solution and it is wrong."*****

INTRODUCTION

In *Basic Inc. v. Levinson*,[1] the Supreme Court endorsed a theory of financial economics called the semi-strong version of the

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***** This quote is generally associated with H.L. Mencken, though many scholars have failed repeatedly to verify that he actually said this. *See, e.g.*, United States v. Michael, 645 F.2d 252, 264 n.6 (5th Cir.), *cert. denied*, 454 U.S. 950, *reh'g denied*, 454 U.S. 1117 (1981); William A. Klein, *Tax Effects of Nonpayment of Child Support*, 45 TAX L. REV. 259, 278 n.76 (1990).

1 485 U.S. 224 (1988). In September 1976, the management of Basic Incorporated [hereinafter Basic] began extended merger negotiations with Combustion Engineering, Incorporated. *Id.* at 227. Ultimately, on December 20, 1978, Basic announced that its board had approved the terms of Combustion's tender offer for the outstanding shares of its stock. During the interim, in response to inquiries from the New York Stock Exchange precipitated by unexplained price increases in Basic's stock, Basic falsely denied that it was engaged in merger negotiations. *Id.* Former stockholders brought a class action against Basic and its directors on behalf of all persons who sold Basic shares from the time of the first false denial to the announcement of the merger. *Id.* at 228. The class representative alleged that the three false statements made by Basic constituted a violation of Rule 10b-5, 17 C.F.R. § 240.10b-5 (1991), which prohibits the making of any untrue statement of a material fact or the omission of a material fact in connection with the purchase or sale of any security. *Id.* In *Basic*, the Court adopted a reasonable investor standard of materiality to determine the significance of misrepresentations and held that specific reliance on misinformation was not required. Plaintiffs can simply rely on market prices to incorporate and reflect available information.

efficient market hypothesis.[2] The Court found that: "[r]ecent empirical studies have tended to confirm . . . the market price of shares traded on well-developed markets reflects all publicly available information, and, hence, any material misrepresentations."[3] Seizing upon this holding, Justice White, dissenting, warned that any time a court adopts economic theories as legal truths it is inexorably destined to confusion and contradiction.[4]

This Article examines and suggests remedies for the confusion and contradictions that have resulted and will result from the adoption of the semi-strong efficient market hypothesis as a legal truth in class action securities litigation. Initially, the inconsistency implicit in *Basic* is examined. This inconsistency arises from the plurality's retention of the traditional test of materiality, a qualitative standard framed in terms of the importance of information to a "reasonable investor," while adopting an economic theory which has as its focus the quantitative market price reaction to information. Next, we explore the right to rebut the presumption of reliance on an individual basis, particularly by assessing whether class members behaved consistently with the presumption that they relied on the integrity of the market price. The focus then shifts to the dangers lurking in an unenlightened application of the fraud on the market theory to securities fraud cases when the economic theory underlying the fraud on the market theory can be shown to be of dubious validity in particular cases. This discussion is amplified by examining recent academic research that questions whether market prices reflect fundamental values continuously and whether markets adjust instantaneously and unbiasedly to new information.

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[2] The semi-strong version of the efficient market hypothesis holds that prices reflect all publicly available information; hence, price changes cannot be explained by old information. *See generally* EDGAR E. PETERS, CHAOS AND ORDER IN THE CAPITAL MARKETS 13-20 (1991) (explaining the efficient market theory).

[3] *Basic*, 485 U.S. at 246. For the plurality of the Court, the existence of an efficient market justified a presumption of reliance since "market professionals generally consider most publicly announced material statements about companies, thereby affecting stock prices." *Id.* at 246 n.24. The plurality's logic is premised on a belief that "in an open and developed securities market, the price of a company's stock is determined by the available material information regarding the company and its business. . . . Misleading statements will therefore defraud purchasers. . . ." *Id.* at 241-42 (quoting Peil v. Speiser, 806 F.2d 1154, 1160-61 (3d Cir. 1986)). Thus, purchasers or sellers of securities can simply rely on market prices to incorporate and reflect available information. The Court, however, adopted the Court of Appeals' holding that in order to invoke the presumption of reliance, a plaintiff must allege and prove, among other things, that the shares were traded on an efficient market. *Id.* at 248 n.27.

[4] *Id.* at 253-55 (White, J., concurring in part, dissenting in part).

We next examine the pitfalls in applying the fraud on the market theory to assess damages. We show how the theory can be misapplied and how extensive conceptual errors befuddle proper damage assessments.

Finally, both quantitative and qualitative methods are suggested for avoiding many of these pitfalls and for minimizing error. Some of these methods are illustrated in the Appendix, which contains a case study.

I.   THE BASIC DECISION: INCONSISTENCIES

Using principles of finance theory, four of the legal elements of fraud—materiality, reliance, causation and damages—"are subsumed under the general inquiry of whether the alleged fraudulent conduct affected the price of the security."[5] Under the theory, market impact gauges whether the announcement contained information affecting price and, therefore, whether materiality, reliance and causation were present.[6] Nevertheless, while modern finance theory disregards individual assessments of materiality in favor of the market's assessment, *Basic* defines materiality in terms of the importance of misinformation to the "reasonable investor."[7] Put

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[5] Daniel R. Fischel, *Use of Modern Finance Theory in Securities Fraud Cases Involving Actively Traded Securities*, 38 BUS. LAW. 1, 8 (1982).

[6] *See, e.g.*, Roger J. Dennis, *Materiality and the Efficient Capital Market Model: A Recipe for the Total Mix*, 25 WM. & MARY L. REV. 373, 419 (1984) ("The courts should limit their inquiry to whether a particular item of information has, or would have, affected the price of a stock.").

[7] *Basic*, 485 U.S. at 240. This traditional approach was endorsed by all six members of the Court who heard the case. Prior to 1976, debate centered on whether material facts were those which a reasonable investor "would" consider important or those which he "might" consider important in making an investment decision. *Compare* Mills v. Electric Auto-Lite Co., 396 U.S. 375, 384 (1970) (might) *and* Kohler v. Kohler Co., 319 F.2d 634, 642 (7th Cir. 1963) (might) *with* SEC v. Texas Gulf Sulphur Co., 401 F.2d 833, 849 (2d Cir. 1968) (en banc) (would), *cert. denied sub nom.* Coates v. SEC, 394 U.S. 976 (1969) *and* List v. Fashion Park, Inc., 340 F.2d 457, 462 (2d Cir.) (would), *cert. denied sub nom.* List v. Lerner, 382 U.S. 811 (1965). The Supreme Court finally resolved the "might" versus "would" controversy in TSC Industries v. Northway, Inc., 426 U.S. 438, *mot. denied*, 429 U.S. 810 (1976). With respect to a proxy solicitation, the Court held that "[a]n omitted fact is material if there is a substantial likelihood that a reasonable shareholder would consider it important in deciding how to vote." *Id.* at 449. Refining the matter further, the Court held that "there must be a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the 'total mix' of information made available." *Id.* When *TSC Industries* was decided, the fraud on the market theory was relatively new in the courts. Nevertheless, in *Basic* the Court expressly adopted the *TSC Industries* standard of materiality for purposes of Rule 10b-5, 17 C.F.R. § 240.10b-5 (1991), holding that "materiality depends on the significance

KENTUCKY LAW JOURNAL   [VOL. 81

succinctly, under the reasonable investor standard, a qualitative
determination of the importance of information to a reasonable
investor indicates mispricing, while under finance theory, empirical
market impact demonstrates mispricing and, thus, materiality.[8]

By adopting both of these standards *Basic* contains an inherent
anomaly. It is logically inconsistent to endorse a theory that pre-
sumes that investors may reasonably rely on the price of a security
as fully reflecting all available, and indeed all material, information
while simultaneously using a so-called "reasonable investor" as the
yardstick to measure the extent to which information is important
and, therefore, material.[9] This approach is especially inconsistent

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the reasonable investor would place on the withheld or misrepresented information," 485
U.S. at 240, and repeated that materiality must be judged in light of the "total mix" of
available information. *Id.* at 232.

[8] *See Basic*, 485 U.S. at 244-45 (quoting Peil v. Speiser, 806 F.2d 1154, 1161 (3d
Cir. 1986) ("material information typically affects the price of the stock") and Blackie v.
Barrack, 524 F.2d 891, 908 (9th Cir. 1975) ("the same causal nexus can be adequately
established indirectly, by proof of materiality coupled with the common sense that a stock
purchaser does not ordinarily seek to purchase a loss in the form of artificially inflated
stock"), *cert. denied*, 429 U.S. 816 (1976)); *see also In re* Control Data Corp. Sec. Litig.,
933 F.2d 616, 619-20 (8th Cir.) ("To the extent that the defendant's misrepresentations
artificially altered the price of the stock and defrauded the market, causation is presumed."),
cert. denied sub nom. KPMG Peat Marwick v. Abbey, 112 S. Ct. 438 (1991); United States
v. Bilzerian, 926 F.2d 1285, 1298 (2d Cir.) (explaining that lack of price movements does
not establish non-materiality but is a factor which the jury may consider relevant), *cert.
denied*, 112 S. Ct. 63 (1991); Gregory C. Avioli, Note, Basic Inc. v. Levinson: *An Unwise
Extension of the Fraud-On-The-Market Theory*, 67 N.C. L. REV. 1161, 1168 (1989) ("The
fraud-on-the-market theory should not be extended to provide a rebuttable presumption of
loss causation."). In *Basic*, however, the Court declined to invoke the theory to determine
the degree of mispricing, i.e., the effect a misstatement had on prices. Instead, the Court
stated, "by accepting this rebuttable presumption, we do not intend conclusively to adopt
any particular theory of how quickly and completely publicly available information is
reflected in market price. Furthermore, our decision today is not to be interpreted as
addressing the proper measure of damages in litigation of this kind." *Cf.* Bastian v. Petren
Resources Corp., 892 F.2d 680, 685 (7th Cir.) (loss causation is an element of a claim for
damages under Rule 10b-5, which is not merely presumed), *cert. denied*, 496 U.S. 906
(1990); Sirota v. Solitron Devices, 673 F.2d 566, 577 (2d Cir.) (Setting aside the jury's
assessment of damages for one of the years in issue, the court held that "the actual response
of the market must be taken into account in determining damage."), *cert. denied*, 459 U.S.
838, *and cert. denied sub nom.* Louis Sternbach & Co. v. Sirota, 459 U.S. 908 (1982);
Elkind v. Liggett & Myers, 635 F.2d 156, 166 (2d Cir. 1980) (requiring plaintiffs to establish
that a misstatement would have been reasonably certain to have a substantial effect on
market price in order to show materiality); SEC v. Bausch & Lomb, Inc., 565 F.2d 8, 15
(2d Cir. 1977) (requiring plaintiff to allege that an affirmative misrepresentation or an
omission affected the price of a security in order to establish a rebuttable presumption of
reliance).

[9] The theory holds that the reasonable investor would not be so inefficient as to seek
supranormal returns by analyzing publicly available information, which would have already
been digested by securities professionals and embodied in prices by their trading. The semi-

when courts embrace all manner of investors as reasonable. While according to economic theory disparate views of materiality are averaged out by the aggregate market,[10] a progenitor of Rule 10b-5 jurisprudence, *SEC v. Texas Gulf Sulpher*, cited congressional history to hold that "[t]he speculators and chartists of Wall and Bay Street are also 'reasonable' investors entitled to the same legal protection afforded conservative traders."[11] Under a line of cases following *Texas Gulf Sulpher*,[12] sophisticated and innocents alike are all "reasonable investors."

Indeed, on remand, the trial court in *Texas Gulf Sulphur* found that the investors who sold, retained or purchased shares based

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strong form of market efficiency asserts that current prices fully reflect publicly available information and knowledge. Therefore, efforts to acquire and analyze available information cannot be expected to produce superior investment results. Fischel, *supra* note 5, at 3-4; Jonathon R. Macey & Geoffrey P. Miller, *Good Finance, Bad Economics: An Analysis of the Fraud-On-The-Market Theory*, 42 STAN. L. REV. 1059, 1077 (1990). *See also In re* Convergent Technologies Sec. Litig., 948 F.2d 507 (9th Cir. 1991) (according to the fraud on the market doctrine, an investor's reliance on the market price is tantamount to reliance upon statements made to the market, or the non-disclosure of material information); *In re* Apple Computer Sec. Litig., 886 F.2d 1109, 1113-14 (9th Cir. 1989) (The fraud on the market doctrine recognizes that most investors rely on the market to evaluate information for them, rather than making their own independent analysis of a stock's value), *cert. denied sub nom.* Schneider v. Apple Computer, Inc., 496 U.S. 943 (1990); *In re* LTV Sec. Litig., 88 F.R.D 134, 145 (N.D. Tex. 1980) (under the fraud on the market doctrine, plaintiff need only prove reliance on the integrity of the market price). The efficient market hypothesis holds that because all information is rapidly digested by the market, investors in the long run cannot beat the market. If an opportunity for inordinate profit presented itself in the market, it would not go unnoticed for long because so many people are seeking undiscovered information and opportunities.

[10] *See* sources cited *infra* note 134.

[11] 401 F.2d 833, 849 (2d Cir. 1968) (en banc) (citing H.R. Rep. No. 1383, 73d Cong., 2d Sess. 11 (1934)), *cert. denied*, 394 U.S. 976 (1969). On the other hand, however, legislative history is also replete with references to excessive speculation contributing to, or causing, market debacles. Daniel R. Fischel & David J. Ross, *Should the Law Prohibit "Manipulation" in Financial Markets?*, 105 HARV. L. REV. 503, 503 (1991) ("The drafters of the [1933 and 1934 Acts] were convinced that there was a direct link between excessive speculation, the stock market crash of 1929, and the Great Depression of the 1930s."). There is, of course, a debate between the American school of Milton Friedman, which cites the monetary contraction during the 1930s as the principle cause of the Great Depression, and the Austrian school, which lays heavy stress on the bubble created by credit excesses of the 1920s. *See* George Melloan, *A Dire Economic Warning From a German Cassandra*, WALL ST. J., Sept. 14, 1992, at A11. In the Market Reform Act of 1990, 15 U.S.C.S. § 78a (Law. Co-op. Supp. 1991), Congress appears to have adopted a bubble theory for the crash of 1987. *See* S. REP. No. 300, 101st Cong., 2d Sess. 30-31 (1990) [hereinafter SENATE REPORT].

[12] *See, e.g.*, Woolf v. S.D. Cohn & Co., 515 F.2d 591 (5th Cir.), *reh'g denied*, 521 F.2d 225 (1975), *and vacated*, 426 U.S. 944 (1976); Lehigh Valley Trust Co. v. Central Nat'l Bank of Jacksonville, 409 F.2d 989 (5th Cir. 1969); Moskowitz v. Lopp, 128 F.R.D. 624 (E.D. Pa. 1989); Koenig v. Benson, 117 F.R.D. 330 (E.D.N.Y. 1987); Franklin Nat'l Bank v. L.B. Meadows & Co., 318 F. Supp. 1339 (E.D.N.Y. 1970); Ruszkowski v. Hugh Johnson & Co., 302 F. Supp. 1371 (W.D.N.Y. 1969).

upon the false announcement were all reasonable investors even though they drew different conclusions from the false announcement and made different investment decisions.[13] Under this rubric, virtually everyone is a reasonable investor, ranging from those who never saw, heard, or read the information, including those who could not have understood it if they had,[14] to those who merely relied on the integrity of the price, and to those who were liquidity and noise traders.[15] In class action securities litigation it is both illogical and a literal detachment from reality to base a determination of whether a security is mispriced upon evidence that any one of these disparate types of investors considered the information important. In other words, it seems untenable to use the notion of a "reasonable investor" to determine materiality in securities fraud cases while at the same time utilizing market efficiency as a basis for finding that class members rely on the integrity of the market price and not on the information *per se*.

Nonetheless, before quantitatively determined market impact should be embraced as a guiding light for determining materiality, we should be satisfied that an inquiry into the qualitative beliefs of some securities purchasers (or sellers) might not suffice. This, in turn, raises the question of precisely who does rely upon misleading information and what use, if any, they make of it.[16]

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[13] SEC v. Texas Gulf Sulphur, 312 F. Supp. 77, 83 (S.D.N.Y. 1970).

[14] *See generally* Homer Kripke, *The Myth of the Informed Layman*, 28 BUS. LAW. 631 (1973) (proposing that the focus of the prospectus should be the sophisticated investor instead of the informed layman since the layman is unable to utilize the information).

[15] A liquidity trader trades for consumption. A noise trader trades on non-informational price fluctuations. Both types of traders increase market inefficiency by engaging in non-informationally motivated stock transactions. *See generally* Ian Ayers, *Back to Basics: Regulating How Corporations Speak To Markets*, 77 VA. L. REV. 945, 975-79 (1991) (discussing how liquidity affects stock prices and how liquidity traders contribute to inefficiency); Marshall E. Blume & Jeremy J. Siegel, *The Theory of Security Pricing and Market Structure*, 46-47 (Aug. 22, 1991) (unpublished revised manuscript, on file with the *Kentucky Law Journal*) (discussing how liquidity and noise traders allow informed traders to hide their information).

Program trading is defined as "the simultaneous purchase or sale of 15 or more stocks with a total market value of at least $1 million." NEW YORK STOCK EXCHANGE, INC., REPORT OF MARKET VOLATILITY AND INVESTOR CONFIDENCE PANEL TO THE BOARD OF DIRECTORS OF THE NEW YORK STOCK EXCHANGE 16 (1990) [hereinafter NYSE PANEL REPORT]. Although computers are used to expedite program trading, "program" refers to the basket of stocks traded, not the computer program used to process the information. *Id.* Index arbitrage is the most common and controversial form of program trading. For a general discussion of index arbitrage, see *id.* at 16-19.

[16] *See* Ronald J. Gilson & Reinier H. Kraakman, *The Mechanisms of Market Efficiency*, 70 VA. L. REV. 549, 552 (1984) (Legal users of the efficient market hypothesis "have been, by and large, confronted with a body of empirical evidence in search of a causative theory.").

The composition of the securities marketplace has greatly changed since the formulation of the concept of materiality in securities law, and the influence of the archetypal reasonable, long-term investor has given way to the influence of professional traders utilizing advanced technology to trade increasingly complex financial products on a world-wide basis.[17] Congress and the SEC have found that during the past decade the securities markets have experienced a fundamental change in the predominant type of market participant and in the manner in which such participants conduct business; that the markets have also experienced a significant increase in activity and volatility; that individuals have relinquished direct management of their investments to professional investment managers; and that investor demands for returns greater than market averages have led to the development of complex and innovative relationships, products and trading strategies.[18] Indeed, some trading strategies are designed to take advantage of inefficiencies in securities values, and trades may occur more quickly than the mix of publicly available information changes.[19] For example, it was reported:

> Last week's two-day thrashing of stock prices demonstrated again that in this skittish market the "day traders,"[20] investors who use formula-based programs or who otherwise dart in and out of stocks, have more impact on prices than long-term investors.
> . . . .
> . . . The influence of these short-term investors sets into motion a process that can feed upon itself.[21]

Likewise, the recent New York Stock Exchange Report of Market Volatility and Investor Confidence states:

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[17] See, e.g., SENATE REPORT, supra note 11, at 2-5; Large Trader Reporting System, Exchange Act Release No. 29,593 [1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 84,822, at 82,040 (Aug. 22, 1991).

[18] Larger Trader Reporting System, [1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) at 82,040.

[19] Id. at 82,041.

[20] Day traders may buy and sell in and out of a stock several or even dozens of times a day, buying and selling on 1/8 and 1/4 point changes with minimum trades of 1000 shares. York Securities Offers Low Commissions, PR NEWSWIRE, June 10, 1988, available in LEXIS, Nexis Library, Wires File. See also Thomas G. Donlas, Balking the "Terrors of The Tube," BARRONS, Sept. 2, 1991, at 10 (At present, trading strategies are being developed for computers to digest news more quickly than humans can, and to trade shares based on such information before human decision makers can act.). Of course, the computers may or may not be programmed correctly and the prices they set may reflect any resultant errors.

[21] Anise C. Wallace, Pervasive Impact of "Day Traders," N.Y. TIMES, Aug. 15, 1988, at D6.

KENTUCKY LAW JOURNAL [VOL. 81

A key factor in the recent concerns about U.S. securities markets is the changing market environment of the last decade. As we begin the 1990s, U.S. financial markets are fundamentally different than they were 20 or even 10 years ago. These fundamental changes—the rise of institutional investing, the growth of indexation and derivative products, the increasingly global character of markets, the growth of proprietary trading by major broker/ dealer firms, and the rapid advances in computer and telecommunications technology—have had a profound impact, not only on the way the financial markets function, but also on how people perceive these markets.[22]

Institutional investors and exchange member firms presently account for about 80% of the shares traded each day on the New York Stock Exchange.[23] Decades ago, half of brokerage firms' revenues were derived from commissions on trading for customers. Recently, however, these firms have earned more from trading for their own accounts than from trading for customers.[24] From the beginning of 1989 through March of 1990, computer generated program trading represented about 10% of the New York Stock Exchange average total trading volume.[25] Likewise, derivative se-

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[22] NYSE PANEL REPORT, *supra* note 15, at 13.

[23] NEW YORK STOCK EXCHANGE, INC., INSTITUTIONAL INVESTORS FACT BOOK 1991, at 4 (1991) [hereinafter 1991 FACT BOOK]. The Securities Industry Association Investor Activity Reports have estimated that for the period from 1987 through 1989, approximately 44.7% of the trades were "professional institutional," 28% were member trading and 20.7% were retail customers. *See also* William Power, *Small Investors Continue to Give Up Control of Stocks*, WALL ST. J., May 11, 1992, at C1 (Individual households owned 84% of all stocks traded in 1965. By 1991, individual ownership had declined to 53.5%.). *But see* Robert Steiner, *200 Years Later, Small Investors Find Clout at America's Premier Exchange*, WALL ST. J., May 13, 1992, at C1 (suggesting that statistics are skewed because small investors find clout through mutual funds rather than ownership of individual stocks); Randall Smith, *Mutual Funds Have Become Dominant Buyers of Stock*, WALL ST. J., May 22, 1992, at C1 (noting that "mutual funds have elbowed aside pension funds to become the dominant buyers of stocks" and have become the most popular investment for small investors).

[24] 1991 FACT BOOK, *supra* note 23, at 14 (In 1989, commissions earned on trading for customers accounted for only 17.4% of brokerage firms' total revenues, while 21.6% of their total revenues were from trading for their own accounts.); Craig Torres, *Wall Street's New Elite Are Global Trading Powers*, WALL ST. J., Nov. 11, 1991, at C1 ("A new trading elite is emerging on Wall Street whose members are ringing up huge trading profits trading for their own accounts around the globe."); Craig Torres & Michael Siconolfi, *Leverage: Trading Firms' Hidden Asset*, WALL ST. J., Aug. 21, 1992, at C1 ("Wall Street securities houses and a few trading banks are betting with their capital in markets around the world to an unprecedented degree.").

[25] NYSE PANEL REPORT, *supra* note 15, at 16; *see also* Peter Pae, *Program Trading's Share of Big Board Volume Declines*, WALL ST. J., Aug. 20, 1990, at C1 (noting that program trading tends to be by a few major players trading for the most part for their own accounts); Craig Torres, *Program Trades Surge After Brief Slowdown*, WALL ST. J., Jan. 29, 1990, at C1 (reporting that program trading had regained its 10% average daily volume).

curities markets blossomed during the 1980s.[26] The SEC, in its recently announced study of the structure of the United States equity markets, stated:

> Along with the growth of large institutional investor influ-
> ences has come the increasingly significant role of equity deriva-
> tive products. When the 1975 amendments to the Securities
> Exchange Act of 1934 ("Act") were adopted, the only standard-
> ized equity derivative products in existence were call options on
> several stocks. Only 10 years later, the derivative markets were
> trading options on hundreds of stocks, as well as index options,
> index futures and futures options on a dozen stock indices. The
> trading volume in stock index options and stock index futures by
> the mid-1980s had outstripped the value of stock trading on the
> NYSE. Trading strategies involving these products have signifi-
> cantly altered the nature of the stock market. Program trading,
> index arbitrage, cash substitution, synthetic equities, and other
> derivative product strategies are now used constantly by broker-
> dealers and their institutional customers. Moreover, derivative
> products have facilitated the use of passive management or "in-
> dexation" strategies by large investors.[27]

From 1984 through 1989, the average daily dollar value of trading in Standard & Poor's 500 Index exceeded the dollar value of all transactions on the New York Stock Exchange combined.[28] In the first ten months of 1987, the value of trading in the S&P 500 futures was $2.5 trillion—"more than one and a half times the dollar value of trading of all stocks traded on the New York Stock Exchange."[29] Moreover, the growth in derivatives has been accompanied by a phenomenal growth in volume and a corresponding

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[26] Derivative securities are financial instruments that derive their value from the underlying securities to which they are related. For a general discussion of derivative instruments, see SENATE REPORT, *supra* note 11, at 15. Existing derivative markets include futures and options markets. *Id.* Stock index futures are contracts that obligate traders to either buy or sell the value of a specified stock index at a specified date in the future. *Id.* at 15 n.23. Options differ in that the holder has the option to buy or sell "the value of a specified stock at a specified price" before the option expires. *Id.* at 15 n.24. The most successful derivative securities market is Standard & Poor's 500 Stock Index Futures [here-inafter S&P 500]. *Id.* at 15.

[27] U.S. Equity Market Structure Study, Exchange Act Release No. 30,920 [1992 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 85,012, at 82,907-08 (July 14, 1992) [hereinafter SEC EQUITY MARKET STUDY].

[28] SENATE REPORT, *supra* note 11, at 15.

[29] *Id.* at 15-16. Arguably, there is greater liquidity on the futures market than the stock market by reason of the greater leverage. By selling futures and holding stock, one can liquidate stock positions without depressing stock prices.

responding decrease in the average holding period of stocks.[30] For example, in 1991, the average daily volume of the New York Stock Exchange was ten times that in 1975.[31] Correspondingly, the average holding period of all stockholders has declined from approximately six years in 1974 to just over two years in 1989 (with 1987 being an all time low).[32]

However, simply calculating the average holding period leaves out a great deal of potentially relevant information about the overall composition of share ownership. For instance, what may be more important is the distribution of holding periods across shareholders. Suppose a company has ten percent of its shares change hands extremely frequently, say five times a year. The remaining ninety percent of its shares never trade. The average turnover will thus be fifty percent.[33] Thus, the massive increase in volume may not be due to a decrease in holding periods by most investors. Instead, the increase in volume may be due to increased short-term speculation, derivative strategies and trading by a few very active traders.

Institutional investing has also substantially increased the size of the average trade. From 1970 to 1988, the average size trade on the NYSE increased from 388 shares to 2303 shares and large block transactions (10,000 shares or more) increased from 15.4% to 54.5% of the reported volume.[34] Furthermore, "to avoid producing inordinate market impact, large institutional trades tend to be executed off the floor of the exchanges, in the 'upstairs market.'"[35] In fact, since 1977, off floor members' transactions have exceeded specialists' dealings.[36] Moreover, even among the giants there is no

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[30] *See* SEC EQUITY MARKET STUDY, *supra* note 27, at 82,907.

[31] *Id.*

[32] KENNETH A. FROOT ET AL., SHAREHOLDER TRADING PRACTICES AND CORPORATE INVESTMENT HORIZONS 2 (National Bureau of Economic Research Working Paper No. 3638, 1992).

[33] *Id.* at 20-21.

[34] NEW YORK STOCK EXCHANGE, INC., INSTITUTIONAL INVESTOR FACT BOOK 1990, at 14 (1990) [hereinafter 1990 FACT BOOK]; NYSE PANEL REPORT, *supra* note 15, app. at G2-8; SEC EQUITY MARKET STUDY, *supra* note 27, at 82,925.

[35] PANEL REPORT, *supra* note 15, at app. G2-10; *see also* SEC EQUITY MARKET STUDY, *supra* note 27, at 82,925 (noting that "about 3 million shares of U.S. equities are traded in the London market each day"); Susan Pulliam & John R. Dorfman, *"Tape-Shooting" Irks and Hurts Major Investors, Who Respond by Shipping Big Trades Overseas*, WALL ST. J., Sept. 11, 1992, at C1 (noting that big investors "are taking their largest trades of 200,000 shares or more abroad").

[36] *Id.*; 1990 FACT BOOK, *supra* note 34, at 15. *See also* George Anders & Craig Torres, *The New Market Computers Bypass Wall Street Middlemen and Stir Controversy*, WALL

equality; the largest securities firms, most of which are American, Japanese and British, trade huge blocks of shares of international companies among themselves and with large institutions.[37] Thus, many of the biggest trades by the best informed traders may not be reflected in the reported prices.[38] The NYSE Panel Report observes:

> Recent developments in investment strategies and technologies have revealed shortcomings in traditional economic assumptions regarding efficient securities markets. The growth of institutional investing, increasing use of portfolio strategies, the development of derivative products, upstairs trading, computerized trading and

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ST. J., Aug. 28, 1991, at A1 (Large, computer-assisted trading accounts for 4.4% of the daily volume and "the percentage is expected to keep climbing."); Craig Torres & William Powers, *Big Board Is Losing Some Of Its Influence Over Stock Trading*, WALL ST. J., Apr. 17, 1990, at A1 ("In 1989, the New York Stock Exchange handled only 69.23% of the trades in listed stocks, a historic low. . . . Institutions complain that the Exchange cannot handle big trades."); Michael Siconolfi, *Stockbrokers Prospered in 2nd Quarter, But Specialist Firms Saw Profits Plunge*, WALL ST. J., Sept. 1, 1992, at C1 (volatile prices and trading off the NYSE have hurt specialists' profits).

[37] *See The Next Hundred Years*, ECONOMIST, May 9, 1992, at 97 (estimating that 67% of the sales of New York Stock Exchange listed stocks occur on the exchange); William Power, *Big Board, At Age 200, Scrambles to Protect Grip on Stock Market*, WALL ST. J., May 13, 1992, at A1 (Although the NYSE handles only 67% of the total trades in its own stocks, its share volume in those stocks is 82%. However, "its market share has eroded mostly in orders of fewer than 5000 shares" largely because big institutions now routinely handle the larger trades of New York Stock Exchange listed stocks.); Richard E. Rustin, *London Spawns Market of the Future—For Big Players*, WALL ST. J., Oct. 25, 1990, at C1 (noting the major international firms and their self-dealings); Richard L. Stern, *A Dwindling Monopoly*, FORBES, May 13, 1991, at 64 (noting that some of the New York Stock Exchange's biggest institutional investors, primarily pension and mutual funds, are trading off the exchange to save transaction costs); Chris Welles & Monica Roman, *The Future of Wall Street*, BUS. WEEK, Nov. 5, 1990, at 119 (estimating that 60% or less of the trades in New York Stock Exchange Listed Stock occur on the exchange).

[38] This may be particularly true of over-the-counter ("OTC") options that are not publicly reported. *See, e.g.*, Jonathan Fuerbringer, *In Options Trading Volatility Is a Virtue*, N.Y. TIMES, Jan. 26, 1992, at F5 (One indication of the size of unreported trades is that one major trading firm, Banker's Trust, is expecting over a billion dollars in revenues from options and other derivatives tradings.); Anita Raghavan, *Wall Street Moves in on Futures Products*, WALL ST. J., Feb. 4, 1992, at C1 (recognizing the potential for profit, the New York Stock Exchange is attempting to take business away from the nation's big futures and options exchanges). The SEC found:

> About 50% of all NYSE trades now are block trades, and a substantial proportion of those block trades are negotiated off-floor. As a result of the increasing reliance of both small and large traders upon passive pricing mechanisms, the price discovery mechanism today reflect largely the interaction of medium sized supply and demand.

SEC EQUITY MARKETS STUDY, *supra* note 27, at 82,925; *see also* William C. Freund, *Another SEC Curb on Stock Exchanges*, WALL ST. J., Sept. 2, 1992, at C13 (arguing that transparency on the U.S. markets is driving big traders to London).

intermarket trading present new challenges to the smooth func-
tioning of financial markets. Some of these new developments
have placed strains on existing market structures. These strains
highlight the discrepancies between the way organized markets
function in reality and the way economic theory assumes that
they function. Many recent developments have arisen in response
to these strains as mechanisms for bringing about those market
efficiencies which economic theory assumes occur automatically.[39]

Thus, the classical reasonable investor of yesteryear, the long
term investor purchasing no more than 1,000 shares, is a member
of a distinct minority in modern markets whose number in most
instances would be too few in terms of market volume to explain
prices. Put differently, it may be irrelevant what is "important"
to the archetypal class members because their fewness and lack of
market power would have little impact on prices. Conceivably,
determining "importance" by examining the beliefs of professional
traders or other significant market players might work. However,
a *qualitative* approach would still be evidentiarily inefficient if
markets truly are efficient. Why use polling of qualitative beliefs
if quantitative measurement of the market's behavior is realistic?
Since under *Basic* market efficiency is a prerequisite for presuming
reliance[40] and an examination of the implications of market effi-
ciency must be performed in any event, an examination of quan-
titative materiality consistent with the application of market
efficiency theory to other elements of a securities fraud class action
is theoretically consistent and factually necessary.

In order to address issues relating to the quantitative measure-
ment of materiality (and causation), it is beneficial to examine the
role and dimensions of the efficient market theory in securities
fraud cases as conceptualized by the Court in *Basic*. By first
examining the dimensions of the right to rebut the presumption of
reliance, insight may be obtained· into the dimensions of the effi-
cient market theory as a legally endorsed doctrine.

II. THE REBUTTABLE PRESUMPTION OF RELIANCE

The plurality in *Basic* held that:

Any showing that severs the link between the alleged misrepre-
sentation and . . . [a plaintiff's] decision to trade at a fair price,

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[39] NYSE PANEL REPORT, *supra* note 15, at app. G2-3.
[40] *Basic*, 485 U.S. at 248 n.27.

will be sufficient to rebut the presumption of reliance. . . . Petitioners also could rebut the presumption of reliance as to plaintiffs who would have divested themselves of their Basic shares without relying on the integrity of the market.[41]

The Supreme Court then gave an example of a person who disbelieved the misrepresentations, but nonetheless traded because of unrelated concerns, stating that such a person "could not be said to have relied on the integrity of a price he knew had been manipulated."[42] Justice White elaborated that "if the reliance requirement is to be left with any content at all the fraud-on-the-market presumption must be capable of being rebutted by a showing that a plaintiff did not 'rely' on the market price."[43] Justice White indicated that the presumption could be rebutted by showing (1) plaintiff decided to purchase prior to the alleged misstatement, hence relying upon a price unassociated with the fraud, (2) plaintiff bought or sold for reasons unrelated to price, or (3) plaintiff sold short before the misrepresentation was made.[44] Disallowing recovery in such cases is appropriate because "surely none of these people can state a valid claim under Rule 10b-5. Happily, the majority puts to rest the prospect of recovery under such circumstances."[45]

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[41] *Id.* at 248-49.

[42] Sophisticated market participants, in particular, may rely upon matters other than the integrity of the price. Hence, what is material and misleading may differ depending upon the characteristics of the market participants. *See, e.g.,* Davidson Pipe Co. v. Laventhol & Horwath, 120 F.R.D. 455, 460 (S.D.N.Y. 1988) ("A sophisticated investor is held to a higher duty of inquiry, and so may not claim reliance upon misrepresentations which might dupe only the naive investor. Thus, evidence probative of the degree of sophistication of a plaintiff in a securities case is both admissible at trial and an apt subject of discovery."); Drobbin v. Nicolet Instrument Corp., 631 F. Supp. 860, 891 (S.D.N.Y. 1986) ("The sophistication of the plaintiff is relevant both to the adequacy of the defendant's disclosure and the extent of the plaintiff's reliance on any alleged misrepresentations.") (citing Quintel Corp., NV v. Citibank, NA, 596 F. Supp. 797, 802 (S.D.N.Y. 1984)); *In re* Consumers Power Co. Sec. Litig., 105 F.R.D. 583, 609 (E.D. Mich. 1985) (holding that less sophisticated investors would be entitled to rely on statements on which more sophisticated investors would not be entitled to rely); Weintraub v. Texasgulf, Inc., 564 F. Supp. 1466, 1471 (S.D.N.Y. 1983) (finding that a sophisticated speculative trader engaging in unusual trading activity may be subject to unique defenses, making him an unsuitable class representative); Kline v. Wolf, 88 F.R.D. 696, 699 (S.D.N.Y. 1981) (holding that an investor who engages in speculative trading does not meet the typicality requirement of class certification).

[43] *Basic,* 485 U.S. at 251 (White, J., concurring in part, dissenting in part).

[44] *Id.* (White, J., concurring in part, dissenting in part).

[45] *Id.* at 251-52 (White, J., concurring in part, dissenting in part). Justice White stated that under that portion of the plurality's holding with which he concurred, recovery "in the face of 'affirmative evidence of nonreliance'" would not be allowed, *id.* at 252 (quoting

Nevertheless, despite the undisputable right to rebut the presumption of reliance on an individual basis provided in *Basic*,[46] some courts and commentators have held that, in order to rebut the presumption on an individual basis, defendants must show either that a plaintiff would have purchased the security at the same price had he known the information that was not disclosed, or that he purchased the security knowing the information that was not disclosed;[47] in most cases, either of these showings will be virtually impossible to make. Other courts have erroneously held that to rebut the presumption the defendant must show that price

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Zweig v. Hearst Corp., 594 F.2d 1261, 1272 (9th Cir. 1979)), but that it opened the door for class members to falsely and conveniently testify that they relied on the integrity of the market price, *see id.* at 262. Indeed, the fraud on the market theory changes the facile catechism from claims that persons relied on obscure portions of 10-Ks and 10-Qs, which in all probability, as recognized by the theory and commentators, *see, e.g.*, Kripke, *supra* note 14, they never saw, read or understood, to a claim that they relied upon a financial theory which must seem strange and unfamiliar to them. Specifically, Justice White declared:

> Despite three statements denying that merger negotiations were underway, Basic stock hit record-high after record-high during the 14-month class period. It seems quite possible that, like Casca's knowing disbelief of Caesar's "thrice refusal" of the Crown, clever investors were skeptical of petitioners' three denials that merger talks were going on. Yet such investors, the savviest of the savvy, will be able to recover under the Court's opinion, as long as they now claim that they believed in the 'integrity of the market price' when they sold their stock (between September and December 1978).

Basic, 485 U.S. at 262 (citations omitted).

In many takeover situations like *Basic*, stock is bought and sold by arbitrageurs, who are among the most able to see through management's statements and ascertain for themselves whether merger discussions are taking place and the likelihood of a merger occurring. In *Basic*, unusual price and unexplained activity, with the stock hitting new high after new high on large volume trading, in the absence of other explanation, indicated that market participants were trading on merger speculation. *Id.* The plurality, however, appeared to resolve the difficulty of undeserving class members by defining the class or by limiting the class period so as to exclude claims by undeserving and non-relying speculators. *Id.* at 249 n.29; *see also* Zeidman v. J. Ray McDermott & Co., 651 F.2d 1030, 1040 (5th Cir. Unit A July 1981) (excluding arbitrage community and large institutional and professional investors from proposed class).

[46] At least three lower courts have specifically recognized the need to afford defendants the opportunity to rebut the presumption on an individual basis either after a trial determining only the degree of mispricing, Biben v. Card, 789 F. Supp. 1001, 1003 (W.D. Mo. 1992); Jaroslawicz v. Engelhard Corp., 724 F. Supp. 294, 301-02 (D. N.J. 1989), or after a trial where an estimate of aggregate damages may be rendered by the jury, *In re* ASK Computer Litig., Fed. Sec. L. Rep. (CCH) ¶ 96,911 (N.D. Cal. Aug. 18, 1992).

[47] *See, e.g.*, Fine v. American Solar King Corp., 919 F.2d 290, 299 (5th Cir. 1990), *mot. granted sub nom.* Hurdman v. Fine, 111 S. Ct. 2006, *and mot. granted, cert. denied*, 111 S. Ct. 2849, *and cert. dismissed*, 112 S. Ct. 576 (1991); Wiley v. Hughes Capital Corp., 746 F. Supp. 1264, 1290 (D.N.J. 1990); *see also* Daniel R. Fischel, *Efficient Capital Markets, the Crash, and the Fraud on the Market Theory*, 74 CORNELL L. REV. 907, 918-19 (1991) (suggesting that, in practice, the presumption of reliance is effectively non-rebuttable).

played no part in the investor's decision to invest, which is virtually inconceivable.[48] Still other decisions reason that where an investor relies on information other than price but which is not extraneous to the market, i.e., information which is publicly available, the investor nevertheless relies on the integrity of the market price.[49]

These narrow interpretations of the right to rebut the presumption are perilously close to the pure causation approach, which was rejected in *Basic*,[50] and show a lack of understanding of the meaning of the phrase "integrity of the market price." Some courts have erroneously interpreted "integrity" as meaning that the price was honestly set, free from misrepresentations or omissions.[51] These decisions confuse "market integrity" with "market price integrity." The correct analysis of the meaning of the phrase "integrity of the market price" is that the market price reflects the mix of publicly available information and therefore can be relied upon as a proxy for such information, thus relieving investors of the need to personally investigate and actually rely on the available information.[52] Therefore, if an investor does not rely on price as a proxy for, or a reflection of, the available information, the investor does not rely on the integrity of the market price.

Logically, for the reliance requirement to have any meaning in a case predicated on the fraud on the market theory, the defense must be allowed to show that the plaintiff did not rely on the integrity of the market price but instead relied upon information other than price, and concluded that the price would change due to such information. Such an investor, not relying upon the integrity of the market price, might individually be able to establish his reliance on information which is misleading, but he would not be relying upon the integrity of the market price and should not be presumed to have done so. Indeed, logically many traders' decisions to trade are not based upon belief in the integrity of the market price, if, as Justice White pointed out and as common sense would indicate, "many investors purchase or sell stock because they believe the price *inaccurately* reflects the corporation's worth."[53]

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[48] *See, e.g.*, Moskowitz v. Lopp, 128 F.R.D. 624, 630-31 (E.D. Pa. 1989).

[49] *See, e.g.*, Rolex Employees Retirement Trust v. Mentor Graphics Corp., 136 F.R.D. 658, 665 (D. Or. 1991). *But see* cases cited *supra* note 12 (listing cases treating all investors alike regardless of sophistication).

[50] 485 U.S. at 248.

[51] *See, e.g.*, Tolan v. Computervision Corp., 696 F. Supp. 771, 776 (D. Mass. 1988).

[52] *See Basic*, 485 U.S. at 255 (White, J., concurring in part, dissenting in part).

[53] *Id.* at 256 (White, J., concurring in part, dissenting in part). Such a belief is fundamentally inconsistent with a belief that the price reflects the stock's value.

For example, a short seller[54] who believes the market price does not correctly reflect the publicly available information, and believes that the price is too high, while he may not know of the misstatement, nevertheless could not be said to have relied upon the integrity of the market price.[55] The same holds true for persons trading in reliance on publicly unavailable and undisclosed inside information.[56] Similarly, certain computer-assisted trading strategies do

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[54] A "short seller" is "one who sells stock not owned." SENATE REPORT, *supra* note 11, at 18.

[55] *See* Zlotnick v. TIE Communications, 836 F.2d 818, 823 (3d Cir. 1988). In *Zlotnick*, the Third Circuit held that an investor could not maintain an action under Rule 10b-5 against defendants whose alleged misrepresentations artificially inflated the price of a stock which the plaintiff had sold short. The court drew a clear distinction between allegations of "[r]eliance on the integrity of the *market* in a stock [and] . . . reliance on the integrity of the market *price* of the stock." *Id.* While recognizing that reliance upon the price as an accurate representation of the worth of a stock is supported by the efficient market hypothesis, the Third Circuit held that reliance upon the ability of investors to respond correctly to future information concerning a stock, i.e., market integrity, is not reasonable. *Id.* at 823-24; *see also* Grace v. Perception Technology Corp., 128 F.R.D. 165, 169 (D. Mass. 1989) (acknowledging that although reliance on factors other than market price does not destroy the presumption of reliance, if purchasers rely on non-market information that is not generally available to the public, then purchasers did not rely on the integrity of the market); Priest v. Zayre Corp., 118 F.R.D. 552, 555 (D. Mass. 1988) (Personal contact with corporate officers and attendance at special meetings of the company precludes a finding of reliance on the marketplace.); Zandman v. Joseph, 102 F.R.D. 924, 931 (N.D. Ind. 1984) (denying class certification because representative relied on non-market information and is therefore subject to the defense of non-reliance on the market).

However, other courts apparently fail to recognize that in an efficient market stock price is supposed to reflect value based upon current, disclosed information. Thus, in *Deutschman v. Beneficial Corp.*, 132 F.R.D. 359, 370 (D. Del. 1990), *class certification granted*, 761 F. Supp. 1080 (1991), the court found that a purchaser of a call option who expects the price to rise and, therefore, believes that the market price undervalues the security nevertheless may be presumed to rely on the integrity of the market price. *See also* Moskowitz v. Lopp, 128 F.R.D. 624, 631 (E.D. Pa. 1989) ("There is a fundamental difference between an investor's presumption that the market price will move and the fact that the price was tainted by fraud."); Tolan v. Computervision Corp., 696 F. Supp. 771, 773 (D. Mass. 1988) (holding that put and call options traders' invocation of the presumption was sufficient to withstand a motion for summary judgment).

[56] Presumably, a trader illegally trading on undisclosed inside information has not relied on the integrity of market price even though he did not know of the misrepresented or omitted information. *See* Epstein v. American Reserve Corp., 1988 U.S. Dist. LEXIS 3382, at *8 (N.D. Ill. Apr. 20, 1988) (class certification precluded where plaintiffs relied exclusively upon broker's recommendation in making investment decisions and "(1) broker purchased stock after alleged fraudulent information had become known; (2) broker's strategy was to purchase speculative stock; (3) broker allegedly traded on inside information; and (4) broker was member of board of directors of the X corporation which was the largest shareholder of the defendant corporation.").

Likewise, option traders who bet on a corporation's stock to decline and incurred a loss as a result of a misrepresentation, which caused an artificial inflation of the stock's price, did not rely on the market price. Starkman v. Warner Communications, Inc., 671 F.

not rely upon the integrity of market price, as in the case of a trader who locks in "risk free" spreads by buying the stock while shorting the future or options. Logically, such a trader does not rely on the integrity of the market price and should not recover damages for any price inflation in the stock.[57] A defendant should be allowed to demonstrate that other strategies, such as a non-diversified portfolio, day trading, strategies to beat the market, or strategies based on technical or "chartist" analysis, evidence a disbelief in the efficient market hypothesis, and hence nonreliance

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Supp. 297, 307 (S.D.N.Y. 1987). *See also* Fleck v. Cablevision VII, Inc., 763 F. Supp. 622, 627 (D.D.C. 1991) (finding that plaintiffs who acquired interest through a limited partnership instead of through the initial offering did not rely on material misstatements in the prospectus); *In re* Bank of Boston Corp. Sec. Litig., 762 F. Supp. 1525, 1530 n.3 (D. Mass. 1991) (holding that automatic reinvestment of dividends did not constitute reliance on the integrity of the market price).

[57] *See generally* SENATE REPORT, *supra* note 11, at 17-19 (explaining how stock index arbitrage allows arbitrageurs to buy in one market and sell in another relying solely on market mispricing to make a profit). For example, where a trader buys a stock at an artificially inflated price, but simultaneously sells the future at an equally inflated price, he suffers no loss due to the mispricing. This type of transaction is a form of index arbitrage. *See id.* In 1989, index arbitrage was the single largest proportion of program trading. *Id.* at 19 n.55. *See also* Abrahamson v. Fleschner, 568 F.2d 862, 878-79 (2d Cir. 1977) (concluding that the proper measure of damages is the net losses incurred after any fraudulent representations), *cert. denied*, 436 U.S. 905, *and cert. denied*, 436 U.S. 913 (1978); Richardson v. MacArthur, 451 F.2d 35, 44 (10th Cir. 1971) (holding that the plaintiff should "not be allowed to retain his profit in silence while pleading to be made whole for his losses"); SEC v. Finacor Anstalt, [1991 Transfer Binder] 1991 Fed. Sec. L. Rep. (CCH) ¶ 96,272, at 91,468 (S.D.N.Y. Aug. 29, 1991) (finding that professional option traders who sold call options contracts against purchases of stock or other series of call options did not suffer an "out-of-pocket" loss); Disher v. Information Resources, Inc., 691 F. Supp. 75, 79 (N.D. Ill. 1988) (recognizing the inherent unfairness of allowing a plaintiff to "recover from losses and ignore profits where both result from a single wrong," courts have required that "[a]ll profits and losses. . .be netted against each other"), *aff'd*, 873 F.2d 136 (7th Cir. 1989); Katz v. Comdisco, Inc., 117 F.R.D. 403, 407-08 (N.D. Ill. 1987) (holding that by selling more stock than he purchased at a purportedly inflated price, plaintiff benefitted from the fraud and thus could not serve as a class representative).

A prime example of this unfairness would be trades made by market makers who will have a continuously high volume of transactions throughout the class period. For a general discussion of market makers, see NYSE PANEL REPORT, *supra* note 15, at app. G2-6. In a market maker setting, the recoverable losses of the market maker should be limited to actual losses after considering all purchases and sales during the relevant time period. Etshokin v. Texasgulf, Inc., 612 F. Supp. 1220, 1232 (N.D. Ill. 1985); *see also Zlotnick*, 836 F.2d at 822 (holding that a short seller is not entitled to the fraud on the market presumption of reliance). Likewise, specialists and market makers arguably may not be entitled to be members of a fraud on the market class action because they are contractually obligated to trade, and they trade in order to profit on spreads and commissions, not necessarily on values. Put differently, if specialists and market makers are permitted to be class members then spreads and commissions should be included in computing net damages. *See, e.g.,* McNichols v. Loeb Rhoades & Co., 97 F.R.D. 331, 334 (N.D. Ill. 1982) ("A market maker . . . is not an investor.").

on the integrity of the market price.[58] In fact, all purchases of
stock not calculated to diversify an investor's portfolio are incon-
sistent with a belief in the theory because investors who believe
shares are fairly priced will not seek to beat the market by picking
individual winners. Instead, they will spread their risk to obtain

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[58] The efficient market hypothesis is fundamentally at odds with beating the market
by technical and fundamental analysis. *See, e.g.*, Dennis, *supra* note 6, at 375-80 (discussing
the implications of the fraud on the market theory on attempts to beat the market); David
J. Schulte, Note, *Fraud on the Market Theory: Efficient Markets and the Defenses to an
Implied 10b-5 Action*, 70 IOWA L. REV. 975, 982-83 (1985) (noting that any individualized
study of publicly available information would be a "waste of time and money"). *See also*
Jonathan Clements, *When Small is Beautiful: A Stock Investor's Guide*, WALL ST. J., Oct.
23, 1991, at C1 (discussing a mutual fund named the "Inefficient Market Fund").

It may also be possible to challenge a professional plaintiff based upon his trading
activity. For example, an investor may buy stock in a multitude of shaky companies,
ostensibly for ordinary investment activity, but in reality with an eye toward future class
actions. For example, in Cooperman v. Fairfield Communities, Inc., No. LR-C-90-464, slip
op. at 9 n.1 (E.D. Ark. filed June 26, 1991), Magistrate John J. Forster, Jr., regarding a
perennial plaintiff, stated that:

> [T]he plaintiff appears to be far from an ideal representative. His personal
> involvement in a long series of securities actions suggests extremely poor
> investment judgment, amazingly bad luck, or, most probable, an ardent ten-
> dency to pursue claims against any company which disappoints his investment
> expectations. In addition, the sheer number of complex cases in which the
> plaintiff is involved presents the possibility that he will not be able to focus a
> meaningful degree of attention on the pending action.

In Hoexter v. Simmons, 140 F.R.D. 416, 422-23 (D. Ariz. 1991), the court held that Steven
Cooperman could not serve as a class representative, stating: "[T]he prior litigation in
which Cooperman and Lord have served as plaintiffs is so extensive, however, that they
will inevitably be subject to unique defenses concerning their reliance on the market's
integrity in purchasing stock."

Similarly, Judge Fern Smith of the Northern District of California said of another
perennial plaintiff:

> After a careful review of the record and further documents reflecting Plaintiff's
> investment records, the Court finds clear evidence that Plaintiff's purchasing
> of stock in troubled companies (including ABI) to possibly pursue litigation,
> is a serious defense likely to become the focus of the litigation to the detriment
> of the class. The consistent pattern of purchasing a few shares in troubled
> companies, Plaintiff's involvement in over two dozen lawsuits, and his pur-
> chase of ABI shares after the company's disclosures of some short-term
> problems, supports an interpretation that Plaintiff's motive in purchasing two
> shares in ABI was to pursue a lawsuit. This presents serious questions con-
> cerning the materiality to Plaintiff of the integrity of the market and his
> reliance on misrepresentations of Defendants in making his decision to pur-
> chase ABI stock.

Shields v. Smith, [1991-92 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 96,449, at 91,967-
68 (N.D. Cal. Nov. 4, 1991). Another common practice is for securities class action lawyers
or members of their families to be class action representatives. *See, e.g.*, Tanzer v. Tur-
bodyne Corp., 417 N.Y.S.2d 706, 706 (N.Y. App. Div. 1979). Class representatives also
occasionally act as consultants to lawyers with respect to law suits, *id.* at 708, or in the
case of lawyers, co-counsel in suits.

the maximum return commensurate with the reduced risk of their diversified portfolio.[59]

An investor who uses research to "beat the market" is not, as Justice White noted, relying on integrity of price to reflect all public information.[60] The investor is relying on his research and acumen, believing that he will be rewarded by market inefficiency. Indeed, the Grossman-Stiglitz paradox holds that markets must be somewhat inefficient, i.e., not reflect all publicly available information, in order to encourage people to gather and analyze information.[61] If gathering and analyzing information were not profitable, no one would do it, and markets would be entirely inefficient. It is only by a degree of inefficiency that greater efficiency can be achieved and sustained.[62]

We know of no action since *Basic* that has been tried to the point that the issue of rebuttal of the presumption of reliance has arisen on an individual basis. Likewise, we know of no empirical evidence showing the extent to which price-relying class members actually predominate over non-price-relying class members in a given class. It is conceivable, however, that the latter could predominate. Furthermore, non-price-relying class members may not be similarly "reasonable" in evaluating information, as evidenced by the disparity of traders and investors employing different strategies. Since qualitative materiality is the trigger under *Basic* to invoke the efficient market hypothesis to presume reliance, either the trigger or the theory should be revisited. Accordingly, we next examine the theory.

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[59] Jeffrey N. Gordon & Lewis A. Kornhauser, *Efficient Markets, Costly Information and Securities Research*, 60 N.Y.U. L. Rev. 761, 796 (1985). Note also that the large volume of trading in a particular case may indicate that the market participants do not have similar interpretations of the implications of the available public information presumably reflected in the price. There is no reason why the volume of trades in a year should equal or exceed the entire capitalization of a company when one assumes investors agree on the implications of information fully reflected in the price. Rampant speculative trading and very short holding periods unaccompanied by fresh news are inconsistent with an assumption that those traders believe that prices fully reflect all publicly available information.

[60] *Basic*, 485 U.S. at 256 (White, J., concurring in part, dissenting in part).

[61] Sanford J. Grossman & Joseph E. Stiglitz, *On the Impossibility of Informationally Efficient Markets*, 70 Am. Econ. Rev. 393, 395 (1980); *see also* Gilson & Kraakman, *supra* note 16, at 557-58. The theory holds, however, that the degree of inefficiency should be relatively stable, that there should be an "equilibrium degree of disequilibrium." Grossman & Stiglitz, *supra*, at 393. Nevertheless, even under the theory, there will be persons who trade based upon their belief that the price does not fully reflect the available information.

[62] *See* Grossman & Stiglitz, *supra* note 61, at 404.

III.   THE EFFICIENT MARKET HYPOTHESIS

Recently, the efficient market hypothesis has come under significant attack. Events such as the recent stock market panics of October 1987 and 1989, price swings on "triple witching hours,"[63] and the enormous premiums paid by acquirers for takeover targets have led some observers to question the efficient market hypothesis.[64] Particularly, the 1987 crash was a watershed, which has shaken confidence in the hypothesis.[65] Economic theorists have

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[63] "Triple witching hours" refer to "[s]evere price swings and increased volume [that] have occurred on days when the quarterly expiration of stock index futures, stock index options and equity options coincide." SENATE REPORT, *supra* note 11, at 21.

[64] *See, e.g.*, Ayers, *supra* note 15, at 964-97 (distinguishing between informational and fundamental efficiency; at best, the stock market is only informationally efficient); Victor L. Bernard, *Stock Price Reactions to Earnings Announcements, A Summary of Recent Anomalous Evidence and Possible Explanations, in* ADVANCES IN BEHAVIORAL FINANCE (Richard Thaler ed., forthcoming 1992) (examining the stock market's inefficient reaction to earnings announcements); L. Brent Lockwood, Comment, *The Fraud-On-The-Market Theory: A Contrarian View*, 38 EMORY L.J. 1269, 1308-09 (1989) (suggesting that highly sophisticated investors who react to new information may be able to beat the market because there is a timelag in market's reaction to new information); William Baldwin, *The Crazy Things People Say to Rationalize Stock Prices*, FORBES, April 27, 1992, at 140, 150 ("For decades academics believed in market rationality the way they believed in gravitation. But the rationalists have to go through contortions to explain away investor behavior that might more easily be classed as stupid."); Elizabeth Corcoran & Paul Wallich, *Bursting Bubbles*, SCIENTIFIC AM., May 1991, at 125 (finding real estate markets as well as the stock markets inefficient); John R. Dorfman, *Autumn: A Season for Stock Investors to Beware?*, WALL ST. J., Sept. 10, 1991, at C1 (noting that the market is given to seasonality with summer rallies, Labor Day lulls and fall crashes); Christopher Farrell, *Where was the Invisible Hand During the Crash?*, BUS. WEEK, Apr. 18, 1988, at 65 (finding the stock market crash of October 1987 to be another sign that the market is inefficient); Gary Hector, *What Makes Stock Prices Move?*, FORTUNE, Oct. 10, 1988, at 69 (identifying alternative theories of market behavior now that the validity of the efficient market theory is suspect); Jonathan R. Laing, *Efficient Chaos: Or, Things They Never Taught in Business School*, BARRONS, July 29, 1991, at 12, 13 (describing empirical anomalies that suggest an inefficient and, at times, irrational stock market); John Liscio, *The Buyout Bubble*, BARRONS, Oct. 31, 1988, at 6 (suggesting that as a result of the proliferation of leveraged buyouts, the efficient market theory as applied to the stock market has "gone up in smoke"); Burton G. Malkiel, *Is the Stock Market Efficient?*, 243 SCIENCE 1313, 1315 (Mar. 10, 1989) (finding several anomalies inconsistent with an efficient stock market); *Riding the Wave*, ECONOMIST, Sept.-Oct. 1991, at 22, 22 (finding that the efficient market theory fails to explain why takeovers tend to come in waves); Matthew Schifrin, *Dangerously Inefficient*, FORBES, July 10, 1989, at 60 (questioning how an efficient stock market could lose one-third of its value in one day).

[65] *See, e.g.*, Barbara Donnelly, *Efficient Market Theorists are Puzzled by Gyrations in Stock Market*, WALL ST. J., Oct. 23, 1987, at A7 (quoting Yale professor Robert Shiller as declaring that "[t]he efficient market hypothesis is the most remarkable error in the history of economic theory." Likewise, Harvard economist Lawrence Summers is quoted as stating that "[i]f anyone did seriously believe that price movements are determined by changes in information about economic fundamentals, they've got to be disabused of that

been at a loss to convincingly explain how the wildly different prices before and after the crash could somehow reflect "all publicly available information" when the publicly available information did not appear to change appreciably.[66]

Most of the criticisms of the theory have centered around observations that humans are incredibly changeable, fickle, capricious, faddish, fashion-conscious, moody and given to group or herd psychology.[67] A number of researchers have conducted studies questioning the efficient market hypothesis.[68] Others have shown

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notion by Monday's 500-point movement."). The *New York Times*, reporting of the award of the 1990 Noble prize in economics to Harry Markowitz, Merton Miller and William Sharpe, relates that Dr. Sharpe's confidence in market efficiency was shaken by the 1987 stock market crash. "My theory assumes that at any given time, market prices reflect investors' opinions of the future course of the economy. The crash certainly raises serious questions about the efficiency of markets." *Nobel Prize Win for Americans*, N.Y. TIMES, Oct. 17, 1990, at D6. *See also* Christopher Farrell, *The Efficient Market Was A Good Idea—And Then Came the Crash*, BUS. WEEK, Feb. 22, 1988, at 140, 141 (describing the crash as the "nail in the coffin of the theory."); Herbert Stein, *Don't Be Spooked By The Market's Moves*, WALL ST. J., Nov. 22, 1988, at A22 (advising investors not to rely on the integrity of prices: "What a joke! In September 1987, The Market thought that the Dow Jones Industrials were worth 2700. In October it thought they were worth 2000. On May 18, The Market thought that RJR Nabisco was worth $44.50. Yesterday, The Market thought it was worth $85.875.").

[66] *See, e.g.*, Ayers, *supra* note 15, at 977-80; Fischel, *supra* note 47, at 915.

[67] *See, e.g.*, J. Bradford Delong et al., *Positive Feedback Investment Strategies and Destabilizing Rational Expectations*, 45 J. FIN. 379 (1990); Bruce N. Lehmann, *Fads, Martingales, and Market Efficiency*, 105 Q. J. ECON. 1, 25 (1990); Joseph Stiglitz, *Symposium on Bubbles*, 4 J. ECON. PERSPECTIVES, Spring 1990, at 13; Laing, *supra* note 64, at 13. These criticisms are directed toward the theory's requirements that markets be impersonal and traders' reactions be unbiased. The difference between individual and group assessments has long been a source of remark and interest. The classic work on the subject is CHARLES MACKAY, MEMOIRS OF EXTRAORDINARY POPULAR DELUSIONS AND THE MADNESS OF CROWDS (1841). *See also* Jean S. Chatzky, *A Brief History of Stock Fads*, FORBES, Sept. 14, 1992, at 253 (discussing the historically faddish nature of investors).

[68] Numerous studies have failed to validate the efficient market hypothesis, especially its semi-strong form. *See, e.g.*, S. Basu, *Investment Performance of Common Stocks in Relation to Their Price-Earnings Ratios: A Test of the Efficient Market Hypothesis*, 32 J. FIN. 663 (1977); Blume & Siegel, *supra* note 15; David A. Goodman & John W. Peavy III, *Industry Relative Price-Earnings Ratios as Indicators of Investment Returns*, 39 FIN. ANALYSTS J., July-Aug. 1983, at 60; James D. McWilliams, *Prices, Earnings and P.E. Ratios*, 22 FIN. ANALYSTS J., May-June 1966, at 137; Paul F. Miller & Ernest R. Widman, *Price Performance Outlook for High and Low P/E Stocks*, COM. FIN. CHRON., Sept. 9, 1966, at 26, 28; George C. Philippatos & David N. Nawrocki, *Information Inaccuracy of Stock Market Forecasts: Some New Evidence of Dependence on the New York Stock Exchange*, 8 J. FIN. & QUANTITATIVE ANALYSIS 445 (1973).

Other studies have documented so-called "effects" for which, as yet, there is no satisfactory explanation within the framework of efficient markets. For example, stock market prices disproportionately rise in January, *see, e.g.*, Donald B. Keim, *Size-related Anomalies and Stock Return Seasonality: Further Empirical Evidence*, 12 J. FIN. ECON. 13,

it to be untestable.[69] Furthermore, some are also questioning the fundamental assumptions about the market place.[70] For instance, an increasing number of economists are suggesting that markets are dynamic, non-linear, complex and evolving, and are not governed solely by principles of competition and diminishing returns, as assumed by conventional economics.[71] While clearly there is not

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20-21 (1983); Michael S. Rozeff & William R. Kinney, Jr., *Capital Market Seasonality: The Case of Stock Returns*, 3 J. FIN. ECON. 379, 395 (1976), fall on Mondays, *see, e.g.*, Frank Cross, *The Behavior of Stock Prices on Fridays and Mondays*, 29 FIN. ANALYSTS J., Nov.-Dec. 1973, at 67, 68-69; Michael R. Gibbons & Patrick Hess, *Day of the Week Effects and Assets Returns*, 54 J. BUS. 579, 591 (1981); Lawrence Harris, *A Transaction Data Study of Weekly and Intradaily Patterns in Stock Returns*, 16 J. FIN. ECON. 99, 105 (1986), may gyrate wildly on options and futures expiration days, *see, e.g.*, Hans R. Stoll & Robert E. Whaley, *Program Trading and Expiration-Day Effects*, FIN. ANALYSTS J., Mar.-Apr. 1987, at 16, 23-25, and small firms appear to earn higher risk-adjusted returns than do larger firms, *see, e.g.*, Rolf W. Banz, *The Relationship Between Return and Market Value of Common Stocks*, 9 J. FIN. ECON. 3, 16 (1981). Although worldwide news is relatively constant, markets are more active when open for trading and then are most active around the opening and closing. *See, e.g.*, Raymond C. Chiang & J. Craig Tapley, *Day of the Week Effects and the Futures Markets*, 2 REV. RES. FUTURE MARKETS 356, 368-69 (1982); Edward A. Dyl & Edwin O. Maberly, *The Weekly Patterns in Stock Index Futures: A Further Note*, 41 J. FIN. 1149, 1151-52 (1986); Kenneth R. French & Richard Roll, *Stock Return Variance: The Arrival of Information and the Reaction of Traders*, 17 J. FIN. ECON. 5, 5 (1986). For a general discussion of the anomalies that combine to create an inefficient stock market, see Peter Fortune, *Stock Market Efficiency: An Autopsy?*, NEW ENGLAND ECON. REV., Mar.-Apr. 1991, at 17, 34 ("the empirical evidence . . . provides an overwhelming case against the efficient market hypothesis.").

[69] The efficient market hypothesis does not specify how the market values different securities and is potentially consistent with an infinite number of pricing models. To test the theory an asset pricing model must be selected. Thus, any test of the theory is a joint test of both the theory and the selected pricing model. Results tending to support or reject the theory may instead be due to the particular pricing model employed. *See* Menachem Brenner, *The Sensitivity of the Efficient Market Hypothesis to Alternative Specifications of the Market Model*, 34 J. FIN. 915, 915-16 (1979); Eugene F. Fama, *Efficient Capital Markets II*, 46 J. FIN. 1575, 1575-76 (1991); Richard Roll, *A Critique of the Asset Pricing Theory's Tests, Part I: On Past and Potential Testability of the Theory*, 4 J. FIN. ECON. 129, 157 (1977). Testing the theory is akin to determining the reason for the surge in no-hitters in baseball. The quality of the pitching cannot be measured without measuring the quality of the hitting.

[70] *See, e.g.*, ROBERT KUTTNER, THE END OF LAISSEZ-FAIRE 262-87 (1991); Robert Teiteman, *The Revolt Against Free-Market Finance*, INSTITUTIONAL INVESTOR, June 1992, at 37, 39, 44; Floyd Norris, *Basic Assumption is Being Doubted*, N.Y. TIMES, July 21, 1992, at D8.

[71] *See* EVOLUTIONARY PATHS OF THE GLOBAL ECONOMY WORKSHOP, THE ECONOMY AS AN EVOLVING COMPLEX SYSTEM (Philip W. Anderson et al. eds., 1988); PETERS, *supra* note 2; W. Brian Arthurs, *Positive Feedback in the Economy*, SCIENTIFIC AM., Feb. 1990, at 92; Ronald Bailey, *Them That Can, Do, Them That Can't, Forecast*, FORBES, Dec. 26, 1988, at 94; Per Bak & Kan Chen, *Self-Organized Criticality*, SCIENTIFIC AM., Jan. 1991, at 46, 53; Elizabeth Corcoran, *Sorting Out Chaos on Wall Street*, SCIENTIFIC AM., June 1991, at 121; Hector, *supra* note 64, at 69; Laing, *supra* note 61, at 13; *Money and Mayhem*, ECONOMIST, Apr. 21, 1990, at 93.

yet any unified theory that supplants the efficient market hypothesis, new concepts of causation derived from the physical sciences are fundamentally changing our understanding of markets. The most promising of these new concepts are the theories of criticality and chaos. Criticality refers to a state where a slight stimulus can cause a large change. An example is the straw that breaks the camel's back. Chaos refers to a deterministic non-linear system that can produce random looking results. Chaotic systems exhibit sensitive dependence on initial conditions, which is to say that a slight change in the environment or conditions in which an event occurs will have a great effect on the result the event causes; the effect of a cause is critically dependent on the context in which the cause occurs.[72] Thus, while conventional economics assumes the existence of a strongly stable equilibrium price and that large fluctuations result only from strong external shocks, some recent research regarding self-organized criticality suggests that periodic large scale fluctuations are to be expected even in the absence of any large stimulus, and that prices over time will reach a critical state in which a slight stimulus will produce a large price change.[73] For example, on occasion a silly rumor, having minimal informational significance, started by a person who ordinarily has little influence on market prices, may have an enormously disproportionate impact on market prices and yet, in other conditions, have none at all.[74] Chaos theory also raises questions of proximate

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[72] *See generally* PETERS, *supra* note 2, at 163-86 (testing the S&P 500 Index for chaotic characteristics).

[73] Bak & Chen, *supra* note 71, at 53. The effect of information entering the market is like dropping a lit cigarette in a forest. On some occasions the effect will be negligible, on others cataclysmic. John R. Dorfman, *Three Measures Indicate Stocks are High Priced*, WALL ST. J., Apr. 16, 1992, at C1 ("[O]vervaluation is like dry pine needles on a forest floor. It makes the stock market vulnerable to nasty surprises, though no one can predict in advance what the surprises will be.").

[74] Evidence of this, while admittedly anecdotal, is pervasive. *See, e.g.*, Douglas R. Sease, *Stocks' Fall is Deepened by a Rumor*, WALL ST. J., Oct. 20, 1988, at C1 (On the first anniversary of the stock market crash, stocks were sharply lower due in part to a rumor that George Bush had a mistress. An analyst was quoted declaring that, "a strong market would have shrugged off the rumor."). Another example is the August, 1991, two-day run on CitiBank in Hong Kong set off by Congressman John Dingell describing CitiBank as "technically insolvent." The reaction in Hong Kong was unique and different from that of the U.S. and the rest of the world. Due to its political and economic environment, Hong Kong was prone to runs and panics. *Overdrawn in Hong Kong*, WALL ST. J., August 14, 1991, at A8; *see also* Corcoran, *supra* note 71, at 121 (suggesting that traders' mood swings may have a more profound effect than previously believed); Daniel Goleman, *Anatomy of a Rumor: It Flies on Fear*, N.Y. TIMES, June 14, 1991, at C1 (describing a rumor as an "opportunistic information virus"); William Power, *"Swoons" Underscore Market's Sen-*

causation, where remote acts through ephemeral connections cause extreme consequences, and the appropriate limits of judicial redress for such acts. Or, as Justice Scalia put it, "Life is too short to pursue every human act to its most remote consequences; 'for want of a nail, a kingdom was lost' is a commentary on fate, not the statement of a major cause of action against a blacksmith."[75]

The efficient market hypothesis is premised on the assumption that absent new information about economic fundamentals, deviations of securities price movements from their equilibrium relation to risk and other pertinent market factors are entirely random; hence, there is always an equal probability that such deviations will move the price either up or down. However, researchers have demonstrated that changes in economic fundamentals cannot explain the majority of the variation in market prices.[76]

Under the theory, since residual price movements are random and independent of each other (because prior information has been completely discounted in prices), a (statistically significant) abnormally large residual presumably would be due to new information. Yet, whether a residual is deemed to be statistically abnormal depends on the probability distribution assumed.[77] For example, a

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sitivity, WALL ST. J., Nov. 4, 1988, at C1 (Swoon stocks are stocks that in a skittish market "plunge 20% to 50% in one day on the slightest bad news or negative comment from a single analyst."); Douglas R. Sease & Steven E. Levingston, *As Stocks Swing About and Decline Abruptly, Many Investors Suffer*, WALL ST. J., Aug. 10, 1992, at A1 (In this most fickle market, "the slightest bad news causes investors to punish individual stocks mercilessly."); Siconolfi, *supra* note 36 (noting that during mid-1992, the stock market has been "treacherously choppy . . . with many stocks pummeled by even the slightest bad news").

However, chaos may not be seen in stock prices alone, as it may be unlikely that a large price change in the future is highly dependent upon a small present or past price difference alone. If stock prices are chaotic it may be due to many factors, including emotional and informational factors. Furthermore, if prices alone revealed a deterministic foundation it would be exploited, which would alter that function. *See* David A. Hsieh, *Chaos and Nonlinear Dynamics: Application to Financial Markets*, 46 J. FIN. 1839, 1842-43 (1991). On the other hand, traders on the world's largest and currently most active market, the foreign currency market, are purportedly using computer programs based on past prices and chaos theory to forecast future prices. Richard L. Hudson, *Currency Traders' Computers ImproveNew Systems Give Instant Forecasts of Market Moves*, WALL ST. J., Sept. 25, 1992, at B5.

[75] Holmes v. Securities Investor Protection Corp., 112 S. Ct. 1311 (1992) (Scalia, J., concurring). *See also* JAMES GLEICK, CHAOS 11-23 (1987) (discussing the "for want of a nail" story as chaos and describing the Butterfly Effect—how the stirring of the wings of a butterfly can change a storm system in New York a month later).

[76] *See, e.g.*, David M. Cutler et al., *What Moves Stock Prices?*, 15 J. PORTFOLIO MANAGEMENT, Spring 1989, at 4, 9; Richard Roll, *R²*, 43 J. FIN. 541, 561 (1988).

[77] *See, e.g.*, Fischel, *supra* note 5, at 5; Philip J. Leas, Note, *The Measure of Damages in Rule 10b-5 Cases Involving Actively Traded Securities*, 26 STAN. L. REV. 371, 386-87 (1974).

normal distribution assigns little likelihood to the occurrence of extreme values. However, there is substantial evidence that stock prices are not normally distributed and extremes occur quite often, a condition known as "leptokurtosis," as in the case of a Pareto-Levy or Paretian distribution.[78] In fact, the arrival of information may not occur randomly, reaction to information may not occur in a consistent time frame, and old information may have a feed-back effect on new information.[79]

An example of the simmering dispute over market efficiency is found in the recent, much-debated editorial in the *Wall Street Journal* by Nobel Prize winner Harry Markowitz, who urged that junk bonds on a fully diversified basis are an investment as good as or better than treasuries, on the theory that the market efficiently prices the risk of junk bonds and that evidence to the contrary is caused by fraud and government over-regulation.[80] Some Wall Street practitioners and academics, on the other hand, have argued

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[78] *See generally* PETERS, *supra* note 2, at 105 (discussing the history of Paretian distribution). Levy published a study in 1925 based on the work of Pareto in 1897 regarding the distribution of income. *Id.* Pareto had found that, while the probability of finding someone who is ten times taller than another person is relatively finite (and follows a normal distribution), the probability of finding a person with a hundred times another's wealth is much higher than normal probability would predict. *Id.* The tendencies of certain distributions such as the Paretian distribution to have trends and cycles and to have abrupt and discontinuous changes have been named the Joseph effect and the Noah effect, respectively, after biblical stories of cycles of feast and famine and the cataclysmic deluge, *see Genesis* 6, 7, 37, 41. *Id.* at 108. The statistical likelihood of these extreme price movements is important for securities litigation, particularly in regard to the reliability of inferring materiality or mispricing from price changes and the validity of presuming that investors can rely upon dramatically changing prices as reflecting fundamental values and information.

[79] In order to use efficient market theory to calculate mispricing, an asset pricing model must be used. *See supra* note 69 and accompanying text. Statistically-based models of market mispricing, particularly those which appear to have been used in securities class actions, have been linear, and assume independence of observations, normality, and stability of the distribution over time. All of these assumptions may be wrong, in whole or in part, in a particular case, or, indeed, wrong generally as a description of real economic events. *See, e.g.,* Gordon & Kornhauser, *supra* note 59, at 765 ("The particular theory used most often in EMH tests, the Capital Asset Pricing Model (CAPM) and its variants, has drawn increasing economic skepticism. It may be only a slight overstatement to say that only in the legal literature is CAPM considered an *accurate* account of market processes.") (footnote omitted). Such methods, however, are immeasurably better than permitting "experts" to offer subjective estimates of mispricing and the extent to which the market price would have been different had the mix of information been different. *See, e.g., In re* Apple Computer Sec. Litig., 886 F.2d 1109, 1116 (9th Cir. 1989) (rejecting an expert's opinion that the investment community pays special attention to the statements of management and therefore such statements would be material and would alter the market price even where press reports adequately convey the risks to the public), *cert. denied,* 496 U.S. 943 (1990).

[80] Harry Markowitz, *Markets and Morality: Or, Arbitrageurs Get No Respect*, WALL ST. J., May 14, 1991, at A22.

that the junk bond market was inefficient and that the early junk bond deals were highly profitable because the market undervalued target companies, while the later junk bond deals were unprofitable because they were over-leveraged and overpriced.[81]

Just as the crash of October 1929 and the ensuing depression spawned the major securities laws promulgated in the 1930s, the crashes of October 1987 and October 1989 have led to new securities laws that take a very different direction from their predecessors.[82] The *Basic* Court concluded that studies supporting the efficient market hypothesis have "tended to confirm Congress' premise that the market price of shares traded on well-developed markets reflect all publicly available information, and hence, any material misrepresentations."[83] The Market Reform Act of 1990, on the other hand, recognizes the need to identify the specific persons trading large amounts of securities and to determine their trading activity and trading strategies in order to analyze the cause of significant market movements.[84]

The Senate Report found that the market's steep ascent in 1987 was not propelled by fundamental forces alone and referred to the market as "defying natural forces."[85] By historical measures or measures of asset values, stocks were over-valued; the securities markets had become a bubble ready to burst—an accident waiting to happen. The Senate Report states that the overwhelming consensus of the various studies of the October 1987 crash found that the securities markets were over-valued and a decline in market

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[81] *See, e.g.*, GENERAL ACCOUNTING OFFICE, LEVERAGED BUYOUTS, CASE STUDIES OF SELECTED LEVERAGED BUYOUTS (1991); Floyd Norris, *Win or Lose, Buyouts Do It Big*, N.Y. TIMES, Jan. 28, 1992, at D1; Jeremy C. Stein, *What Went Wrong With the LBO Boom*, WALL ST. J., June 19, 1991, at A12; *Nobel Lessons in Finance*, WALL ST. J., May 14, 1991, at A22.

[82] *See* SENATE REPORT, *supra* note 11, at 2, 7-12.

[83] Basic Inc. v. Levinson, 485 U.S. 224, 226 (1988) (referring to H.R. REP. No. 1383, 73d Cong., 2d Sess. (1934)).

[84] Market Reform Act of 1990, 15 U.S.C.S. § 78a (Law. Co-op. Supp. 1991). For example, *Basic* postulates an "impersonal" marketplace involving millions of participants. Yet, amazingly, on Black Monday, October 19, 1987, the top four sellers alone accounted for 14% and a mere fifteen sellers accounted for 20% of the total sales of stock on the New York Stock Exchange. In the futures market, the top ten sellers accounted for 50% of the non-market maker total volume. Three portfolio insurers accounted for almost 10% of the sales of shares, and one mutual fund group sold almost $.8 billion of the $21 billion in NYSE total shares. SENATE REPORT, *supra* note 11, at 24. Thus, ironically, despite an unprecedented high volume, the concentration of trades resembled a thinly traded market.

[85] SENATE REPORT, *supra* note 11, at 4.

values was inevitable.[86] The Report further states that technological advances and (changing) computer-assisted trading strategies affected prices, and that the markets demonstrated a confrontation between dramatically changing computer and telecommunication technology and unchanging human nature.[87] The Senate observed that "[j]ust as economic factors affect investor perceptions of market values, psychological factors influence investor behaviors. Fear, uncertainty and illusions played important roles in the events surrounding the October 1987 market crash."[88]

These findings appear at odds with the efficient market theory that prices reflect information and that investors are entitled to "'rely on the price of a stock as a reflection of its value.'"[89] Moreover, the Senate Report does not mention the theory or offer it as an explanation for price activity. Instead, the Senate Report refers to numerous factors other than information that affect prices,[90] which, of course, supports the argument that prices are a function of a great deal more than simply information, and hence market prices do not reflect a "true value" based on the mix of publicly available information.

Congress' premise in the Market Reform Act of 1990, that prices may reflect trading activity and strategies rather than or in addition to publicly available information, was confirmed in the SEC's preliminary investigation of the November 15, 1991 120-point drop in the Dow.[91] At the time, the drop was attributed to statements by President George Bush and Senator Alfonse D'Amato about possible cuts in credit card interest rates, i.e., a change in the mix of publicly available information.[92] The SEC's preliminary analysis of actual trading concluded that while the politicians' statements may have played a role in kicking off the price move-

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[86] *Id.* at 30-31.

[87] *See id.* at 34.

[88] *Id.* at 30.

[89] *Basic*, 485 U.S. at 244 (quoting Peil v. Speiser, 806 F.2d 1154, 1161 (3d Cir. 1986)). As Justice White observed, the majority in *Basic* held that investors "rely—not just on the market price—but on the 'integrity' of that price," i.e., that prices reflect "true value" because investors in developed markets set prices based on rational, unbiased and impersonal judgments regarding publicly available information. *Id.* at 255 (White, J., concurring in part, dissenting in part).

[90] SENATE REPORT, *supra* note 11, at 12-33. This approach was also adopted by Congress with its passage of the Market Reform Act of 1990.

[91] Letter from SEC Chairman Richard Breeden to Edward J. Markey, Chairman of the House Subcommittee on Telecommunications and Finance, [1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 84,907, at 82,360 (Dec. 31, 1991).

[92] *Id.*

ment, they did not cause the plunge.[93] Instead, the SEC found that the plunge was largely the result of particular internal market dynamics and strategies employed by institutions, particularly using derivatives to lock in profits.[94] The SEC also questioned whether the 1989 mini-crash was due to the collapse of the attempted United Airlines takeover, as had been assumed, and concluded that "most market swings are better understood in the context of longer-term institutional investment outlooks, as well as the short-term effects of professional and speculative trading strategies."[95]

In sum, to quote Shakespeare, "There are more things in heaven and earth . . . than are dreamt of in your philosophy."[96] Or, as Justice Holmes so eloquently put it, "The life of the Law has not been logic: it has been experience."[97] The efficient market theory fails to describe multiple variable reality. The Court in *Basic* made a serious mistake in grounding its decision on purportedly scientific theory, and should instead follow Congress' lead and base securities fraud actions on the verified, not presumed, facts.

There has also been a noticeable dampening of the ardor for the efficient market hypothesis among scholars.[98] The theory only became widely known outside of academia with Fama's landmark article in 1970[99] and then received its biggest boosts in the law in

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[93] *Id.*

[94] *See id.* at 82,360-67.

[95] *Id.* at 82,360. *See also* Michael R. Sesit, *Nomura Becomes a Top Program Trader In New York, But Shuns Strategy in Japan*, WALL ST. J., Feb. 7, 1992, at C1 ("On some occasions index arbitrage can send the market zooming or plunging unexpectedly," angering and traumatizing investors.); Randall Smith & Barbara Donnelly, *Year-End Rally Tightened "Zero Cost Collars,"* WALL ST. J., Jan. 9, 1992, at C1 (Offsetting put and call options on stocks and futures gave the market a kick upward at year-end as money managers and traders covered shorts. The so-called zero cost collars were designed to lock in profits while sacrificing high range gains. Many traders believe that this strategy caused prices to go up.). *But see* Gregg Jarrell, *SEC Lets Bush Off the Hook for Nov. 15 Stock Plunge*, WALL ST. J., Jan. 16, 1992, at A12 (finding that the SEC's letter was poorly researched and an attempt to protect President Bush). It is interesting to note, however, that the plunge commenced at 1:30 p.m. on Friday, a day when options were to expire. The news of legislative action was widely reported on the preceding day. If the news caused the drop, for some unexplained reason the market did not discount the news rapidly within the first few minutes or hours of its announcement. Instead, the drop coincided or was accompanied by a wave of program trading. Thus, it would seem something other than, or in addition to, market efficiency was moving prices.

[96] WILLIAM SHAKESPEARE, HAMLET act I, sc. 5, lines 165-66 (Tucker Brooke & Jack R. Crawford eds., The Yale Shakespeare 1947).

[97] OLIVER WENDALL HOLMES, THE COMMON LAW 1 (1881).

[98] *See* sources cited *supra* note 64.

[99] Eugéne F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 J. OF FIN. 383 (1970). One indication of the influence of Fama's article is the

boosts in the law in Judge Sneed's concurring opinion in *Green v. Occidental Petroleum*,[100] his reference to a landmark 1974 article in the *Stanford Law Review*,[101] and later in Fischel's steadfastly influential 1982 article in the *Business Lawyer*.[102] During the 1980s, numerous courts and commentators adopted the theory, often in an unquestioning doctrinaire form.[103]

As with any theory, particularly one with ideological grounds, the adherents' views can become extreme. Thus, for example, in 1984, a Note in the *Stanford Law Review* seriously advocated that securities trade confirmations should contain warning legends, akin to those on cigarette packages, stating that empirical evidence indicates that securities prices reflect all publicly available information, price movements are random, and fundamental analysis generally produces disappointing returns.[104]

Since the 1987 crash, however, the proponents of the theory have tended to divide the theory of efficiency conceptually in order to explain the unexplainable. For example, the theory is being parsed into segments such as "informational efficiency,"[105] "value

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number of studies it has spawned. *See* Fama, *supra* note 69, at 1576-1601 (reviewing the more important research).

[100] 541 F.2d 1335, 1343 (9th Cir. 1976).

[101] Leas, *supra* note 77.

[102] Fischel, *supra* note 5.

[103] *See, e.g.*, *In re LTV Sec. Litig.*, 88 F.R.D. 134 (N.D. Tex. 1980); Schulte, *supra* note 58, at 981.

[104] John M. Salmanowilz, Note, *Broker Investment Recommendations and Efficient Capital Market Hypothesis: A Proposed Cautionary Legend*, 29 STAN. L. REV. 1077 (1977).

[105] Ayers, *supra* note 15, at 965-68. Ayers distinguishes between fundamental market efficiency and informational market efficiency. To him, fundamental efficiency means that, "conditioned on the information available, stock prices will reflect the present value of a corporation's expected underlying profits." *Id.* at 969. He defines informational efficiency as a situation where "the current market price immediately reflects different categories of existing information." *Id.* at 968. Ayers claims that these two dimensions of market efficiency are theoretically independent in that security markets can exhibit one type of efficiency with or without exhibiting the other. *Id.* at 997. Moreover, Ayers claims that in *Basic*, while the dissent argued against the fraud on the market doctrine on the basis of potential fundamental inefficiency or because fundamental efficiency is unknowable, the plurality argued in favor of fraud on the market doctrine because the market was believed to be informationally efficient. *Id.* at 997-98. He concludes that the semi-strong form of informational efficiency is an adequate ground for the fraud on the market doctrine, but that the dissent's skepticism concerning fundamental efficiency raises legitimate concerns regarding calculating damages. *Id.* at 998. However, if a market is fundamentally inefficient, when and for how long will rational investors rely on the integrity of the market price, while they are aware of fundamental inefficiency? Furthermore, if as Ayers contends, non-fundamental speculation may cause overreaction, then both informational and fundamental

efficiency"[106] and "fundamental efficiency."[107] Some legal scholars
are recognizing that a lack of "fundamental efficiency" would
render courts unable to determine what the price would have been
but for corporate misrepresentations.[108] Yet, Fischel maintains that
"[i]t takes a theory to beat a theory and thus far none exists."[109]
In light of such uncertainty concerning the validity of the efficient
market theory, several prominent legal commentators have con-
cluded:

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efficiency may be violated, rendering the measurement of an unbiased stock price elusive.

   One commentator urges that the computation of fundamental value requires a great
deal of unobtainable information resulting in inaccurate estimates of value by markets so
that "true value efficiency remains elusive," but, nevertheless, markets are informationally
efficient because analysts and markets can assess and rapidly discount in prices the effect
of nonfundamental information "including psychological tendencies of investors." Robert
G. Newkirk, Comment, *Sufficient Efficiency: Fraud on the Market in the Initial Public
Offering*, 58 U. CHI. L. REV. 1393 1399-40 (1991). Newkirk argues that such "sufficiently
efficient" markets are unbiased. *Id.* at 1410. By "unbiased," Newkirk means that "while
the market price of a security may not *accurately* reflect some appropriate price of the
security, the amount and direction of any error in price will be random." *Id.* Under the
theory, one can predict with "a high degree of confidence" that markets will react to new
information and the reaction will not be systematically biased either up or down. *Id.* at
1410-11. Newkirk gives the following example of unbiasedness: a security that would
generate a rate of return commensurate with its riskiness may have a value of $100 but
may be priced by "the market at $120, or $80, or even $200, due to differences in analysts'
methodologies and human inability to forecast." *Id.* Nonetheless, he argues, over time (and
over a large group of analysts), the average difference between the security's trading price
and its appropriate price would be zero. *Id.* at 1411. However, even assuming Newkirk is
correct, what in theory may happen to prices over a sufficiently long term and a sufficiently
large group of analysts says very little that is relevant to securities litigation concerning a
particular purchase or sale of a particular stock at a particular time. For example, what is
the likelihood that a security with an appropriate value of $100, and which usually trades
between $80 and $120, but has a current market price of $200, will go up or down? Put
differently, can investors rely on the integrity of the market price such that a future price
surprise does or does not indicate bias due to fraud? If the investors assume informational
efficiency and fundamental inefficiency, they would assume an equal probability that the
stock, which the market has priced at $200, will go up or down. On the other hand, if
investors assume fundamental efficiency and informational inefficiency, they will assume
that the $200 price is a random fluctuation and the stock will go down to $100. If they
assume neither or a varying mix of inefficiency and various types of efficiency the current
price says little or nothing about future prices or true values.

   Accordingly, the court in *In re* Seagate Technology II Sec. Litig., No. C089-2493(A)-
VRW, 1992 U.S. Dist. LEXIS 14,606, at *17 (N.D. Cal. Sept. 8, 1992), correctly recognized
the importance of analyzing bias affecting stock prices through appropriate methodologies
in order to determine the bias, if any, caused by fraud. However, the distinction between
fundamental and informational (in)efficiency is not sustainable over time.

   [106] *See, e.g.*, Fischel, *supra* note 47, at 913.
   [107] Ayers, *supra* note 15, at 975-83.
   [108] Macey & Miller, *supra* note 9, at 1014.
   [109] Fischel, *supra* note 47, at 915.

There is disagreement among financial economists about the meaning of efficiency, how to test for it, and what the results of the tests mean. It is simply too complex to determine in a securities fraud case whether the presumption of reliance on the integrity of the market price is justified on the basis of the existence of an efficient market.[110]

Thus, it appears that "[t]he issue of market efficiency is far from resolved,"[111] and arguably the Supreme Court should not continue to endorse a presumption of reliance upon the integrity of market price. However, given the Supreme Court's acceptance of the semi-strong version of the efficient market hypothesis in *Basic*,[112] whether as an empirically based presumption or merely a legal fiction designed to facilitate federal class actions,[113] we must work within the framework of the Court's holding.

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[110] Johnathan R. Macey et al., *Lessons From Financial Economics: Materiality, Reliance, and Extending the Reach of Basic v. Levinson*, 77 VA. L. REV. 1017, 1049 (1991). Professors Schleifer and Summers suggest, somewhat tongue in cheek, that if the theory were a publicly traded security its price would be enormously volatile, reaching a peak with the claim in 1978 that it was the best established fact in all social science, crashing with the market in 1987, and lagging behind the rest of the market in its recovery. Andrei Schleifer & Lawrence H. Summers, *The Noise Trader Approach to Finance*, 4 J. ECON. PERSP., Spring 1990, at 19, 19 n.22.

[111] Elizabeth Corcoran, *Taking Stock*, SCIENTIFIC AM., Feb. 1990, at 66.

[112] There are legal scholars who applaud the Supreme Court's adoption of the efficient market theory, especially in its semi-strong version. *See* Fischel, *supra* note 47, at 922 (After rebutting the dissent's arguments, Fischel concludes the efficient market theory "has revolutionized securities fraud litigation."); William J. Carney, *The Limits of the Fraud on the Market Doctrine*, 44 BUS. LAW. 1259, 1266 (1989) (affirming that the efficient market hypothesis is "one of the best established hypotheses in all social sciences"); Gilson & Kraakman, *supra* note 16, at 550 (declaring that the efficient market theory "is now *the* context in which serious discussion of the regulation of financial markets takes place"). While we are aware that it might be simpler and more doctrinally acceptable to simply accept the weak and semi-strong versions of the efficient market hypothesis, we are not so confident that they may not be supplanted, evolve, change, be disbelieved or even be wrong that we would wish to have our methodology depend upon them more than necessary. This approach is also consistent with the approach of the Court, which refused in *Basic* to conclusively endorse any particular theory of how quickly or completely prices reflect information. Basic Inc. v. Levinson, 485 U.S. 224, 248 n.28 (1988). For example, if we were to assume the strong form of market efficiency, i.e., that market prices fully reflect both public and private information, then of course there would be no damages due to fraudulent misstatements since the market would see through the misstatements. While in the aggregate the evidence does not support strong form efficiency, in particular instances (e.g., the facts in *Basic*), a class action defendant may be able to establish that the private information allegedly withheld was in fact known to the market participants, which would imply strong form efficiency in such instances and hence no damages.

[113] It is interesting to note that the fraud on the market theory has been widely rejected with respect to state common law securities fraud claims. *See, e.g., In re* Consolidated

Moreover, in practice, the theory is applied not only to presume reliance, but also to assess damages. For damage computation purposes, the theory establishes a presumption that misinformation is reflected in the price of a security. In other words, market efficiency is posited to produce, under the impact of false information, a fraudulent mispricing, albeit a price that has integrity in the sense that it was set by a developed, impersonal and efficient market that was ignorant of the fraud.

IV. ISOLATING THE EFFECT OF MISREPRESENTATIONS ON PRICES—
THE PRESENT IMPRECISE METHODOLOGY

The first appellate court to endorse the fraud on the market theory[114] was also the progenitor of a hindsight approach to determining the fair value of a security. The court sanguinely stated:

> [F]rom an appropriate mix of the various methods we are confident that the jury will be able to trace a graph delineating the actual value of the stock throughout the class period. When compared with a comparable graph of the price the stock sold at, the determination of damages will be a mechanical task for each class member.[115]

While the *Blackie* court did not absolutely endorse a hindsight approach as the exclusive method of measuring price inflation, it stated that a decline in price after a so-called corrective announcement "is circumstantial evidence of the inflation, when (the security was) purchased."[116] Following this lead, many courts and commentators have used a hindsight approach in computing damages based on the stock price drop at the time of a corrective announcement of prior, misleading information to determine the amount of mis-

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Capital Sec. Litig., [1990 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 95,238, at 96,056 n.6 (N.D. Cal. Feb. 26, 1990); Cammer v. Bloom, 711 F. Supp. 1264, 1277 (D. N.J. 1989); *In re* ORFA Sec. Litig., 654 F. Supp. 1449, 1460 (D. N.J. 1987); Gruber v. Price Waterhouse, 117 F.R.D. 75, 81 (E.D. Pa. 1987); Rosenberg v. Digilog, Inc., 648 F. Supp. 40, 43-44 (E.D. Pa. 1985); *In re* Consumers Power Co. Sec. Litig., 105 F.R.D. 583, 609 (E.D. Mich. 1985); McFarland v. Memorex Corp., 96 F.R.D. 357 (N.D. Cal. 1982); Seiden v. Nicholson, 69 F.R.D. 681, 686 (N.D. Ill. 1976); Mirkin v. Wasserman, 278 Cal. Rptr. 729, 732 (Cal. Ct. App. 1991), *appeal filed* Cal. No. 5,020,465.

[114] Blackie v. Barrack, 524 F.2d 891 (9th Cir. 1975), *cert. denied*, 429 U.S. 816 (1976).
[115] *Id.* at 909 n.25.
[116] *Id.* at 909 n.25. *See also In re* Goldome Sec. Litig., [1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 96,086, at 90,456 (S.D.N.Y. June 17, 1991).

pricing resulting from the fraud.[117] They have generally assumed that the price line and the value line converge on the date of disclosure of the curative news, i.e., the "discovery" of the fraud. This approach assumes that the price decline at some point after the corrective disclosure is the starting point in the computation of the value line.[118] However, this can produce anomalous results. The

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[117] *See, e.g.*, Green v. Occidental Petroleum, 541 F.2d 1335, 1343 (9th Cir. 1976) (Sneed, J., concurring); Backman v. Polaroid Corp., 893 F.2d 1405, 1426-27 (1st Cir.), *opinion withdrawn and rev'd on other grounds*, 910 F.2d 10 (1st Cir. 1990) (en banc); Wool v. Tandem Computers Inc., 818 F.2d 1433, 1436-38 (9th Cir. 1987). Some courts have deduced the so-called fair value by using a price at which the stock traded after corrective disclosure was made. Harris v. American Inv. Co., 523 F.2d 220, 225-27 (8th Cir. 1975), *cert. denied*, 423 U.S. 1054 (1976); Esplin v. Hirschi, 402 F.2d 94, 104 (10th Cir. 1968), *cert. denied*, 394 U.S. 928 (1969); Tucker v. Arthur Andersen & Co., 67 F.R.D. 468, 482 (S.D.N.Y. 1975); *In re* Brown Co. Sec. Litig., 355 F. Supp. 574, 588 (S.D.N.Y. 1973); SEC v. Texas Gulf Sulphur Co., 331 F. Supp. 671, 672 (S.D.N.Y. 1971).

    Other courts, rather than looking at the price of the stock after corrective disclosure, have suggested that it is better to award damages by measuring the percentage impact of the disclosure of the negative news on the price of the stock and then apply that percentage to each class member's purchase price. *See* Sirota v. Solitron Devices, 673 F.2d 566, 576-77 (2d Cir.) (percentage by which the misstatement inflated the stock price), *cert. denied*, 459 U.S. 838 (1982); Blackie v. Barrack, 524 F.2d 891, 909 n.25 (9th Cir. 1975), *cert. denied*, 429 U.S. 816 (1976) (percentage change in price following corrective release is "circumstantial evidence of the inflation, when purchased, but is not the exclusive method of measuring inflation"); Entin v. Barg, 412 F. Supp. 508, 515-16 (E.D. Pa. 1976) (finding settlement calculated by measuring percentage impact reasonable). *Cf. In re* Goldome Sec. Litig., [1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 96,086, at 90,455 (defining recognized loss as difference between purchase price and either sales price (for class members who sold) or a deemed value (for class members who retained their stock)).

    [118] *See generally* Bradford Cornell & R. Gregory Morgan, *Using Finance Theory to Measure Damages in Fraud on the Market Cases*, 37 UCLA L. REV. 883, 900 (1990) (describing the comparable index approach and the event study approach to calculating the value line); Fischel, *supra* note 5, at 18 (describing the market model for measuring the effect of exogenous events on stock prices); Leas, *supra* note 77, at 388-89 (constructing a standardized approach to the market model to determine the amount of loss incurred). Cornell and Morgan describe the two commonly used methods of calculating the value line based on finance theory, which are known as the comparable index approach and the event study approach. *See* Cornell & Morgan, *supra*, at 900-11. Both methods are potentially biased. *Id.* The comparable index rolls the price back after the corrective disclosure, based on a market or industry index. This approach almost invariably is inaccurate because it ascribes every change in the stock price, relative to the index, to the fraud, which is rarely the case. *Id.* at 903. Numerous non-fraudulent company-specific factors may impact on the stock price. The index is merely an average, and companies rarely exactly follow an average. The event study approach rolls back the stock price after the corrective disclosure, using the index on days when fraud occurred and using actual returns on days when there was no fraud. This method is better than the other, but it too is flawed because it fails to account for leakage and drift. *Id.* at 903, 905. Additionally, it may be difficult to determine which days are "fraud days." *Id.* at 906. Cornell and Morgan believe that finance theory is inadequate to cure these deficiencies, and thus damages computed using finance theory and the market model will necessarily tend to either overestimate or underestimate damages.

price and value lines should not diverge until the point at which
the fraud was commenced, typically at the beginning of the class
period. However, when the hindsight approach is used to roll back
prices, they may not merge at the commencement of the fraud or
at any time prior thereto.[119] Thus, while a principal reason courts
have looked to the impact of the corrective disclosure to calculate
damages is a perceived difficulty in assessing the impact of misre-
presentations or omissions at the time they occurred,[120] a hindsight
approach using financial theory may lead to anomalous conclu-
sions. Of course, if the theory is flawed, ascribing price declines
to prior market mispricing due to misinformation may impose
"damages" upon defendants that in reality are merely the result
of normal market price movements.

Even assuming the theory is valid, using the raw decline at or
around the time of the corrective disclosure as a basis for measuring
damages is nevertheless fraught with hazard. As Cornell and Mor-
gan have observed, "only in rare circumstances does . . . observing
the market price of the security on a date by which all elements
of the fraud have been revealed [provide an estimate of the impact
of the omitted or misrepresented information] because, by that
time, the market price has been affected by much more information
than just the information previously misrepresented or omitted."[121]
As time passes from the fraudulent disclosures or omissions, in-
numerable other confounding factors affect the stock price, so the
disclosure revealing the fraud rarely addresses the original fraud-
ulent disclosure or omissions alone. At the time of the corrective
disclosures, information that did not exist at the time of the mis-
representation or omission may be affecting the price such that the
price change upon discovery of the fraud may not indicate what
the price would have been without the fraud. These causal events
may be either market- or industry-wide or even firm-specific.

In sum, the corrective disclosure may occur many months or
even several years after the improper disclosure, resulting in vari-

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Id. at 911. Likewise, they question the wisdom of placing the burden of error on the party
having the burden of proof. *Id.* at 916.

[119] Cornell & Morgan, *supra* note 118, at 911.

[120] *See* Harris v. American Inv. Co., 523 F.2d 220, 226 (8th Cir. 1975), *cert. denied*,
423 U.S. 1054 (1976); Cornell & Morgan, *supra* note 118, at 909.

[121] Cornell & Morgan, *supra* note 118, at 894-95; *see also* Gerstle v. Gamble-Skogmo,
Inc., 478 F.2d 1281, 1306 (2d Cir. 1973) ("[t]he passage of time introduces so many elements
. . . that extreme prolongation of the period for calculating damages may be grossly
unfair.").

ance in market reactivity that may yield disproportionate price results. Thus, it is often the case that when a corrective announcement is made, the ensuing decline in the stock price reflects many current factors other than the correction of the alleged prior misrepresentation.[122] Indeed, despite the sanguine statements in *Blackie* regarding the jury's ability to calculate damages and despite fifteen years of experience with fraud on the market cases since *Blackie*, the trial court in one of the very few securities cases to actually go to trial described the evidence as to damage calculation as "confusing."[123]

There is a manifest need to quantify the amount, if any, by which a misrepresentation actually inflated the stock price. Otherwise, defendants are being subjected to a virtual presumption of damages equal to a price decline that is actually based upon idiosyncracies (firm-, industry-, or world-wide economic events) having nothing to do with the alleged misrepresentation. Indeed, an apparent byproduct of fraud on the market theory and the hindsight approach is the phenomenon that a company whose stock price drops is a ripe target for securities class action litigation.[124]

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[122] An example may clarify this. Assume that there has been a misrepresentation or omission on March 15, 1991, when the financial statements issued for the calendar year 1990 disclosed a downward restatement of the 1989 results. The reason offered for the restatement is the discovery of errors caused by weaknesses in internal controls. At the same time, the SEC initiates an investigation into the accounting and internal control systems of the company. The investigation itself bodes ill for the company in that it will inhibit the company's ability to finance its future operations through either debt or equity. Further, the company's fortunes have independently taken a downward turn due to a combination of factors, including competitors' new product introductions and an increase in the dollar's price relative to certain foreign currencies. The current projected earnings per share for 1991 are therefore less than expected. Accordingly, the liquidity position of the company has deteriorated, its inventory and accounts receivable turnover ratios have declined, and bank and trade creditor financing of the company's ongoing operations is strained. Immediately following the virtually simultaneous occurrence of the announcement and the market's discovery of all these events, the price of the stock plummets by approximately 25%. Clearly, this 25% decline is the result of numerous conjunctive causes, only one of which is the disclosure of the alleged prior misrepresentation.

[123] *In re* Apple Sec. Litig., No. C-84-20148(A), slip op. at 3 (N.D. Cal. filed Sept. 6, 1991) (granting new trial because jury's special verdict was inconsistent with evidence presented).

[124] *See* Cornell & Morgan, *supra* note 118, at 903. The computer industry is an excellent example of this problem. Over the past twenty years many, if not most, companies in the computer industry in the United States and their directors and officers have been sued for securities fraud, some more than once, at considerable cost in time and money. *See* Daniel R. Fischel, *The Regulation of Accounting: Some Economic Issues*, 52 BROOK. L. REV. 1051, 1054 (1987). In most cases, the allegations are that actual earnings did not meet projections. In reality, however, the plethora of computer industry securities fraud cases is probably

Related to the general bias towards liability and damages in using a hindsight approach are the limitations of regression analysis as a means of statistically extracting from a stock's price move-

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due to the dynamics of the industry, particularly with respect to changing product lines and technology, the difficulty of predicting earnings in such circumstances, and the market's understandable skittishness in an industry where rapid change makes it very difficult to gauge the long-term implications of current earnings disappointments. *See id.* The following companies in the computer industry are among those that have been sued in one or more waves of securities class actions: Apple Computer, Amdahl, ASK Computer, Atari, Bolt Bernak & Newman Company Computer, Coleco, Commodore, Computervision Corp., Control Data, Convergent Technology, Convex Computer, Cray Research, Daisy Systems, Data Access Systems, Data General Corp., Datapoint, Digital Equipment, Fortune Systems, IBM, Interlogic Trace, Kulicke & Soffa, Mentor Graphics, Seagate Technology, Silicon Graphics, Software Toolworks, Storage Technology, Sun Microsystems, Tandem, Tandy, Texas Instruments, Wyse Technology, and Xerox. *See* Capri Optics Profit Sharing v. Digital Equip. Corp., 950 F.2d 5 (1st Cir. 1991); *In re* Convergent Technologies Sec. Litig., 948 F.2d 507 (9th Cir. 1991); *In re* Kulicke & Soffa Industries, Inc. Sec. Litig., 944 F.2d 897 (3d Cir. 1991); *In re* Control Data Corp. Sec. Litig., 933.F.2d 616 (8th Cir.), *cert. denied sub nom.*, KPMG Peat Marwick v. Abbey, 112 S. Ct. 438 (1991); *In re* Apple Computer Sec. Litig., 886 F.2d 1109 (9th Cir. 1989), *cert. denied sub nom.* Schneider v. Apple Computer, Inc., 496 U.S. 943 (1990); *In re* Data Access Systems Sec. Litig., 843 F.2d 1537 (3d Cir.), *cert. denied sub nom.* Vitiello v. I. Kahlowsky & Co., 488 U.S. 849 (1988); Wool v. Tandem Computers Inc., 818 F.2d 1433 (9th Cir. 1987); *In re* Warner Communications Sec. Litig., 798 F.2d 35 (2d Cir. 1986); Sibley v. Tandy Corp., 543 F.2d 340 (5th Cir. 1976), *reh'g granted,* 547 F.2d 286, *and cert. denied,* 434 U.S. 824 (1977); SEC v. Senex Corp., 534 F.2d 1240 (6th Cir. 1976); *In re* Sun Microsystems Sec. Litig., No. C-89-20351 RMW (PVT), 1992 U.S. Dist. LEXIS 13009 (N.D. Cal. July 10, 1992); Wright v. International Business Mach. No. 91-C3517, 1992 U.S. Dist. LEXIS 10,110 (N.D. Ill. July 1, 1992); *In re* Software Toolworks, Inc., 789 F. Supp. 1489 (N.D. Cal. 1992); Zaltzman v. Clark, [1991-1992 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 96,603 (N.D. Cal. March 17, 1992); Pinkowitz v. Data General Corp., [1991-1992 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 96,532 (D. Mass. Dec. 27, 1991); *In re* Daisy Systems Sec. Litig., [1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 96,190 (N.D. Cal. August 9, 1991); Prostic v. Xerox Corp., [1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 96,197 (D. Conn. July 19, 1991); *In re* Ask Computer Systems Sec. Litig., [1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 96,023 (N.D. Cal. Mar. 11, 1991); Ensign Corp., S.A. v. Interlogic Trace, Inc., [1990-1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 95,766 (S.D.N.Y. December 19, 1990); *In re* Storage Technology Corp. Sec. Litig., [1990-1991 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 95,688 (D. Colo. September 28, 1990); *In re* Seagate Technology II Sec. Litig., [1990 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 95,427 (N.D. Cal. June 19, 1990); *In re* Wyse Technology Sec. Litig., 744 F. Supp. 207 (N.D. Cal.), *motion granted, stay granted,* [1990 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 95,509 (N.D. Cal. Feb. 16, 1990); *In re* Fortune Sec. Litig., No. C-83-3348(A)WHO, 1988 U.S. Dist. LEXIS 18505 (N.D. Cal. May 10, 1988); Tolan v. Computervision Corp., 696 F. Supp. 771 (D. Mass. 1988); Sherin v. Smith, [1987-1988 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 93,582 (E.D. Pa. October 22, 1987) (involving Commodore); Bianco v. Texas Instruments, Inc., 627 F. Supp. 154 (N.D. Ill. 1985); *In re* Digital Equipment Corp. Sec. Litig., [1984-1985 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 91,991 (D. Mass. March 20, 1985); *In re* Coleco Sec. Litig., 591 F. Supp. 1488 (S.D.N.Y. 1984). It is possible that such litigation inhibits economic growth by unduly penalizing innovative competitive risk-takers.

ments general stock market and industry price movements.[125] While pertinent and helpful, regression analysis often explains only partially the behavior of a company's stock price and suffers from the tendency, in the absence of other methodology, to permit the inference that all statistically significant unexplained price behavior is the result of a prior misrepresentation.

Thus, even before addressing an empirical methodology to measure the impact of information, an understanding of the determinants of price movements is necessary. One must bear in mind that the amount by which publicly available information explains the price changes of a security can be remarkably small compared to the amount of the changes in the security's prices.[126] That is, stock prices may fluctuate far more than can be explained by news,[127] and "prices may soar or dive like the erratic movement of a kite in flight" without a material change in publicly available information about economic fundamentals.[128]

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[125] Regression analysis seeks to determine the effect of one or more variables upon the variable of interest. *See generally* Michael O. Finkelstein, *The Judicial Reception of Multiple Regression Studies in Race and Set Discrimination Cases*, 80 COLUM. L. REV. 737 (1980) (examining recurring problems and possible solutions in the courts' use of multiple regression analysis); Franklin M. Fisher, *Multiple Regression in Legal Proceedings*, 80 COLUM. L. REV. 702 (1980) (explaining the basic concepts of multiple regression and exploring its various uses in legal proceedings). The generally used measure of the historical sensitivity of the change in a stock's price to changes in the price of market or industry averages is the well-known "beta." This measure can be determined historically and used to predict how a stock would perform relative to the market and industry. The difference between a stock's returns and its expected returns based upon a historical relationship or "beta" is the abnormal return. This abnormal return exhibits both positive and negative unexplained residuals relative to what might be expected given the historical relationship, which must be painstakingly explained by events. *See* Fischel, *supra* note 5, at 18 & n.47; Leas, *supra* note 77, at 389-90; *see also* Akerman v. Oryx Communications, 810 F.2d 336, 342-43 & n.2 (2d Cir. 1987) (denying plaintiff's appeal from its motion for summary judgment because plaintiff's statistical comparisons failed to examine other variables affecting price); Gartenberg v. Merrill Lynch Asset Management, Inc., 573 F. Supp. 1293, 1313 n.19 (S.D.N.Y. 1983) (finding results of regression analysis unreliable because failed to properly use an abnormal price index), *aff'd*, 740 F.2d 190 (2d Cir. 1984); Chiang & Tapley, *supra* note 68, at 368 (various market anomalies suggest need for determination of a market's responsiveness); Dyl & Maberly, *supra* note 68, at 1152 (implying a need for individual assessment of a market's responsiveness due to various lull patterns found in the market); French and Roll, *supra* note 68, at 5 (assessment of the market's responsiveness is desirable in particular cases to avoid an award of excessive damages).

[126] *See, e.g.*, Cutler et al., *supra* note 76, at 9; FROOT ET AL., *supra* note 32, at 6; Roll, *supra* note 76, at 566; John J. Curran, *Why Investors Misjudge the Odds*, FORTUNE, Fall 1988, at 85, 86; Hector, *supra* note 64, at 76; Schifrin, *supra* note 64, at 61.

[127] *See* John Y. Campbell, *A Variance Decomposition for Stock Returns*, 101 ECON. J. 157, 176-77 (1991); FROOT ET AL., *supra* note 32, at 6.

[128] Laing, *supra* note 64, at 12.

While the efficient market hypothesis tends to dismiss securities price fluctuations unexplained by news as mere random noise or revisions of risk assessment, some notable academics believe that the actions of noise traders may significantly affect securities markets.[129] Therefore, price responsiveness to news should be analyzed with regard to the particular fraud on the market case in order to determine the bounds of market efficiency.[130] If there are significant price movements without an accompanying material change in economic fundamentals, then either the market is not acting efficiently or, assuming efficiency, non-fundamental economic forces are at work. Although a lack of responsiveness to news may indicate a lack of efficiency, it may also show low sensitivity to news as compared to other forces.

Consider initially a couple of intuitive propositions. First, the lack of consensus among market participants with respect to the implications of a particular piece of false news for the future prospects of the company should be inversely related to the degree to which that piece of information could "mislead" the market. That is, the larger the disagreement, the less the information giving rise to that disagreement can be viewed to have "misled" the market or mispriced a security.

Consider, also, that the very uncertainty surrounding information, rather than the content of the information itself, may attract traders, particularly professional traders, who perceive in a highly uncertain environment an opportunity to profit by trading on price fluctuations.[131] If this is so, a high level of volatility,

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[129] Ayers, *supra* note 15, at 978-83; J. Bradford DeLong et al., *Noise Traders Risk and Financial Markets*, 98 J. POL. ECON. 703, 704 (1990); Gerard Gennotte & Hayne Leland, *Market Liquidity, Hedging and Crashes*, 80 AM. ECON. REV. 999, 1001 (1990); Schleifer & Summers, *supra* note 110, at 27.

[130] *See* Freeman v. Laventhol & Horwath, 915 F.2d 193 (6th Cir. 1990) (finding market for newly created bonds not efficient because of a lack of responsiveness); Cammer v. Bloom, 711 F. Supp. 1264 (D.N.J. 1989) (responsiveness of stock prices to company-specific news is an indication of whether the market is efficient); ALAN R. BROMBERG & LEWIS D. LOWENFELS, 4 SECURITIES FRAUD AND COMMODITIES FRAUD § 8.6 (1988) (advocating a determination of responsiveness in each case).

[131] Professional traders' transaction costs are so small that they can profit on a fluctuation of an eighth or quarter of a point. Thus, in a rapidly fluctuating market, professional traders can profit by rapidly trading in and out of stocks. In addition, traders may seek to have others emulate their actions so as to increase directional price movements. Delong et al., *supra* note 129, at 718; *see also* Craig Torres, *Are "Slam Dunks" on Troubled Stocks a Foul?*, WALL ST. J., Feb. 1, 1991, at C1 (describing a new variant on the bear raids called the "slam dunk," in which traders sell shares to encourage others to emulate them so that they can profit from "deep in the money" put options); Ayers, *supra*

caused or accompanied by professional trading and speculation, may signal that prices are not based on the content of information as much as they are the products of traders' attempts to profit from uncertainty.[132]

If these considerations are plausible, then market activity and mechanisms should be examined closely to determine whether contemporaneous information in a given case in fact directionally affects market price. Unless allegedly false information actually does affect the market price of a security directionally up *or* down, rather than merely causing fluctuations up *and* down, its importance to a hypothetical reasonable investor is irrelevant, and its role in setting prices is superseded by other causes.[133]

Most fraud on the market securities actions allege, and counsel and the courts often assume, that securities prices change based upon the market's digesting and reaching a consensus as to the import of news. However, prices, and especially price fluctuations, may reflect disagreement and lack of consensus regarding news. When this occurs, prices may not reflect news in a perceptibly stable manner. While the efficient market hypothesis can work, even if different investors have different opinions (in that the overall impressions of all investors will be offset in the process of setting a market price),[134] the degree to which the market is misled by news may be considerably less than in the hypothetical situation of a commonly held view.

Contrast, for example, two cases involving misleading information with the same price impact. In the first case, all market

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note 15, at 978-80 (liquidity effects may increase due to investment strategies such as portfolio insurance); Gilson & Kraakman, *supra* note 16, at 561-62 n.41 (finding that the greater the heterogeneity of views, the greater the inefficiency according to the Capital Asset Pricing Model).

[132] *See* Sanford Grossman, *On the Efficiency of Competitive Stock Markets Where Trades Have Diverse Information*, 31 J. FIN. 573, 585 (1976).

[133] One example of a market driven by the lack of informational content of news appears to have occurred on November 8, 1990. On that day, President Bush called a news conference for 2:30 p.m. The time was then changed to 3:00 p.m., then to 3:30 and later to 4:00 p.m. Traders wondered with each change what could be going on to cause the delays. Unfounded rumors that the delays were due to some action regarding Iraq shot through the trading rooms. Short term traders and program traders rushed into the market, causing prices to gyrate wildly and the trading volume to rise. Robert J. Coles, *Stock on Roller Coaster as Dow Rises 2.97*, N.Y. TIMES, Nov. 9, 1990, at D6; Craig S. Smith, *Share Prices End Slightly Higher*, WALL ST. J., November 9, 1990, at C2.

[134] *See* Gilson & Kraakman, *supra* note 16, at 620-21; *see also* John Lintner, *The Aggregation of Investors' Diverse Judgments and Preferences in Purely Competitive Security Markets*, 4 J. FIN. & QUANTITATIVE ANALYSIS 347, 360 (1969) (positing a representative investor reflecting a consensus to explain the aggregate effect of all investors' opinions).

KENTUCKY LAW JOURNAL [VOL. 81

participants uniformly revised their expectations in the same direction and magnitude in response to the news. The second case, however, is characterized by greatly differing interpretations of the news. Some have revised expectations upwards by varying magnitudes; others have revised their expectation downwards by varying magnitudes. Can the two cases be said to reflect the same degree of misleadingness of news? The greater the manifest dispersion of beliefs in reaction to the false announcements, the less the degree of market misleadingness. Of course, at the extreme, disagreement can be such that equal mixtures of favorable and unfavorable revisions of expectations given the same news exactly offset each other, leaving price unchanged while possibly resulting in a large volume of trading. In most cases, however, we would expect some price impact depending upon the extent of disagreement among investors and traders.[135]

Relevant to the phenomenon of disparity of investor beliefs concerning specific information is the phenomenon of traders who trade for reasons other than their assessment of information, such as profiting from trading gamesmanship. The classic example of the latter is the apocryphal story of Nathan Rothschild, the pillar of the London Exchange, who when he was the first to learn of the result of the battle of Waterloo, sold in order to signal to others the opposite of his true intention so he could buy at a lower

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[135] *In re* Texas Int'l Sec. Litig., 114 F.R.D. 33 (W.D. Okla. 1987), is an example with which the authors are directly familiar. The company was heavily leveraged and engaged in non-diversified wildcat drilling in the Gulf of Mexico in an area where the major oil companies had concluded that there was no economically recoverable oil. The company was drilling deeper than had been done before with new, untried technology. If oil was found almost a billion dollars would have to be spent to recover it. Nevertheless, given the extremely high oil prices at the time and various estimates of future prices as high as $100 a barrel, if oil were found in sufficient quantities, the recovery cost might be warranted. Estimates of future cash flows ranged from very negative to billions of dollars positive. The stock price soared and plunged erratically. Ultimately, however, oil prices collapsed, making further drilling uneconomical. In addition, a critical drill broke before reaching the desired depth. The stock, which had traded as high as eighty dollars a share (adjusted for a split) sank to two dollars a share before the company announced, approximately two years later, that it was writing down its oil reserves based on new lower estimates of the recoverable oil. The soaring and plunging trading activity prior to the collapse of the price of oil demonstrated an environment of extreme uncertainty and changing predictions and showed the extreme degree of disagreement among traders concerning the future. There literally was no "hard" or probative information in the market place. *See also* Roger Lowenstein, *Triton Hits Gusher on Street Amid Speculation by Analysts About a Big Oil Strike in Columbia*, WALL ST. J., May 1, 1991, at C2 ("Never mind that no one knows how much oil is there. When facts are scarce, dreams run wild.").

price.[136] Such bluffing can affect prices and, therefore, must be considered to some extent in measuring the impact of news on market price. However, while traders' gamesmanship may be the most vivid example of non-informational noise, modern program trading and other market-based technological practices may well have a greater impact on the market.[137]

While eliminating unfairness in the assessment of damages in Rule 10b-5 cases is an important objective, it is only part of the goal. The ability to measure the impact of information on price affects not only damage measurement but also the measurement of market efficiency, loss causation, and materiality—all predicates to finding liability. In other words, the employment of a crude methodology to determine market impact introduces biases in these four vital components of a securities fraud on the market case. Therefore, there is a manifest need to measure the market impact of misrepresentations with reasonable accuracy.

V.   DEVELOPING QUANTITATIVE METHODOLOGY

A.   The Responsiveness Coefficient—A Measure of Sensitivity to Information

A method of isolating the effect of an alleged misrepresentation is to assess the stock's price reaction to the corrective disclosure in light of its prior sensitivity to that particular type of news and

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[136] Lockwood, *supra* note 64, at 1308 n.192; *see also* Thomas Jaffe, *Follow The Money*, FORBES, Apr. 1, 1991, at 50 (On getting a hot tip to buy, Jesse Livermore would sell to test the market's buying strength.); Michael Lewis, *A Liar's Obituary*, WALL ST. J., Aug. 21, 1991, at A12 ("People who haven't worked on Wall Street have trouble understanding that the market often values lies more highly than the truth. . . . Traders spend a large part of their day pretending to their rivals to be selling when they want to buy and buying when they want to sell. Salesmen spend an even larger part of their day overpricing mediocre investments to their clients. This is less venal than it sounds. Everyone who deals with financial intermediaries knows better than to believe everything he hears. Anyone who does not is regarded as a fool."); Martin Mayer, *Falling Short*, N.Y. TIMES MAG., June 6, 1991, at 6, 13 (In the 1920s, market manipulators like "Sell-'em Ben" Smith and Joseph Kennedy, later to become the head of the SEC, would simply pour sales orders into the market until the public fled the stock, at which point they would buy shares from panicked holders at prices much lower than those at which they had sold short.); Jeffrey Taylor, *Psst! Want to Make a Small Fortune in Futures Markets*, WALL ST. J., Aug. 30, 1991, at A1 (examining deceptive practices in commodities trading); Craig Torres, *J.P. Morgan's Best-Kept Secret Is Shrewd, High-Stakes Trader*, WALL ST. J., Jan 10, 1992, at C1 (noting that a big trader who wants to be invisible uses derivatives rather than the underlying securities).

[137] *See* sources cited *supra* note 129.

other types of news. For any given market price decline at the time
of a corrective announcement, the portion attributable to the nor-
mal effect of an alleged prior misrepresentation reflecting the extent
to which the market was "misled" by that prior misrepresentation
may be assessed by examining the historical reaction of the stock's
price to news of that type. A measure of that impact is the
coefficient of responsiveness of the market price change to that
type of news. The lower the coefficient, the lower the portion of
the unexplained residual (at any time, such as at the time of the
corrective announcement) that should be attributed to the alleged
wrongdoing.[138]

In the following section, this analysis is employed to determine
the responsiveness measure, i.e., a response coefficient for a par-
ticular type of information.[139] In this way, the amount of price
change attributable to a specific event from among several coinci-
dental events can be isolated and measured empirically.

1. Sensitivity to Persistent and Transitory Components

The magnitude of stock price reactions to unexpected earnings
reports may depend on whether the unexpected portion of earnings
is recurrent in the future or is transitory.[140] The relatively larger

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[138] In the discussion that follows, for the most part, we examine earnings announce-
ments. However, a similar analysis can be employed with respect to other types of infor-
mation.

[139] In the case of earnings, the response coefficient is simply the ordinary least square
regression coefficient of unexpected earnings (the difference between the actual earnings
and forecasted earnings such as those provided by securities analysts) using unexpected
return as a dependent variable. Thus the response coefficient is "b" in the following model:

$$R_t - E(R_t) = a + b \frac{I_t - E(I_t)}{P_{t-1}} + U_t$$

where R_t is the stock return, $E(R_t)$ is the expected stock return based typically on the
historical relation with the market and the industry, I_t and $E(I_t)$ are accounting earnings
and expected accounting earnings, respectively, P_{t-1} is the price at the beginning of period
t, U_t is the error, and a and b are the regression coefficients. See Robert Kormendi &
Robert Lipe, *Earnings Innovations, Earnings Persistence, and Stock Returns*, 60 J. BUS.
323, 325 (1987).

[140] *See, e.g.*, JOSHUA RONEN & SIMCHA SADAN, SMOOTHING INCOME NUMBERS: OBJEC-
TIVES, MEANS, AND IMPLICATIONS 23-27 (1981) (finding the price reaction to announcements
of extraordinary income, which is typically non-recurring in nature by virtue of the applied
accounting standards, to be smaller than the same reaction to announcements of net ordinary
income). One dollar of unexpected earnings that is non-recurring would not create more
than one additional dollar in the value of the company. However if, for example, a one-
dollar unexpected increase in earnings is expected to persist indefinitely into the future, the
stock price would increase by the present value of a future annuity of $1 per share per

the persistent component, the larger generally is the sensitivity of the market prices to unexpected earnings announcements.[141] This, in turn, implies that the responsiveness coefficient for announcements reflects the degree to which market traders believe that an announced unexpected earnings change (whether increase or decrease) will persist into the future. The smaller the responsiveness coefficient, the lesser the degree to which the market is convinced that the earnings change will persist.

In other words, the responsiveness coefficient is a measure of "misleadingness." That is, the less the market believes earnings changes will persist into the future, the less the market is misled by a false report of earnings.[142] Different companies may well differ in the degree to which their earnings are perceived to be persistent by the market, and hence, in the degree to which the market can possibly be misled by earnings announcements.

The determinants of persistence are likely to be related to economic factors and characteristics of the companies in question.

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year. The increment would vary depending on the discount rate. The higher the discount rate, the smaller the present value, and hence, the smaller the increment of the stock price. For example, if the discount rate is 10%, the impact of $1 positive unexpected earnings anticipated to be recurring in perpetuity would be 1 divided by .1, yielding 10. In other words, $1 unexpected increment in earning which is expected to persist will increase stock price by ten dollars.

[141] A measure of the persistence of earnings can, in fact, be developed empirically and its relationship with the responsiveness of market prices to unexpected earnings can be examined. One such attempt is reported by Kormendi & Lipe, *supra* note 139, at 323. The authors' model assumes that (1) the stock price equals the present value of expected future benefits accruing to equity holders; (2) the present value of the revisions in unexpected accounting earnings approximates the present value of the revisions in these expected future benefits; and (3) a univariate auto-regressive model approximates market expectations of earnings. *Id.* at 342. From this, they deduce that the earnings responsiveness coefficient, that is, the coefficient of the time-series regression of unexpected returns on unexpected earnings properly scaled, should equal 1 plus PVR, the present value of the revisions in expected future earnings induced by a $1 innovation in current earnings as implied by the time-series properties of the earnings. *Id.* at 330. PVR is shown to equal:

$$\text{PVR} = \sum_{s=1}^{\infty} \beta^s \Theta_s = \frac{1}{(1-\beta)(1-\sum_{i=1}^{N}\beta^i b_i)} - 1$$

where Θ_s is the moving average parameter and $\beta = \dfrac{1}{1+r}$ where r is the approximate rate rate of interest for discounting expected future cash flows, and b_i reflects the time series properties of earnings. *Id.* at 330.

The empirical results strongly support a positive relation between the empirical responsiveness coefficient and 1 plus PVR. *Id.* at 342.

[142] A lack of responsiveness may also indicate that the information is disbelieved or discounted.

Companies whose earnings are generated by idiosyncratic projects are more likely to exhibit earnings shocks that are not persistent into the future. A good example is a film company whose earnings are crucially dependent on the idiosyncratic success or failure of the particular movies produced and exhibited during that period. Hence, any earning increase or decrease would be less likely to be perceived by the market to persist into the future. The market well realizes that future earnings will be a function of the particular characteristics of the movies that will be produced in the future, and may have little to do with the movies produced and exhibited historically.

In implementing this concept to compute damages in a particular case, it is not necessary to determine whether a given announcement has the same relative transitory and permanent components as a prior announcement. Relative market reaction to prior transitory and permanent announcements can be estimated. Then the degree to which an allegedly curative disclosure contains transitory or permanent components can be estimated to apportion the relative price drop upon the allegedly curative disclosure as between that disclosure's transitory and permanent components. Whether the alleged misrepresentation or omission is of either a permanent or (as is often the case) a transitory nature, the relative price drop due to the misrepresentation or omission can be isolated from the impact of other non-fraudulent confounding news.

2. *Alternative Sources of Information*

In isolating the effect of a misrepresentation, it is also necessary to consider the availability of alternative information sources. Indeed, *Basic* requires that the mix of information available to the reasonable investor be considered when determining materiality. In the real world there exist alternative information sources about a company, and the greater the quantity and quality of alternative information existing about that same company,[143] the less the com-

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[143] If enough outsiders know of the undisclosed information, there may be no substantial likelihood that a reasonable investor would view the disclosure of such information as significantly altering the total mix of information. Basic Inc. v. Levinson, 485 U.S. 224, 246 (1988). The Court in *Basic* stated that the presumption that withheld or misleading information was impounded in the market price may be rebutted by showing that the market makers knew of the correct information, in which case the price would not have been affected. *Id.* at 248. Hence, the causal connection would be broken, and the basis for finding that the fraud had been transmitted through the market price would no longer exist.

pany's announcements would be expected to have an impact on investor decisions, and hence on market prices. A company's earnings announcements would not "mislead" the market, thus causing false expectations about the company's future, when there exists reliable alternative information of its earnings prospects.[144]

Id. In *In re* Apple Computer Sec. Litig., 886 F.2d 1109, 1114 (9th Cir. 1989), *cert. denied*, 496 U.S. 943 (1990), the Ninth Circuit declared that "provided that they have credibly entered the market price through other means, the facts allegedly omitted by the defendant would already be reflected in the stock's price; the mechanism through which the market discovered the facts in question is not crucial." Such a defense will be entirely successful where the information has been "transmitted to the public with a degree of intensity and credibility sufficient to effectively counter-balance any misleading impression created by the insiders' one-sided representations." *Id.* at 1116. In *Apple*, the court rejected plaintiffs' expert's opinion that the investment community pays special attention to the statements of corporate management and therefore management's misstatements were material. *Id. See also In re* Convergent Technologies Sec. Litig., 948 F.2d 507, 512-13 (9th Cir. 1991) (finding that failure to include in prospectus facts regarding industry slowdowns which would reduce future earnings and reduction of orders from a major customer did not constitute a fraud on the market because the market was aware of the information); Delta Holdings, Inc. v. National Distillers & Chem. Corp., 945 F.2d 1226, 1246 (2d Cir. 1991) (management's failure to ascertain error in actuarial firm's evaluation of loss reserves was not a fraud on the market since plaintiff had access to same information); Wielgos v. Commonwealth Edison Co., 892 F.2d 509, 516 (7th Cir. 1989) ("Prompt incorporation of news into stock prices is the foundation for fraud-on-the-market doctrine and therefore supports a truth-on-the-market doctrine as well."); Jackvony v. RIHT Fin. Corp., 873 F.2d 411, 415 (1st Cir. 1989) (finding omissions regarding preliminary merger negotiations not material because market expects large corporations to be approached concerning mergers); Rowe v. Maremont Corp., 850 F.2d 1226, 1235 (7th Cir. 1988) ("Having sufficient information to call a representation into question may preclude an investor from later claiming that the representation was material."); Rodman v. Grant Found., 608 F.2d 64, 70 (2d Cir. 1979) (affirming district court's taking into account publicly known information in deciding materiality); Beissinger v. Rockwood Computer, 529 F. Supp. 770, 782 (E.D. Pa. 1981) (holding that even if statements in annual report contained misrepresentations and omissions the market would nevertheless have been aware of uncertainty based on computer industry norms in changing product lines). *But see* Hughes v. Dempsey-Tegeler & Co., 534 F.2d 156, 166 (9th Cir.) (finding that complete disclosure from other sources to an individual investor does not necessarily obviate an issuer's misrepresentation because even in the context of a complete disclosure, a misrepresentation may cause the person to whom it is addressed to discount the other information available to him.), *cert. denied,* 429 U.S. 896 (1976) (en banc); *In re* Western Union Sec. Litig., 120 F.R.D. 629, 634 (D. N.J. 1988) (finding the fact that class representative ignored available information not controlling on motion for class certification); State Teachers Retirement Bd. v. Fluor Corp., 566 F. Supp. 945, 952 (S.D.N.Y. 1983) (anticipating this argument, but finding that it presented a factual issue for jury); Jordan v. Global Natural Resources, Inc., 564 F. Supp. 59, 67 (S.D. Ohio 1983) (allegedly curative information from opposing side in proxy battle relevant to the issue of materiality, but not a basis for summary judgment).

[144] Robert Lipe, *The Relation Between Stock Returns and Accounting Earnings Given Alternative Information*, 65 ACCOUNTING REV. 49, 65-66 (1990), further illustrates how the response coefficient is positively related to persistence as well as to the predictability of earnings where predictability is seen as inversely related to the variance of unexpected earnings. This study involved a sample of 145 firms for the period from 1947 to 1980. *Id.*

Other things being equal, an increase in the amount of alternative information would decrease the response coefficient to the company's own announcements. In the context of securities fraud cases, the implication is that the lower the response coefficient for the type of disclosure, the more likely it is that there exists reliable alternative information about the company.

B. The Variance of Price Changes

Another measure that indicates the degree to which the market can be misled by the information announced by a company is the variance of stock price changes. Empirical research has shown that the variance of price changes is positively related to the variance in the earnings, or conversely, the variance of price changes is negatively correlated with predictability. Thus, the higher the variance of the price changes, the greater the likelihood that the market does not perceive the company's announcements as possessing high predictive value.[145] Indeed, a market that cannot predict a company's future prospects is inherently in an uncertain state, and false information therefore will not necessarily have a significant misleading effect.[146] So long as the information merely fuels the fires of uncertainty it will not mislead investors, but activity in the stock may increase.

C. Trading Volume Indices

We have suggested that the more market traders disagree about the implications of a piece of information announced about a company, the less the market may be "misled" by the information.

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[145] *See id.* at 63.

[146] Options prices and volume may give insight as to how traders actually react to news. For example, where news results in both put and call prices going up but the stock price remaining in the same range the likely implication would be that options traders are perceiving higher future volatility in the price of the underlying security. That is, the news has affected investor perceptions even though the stock price is unaffected. The market expects future price swings that are reflected in options prices but not yet reflected in the stock price. Uncertainty has increased, and hence the misleadingness of the announcement can be said to have decreased. In fact, the increase in option prices upon news announcement can be quantitatively used to determine that a given misrepresentation is immaterial. By using an accepted option pricing model, the increased variance implied in increased option prices can be computed. The higher implied variance will increase the standard error used in determining whether an observed impact of a misrepresentation (or its consequent curative revelation) is statistically significant, leading more often to the conclusion that the impact is insignificant and hence immaterial.

An example of an empirically observed measure of disagreement is the trading volume, specifically represented by the square root of the sum of squared changes in trades; that is, the sum of the squares of the individual trades where each trade counts twice—as a purchase and as a sale.[147] This calculation gives greater weight to larger trades, which are typically made by professional traders who have quicker and greater access to information. Similarly, the larger the trade, presumably the greater one's conviction. Therefore, this measure captures the dispersion in the intensity of traders' beliefs and reflects revisions in their beliefs over time.

This measure can be computed to reflect the dispersion of beliefs both before and after the information reaches the marketplace. Where new information generates great disagreement among sophisticated market participants regarding its implication for the potential future cash flow prospects of the company, this measure of trading volume and the size of the trades should increase substantially. Conversely, when new information promotes agreement and the market takes the announcement at face value, this measure should not be substantially different from the value computed for other periods.[148] For example, one method used to determine the extent of misleadingness of the news is to establish a "normal" trading volume reaction to the type of news contained in the alleged misleading disclosure. This "normal" trading volume reaction can

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[147] Alex Dontoh & Joshua Ronen, *Trading Volume and Price Reaction to Information Content of Public Disclosures* 16 (Feb. 1992) (unpublished manuscript, on file with the *Kentucky Law Journal*).

[148] The measure is computed based on two different trade figures. The first is simply the total trading volume for each day. The second is the number of blocks traded, where a block is determined by an arbitrary, predetermined large number and dollar value of shares. Typically, lots of such size are traded by institutions, brokers, and other professional traders. Block tradings serve as a barometer of the intensity of demand and supply of securities by sophisticated professional traders and speculators. A block size of a high enough dollar value is beyond the means and trading habits of the ordinary investing public. The number of blocks traded on an uptick and those traded on a downtick, and the average block size, are calculated and compared with the day to day variation in the daily stock return. In particular, the average block size may have a significant impact on price changes and returns. This measure can be distorted by bunching or splitting of trades and program trading. Indeed, bunching and splitting of trades is one of the areas which the Market Reform Act of 1990 permits the SEC to monitor. *See* Market Reform Act of 1990, 15 U.S.C.S. § 78a (Law. Co-op. Supp. 1990). The trading volume measure is computed separately by looking at the total volume as well as the volume of block trading. The results confirm the hypothesis that the trading measure, which theoretically is associated with disagreement about the implications of the news, typically reaches a higher magnitude at the time of an announcement that can be seen to be generating disagreement such as is manifest in analysts' divergent interpretations of the announcement.

be estimated to serve as a benchmark against which is compared the trading volume reaction to the alleged curative news. Thus, if, for example, the trading volume reaction to an alleged misleading disclosure or consequent curative disclosure is significantly larger than the benchmark (the normal trading volume reaction) one may (as a crude measure) discount the "misleadingness" of the allegedly misleading disclosure by an appropriately determined percentage.

D. *Financial Analysts' Revisions in Response to News*

As pointed out by the Court in *Basic*, financial analysts may be considered representative of the sophisticated market participants who are informed about a company.[149] Hence, their estimates

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[149] One must consider, however, that analysts may be pressured to report information favorable to the company or their employers. Analysts also are purported to be an optimistic lot whose forecasts tend to be on the high side, and analysts' buy recommendations abound while sell recommendations are rare. *See* Baldwin, *supra* note 64, at 147-48 (analysts are habitually optimistic); Eric N. Berg, *If the News is Bad, Silence the Messenger*, N.Y. TIMES, May, 15, 1990, at D1 (recounting tales of companies bullying analysts who recommend selling the company's stocks); John R. Dorfman, *When'Wall Street Says "Sell", It's Usually Too Late*, WALL ST. J., Jan. 8, 1991, at C1 ("Brokerage firms usually recommend four to five 'buys' for every 'sell'. And, the 'sells' usually come after the stock has fallen."); Floyd Norris, *Profit Forecasts: How Accurate?*, N.Y. TIMES, May 8, 1990, at D10 (analysts are an optimistic lot, often accepting "the company's own rosy scenario"); Michael Siconolfi, *Under Pressure at Morgan Stanley, Analysts Were Urged to Soften Harsh Views*, WALL ST. J., July 14, 1992, at A1 (finding that investment bankers often pressure research analysts to alter negative reports on the stocks of the firm's clients, particularly those for which it did the underwriting).

There are several reasons for this. Sell ratings are not big commissions generators, many investors ignore them, and they generate ill-will. Brokerage houses can lose corporate finance business and analysts' access to company personnel. Berg, *supra*, at D1; Siconolfi, *supra*, at A1. In a celebrated case, Janney Montgomery Scott was reported to have dismissed analyst Marvin Rothman when he issued a negative, albeit accurate, report on Donald Trump's Taj Mahal casino and Trump objected. *See, e.g.*, Berg, *supra*, at D1; John R. Dorfman, *Analysts Devote More Time To Selling As Firms Keep Scorecard On Performance*, WALL ST. J., Oct. 29, 1991, at C1; Milo Geyelin, *Fired Analyst Ends A Winner In Trump Flap*, WALL ST. J., March 6, 1991, at C1; John Markoff, *Dismissed in Trump Case, Analyst Is Awarded $750,000*, N.Y. TIMES, March 6, 1991, at D1; Ellen E. Shultz, *Wall Street Grows Treacherous For Analysts Who Speak Out*, WALL ST. J., Apr. 15, 1990, at C1. Purportedly, in Japan, sell recommendations on Japanese stocks "would border on heresy in a market where securities firms are known for their undying optimism." Quentin Hardy & Clay Chandler, *Scandal Tames Nomura and Alters Dynamics of Tokyo Stock Market*, WALL ST. J., Aug. 29, 1991, at C1; John R. Dorfman, *Analysts Frequently Own Stocks They Tout*, WALL ST. J., Jan. 7, 1992, at C1; *see also* Laing, *supra* note 64, at 12 (Securities analysts are no more sober or rational than the average investor. Analysts' estimates of earnings have dramatically overstated the mark in nine of the past ten years. "[T]heir numbers weren't even close to reality.").

Furthermore, the *Wall Street Journal* reports that the quality of analysts' reports is declining because low commission rates have made research analysts uneconomical. William

of the company's earnings and the revision of these estimates may reflect, to some extent, the impact of an alleged fraud on the market. Because the market reaction in any given time window surrounding the disclosure of the corrective information represents a variety of events, many of which are unrelated to the alleged misrepresentation, analysts' revisions may be used to assess the pertinent portion of the market's reaction attributable to the misrepresentation.

An example may clarify this approach. Suppose that a company announces a restatement of its financial results. The plaintiffs argue that accounting policies prior to the restatement misrepresented results and misled investors. An often used approach for estimating damages would be to observe the market's reaction at the time of the restatement to deduce the percentage decline in the stock price that is attributable to the prior overstatement.

However, the cumulative decline of price was a reaction not only to the actual content of the restatement but also to other negative factors that could adversely affect the stock price performance of the company during the announcement period. One basic factor is the mere fact that there was a restatement of the financials. For example, a change in the application of accounting principles could indicate factors not fully reflected in the figures, such as a slackening of demand. These uncertainties would be enough to make investors balk and would not be fully resolved until future reports dispelled these anxieties. The question is how

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Power, *Wall Street Research Faulted by Big Institutional Investors*, WALL ST. J., July 31, 1991, at C18; *see also* Susan Antilla, *Analysts: The Gang That Couldn't Pick Straight?*, N.Y. TIMES, Aug. 10, 1992, at D1 (suggesting that analysts may be too busy to analyze and, even with adequate time, attempts may be futile due to the presence of too many variables). For a humorous treatment of analysts and Wall Street generally, see FRED SCHWED, JR., WHERE ARE THE CUSTOMERS' YACHTS 195 (1940) (describing analysts as "thousands of erring humans, of varying degrees of good will, solemnly engaged in the business of predicting the unpredictable"). Another factor perpetuating "low quality" information is that brokers may not share analysts' views. This may result from brokers feeling pressured, or otherwise motivated, to recommend certain investments to their customers. *See* Jayne W. Barnard, *Sears Incentives, A Wall Street Parallel*, N.Y. TIMES, Aug. 30, 1992, at F11 ("where auto mechanics had a financial stake in selling specific services, car owners often ended up paying for unneeded work; where stockbrokers have a financial stake in selling specific products, investors find themselves getting questionable investment advice"); John Dorfman, *Poll Shows Brokers Stick to Household Names in Stocks, Yawning at Research Reports' Picks*, WALL ST. J., June 1, 1992, at C2 (quoting Art Rivel, president of Rivel Research, as saying "'[b]rokers tend to mirror their customers'" thus suggesting "[f]amiliar names . . . are easier to sell."); Chuck Hawkin & Leah N. Spiro, *The Mess at Pru-Bache*, BUS. WEEK, Mar. 4, 1991, at 66, 72 (noting that brokers are pressured and compensated to have customers invest in investments syndicated by the firm).

to isolate the effects of the alleged prior misstatement from other factors that, together, seem to have induced a negative abnormal return.

As mentioned, the analysts may have been aware of the difference in quality of earnings and the effect of differing accounting income recognition policies. They may not have been fooled by one accounting treatment or another. Earning surprises may have been discounted, deemed transitory, or otherwise not thought to have real permanent implications for the company's future cash flows. A quantitative measure of the analysts' true assessment of the real impact of an "overstatement" can be derived from the analysts' forecasts and their revisions of such forecasts for the same future period made subsequent to the restatement announcement. The average downward revision of a previously made analyst forecast constitutes a proxy for a restatement's impact on future cash flows as assessed by analysts.

A careful study of the analysts' reports following the restatement can yield an average downward revision that will probably be purely attributable to the disclosure of fraud as a proportion of the total restatement amount. In this way, it is a proxy for the proportion of the drop in stock price caused by the fraud. Thus, when analysts' estimates of earnings and their revisions are available, they can be used to quantify the portion of the negative market reaction at the time of the corrective disclosure that is purely attributable to the alleged misstatement, adjusted, as necessary, for analysts' forecasting accuracy and bias. Furthermore, in a projection's case, an analysis of the difference between management's internal forecasts and analysts' contemporaneous forecasts at the time of the alleged misstatement or omission as compared to the ultimate financial results yields a measure that can be used to apportion the share price decline coincident with the corrective announcement. The decline should be apportioned by the ratio of the difference between management's internal projections and its external forecasts to the difference between analysts' forecasts at the time of management's external forecasts and the actual results.

E.   The Basic *Problem: Establishing an Equivalent Disclosure Price Based on Ex Ante Prices Rather Than Ex Post Prices*

In *Basic*, despite management's denials that merger negotiations were occurring, the company's stock price rose fifty percent during the class period and before the corrective disclosure. Indeed, the

market was so efficient that it identified Basic as a takeover can-
didate and Basic's stock rose in heavy trading based on takeover
speculation before merger negotiations even commenced.[150] As early
as 1965 or 1966, Combustion Engineering had expressed some
interest in acquiring Basic but was deterred from pursuing this
inclination because of antitrust concerns.[151] Beginning in September
of 1976, Combustion representatives met with Basic's directors and
officers. Combustion requested that its investment banker, First
Boston, prepare a feasibility report for the acquisition at prices of
$18, $20 and $22 per share.[152] Thereafter, in August and on October
18, 1977, Basic's management met with its investment banker,
Kidder Peabody, to discuss the valuation of the firm for merger
negotiations. On October 19 and 20, 1977, the volume in Basic
stock rose from an average of 6000 to 8000 shares to 29,000 shares
per day. Normal trading volume in Basic stock was 2000 to 8000
shares.[153] On October 21, 1977, Basic's president denied the exis-
tence of merger negotiations and claimed there was no known
reason for the stock's activity.[154]

Between October of 1977 and September of 1978, the contacts
between the two companies continued. In June of 1978, Combus-
tion apparently informally offered $28 and on July 14, Basic's
stock rose sharply by twelve per cent to 26 7/8 on a volume of
18,200 shares. A company spokesperson again denied any undis-
closed merger plans.[155] On September 14, 1978, First Boston pre-
pared a draft proposal of an agreement to merge, and before noon
on September 25, Basic's stock price rose to 32 7/8 on a volume
of 28,500 shares.[156] On that day the Dow was down more than
three points.[157] Like Peter in the courtyard of the high priest,[158] for
a third time Basic made an untruthful denial that its management
was aware of any corporate development that would account for
the abnormally heavy volume and price fluctuation in Basic's
shares.[159]

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[150] *See* Basic Inc. v. Levinson, 485 U.S. 224, 227 & n.4, 229 & n.5 (1988).
[151] *Id.* at 226.
[152] Levinson v. Basic Inc., 786 F.2d 741, 744 (6th Cir. 1986), *vacated,* 485 U.S. 224
(1988).
[153] *Id.*
[154] *Id.*
[155] *Id.* at 745 n.2.
[156] *Id.* at 745 n.3.
[157] *Id.*
[158] *Luke* 23:54-62.
[159] *Basic,* 786 F.2d at 745.

In October of 1978, the Sixth Circuit ruling was issued, alleviating anti-trust concerns and leading members of Basic's management to conclude that it "would be a good time to get the acquisition done."[160] For a fourth time, in early November, Basic denied any reason for the activity in its stock. In late November, 1978, Basic rejected Combustion's all cash bid of $35 per share.[161] On December 14, 1978 Combustion approved an offer of $46 per share. The next day Basic's stock again soared, and for the fifth time, Basic denied any developments.[162] Finally, on December 18, 1978, Basic asked the NYSE to suspend trading pending an announcement, and on December 19, Basic agreed to accept Combustion's offer and the merger was announced on December 20.[163]

Somehow the market appears to have had sharp insight into the negotiation process; Basic's volume and share price rose quickly upon the occurrence of publicly undisclosed key events despite management's pregnant denials. Clearly, the merger was a very poorly kept secret. Indeed, the Court of Appeals noted that an analyst with a brokerage house was told by Basic's Chairman and CEO at least six times between January and October or November of 1978 that Basic had in fact been approached regarding a potential merger.[164] Even the plurality in *Basic* noted the incongruity between the assumption that Basic's shares were traded on an efficient, information-hungry market and that the market could have been misinformed.[165] For that same reason, Justice White, dissenting, felt the particular facts of *Basic* made it an "exceedingly poor candidate for the majority's fraud on the market theory."[166]

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[160] *Id.*
[161] *Id.*
[162] *Id.*
[163] *Id.*
[164] *Id.*
[165] *Basic*, 485 U.S. at 249 n.29.
[166] *Id.* at 259. In the respect that *Basic* involved a takeover, Justice White was certainly right. Courts do not accept the market price as reflecting the total mix of publicly available information as to value in the context of acquisitions. *See, e.g.*, Paramount Communications Inc. v. Time Inc., [1989 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 94,514, at 93,277 (Del. Ch. Ct. July 14, 1989) (The efficient market theory has not been given "the dignity of a sacred text" and directors, when valuing a stock buy-out, may operate on the theory that the stock market valuation is wrong.); Smith v. Van Gorkom, 488 A.2d 858, 876 (Del. 1985) (holding that market price is not an adequate basis for valuing corporation). Acquisition prices have generally been far higher than market prices, which appears inconsistent with the efficient market hypothesis and fraud-on-the-market theory. *See* sources cited *supra* note 64 and *infra* note 170. In Viacom Int'l Inc. v. Icahn, 946 F.2d 998, 999 (2d Cir. 1991), *cert. denied*, 112 S. Ct. 1244 (1992), Icahn received greenmail of $79.50 a share at a time

Herein we see another anomaly in *Basic*. The defense was afforded
the right to rebut the presumption of reliance by demonstrating
that a class member was engaged in takeover speculation and was
not relying upon the integrity of the market price of the takeover
candidate.[167] Yet in *Basic*, a market based on takeover speculation
is seen as providing a presumptively mispriced security. Logically,
it seems that evidence of takeover speculation should require fur-
ther analysis of whether a presumption was warranted.

Cornell and Morgan argue that *Basic* demonstrates the inade-
quacy of the current models for determining materiality, reliance,
and market impact.[168] They term the situation when Basic's man-
agement was denying that merger negotiations were taking place
as "underdisclosure," and the situation after the merger was an-
nounced as "over-disclosure," of the fraud. They claim it is not
possible to construct an "equivalent disclosure price" at which
Basic's securities would have traded had the omitted information
been accurately disclosed based on finance theory and actual stock
prices.[169] That is, they argue that one cannot look at Basic's stock
at any time and use that price as the measure of what the stock
price would have been at another time, had there been full disclo-
sure by the company. They argue that the change in Basic's price
upon the fruition of merger negotiations is not determinative or
even indicative of the effect of denials of negotiation in a nascent
state.[170] This criticism of current quantitative models is likewise

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when the stock was trading for $62 a share. Relying on the efficient market hypothesis,
plaintiff based its damage claim on the $17.50 premium. The Second Circuit held there was
no damage. *Id.* at 1000. The stock was worth $79.50, notwithstanding the market's far
lower valuation. Investment bankers valued Viacom at $88 to $100 a share. Icahn offered
to buy Viacom at $75 a share. Four months after the greenmail, management offered $81,
and the company was ultimately acquired for $111 per share seven months later. *Id.* at 999.
But see Litton Indus. v. Lehman Bros. Kuhn Loeb, Inc., 967 F.2d 742, 751 (2d Cir. 1992)
(finding that the jury must determine whether market price was a substantial factor in the
target's board of director's assessment of a tender offer).

[167] *See, e.g., In re* Amerifirst Sec. Litig., 139 F.R.D. 423, 434 (S.D. Fla. 1991);
Moskowitz v. Lopp, 128 F.R.D. 624, 630-31 (E.D. Pa. 1989).

[168] Cornell & Morgan, *supra* note 118, at 895 ("While the efficient market hypothesis
predicts that market assessments will be fair and unbiased in reaction to disclosure, it does
not offer a way to determine what these assessments will be.").

[169] *Id.*

[170] *See id.* at 896-97. Even in the absence of firm-specific responsiveness data, resort
may be had to market data. Extensive data is available regarding takeover premiums, price
run-ups prior to disclosure of mergers, and price reaction to disclosure of negotiations. *See,
e.g.*, Litton Indus. v. Lehman Bros. Kuhn Loeb Inc., 967 F.2d 742, 749-50 (2d Cir. 1992);
Gregg A. Jarrell & Annette B. Poulsen, *Stock Trading Before the Announcement of Tender
Offers: Insider Trading or Market Anticipation?*, 5 J. LAW, ECON. & ORGANIZATION 225,

applicable to the Court's materiality standard, which utilizes a qualitative assessment of the beliefs of a hypothetical reasonable investor. Assuming the ability to measure the market's disbelief in the misrepresentations, the denials of negotiations may have been utterly immaterial in a market context irrespective of the beliefs of a hypothetical individual reasonable investor.

In our view, *Basic* is far from an unsolvable problem from a qualitative standpoint. If arbitrageurs and other sophisticated traders or brokers account for a substantial amount of trading activity, then the prices in *Basic* can be explained by the make-up of the market trading in Basic stock. In other words, the test of whether Basic's stock was mispriced, and if so to what extent, turns in significant part on identifying the persons who traded Basic, ascertaining their reasons for trading and examining their prior trading habits and strategies. What is obviously required in *Basic* is conducting discovery of the persons who traded during the class period to determine whether they, and hence the market, were in fact trading based on the possibility of a merger. In an information hungry market, rumors or suspicions of merger discussions will be chased down. Where the economic incentives are great, sophisticated traders will investigate and seek to uncover the truth. Once the market has begun to recognize the likelihood of a potential merger, as demonstrated by a significant amount of trading based on merger rumors, the misleading effect of management's denial will dissipate. Put differently, whether management's denials serve to mislead and, thus, act to misprice, will be quickly assessed by market behavior affecting price.[171] In *Basic,* several quantitative

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244 (1989) (finding that on average targets' stocks rose almost 40% relative to the predicted return before the first announcement of a merger or tender offer). Nevertheless, it is conceivable that the Supreme Court chose *Basic* to adopt the fraud on the market theory in order to illustrate the theory's limitations, because *Basic* illustrates the inefficacy of finance theory in a given factual environment and the manifest need to rebut the presumption of reliance where the price appears to have been driven by the market's awareness of merger negotiations, the very matter alleged to have been misrepresented.

[171] In an efficient market, particularly the pre-October 1987 market in which merger and acquisition activity and arbitrageurs abounded, sophisticated market participants were aware of the so-called "price-and-structure" rule first adopted by the Third Circuit in Staffin v. Greenberg, 672 F.2d 1196 (3d Cir. 1982) and expanded in Greenfield v. Heublein, Inc., 742 F.2d 751 (3d Cir. 1984), *cert. denied,* 469 U.S. 1215 (1985). This rule permitted management, for the good of the shareholders, to be evasive and deny that merger negotiations were taking place until the price-and-structure terms were agreed upon. *See also* Flamm v. Eberstadt, 814 F.2d 1169, 1182 n.2 (7th Cir.), *cert. denied,* 484 U.S. 853 (1987). Sophisticated market participants were also aware of the practice of denying the existence of merger negotiations before an agreement on price-and-structure terms had been reached.

techniques could have been employed. Actual market reaction to management's denials on a minute by minute basis can be examined. An analysis of variance of price changes and trading volume should also have been feasible. An analysis of market reaction to stock-exchange-required responses regarding unusual stock activity made by companies of similar size and other characteristics could be used to develop or measure what Basic's stock price would have been "but for" the denial. In particular, comparison with the market impact of "no comment" and denial responses to rumors of merger discussions of similar companies in the past would be beneficial.

Basic demonstrates the need for actual case-specific evidence as to whether a significant number of Basic shareholders actually sold their shares in reliance upon management's denials. In *Basic*, the market was affected by takeover rumors before management's denials. Therefore, traders who knew that Basic's share price was based upon takeover rumors and believed management's denials would utilize that knowledge to sell Basic shares. Justice White feared that the savviest of the savvy would falsely claim they believed in the integrity of the market price and did not know of and question management's denials.[172] Yet, if a large majority of the shares were traded by persons who relied on market price integrity, or disbelieved management's denials, then the few shares traded by persons who relied on management's denials might have little or no effect on price. This presents perhaps the ultimate irony in *Basic*: the amount of mispricing and, therefore, class recovery, may be inversely proportional to the number of shares traded by persons relying solely upon the integrity of the market price or disbelieving management's denials. The best proof of mispricing in *Basic* would be a showing that certain persons actually sold based upon reliance on management's denials of takeover rumors. In the absence of testimony of substantial reliance, there is scant indication of mispricing, let alone the amount of mispricing.

Furthermore, as mergers and acquisitions progress to involve persons beyond a small group of top management, experience has shown that maintaining secrecy is virtually impossible. *See id.* at 1180 (reproducing § 202.01 of the New York Stock Exchange's manual). Given the legal rules and business practices regarding denials of merger negotiation before *Basic*, as well as the inability of companies to maintain secrecy, it is entirely plausible that sophisticated market participants entirely disbelieved Basic's management's denials. Thus, in a market dominated by sophisticated professionals, it is plausible that the market impact of management's misleading statements were negligible or brief.

[172] *Basic*, 485 U.S. at 262 (White, J., concurring in part, dissenting in part).

It is also questionable whether a large number of securities professionals would testify that they sold in reliance upon management's denials, particularly where they can be cross examined based upon their trading records and other investment documentation. A claim of reliance by a seller who sold more than a few days after the news would certainly be suspect, because under the theory the news would have been discounted in the price by then and the stock fairly priced so that no gain could be obtained by selling in reliance upon the news. Moreover, in order for mispricing to occur based on management's false denials, a large number of shares would have to be sold in reliance on those denials. Since in *Basic* merger rumors caused unprecedented volume and volatility, a much larger number of shares would have to be sold to cause mispricing. If a large number of shares were not traded in reliance upon management's denials, under the theory one may conclude that the denials did not affect price.

In the end, in order for the legal theory applied in *Basic* to have integrity and to be reliable there must be evidence, irrespective of who as a matter of policy should have the burden, that traders acted based on the alleged false information. Otherwise it is not possible to tell if the market was efficient, the information was material, the security was mispriced, (and if so by how much), and the amount of damages. Thus, in *Basic*, evidence that persons did not sell based on management's denials, or that they bought notwithstanding management's denials, would provide an inference that the stock was not mispriced. Put differently, in *Basic*, due to the persistent trading based upon takeover speculation and rumor throughout the class period, the presumption that the market relied on management's denials is weak. Offering even slight evidence that traders did not actually rely could shift the burden to the plaintiff to show that the market did actually rely. Thus, in the end, *Basic* comes full circle. Carried to its logical conclusion, once the defense offers rebuttal evidence of lack of actual reliance by sophisticated traders, the plaintiff must respond with evidence of actual reliance, and ultimately *Basic* must turn on its specific facts rather than on economic theory.[173] The theory of market efficiency can work only if traders by their actions cause prices to reflect new information. Since there is nothing in the reported facts of *Basic* to support an inference that the market was misled or that

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[173] *See* cases cited *supra* note 46.

Basic's shares were mispriced due to management's denials, actual rather than presumed reliance is required for *Basic* to reach a logical and satisfying conclusion.

CONCLUSION

The extent to which the market was misled in *Basic*, or in any other case, need not be a matter of subjective speculation or intuition—it is susceptible to empirical and quantitative analysis. Necessarily, such analysis must be subjected to rigorous scrutiny by the courts to assure its reliability. However, empirical analysis should be required if theories of market behavior are to be used to impose liability. Inconsistent invocation of theory coupled with subjective standards and economic alchemy not subjected to rigorous testing is an unreliable basis for imposing liability.

Pricing efficiency, though perhaps an important goal of securities regulation, is not always achieved in reality if the latest research and debate are given full credence. Nevertheless, an inability to presume efficiency in all cases should not deter the courts from judging securities fraud cases in light of actual modern market behavior. Empirical techniques to determine market efficiency, materiality, reliance, causation and damages, however embryonic, can be efficacious and more relevant than a doctrinal description of a historical static model of securities transactions utilizing qualitative criteria for imposing liability. We have suggested certain concepts and empirical methods to quantify and measure effects or misleadingness with the hope and expectation that continually developing methodology will make empirical analysis of efficiency, materiality, reliance, causation and damages more doctrinally acceptable and judicially available to aid in resolving securities fraud class action suits.

APPENDIX

The facts of the case are that stockholders of X who purchased stock between March of 1985 and March of 1986 allegedly sustained losses as a result of purchasing stock at an inflated price brought about by inadequate disclosures regarding financial losses and liabilities of two subsidiaries, Y and Z. In general, X is alleged to have omitted disclosures about impending losses that were associated with the operations and planned termination of these two subsidiaries. Specifically, the plaintiffs argued that disclosures made in the annual report for the 1984 fiscal year and subsequent quarterly reports failed to quantify the full exposure of X, to disclose that its reserve for losses was insufficient, or that material write-offs would be necessary. Plaintiffs further claim that it was not until the end of March 1986, that X finally announced: (a) that based on an expert consultant's estimates, the Y loss would approximate $100 million, (b) that X had reserved $64 million against losses relating to the Y situation, and (c) that the auditors would issue a qualified opinion on X's financial statements.

Regarding Z, the plaintiffs alleged that in order to increase the flow of profits to X and its subsidiaries and affiliates as well as to increase the revenue volume of Z, X caused Z to enter into imprudent high risk business. Plaintiffs further alleged that X encouraged or permitted Z to engage in highly speculative practices with inadequate reserving of liabilities. All of these actions presumably jeopardized the financial viability of Z, thereby precipitating a review by regulatory authorities. At such an examination in March of 1985, the regulators found that Z was insolvent and that its capital was impaired by large amounts. X had publicly stated that its potential liability with respect to Z was limited to its investments in Z. Plaintiffs allege that the statement was false and misleading in that it was likely that claims for all or a substantial amount of the $140 million insolvency of Z could, and in all likelihood would, be asserted against X due to its relationship with Z. In the June 1985 quarterly report, a $6 million write-off was specifically taken to cover losses associated with Z for the second quarter, and in the September 1985 quarterly report, an additional write-off was taken which included Z without identification of the amount.

In its fourth quarter and annual report of 1985, X reported an $85 million write-off for the fourth quarter and an overall $192 million write-off for the fiscal year of 1985. One component of the write-off was $64 million for Y. The report also disclosed for

the first time that in December 1985 the regulators had notified
the company that they believed that the insolvency of Z was due
to acts of X and that claims may be made against X for the
amount of the insolvency. On the disclosure of these facts relating
to Y and Z, plaintiffs asserted, there was a substantial decline of
the market price of X's securities.

A crude method of computing damages posits that at the end
of the class period, the full decline in the price reflected the impact
of the curative disclosures pertaining to the prior omissions or
misrepresentations. Curative disclosure presumably brought the full
stories to light, both the one concerning the likelihood that claims
might be asserted because of Z's insolvency and the problems that
X was experiencing with Y. In fact, the disclosure on March 31,
1986, which was contained in the Company's fourth quarter results
in the year ending December 31, 1985, along with other informa-.
tion, was associated with a price per share drop from $22.37 to
$21.25 on the close of April 1, 1986.

However, there was another major drop in the price from $26
on the close of January 24, 1986 to $21.50 on the close of January
27, 1986. This drop was associated with a downward revision in
the earning per share estimate by a prominent analyst, who cut his
1986 earnings estimate from $3 a share to $1.3 a share and the
1987 estimate from $5 a share to $2.5 a share. The analyst's reason
for the downward revision: "We were told that the write-offs of
the third quarter would be it and that the company would not
need any financing . . . now we are told that there will be addi-
tional write-offs and the company would need more financing—
which will be dilutive and lower earnings."

The crude damage analysis extrapolated the price as of April
1, 1986 backward by using an industry index. The extrapolated
backward price line was considered the true value line, i.e., the
prices that X's stock would have had during the class period had
it not been for the alleged omissions and misrepresentations. Hence,
under the crude methodology the difference between the actual
price line and the true value line will measure, throughout the class
period, for any given day the inflation band that should be used
as a basis for computing the total damages, which in this case
would amount to approximately $100 million.

Of course, this assumes that the alleged misrepresentations
caused X's stock price to be artificially inflated and caused the
investors during the class period to lose money. An alternative
hypothesis is that there was no artificial inflation and that investors

lost money for reasons unrelated to plaintiffs' allegations or as a result of disclosure of X's problems relating to its two subsidiaries but which in fact were disclosed in a timely manner.

A more appropriate and refined damage analysis is to examine the exact nature of plaintiffs' allegations and to attempt to pinpoint precisely what caused X's stock prices to move as they did during the class period. This involves two distinct sets of analyses. First, it is necessary to decide which dates during the class period were associated with alleged fraud-related disclosures, and whether the disclosures were inflationary, causing the stock price to move up without justification, or curative, causing a downward correction of the inflation by providing a partial disclosure of prior omitted disclosures or misrepresentations. It is only on these fraud-related disclosure dates that price movements could be said to result from the alleged omissions or misrepresentations. Note here the contrast with the crude mode of analysis whereby every movement in the stock price (beyond the industry index movements) throughout the class period is implicitly assumed to be caused by fraud-related disclosures or misrepresentations. The second set of analyses attempts to isolate the degree to which a curative fraud-related disclosure caused, relative to other causes, a stock price drop. This necessitates discrimination among different components of earnings that would be expected to have differential impacts on stock price.

Addressing the first analysis, dates are determined during the period when the alleged fraud-related disclosures and misrepresentations were made. In order to reflect the fact that only price movements on those particular dates were possibly caused by fraud-related disclosures, the price at the end of the class period is extrapolated backward, not by the industry index—or what in the typical case would be the relevant index for the peer group of companies whose behavior arguably would have been mirrored by the defendant corporation had it not been for the alleged misrepresentations—but by the actual return series of the price of X itself except for the dates pre-identified as alleged fraud-related disclosure dates. In other words, when the price is extrapolated backward by use of the actual return series itself, the implication is that those price movements were not caused by or related to any alleged fraud-related disclosure. However, on those days during which it has been determined that alleged fraud-related disclosure occurred, the industry index is used rather than the actual return of X in extrapolating backward the simulated price series. As a result of this method, only for the days during which fraud-related

disclosures occurred is there an adjustment for price inflation, while
on other dates (during which no alleged fraud-related disclosures
were deemed to have occurred) no corrections or adjustments of
the inflation band (difference between the value line and the price
line) are made.

A more difficult task is allocating any given relative price drop
at the time of the curative disclosure to the various causes or
disclosures so as to isolate the impact of the corrective disclosures
associated with the specific complaint's allegations. It is here that
the use of responsive coefficients can be nicely illustrated. The
primary allegation in the case involved delay of write-offs (associ-
ated with the X situation) beyond the time at which management
allegedly became aware of their necessity. It must be noted that
write-offs are typically one-time losses that will not recur in the
future, i.e., they constitute transitory components of earnings whose
impact on the market price theoretically must be of many magni-
tudes lower than the impact of a recurring component of earning
expected to persist into the future. Indeed, empirical evidence cited
above demonstrates that response coefficients associated with tran-
sitory earnings are significantly lower than those associated with
persistent earnings.[174] Moreover, in the case of write-offs, the mar-
ket may revise its expectations of the prospects of the company
favorably in light of the knowledge that discontinuing a losing line
of business may enhance future profitability. Thus, it would not
be surprising to see upward price movements associated with write-
offs pertaining to discontinuations of business of the same nature
as those made by X.

Thus, it is necessary to determine the relative impact of write-
offs and discontinuations of business charges on the market price
as compared and contrasted with the impact of ordinary, recurring
components of earnings revisions. The following is a brief descrip-
tion of an analysis of the damage computation utilizing the re-
sponse coefficient approach.

The first step is to apportion X's stock return into the parts
due to the information impact of its net income components (in-
come from continuing operation, income from extraordinary items,
and income from discontinued operations). This is done through
the following regression model:

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[174] Lipe, *supra* note 144, at 65-66.

$$R_t = B_0 + B_1 \left(\frac{UEPS_t}{P_{t-1}}\right) + B_2 \left(\frac{EXT_t}{P_{t-L}}\right) + B_3 \left(\frac{DISC_t}{P_{t-1}}\right) + U_t$$

$$\begin{array}{cccc} -0.035 \ \ 6.90 & 3.76 & .64 \\ (0.026) \ (2.22) & (2.99) & (0.44) \end{array}$$

$R^2 = .47$

where R_t is a measure of X's risk-adjusted return for period t, $UEPS_t$ is the unexpected earnings per share from continuing operations for period t, EXT_t is the extraordinary income for period t, $DISC_t$ is the income from discontinued operations for period t, P_{t-1} is the price at the beginning of period t, B_0, B_1, B_2 and B_3 are the estimated regression coefficients, and U_t is the random disturbance term. The numbers below B_0, B_1, B_2 and B_3 are estimated coefficients and standard errors are in parenthesis.

B_1, B_2, and B_3, respectively, measure the dollar change in X's stock price per dollar of unexpected realization of ordinary income from continuing operations, of extraordinary income, and of income from discontinued operations. The model is estimated using quarterly earnings and stock return data from the fourth quarter of 1979 through the third quarter of 1987, which represented the available data. This analysis used unexpected earnings because the stock price should react only to news, not something expected. To measure R_t this analysis cumulated market adjusted returns, i.e., X's daily stock returns minus the daily return on the CRSP[175] value-weighted NYSE-AMEX index from two days after the announcement of the previous quarter's earnings, through one day after the announcement of the current quarter's earnings. Thus, the analysis assumed that the full information effect on the stock price is achieved by the day after the earnings announcement. To quantify the unexpected earnings per share from continuing operations, the analysis used the model developed by Professor Foster,[176] which has been widely used to represent the behavior of quarterly earnings per share:

$$Q_t - Q_{t-4} = \gamma_0 + \gamma_1 (Q_{t-1} - Q_{t-5}) + UEPS_t$$

$$\begin{array}{cc} -.108 & .352 \\ (.048) & (.172) \end{array}$$

where Q_t is the income from continuing operations in quarter t, γ_0 and γ_1 are estimated coefficients, and $UEPS_t$ is the unexpected

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[175] Center for Research in Security Prices, University of Chicago.

[176] George Foster, *Quarterly Accounting Data: Time-Series Properties and Predictive-Ability Results*, 52 ACCT. REV. 1, 4-7 (1977).

earnings per share. The numbers below Υ_0 and Υ_1 are estimated coefficients and the standard errors are in parenthesis.

The diagnostics from the model indicate that it describes well the behavior of X's quarterly earnings per share from continuing operations. To measure the unexpected income from extraordinary items and discontinued operations, the analysis used the actual, i.e., realized, values of these figures, thus assuming the entire portion to be unexpected. This is consistent with theoretical concepts of extraordinary income and income from discontinued operations.

Using the above results the analysis decomposed X's daily stock returns into that part attributable to curative disclosures versus all other factors as follows. For days on which there was no curative disclosure about Z or Y released to the market, the analysis used X's actual daily return. For the following periods, dates on which curative disclosures were released to the market about Y and Z, the analysis used X's return as predicted from a multi-factor (i.e., market and industry factor) model:

6-11-85

6-15-85 through 6-18-85

7-13-85 through 7-15-85

10-30-85 through 10-31-85

12-14-85 through 12-16-85

For dates on which news about X's income or revisions of income forecasts were released to the market, the analysis determined q, the proportion of X's abnormal return (actual - predicted) attributable to Y. The percentage, q, was calculated based on the results of formula 1 below. The dates on which news was released about X's income or forecast revisions were: 1-25-86 through 1-28-86 and 3-28-86 through 3-31-86.

A "simulated" return series for X was spliced, using the actual and constructed daily returns described above. Using X's actual stock price at the close of 3-31-86, a price series for X from 3-25-85 through 3-31-86 is "back-simulated." By subtracting this simulated price series from X's actual daily prices during this period, the analysis could estimate the effect on X's price of curative disclosures released about X and X's income.

The analysis calculated the percentage, q, in the following way:

1) 1-25-86 through 1-28-86

$$q = \frac{c}{t} \text{ where } c = \frac{.84 \times B_3}{2} \text{ and } t = (.84 \times B_3) + (.86 \times B_1)$$

where .84 is the income per share from discontinued operations and .86 is the unexpected income per share from continuing operations.

2) 3-28-86 through 3-31-86

$$q = \frac{c}{t} \text{ where } c = \frac{\text{income per share from discontinued operations} \times B_3}{2}$$

and

$$t = \begin{cases} [\textit{EPS from discontinued operations} \times B_3] + \\ [\textit{EPS from extraordinaty items} \times B_2] + \\ [\textit{EPS (unexpected) from continuing operations} \times B_1] \end{cases}$$

The division by two reflects the fact that only one half (approximately) of the write-offs disclosed pertained to Y.

After the simulated price series was obtained, the analysis used it as a value line in conjunction with X's own price line in a decaying trading model to determine both in and out damages, and damages related to shares purchased during the class period and still retained as of the end of the class period. A similar calculation based on the assumption that trading satisfies a LIFO flow assumption was also prepared. Based on the moving average decay model and q calculated using formula 1 above, the total damages amounted to $1,945,568, in contrast to the approximately $100 million computed by a crude approach of extrapolating the April 1, 1986 price backwards.