Some Arguments that the Stock Market Is Not Efficient

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Much commentary on corporate or securities law rests on the premise that the stock market efficiently prices securities. This Article questions that assumption. Two different forms of efficiency are described: "information-arbitrage" efficiency and "fundamental-valuation" efficiency. Summarizing some empirical studies which suggest that the market may be inefficient in either sense, the Article then discusses the risk-measurement problem with many studies either supporting or attacking stock market efficiency. It also describes the theoretical problem with the pure form of the efficient market theory (either "information-arbitrage" or "fundamental-valuation"). The Article illustrates the inefficiency of the stock market by discussing two types of anomalies involving clearly mispriced securities: convertible securities selling at conversion value and unleveraged packages of dual purpose fund shares selling below net asset value. Finally, the Article urges commentators to take into account the possible inefficiency of the stock market when advancing proposals to change corporate or securities law.

I. Introduction and Background

Much has been written on the semi-strong form of the efficient stock market hypothesis, which asserts that stock market prices react quickly

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and in an unbiased fashion to publicly available information.[1] Under this theory, prices "fully reflect" all publicly available information.[2]

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[1] R. BREALEY & S. MYERS, PRINCIPLES OF CORPORATE FINANCE 270 (2d ed. 1984); J. FRANCIS, INVESTMENT ANALYSIS AND MANAGEMENT 651-61 (3d ed. 1980); H. KRIPKE, THE SEC AND CORPORATE DISCLOSURE: REGULATION IN SEARCH OF A PURPOSE 84 (1979); H. LEVY & M. SARNAT, PORTFOLIO AND INVESTMENT SELECTION: THEORY AND PRACTICE 666 (1984); J. LORIE, P. DODD & M. KIMPTON, THE STOCK MARKET: THEORIES AND EVIDENCE 56, 65 (2d ed. 1985); J. LORIE & M. HAMILTON, THE STOCK MARKET: THEORIES AND EVIDENCE 71, 83, 97 (1973); Banoff, *Regulatory Subsidies, Efficient Markets, and Shelf Registration: An Analysis of Rule 415*, 70 VA. L. REV. 135, 177-79 (1984); Barry, *The Economics of Outside Information and Rule 10b-5*, 129 U. PA. L. REV. 1307, 1330-33 (1981); Bines, *Modern Portfolio Theory and Investment Management Law: Refinement of Legal Doctrine*, 76 COLUM. L. REV. 721, 775-76 (1976); Rohrer, *Ferment in Academia*, INSTITUTIONAL INVESTOR, July 1985, at 69, 70; Note, *Broker Investment Recommendations and the Efficient Capital Market Hypothesis: A Proposed Cautionary Legend*, 29 STAN. L. REV. 1077, 1090-91 (1977) [hereafter Note, *Broker Recommendations*]; Note, *The Efficient Capital Market Hypothesis, Economic Theory and the Regulation of the Securities Industry*, 29 STAN. L. REV. 1031, 1044 (1977) [hereafter Note, *Economic Theory*].

[2] J. FRANCIS, *supra* note 1, at 651 ("The semi-strong efficient markets hypothesis requires that all available relevant *public* information . . . be fully reflected in security prices.") (emphasis in original); H. KRIPKE, *supra* note 1, at 84 ("[T]he semi-strong version asserts that the current price reflects everything that is publicly known about the stocks being traded and that the market is too efficient for anyone regularly to find information by research that is not already reflected in prices."); H. LEVY & M. SARNAT, *supra* note 1, at 666 ("The market is semi-strong efficient if all *publicly available information* is reflected in the stock price.") (emphasis in original); S. MITTRA & C. GASSEN, INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT 593 (1981) ("[P]roponents of the semi-strong form assert that the current price of the stock contains all available information possessed by investors . . . . [S]emistrong form supporters also argue that the current stock price fully reflects the information which only sophisticated analysis of fundamental factors can uncover."); Seligman, *Can You Beat the Stock Market?*, FORTUNE, Dec. 26, 1983, at 82, 83; *see* J. COX, FINANCIAL INFORMATION, ACCOUNTING, AND THE LAW: CASES AND MATERIALS 179-81 (1980) (reprint of excerpts from *The Efficient Market Hypothesis*, in Financial Accounting Standards Board, *Tentative Conclusions on Objectives of Financial Statements of Business Enterprises* ¶ 122-30 (1976)) ("[F]undamental analysis of individual business enterprises is [not] likely to help investors to 'beat the market.' At any time, the market price is, on the average, the best estimate of the stock's value." *Id.* at 180) [hereafter FASB].

In addition to the semi-strong form, two other forms of the efficient market hypothesis exist. The weak form asserts that all information regarding past price movements is reflected in the current stock price. R. BREALEY & S. MYERS, *supra* note 1, at 270-72; J. FRANCIS, *supra*, at 646-48; H. LEVY & M. SARNAT, *supra*, at 666; J. LORIE & M. HAMILTON, *supra* note 1, at 71, 97. The strong form of the efficient capital market hypothesis asserts that all information, including nonpublic information, is reflected in the stock price. J. FRANCIS, *supra* at 662; H. LEVY & M. SARNAT, *supra*, at 666; *see* T. COPELAND & J. WESTON, FINANCIAL THEORY AND CORPORATE POLICY 287 (2d ed. 1983).

This theory implies that investors relying on public information will have great difficulty consistently earning above-normal profits.[3] A standard anecdote is that of the finance professor walking on a campus with

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Confusingly, another definition of the strong form of efficiency is that "prices reflect not just public information but *all* the information that can be acquired by painstaking fundamental analysis of the company and economy." R. BREALEY & S. MYERS, *supra*, at 270 (emphasis in original); *see* E. ELTON & M. GRUBER, MODERN PORTFOLIO THEORY AND INVESTMENT ANALYSIS 376-78 (2d ed. 1984) (including in the strong form the thesis that no investor has superior ability to analyze public information, but stating that this definition "is different from that contained in the literature." *Id.* at 376 n.1). This Article will not use this definition of the strong form of the efficient market hypothesis. Instead, this Article defines semi-strong efficient prices as those that reflect all public information after that information is analyzed. *See* S. MITTRA & C. GASSEN, *supra*, at 593. Consequently, tests of analysts' performance and of mutual fund performance are relevant to semi-strong efficiency (as the term is used in this Article), and not to strong form efficiency. *See* H. LEVY & M. SARNAT, *supra* note 1, at 685-86 ("[I]f mutual funds fail to outperform the market, we cannot assert that the market is strong-form efficient, simply because it may be that mutual funds do not have access to any non-public information." *Id.* at 686). For discussion of mutual fund performance, see *infra* notes 58 & 64-69 and accompanying text. For discussion of analysts' performance, see *infra* notes 26-28 and accompanying text.

[3] Bines, *supra* note 1, at 775-76; Cohen, *The Suitability Rule and Economic Theory*, 80 YALE L.J. 1604, 1614-17 (1971); *see* N. WOLFSON, THE MODERN CORPORATION 121 (1984); Note, *Broker Recommendations*, *supra* note 1, at 1093-96; Note, *A Reconsideration of the Stock Market Exception to the Dissenting Shareholder's Right of Appraisal*, 74 MICH. L. REV. 1023, 1043 (1976) [hereafter Note, *A Reconsideration*]; *cf.* Tobin, *On the Efficiency of the Financial System*, 153 LLOYDS BANK REV. 1, 5 (July 1984) ("[T]he mathematical expectation of return from resources used in active portfolio management is zero for the clients of brokers and investment advisers and for owners of mutual funds."). *But cf.* J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at 83 ("A belief in an efficient market is not exactly equivalent to a disbelief in the possibility of superior security analysis. There are individuals who have a quicker or more profound understanding . . . ."); J. LORIE & M. HAMILTON, *supra* note 1, at 104 (same); J. WESTON & E. BRIGHAM, MANAGERIAL FINANCE 742 (7th ed. 1981) ("[Under the semi-strong efficiency theory] fundamental analysts will have returns commensurate with the ability with which they evaluate publicly available data. A highly able analyst will earn high returns; those of lesser ability will earn lower returns, as in most other fields of executive and managerial activity."); Fischel, *Use of Modern Finance Theory in Securities Fraud Cases Involving Actively Traded Securities*, 38 BUS. LAW. 1, 4 (1982) ("The assertion that securities markets transmit all relevant information may appear to be belied by the constant attempt of securities analysts, institutional investors, and other market professionals to locate mispriced securities. It is not. Markets will be analyzed by two classes of participants. One class will have a comparative advantage in obtaining and interpreting relevant information."); Gilson & Kraakman, *The Mechanisms of Market Efficency*, 70 VA. L. REV. 549, 569-79 (1984) (explaining that the mechanisms of market efficiency require a minority of knowledgeable traders skilled in evaluating new information, including news about the issuer and about trading activity by others (*e.g.*, identified or unidentified insiders)).

a research assistant, who asks: "Professor, I see a twenty dollar bill on the sidewalk. Should I pick it up?" The professor replies: "No, of course not. If it were really there, it would already have been picked up."[4]

A. Two Different Meanings of Efficiency: "Information-Arbitrage" and "Fundamental-Valuation"

In a rational stock market, common stock prices should reflect the discounted present value of future dividends and other payouts (using an appropriate discount rate).[5] The efficient market hypothesis, however, does not imply that prices reflect intrinsic or fundamental value (the discounted present value of future payouts). Professor (and Nobel laureate) James Tobin stresses that "[e]fficiency in this sense [reflecting future payouts] is by no means implied by the . . . efficiency [reflecting all public information] just discussed. There are good reasons to be skeptical."[6] To avoid confusion, Professor Tobin relabels the classic semi-strong efficient market theory as "information-arbitrage" efficiency.[7] With this form of efficiency, prices reflect all public information, and only those trading on inside information can consistently earn above-normal returns.[8] On the other hand, Professor Tobin calls a market for financial assets "fundamental-valuation" efficient if prices are based on the rational expectations of the future payments to which the asset gives title.[9] This Article frequently employs these two terms,

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[4] This anecdote appears in Tobin, *supra* note 3, at 2.

[5] R. BREALEY, AN INTRODUCTION TO RISK AND RETURN FROM COMMON STOCKS 67-68 (2d ed. 1983) ("[T]he value of . . . stock . . . is equal to the discounted value of a continuing stream of expected dividend payments." *Id.* at 68); B. GRAHAM, D. DODD & S. COTTLE, SECURITY ANALYSIS: PRINCIPLES AND TECHNIQUE 480-81 (4th ed. 1962) ("[A] generally accepted theory of investment value . . . states that a common stock is worth the sum of all the dividends expected to be paid on it in the future, each discounted to its present worth."); *see* V. BRUDNEY & M. CHIRELSTEIN, CASES AND MATERIALS ON CORPORATE FINANCE 429-32 (2d ed. 1979); W. KLEIN, BUSINESS ORGANIZATIONS AND FINANCE: LEGAL AND ECONOMIC PRINCIPLES 211-13 (1980).

[6] Tobin, *supra* note 3, at 5.

[7] *Id.* at 2, 5.

[8] *Id.*

[9] *Id.* For a similar distinction between "the firm-foundation theory" (intrinsic value based on the present value of future payouts) and "the castle-in-the-air theory" (concentrating on psychic value and on how the crowd of investors will behave in the future, attributed to Keynes), see B. MALKIEL, A RANDOM WALK DOWN WALL STREET 20-25 (4th college ed. 1985) [hereafter RANDOM WALK]; B. MALKIEL, THE INFLATION BEATER'S INVESTMENT GUIDE 19-25 (1980) [hereafter INVESTMENT GUIDE]. For a similar distinction between "income-flow efficiency" (prices based on risk-ad-

often abbreviating "information-arbitrage" as *IA* and "fundamental-valuation" as *FV*.

Prices in an *IA* efficient market reflect all *relevant* public information. If future investors will be irrational, the relevant information would relate to future irrational investor preferences. If future investors will be rational, the relevant information would relate to future payouts.[10]

Several degrees of securities market efficiency might exist. First, the market might be neither "information-arbitrage" nor "fundamental-valuation" efficient. Stock prices might reflect neither all public information about future irrational investor preferences nor all public information about future payouts. Second, the market could be *IA* but not *FV* efficient. Prices would reflect all public information about future irrational preferences, but not information about future payouts. Third, the market could be both *IA* and *FV* efficient. Prices would reflect all public information about future payouts and about future investor preferences (because the totality of public information indicates future investors will be rational). A fourth possibility is that the market could be *FV* but not *IA* efficient. Prices would reflect all public information about future payouts but not about future investor preferences (because the totality of public information indicates that investors, although presently rational, soon will cease being rational).[11]

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justed long-term income flows) and a competitive market emphasizing short-term price forecasting in which no short-term price forecaster can consistently do a better job than other short-term forecasters, see Kosmicke, *The Contradiction Between Keynes and the EMH*, J. PORTFOLIO MGMT., Fall 1984, at 41, 43; *see also infra* note 23 and accompanying text. For another similar distinction between the "intrinsic value hypothesis" (prices determined by each individual's estimate of asset payoffs without consideration of resale value to other individuals) and the "speculative equilibrium hypothesis" (investors base decisions entirely on their anticipation of other investors' behavior without any necessary relationship to actual payoffs on assets), see T. COPELAND & J. WESTON, *supra* note 2, at 294-95. Copeland and Weston also describe a third hypothesis, the "rational expectations hypothesis" (prices are based on the expected future payouts of the assets, including their resale value to third parties). *Id.* at 295-98.

[10] Strictly speaking, the relevant information would relate to future investor *perceptions* of future payouts in the even more distant future. For simplicity, however, one might assume that present information about future payouts is the best possible predictor of future investor perceptions of future payouts in the even more distant future. For related discussion, see *infra* text accompanying note 13.

[11] Professor Robert Shiller has developed a model in which prices are determined by a combination of (1) "smart money" investors who value stocks based on expected future dividend payments and (2) less rational ordinary investors who do not value shares on the basis of expected future dividends. Shiller, *Stock Prices and Social Dynamics*, BROOKINGS PAPERS ON ECON. ACTIVITY 457, 477-78 (1984). For additional discus-

The eminent economist John Maynard Keynes believed that the stock market was *IA* but not *FV* efficient. He argued that stock prices do not reflect intrinsic value at all, but reflect the outcome of a "game" in which individuals try to predict how the crowd will act in the future.[12] In an often quoted passage, Keynes compared the stock market to a beauty contest:

> [P]rofessional investment may be likened to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces which he himself finds prettiest, but those which he thinks likeliest to catch the fancy of other competitors, all of whom are looking at the problem from the same point of view. It is not a case of choosing those which, to the best of one's judgement, are really the prettiest, nor even those which average opinion genuinely thinks the prettiest. We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be . . . .[13]

The difference between *FV* and *IA* efficiency can be illustrated by comparing wheat and gold. In his December 1982 presidential address to the American Economic Association, Professor Gardner Ackley contrasted the markets for these two commodities. In the case of wheat, the existence of large inventories tends to stabilize the price, while with gold the presence of large inventories tends to decrease price stability. The quantities of wheat produced and/or consumed respond quickly and forcefully to price changes. These changes begin to move the price toward its new equilibrium level within a relevant time period, and this response comes to be anticipated by market participants. With gold, the same prompt and stabilizing response of quantities produced and consumed does not occur and market participants do not expect it to occur. Consequently, gold prices are based upon buyer and seller judgments about what other buyers and sellers will be expecting in the near future. The gold market is much like Keynes' beauty contest.[14] In such a

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sion of Shiller's article, see *infra* notes 20-22 and accompanying text.

[12] J. KEYNES, THE GENERAL THEORY OF EMPLOYMENT, INTEREST AND MONEY 153-57 (1936); *see* W. BAUMOL, THE STOCK MARKET AND ECONOMIC EFFICIENCY 47-53 (1965); H. KRIPKE, *supra* note 1, at 80-83; INVESTMENT GUIDE, *supra* note 9, at 23-25; RANDOM WALK, *supra* note 9, at 22-25; Ackley, *Commodities and Capital: Prices and Quantities*, 73 AM. ECON. REV. 1, 13-14 (1983); Kosmicke, *supra* note 9, at 42; Pozen, *Money Managers and Securities Research*, 51 N.Y.U. L. REV. 923, 936-37 (1976); Tobin, *supra* note 3, at 7-8.

[13] J. KEYNES, *supra* note 12, at 156.

[14] Ackley, *supra* note 12, at 1-5. For a general discussion of the speculative nature

market (in which the impacts of price on amounts produced and consumed are small, slow, and uncertain), the price may stay for a considerable period at or near a level far removed from any equilibrium determined by market fundamentals. In Ackley's words: "This situation might represent either the extrapolation of an originally accidental stability, or a standoff between expectations of further rise by some participants and the expectation of fall by others."[15]

Professor Ackley implies that the stock market resembles the gold market more than the wheat market.[16] He states that "stock prices are not fully rational,"[17] recommends occasional rereading of Keynes' "beauty contest" parable,[18] and notes:

> A simpler course is to admit that we have no very precise concept of an equilibrium level of share prices, but to argue that we can nevertheless predict the direction and rate of movement over time of that equilibrium, whatever it may be. The rate of movement might, for example, be expected to approximate the rate of growth of profits or of dividends per share. . . . This may suffice for rough tests of *ex post* rationality of historical price movements. But it offers essentially zero guidance to the purchaser or seller of a particular stock at a particular time. He must guess whether the price of particular stocks will rise or fall, over some less than infinite horizon, from where they stand today. Is it strange that he is more concerned with the correctness of his guess about what other buyers and sellers are expecting will happen to prices of those particular shares, and to the market averages? Is there a better description than the "beauty contest" parable?[19]

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of the gold market, see B. KETTELL, GOLD 119-21 (1982); RANDOM WALK, *supra* note 9, at 287-89; L. RITTER & W. SILBER, MONEY 268-73 (5th ed. 1984) (discussing the irrelevance of gold to the United States monetary system); *id.* at 276 (discussing the overwhelming impact of speculative demand and supply on the price of gold); Bernstein, *Back to the Gold Standard*, THE BROOKINGS BULL., Fall 1980, at 8, 11; Friedman, *The Price of Gold*, NEWSWEEK, Apr. 22, 1974, at 97; Renshaw & Renshaw, *Does Gold Have a Role in Investment Portfolios?*, J. PORTFOLIO MGMT., Spring 1982, at 28, 31.

[15] Ackley, *supra* note 12, at 6 (footnote omitted).

[16] *See id.* at 3-7, 12-14. *But cf.* Bernstein, *supra* note 14, at 11 (noting that, unlike common shares, gold is not an income-earning asset and cannot be valued by discounting future earnings flows).

[17] Ackley, *supra* note 12, at 14.

[18] *Id.* at 13.

[19] *Id.*; *see* Lowenstein, *Management Buyouts*, 85 COLUM. L. REV. 730, 752-53 (1985) ("[The current] high turnover [of stocks] makes sense only if investors are paying a high degree of attention to what their fellow investors are about to do and to the short term expectations that motivate them, and paying less attention to asset values and other measures that would influence a buyer — or seller — of the business as a whole."). *But cf.* Forsythe, Palfrey & Plott, *Asset Valuation in an Experimental Market*, 50 ECONOMETRICA 537 (1982) (using markets in a laboratory environment to test

Professor Robert Shiller agrees that the stock market is not *FV* efficient. Using several different approaches, one of his recent articles argued that social dynamics (fashions or fads) heavily influence stock prices. First, Shiller borrowed from the social psychology, sociology, and marketing literature. Second, he traced the post-war ebbs and flows of investor interest in the stock market. Third, he developed an alternative to the conventional dividend discount model.[20] In this alternative model, prices are determined by a combination of (1) "smart money" investors who value stocks based on the present value of expected future dividend payments and (2) less rational ordinary investors who do not value shares on the basis of expected future dividends. Fourth, Shiller used United States stock market data to explore some relations suggested by his alternative model. He noted that his model would explain several anomalies, including the overreaction of stock prices to dividends and the excess volatility of stock prices in relation to dividends.[21]

Although Professor Shiller rejects "fundamental-valuation" efficiency, he suggests that the stock market still may be fairly "information-arbitrage" efficient for two reasons. First, fashions may be inherently unpredictable. Second, the limited amount of "smart money" eliminates big short-run profit opportunities.[22]

Similarly, one prominent equity portfolio manager argues that the market is not *FV* efficient, but may be *IA* efficient:

> While I am aware of no research that has attempted to determine . . . investors'. . . attitudes . . . , it seems to me that even the most cursory knowledge of attitudes of investors shows that Keynes was right and that the EMH [Efficient Market Hypothesis] is wrong. People who think of expected return as being caused by short-run price changes make up the overwhelming majority of stock market investors while people who think of expected return as being caused by long-run income flows make up an extremely small minority of investors . . . .
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> [T]his does not mean the stock market is not competitive . . . . [R]esearch . . . shows that it is difficult for any one short-run price forecaster to consistently do a better job than other short-run price forecasters.[23]

Keynes' beauty contest model against various "underlying returns" models; prices eventually converged toward those predicted by the "underlying returns" models). For discussion of the Forsythe, Palfrey and Plott experiment, see T. COPELAND & J. WESTON, *supra* note 2, at 295-96.

[20] *See supra* note 5 and accompanying text.

[21] *See generally* Shiller, *supra* note 11. For related discussion, see *infra* note 47 and accompanying text.

[22] Shiller, *supra* note 11, at 497-98.

[23] Kosmicke, *supra* note 9, at 43.

Investors may be playing a game of predicting periodic earnings announcements for the near future.[24] Winners are those who successfully outguess the consensus forecast. For example, a portfolio manager will buy IBM stock if she feels that the consensus forecast for IBM's earnings is too low. If earnings turn out to be higher than expected, the stock price will move higher. If this game of outguessing is either highly competitive or difficult or both, earning above-average profits might be difficult.[25] In other words, the stock market might be *IA* but not *FV* efficient.

B. Studies or Phenomena Questioning "Information-Arbitrage" Efficiency

A number of studies have questioned the *IA* form of the efficient market theory. At least some investment advisers have consistently generated recommendations which, if followed, would have produced above-normal[26] returns.[27] One notable example of such an advisory

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[24] *Cf.* Arrow, *Risk Perception in Psychology and Economics*, 20 ECON. INQUIRY 1, 5-6 (1982) ("[E]xcessive reaction to current information . . . seems to characterize all the securities and futures markets." *Id.* at 5); DeBondt & Thaler, *Does the Stock Market Overreact?*, 40 J. FIN. 793, 793-94 (1985) (a number of commentators have noted that the stock market pays too much attention to current earnings and too little attention to long term dividend paying power).

[25] *See* DeBondt & Thaler, *supra* note 24, at 807 (discussion by Peter L. Bernstein) ("[T]o demonstrate that the market is inefficient in a long-run sense . . . is different from arguing that security markets are inefficient in a beauty contest sense. I would argue that the stock market in particular is highly efficient in rapidly incorporating information that would have an effect on prices in the short run, even if it fails to process more complex and longer run information in an efficient manner."); *cf.* R. BREALEY, *supra* note 5, at 76-77 ("[M]ost institutions produce earnings forecasts for the companies that they follow . . . . If you buy and sell stocks on the basis of a comparison between your earnings forecast and the consensus forecast, you are likely to find that much of the time you are trading on the basis of your forecast errors."); *id.* at 83 ("The recipe for investment success is clear: buy the stock if investors are substantially underestimating [near] future earnings and sell it if investors are substantially overestimating [near] future earnings. . . . Unfortunately earnings changes are not so easy to predict.").

[26] As used in financial theory, the terms "above-normal," "above-average," "abnormal," or "superior" returns generally mean higher returns than would be expected given the risk. *See infra* note 75 and accompanying text. One frequently used means of determining "normal" or expected returns (given the level of risk) is the capital asset pricing model. This model measures a stock's (or collection of stocks') risk based on its past volatility relative to a broad "market" portfolio. This measure of risk is called beta. The expected return (or more strictly, the expected return in excess of the risk-free interest rate) is assumed to equal beta multiplied by: the expected risk-premium return of the broad "market" portfolio (*i.e.*, the expected return on the "market" port-

folio minus the risk-free rate). *See* Thompson, *How to Evaluate Investment Performance*, 5 J. INST. CERTIFIED FIN. PLANNERS 201, 204-05 (1984). For discussion of beta and the capital asset pricing model, see *infra* note 77 and the sources cited therein. For additional related discussion, see *infra* part I(*E*). Another often used method of determining "normal" or expected risk-adjusted returns is the "market" model. This model calculates "normal" returns by summing the following two figures: (1) a multiple (beta) of the return on the overall "market," and (2) a constant (alpha), which is an average of the returns not associated with fluctuations in the overall "market." For discussion of the "market" model, see V. BRUDNEY & M. CHIRELSTEIN, *supra* note 5, at 1156-63 (reprinting Modigliani & Pogue, *infra*); J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at 35-41; Modigliani & Pogue, *An Introduction to Risk and Return: Concepts and Evidence*, FIN. ANALYSTS J., Mar.-Apr. 1974, at 68, 76-79.

[27] N. JACOB & R. PETTIT, INVESTMENTS 710-11 (1984) (discussing Groth, Lewellan, Schlarbaum & Lease, *infra*); Bierring, Lakonishok & Vermaelen, *Stock Prices and Financial Analysts' Recommendations*, 38 J. FIN. 187 (1983) (analyzing the recommendations of American and Canadian stocks by a Canadian brokerage house; recommendations generated above normal returns); Buffett, *The Superinvestors of Graham and Doddsville*, 11 HERMES, Fall 1984, at 4 (tabulating the above-average investment results of the author and several of his friends, all of whom had different portfolios; all were disciples of Benjamin Graham and David Dodd, who emphasized the search for companies whose value per share far exceeded the stock price; for discussion of the investment philosophy of both Graham and Buffett, see A. SMITH, SUPERMONEY 173-99 (1972); Seligman, *supra* note 2, at 88); Groth, Lewellen, Schlarbaum & Lease, *An Analysis of Brokerage House Securities Recommendations*, FIN. ANALYSTS J., Jan.-Feb. 1979, at 32 (study of an American brokerage house's 6200 recommendations to its individual customers over a seven year period; suggestions were valuable, even after adjusting for risk); Oppenheimer, *A Test of Ben Graham's Stock Selection Criteria*, FIN. ANALYSTS J., Sept.-Oct. 1984, at 68 (New York and American Stock Exchange securities were screened to select issues meeting various criteria specified by Benjamin Graham; stocks selected performed far better than average). Bierring, Lakonishok & Vermaelen, *supra*, cites the following article, which comes to conclusions similar to the above: Cheney, *How Good Are Investment Advisory Services?*, FIN. EXECUTIVE, Nov. 1969, at 30. *See* Groth, Lewellen, Schlarbaum & Lease, *Security Analysts: Some Are More Equal*, J. PORTFOLIO MGMT., Spring 1978, at 43 (studying 6000 common stock advisories by a brokerage house between Jan. 1964 and Dec. 1970; after the recommendations were separated by author, noticeable variations in talent appeared; some authors had consistently good research abilities).

J. LORIE & M. HAMILTON, *supra* note 1, at 101-04, cites the following as examples of "original" approaches to securities analysis: Babcock, *The Concept of Sustainable Growth*, FIN. ANALYSTS J., May-June 1970, at 108; Callard, *Stock Price Outlook During the Coming Decade*, COM. & FIN. CHRON., July 30, 1970, at 1, 14-17; Callard, *The Third Yield*, FIN. ANALYSTS J., Jan.-Feb. 1968, at 114; Lorie & Niederhoffer, *Predictive and Statistical Properties of Inside Trading*, 11 J.L. & ECON. 35, 46-52 (1968); Meyer Berman's scrutiny of § 16(a) filings under the 1934 Act, as described in Martin, *Looking for Losers*, Wall St. J., Jan. 23, 1970, § 1 at 1; Babcock, The Trend and Stability of Earnings (paper prepared for the Seminar on the Analysis of Security Prices, Univ. of Chicago, 1970).

Cf. R. BREALEY, *supra* note 5, at 56, 59 (summarizing various studies authored or

co-authored by Ambachtsheer, *see infra*; Brealey concludes: "[W]hile the analysts' forecasts can explain only a small proportion of what subsequently happens, there is at least some relationship between the two." *Id.* at 59); *id.* at 55-58 (summarizing Lloyd-Davies & Canes, *infra*, and listing other studies that come to similar conclusions); Ambachtsheer, *Portfolio Theory and the Security Analyst*, FIN. ANALYSTS J., Nov.-Dec. 1972, at 53 (the June 1971 medium-term-prospect rankings of one financial institution had a small but significant correlation with actual performance); Ambachtsheer, *Profit Potential in an "Almost Efficient" Market,* J. PORTFOLIO MGMT., Fall 1974, at 84 (finding a small but significant correlation between the forecasts of investment advisory services and actual outcomes); Ambachtsheer & Farrell, *Can Active Management Add Value?*, FIN. ANALYSTS J., Nov.-Dec. 1979, at 39 (finding a small but significant correlation between the predictions of investment advisory services and actual outcomes); Givoly & Lakonishok, *The Information Content of Financial Analysts' Forecasts of Earnings: Some Evidence on Semi-Strong Inefficiency*, 1 J. ACCT. & ECON. 165 (1979) (Stock prices generate abnormal returns during the months surrounding revisions by financial analysts of their earnings forecasts. "This finding suggests that FAF [financial analysts' forecasts] revisions convey or reflect information." *Id.* at 175); Lloyd-Davies & Canes, *Stock Prices and the Publication of Second-Hand Information*, 51 J. BUS. 43 (1978) (secondary dissemination of stock analysts' recommendations in the Wall Street Journal significantly affected stock prices; effects were not reversed in subsequent 20 trading days); Lynch, *Stalwart Performers — Rain or Shine*, MONEY, June 1985, at 183 (identifying 10 mutual funds that for most of the previous decade consistently outperformed the Standard & Poor's 500 (S & P) stock index month after month without adjusting for risk); Stickel, *The Effect of Value Line Investment Survey Rank Changes on Common Stock Prices*, 14 J. FIN. ECON. 121 (1985) (rank changes affect common stock prices over a multiple-day period).

But see sources cited *supra* note 3 (contending that superior performance by a few analysts is consistent with the efficient market hypothesis; for related discussion, see *infra* part I(*F*)); *but cf.* J. CRAGG & B. MALKIEL, EXPECTATIONS AND THE STRUCTURE OF SHARE PRICES 2, 5-6, 76-86 (1982) (studying earnings and dividend forecasts of 19 investment firms made during the period 1961-69 and concluding: "Forecast accuracy can be described as poor. While the forecasts were superior to extrapolations of past observations (which were essentially no use at all), we found no information in the forecasts that was not already impounded in market prices." *Id.* at 2); N. JACOB & R. PETTIT, *supra*, at 695 (summarizing J. CRAGG & B. MALKIEL, *supra*, and B. MALKIEL & J. CRAGG, EXPECTATIONS AND THE VALUATION OF SHARES, NATIONAL BUREAU OF ECONOMIC RESEARCH WORKING PAPER SERIES (Apr. 1980); both studies question the ability of professional analysts to forecast earnings); H. LEVY & M. SARNAT, *supra* note 1, at 682 (discussing Bidwell, *infra*); INVESTMENT GUIDE, *supra* note 9, at 56-58 (results of studies show that security analysts have enormous difficulty in forecasting earnings); RANDOM WALK, *supra* note 9, at 149-60 (discussing analysts' poor ability to forecast earnings and providing explanations); Bidwell, *How Good Is Institutional Brokerage Research?*, J. PORTFOLIO MGMT., Winter 1977, at 26 (studying performance of stocks recommended by the institutional research departments of 11 brokerage firms and finding that the clear majority of research recommendations offered inferior returns); Cragg & Malkiel, *The Consensus and Accuracy of Some Predictions of the Growth of Corporate Earnings*, 23 J. FIN. 67 (1968) (study of earnings growth for forecasts by five investment firms; overall performance was rather poor). *See*

service is the Value Line Investor Survey.[28] During some periods in the past, investors could obtain superior returns by imitating insider trades reported in SEC filings.[29]

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generally R. BREALEY, SECURITY PRICES IN A COMPETITIVE MARKET 112 (1971) ("The performance of recommended stocks indicates that brokers and advisory services have some ability to predict price changes, though their margin of superiority is far narrower than commonly supposed. A significant fraction of the value of the advice seems to be discounted on the day of publication, and a still larger proportion is discounted by the end of the first week.") [hereafter SECURITY PRICES].

[28] Black, *Yes, Virginia, There is Hope: Tests of the Value Line Ranking System*, FIN. ANALYSTS J., Sept.-Oct. 1973, at 10 (following Value Line ranking system leads to above-normal returns); *see* T. COPELAND & J. WESTON, *supra* note 2, at 340-42; N. JACOB & R. PETTIT, *supra* note 27, at 711-13; Seligman, *supra* note 2, at 88-89; *cf.* Brown & Rozeff, *Analysts Can Forecast Accurately!*, J. PORTFOLIO MGMT., Spring 1980, at 31 (using a benchmark model comparison to evaluate the ability of 11 Value Line security analysts to forecast earnings over the period 1973-76; analysts typically produced more accurate quarterly earnings per share forecasts than corresponding benchmark models); Copeland & Mayers, *The Value Line Enigma (1965-1978): A Case Study of Performance Evaluation Issues*, 10 J. FIN. ECON. 289 (1982) (finding abnormal performance for Value Line predictors for the period 1965-78). *But see* Ball, *Anomalies in Relationships Between Securities' Yields and Yield-Surrogates*, 6 J. FIN. ECON. 103, 116-17 (1978) (suggesting that the apparent superiority of Value Line recommendations may be due to problems with the capital asset pricing model; imperfections in the capital asset pricing model may make it impossible to verify or deny the superiority of the Value Line ranking system or any other system or strategy; for related discussion, see *infra* part I(*E*)).

[29] *See* SECURITY PRICES, *supra* note 27, at 116-28 ("[A]ny investor could have obtained a large part of the advantages possessed by insiders simply by acting on the basis of information provided by the *Official Summary*." *Id.* at 128); Lorie & Niederhoffer, *supra* note 27, at 46-49, 52 ("Data . . . indicate a strong relationship between insider trading and price movements . . . . Furthermore, there appears to be an opportunity for investors to profit from knowledge of trading by insiders." *Id.* at 49); *cf.* Trivoli, *How to Profit from Insider Trading Information*, J. PORTFOLIO MGMT., Summer 1980, at 51 (returns from imitating reported insider transactions are enhanced when strategy is coupled with financial-ratio analysis). *But see* H. LEVY & M. SARNAT, *supra* note 1, at 684-85 (discussing study by Kerr, *infra*); Kerr, *The Battle of Insider Trading vs. Market Efficiency*, J. PORTFOLIO MGMT., Summer 1980, at 47 (examining 120 stocks characterized by reported insider buying in the year 1976; study found that imitating insiders did not lead to excess returns; author concluded that "knowledgeable investors have largely eliminated the inefficiency initially perceived [by earlier studies] . . . ." *Id.* at 49); *but cf.* Rose, *Tracking the Trades of Corporate Insiders Doesn't Always Give an Edge to Investors*, Wall St. J., Dec. 19, 1985, at 25, col. 4 (recommendations by a newsletter following insider trading trailed S & P 500 for first 11 months of 1985; mutual fund following insider activity also lagged market from end of September 1985 to December 5, 1985). *See generally* J. BOLAND, WALL STREET'S INSIDERS 203-06 (1985) (summarizing several academic studies finding that insiders outperformed the stock market); T. COPELAND & J. WESTON, *supra* note 2, at 332-33 (discussing studies of official reports on insider trades; studies conclude that insiders

Some research has concluded that stocks with low price-earnings ratios tend to outperform stocks with higher ratios (even adjusting for risk).[30] Moreover, the stocks of small firms (those with smaller aggre-

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earn abnormal returns); N. JACOB & R. PETTIT, *supra* note 27, at 714-15 (same); Givoly & Palmon, *Insider Trading and the Exploitation of Inside Information: Some Empirical Evidence*, 58 J. BUS. 69, 86 (1985) ("[A] significant abnormal return is produced in the wake of the [reported inside] trades themselves, lending support to the conjecture that (outside) investors accept the superior knowledge and follow the footsteps of insiders.").

[30] 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); Goodman & Peavy, *The Risk Universal Nature of the P/E Effect*, J. PORTFOLIO MGMT., Summer 1985, at 14; Peavy & Goodman, *The Significance of P/Es for Portfolio Returns*, J. PORTFOLIO MGMT., Winter 1983, at 43; *see* D. DREMAN, THE NEW CONTRARIAN INVESTMENT STRATEGY 139-52, 202, 204-05 (rev. ed. 1982); Goodman & Peavy, *Industry Relative Price-Earnings Ratios as Indicators of Investment Returns*, FIN. ANALYSTS J., July-Aug. 1983, at 60 (ranking a stock by "price-earnings relatives," the index of its price-earnings ratio to that of its industry; on a risk-adjusted basis, portfolios of stock with low "price-earnings relatives" tend to outperform portfolios of stock with high "price-earnings relatives"; for a discussion and summary of the working paper for this study, see Lowenstein, *infra*, at 285-86); Lowenstein, *Pruning Deadwood in Hostile Takeovers: A Proposal for Legislation*, 83 COLUM. L. REV. 249, 284-86 (1983); Rohrer, *supra* note 1, at 72, 75. *But see* H. LEVY & M. SARNAT, *supra* note 1, at 686-87 (discussing a study by H. Levy and Z. Lerman, which examined 424 stocks over the 20-year period 1960-79 and grouped the stocks into 10 different portfolios from low to high P/E ratio; if the investment decision date was in January when "sophisticated investors and insiders . . . . have access to earnings information before it is made public," the low P/E portfolio was clearly superior; "as the [investment] decision was gradually shifted from January to March, reflecting the public dissemination of the earnings information, the low P/E portfolio lost its clear-cut dominance over the other portfolios (even before allowing for transaction costs)."). When Levy & Lerman published their study, they emphasized that as transaction costs are increased from zero, the advantage of low P/E portfolios decreases. "Consequently, brokers, dealers and institutional investors who pay zero or very small transaction costs can benefit by investing in low P/E stocks and rebalancing their portfolios every year . . . ." *Testing P/E Ratio Filters with Stochastic Dominance*, J. PORTFOLIO MGMT., Winter 1985, at 31, 38.

Even the earlier studies showing the superiority of low P/E stocks may be questioned on the basis that the presently available measures of risk underestimate the risk of low P/E stocks. *See* Boldt & Arbit, *Efficient Markets and the Professional Investor*, FIN. ANALYSTS J., July-Aug. 1984, at 22, 28; Roll, *A Possible Explanation of the Small Firm Effect*, 36 J. FIN. 879, 886-87 (1981); *cf.* R. BREALEY & S. MYERS, *supra* note 1, at 788 (commenting that such studies may demonstrate either that the stock market is not efficient or that the low P/E stocks are really riskier but present methods cannot measure it); Ball, *supra* note 28, at 117 (suggesting that the apparent superiority of low P/E strategies may be due to problems with the capital asset pricing model). For related discussion, see *infra* part I(*E*).

gate market values of securities) tend to have greater risk-adjusted returns than stocks of large firms.[31] Some evidence indicates that shares with very low prices have higher risk-adjusted returns than higher price stocks.[32] One article demonstrated that shares selling below liquidation value generated above-average returns.[33]

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[31] *See* E. ELTON & M. GRUBER, *supra* note 2, at 405-06; Barry & Brown, *Differential Information and the Small Firm Effect*, 13 J. FIN. ECON. 283 (1984) and sources cited therein; Rohrer, *supra* note 1, at 75; Schwert, *Size and Stock Returns, and Other Empirical Regularities*, 12 J. FIN. ECON. 3 (1983) and sources cited therein; Seligman, *supra* note 2, at 94 (summarizing Schwert, *supra*). *But see* RANDOM WALK, *supra* note 9, at 179-80 (questioning the validity of the small firm effect for a number of reasons); Beedles, *The Anomalous and Asymmetric Nature of Equity Returns: An Empirical Synthesis*, 7 J. FIN. RESEARCH 151 (1984) (an investor in small-firm stocks may have an undiversified total portfolio and therefore may incur additional risks); Boldt & Arbit, *supra* note 30, at 28 (mentioning the controversy over whether present measures of risk accurately reflect the risk of small firm stocks; *see infra* part I(*E*)); Rohrer, *supra* note 1, at 75 (superior returns of "small firms" show that either the efficient market theory is wrong or the capital asset pricing model improperly measures risk); Roll, *supra* note 30 (studies showing above-normal returns for small firms may have improperly measured risk; for related discussion, see *infra* part I(*E*)). *But cf.* Lustig & Leinbach, *The Small Firm Effect*, FIN. ANALYSTS J., May-June 1983, at 46 (verifying the small firm effect but warning that the capital asset pricing model, upon which the results were based, may not be accurate for small firm stocks; the author further noted: "The abnormal return garnered from small stocks may just be compensation for the effort required to gather the information needed for prudent investment." *Id.* at 48). *See generally* Jansson, *The Big Debate Over Little Stocks*, INSTITUTIONAL INVESTOR, June 1982, at 141 (discussing both sides of the debate over whether small-firm shares really outperform other stocks).

After summarizing numerous studies of the small firm effect and various attempts to explain it, two commentators concluded: "none of this research supplies a satisfactory explanation of the size effect. . . . While we can explain part of the excess return, we don't seem to be able to explain all of it. There does seem to be a size anomaly." E. ELTON & M. GRUBER, *supra* note 2, at 406. For additional discussion of the abnormal return on small firm stocks, see *Symposium on Size and Stock Returns, and Other Empirical Regularities*, 12 J. FIN. ECON. 3-156 (1983).

[32] Edmister & Greene, *Performance of Super-Low-Price Stocks*, J. PORTFOLIO MGMT., Fall 1980, at 36 (studying performance of stocks selling for three dollars and under during the period from Feb. 1967 to Dec. 1979; earlier work also cited). *But see* Beedles, *supra* note 31, at 152 (an investor in very low price stocks may hold an undiversified total portfolio and therefore may incur greater risk).

[33] Greenblatt, Pzena & Newberg, *How the Small Investor Can Beat the Market*, J. PORTFOLIO MGMT., Summer 1981, at 48 (computer simulation study for period Apr. 1972-Apr. 1978).

Another article discussed the above-normal performance of two different strategies. One strategy involved buying stocks with a high ratio of book value of common equity per share to market price per share. The second strategy involved selecting stocks on the basis of positive or negative monthly specific returns. Rosenberg, Reid & Lanstein,

Research has also shown abnormal stock price increases between the application for a New York Stock Exchange Listing and the actual listing itself followed by abnormal declines for a brief period after listing.[34] A simulation study for certain periods in the 1960's concluded that many option writing strategies produced larger profits and entailed lower risks than other possible strategies (including holding stocks).[35]

Persuasive Evidence of Market Inefficiency, J. PORTFOLIO MGMT., Spring 1985, at 9.

[34] McConnell & Sanger, *A Trading Strategy for New Listings on the NYSE*, FIN. ANALYSTS J., Jan.-Feb. 1984, at 34 (suggesting strategy of purchasing a stock after the announcement of a formal application for a NYSE listing and selling short same security during six weeks immediately after actual listing); *see* SECURITY PRICES, *supra* note 27, at 72-78 (during several month interval between application for listing and actual listing, stocks experience abnormal gains; after listing, some part of the earlier price appreciation is not maintained). *See generally* Hetherington, *Taking the Risk Out of Risk Arbitrage*, J. PORTFOLIO MGMT., Summer 1983, at 24 ("[T]here are significant market inefficiencies in the trading of post-proxy-statement merger candidates." *Id.* at 25).

Although not relevant to the efficiency of the regular stock market, another mystery is why firms' first offerings to the public are significantly underpriced by underwriters. *See* R. BREALEY & S. MYERS, *supra* note 1, at 789; T. COPELAND & J. WESTON, *supra* note 2, at 333-35; SECURITY PRICES, *supra* note 27, at 102-07; Ibbotson, *Price Performance of Common Stock New Issues*, 2 J. FIN. ECON. 235 (1975); Ritter, *The "Hot Issue" Market of 1980*, 57 J. BUS. 215 (1984) (finding substantial initial returns on new issues of stocks of natural resource companies). Gilson and Kraakman explain this phenomenon as the underwriter's attempt to obtain a reputational benefit. Gilson & Kraakman, *supra* note 3, at 621-22 n.197. Levmore questions their explanation. Levmore, *Efficient Markets and Puzzling Intermediaries*, 70 VA. L. REV. 645, 657-66 (1984).

Despite some troubling data, Ibbotson concluded that the aftermarket for new issues was efficient. Ibbotson, *supra*, at 250-58, 265 ("The second through the sixth month of seasoning [after new issuance] may have high performance, but few trading rules are profitable after allowance for transaction costs." *Id.* at 265).

[35] B. MALKIEL & R. QUANDT, STRATEGIES AND RATIONAL DECISIONS IN THE SECURITIES OPTIONS MARKET 104-05, 159-63 (1969) ("Perhaps the most remarkable result of our study is the extent to which strategies involving the use of options, especially option writing, predominate over other possible stock market strategies. Even when the optimal strategy involves the purchase of stock, the investor is almost always advised to combine his purchase with the writing of options. This result holds for all investor attitudes toward risk, with every decision criterion employed, and over all distribution of stock price changes." *Id.* at 163); *see* Chiras & Manaster, *The Information Content of Option Prices and a Test of Market Efficiency*, 6 J. FIN. ECON. 213, 214-33 (1978) (during period June 1973-Apr. 1975, a trading strategy derived in part from the Black-Scholes option pricing model produced abnormally high returns; "[t]he conclusion is that the CBOE was inefficient during the observation period"; *id.* at 233); Galai, *Empirical Tests of Boundary Conditions for CBOE Options*, 6 J. FIN. ECON. 187, 203-10 (1978) (options are sometimes underpriced; "positive profits could have been exploited on the average, but the magnitude of the average was small"; *id.* at

In the past, warrant hedging (selling short the warrants and going long the common stock) has also earned above average profits.[36] One author-

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209); Kalay & Subrahmanyam, *The Ex-Dividend Day Behavior of Option Prices*, 57 J. BUS. 113, 128 (1984) ("a policy of selling short on the last cum-dividend day and repurchasing on the following day could earn significant excess return [but perhaps not after transactions costs]"; holders of options are following wrong exercise policy); Yates & Kopprasch, *Writing Covered Call Options: Profits and Risks*, J. PORTFOLIO MGMT., Fall 1980, at 74 (during the period 1973-80, writing covered calls "yielded far more to the investor than a buy-and-hold-the-market-index approach"; *id.* at 78). *Contra* SECURITY PRICES, *supra* note 27, at 168-70 (discussing studies showing that option writers do not make worthwhile gains; suggesting that Malkiel & Quandt's divergent findings may be attributed to the use of nominal quotations instead of a selection of premiums actually received by option writers); *but see* Whaley, *Valuation of American Call Options on Dividend-Paying Stocks*, 10 J. FIN. ECON. 29 (1982) (studying option prices from Jan. 17, 1975 to Feb. 3, 1978 and concluding: "A proportional transaction cost rate of less than 1 percent . . . is sufficient to eliminate the trading [strategy] profits, and the Chicago Board Options Exchange must be deemed to be an efficient market." *Id.* at 57); *but cf.* Bookstaber & Clarke, *Option Portfolio Strategies: Measurement and Evaluation*, 57 J. BUS. 469, 487-91 (1984) (discussing the pitfalls of some common methods of evaluating portfolios with option positions). *See generally* I. BOESKY, MERGER MANIA 154-56 (1985); Halpern & Turnbull, *Empirical Tests of Boundary Conditions for Toronto Stock Exchange Options*, 40 J. FIN. 481 (1985) (even after transaction costs, market was inefficient over the sample period 1978-79); Rubinstein, *Nonparametric Tests of Alternative Option Pricing Models Using All Reported Trades and Quotes on the 30 Most Active CBOE Option Classes from August 23, 1976 Through August 31, 1978*, 40 J. FIN. 455 (1985) (certain option prices deviated from value as determined by the commonly used Black-Scholes option pricing model).

[36] Kim & Young, *Rewards and Risks From Warrant Hedging*, J. PORTFOLIO MGMT., Summer 1980, at 65 (warrant hedging outperforms a strategy either of simply buying and holding the common stock or of holding the S & P 500 index); *see* B. STARK, SPECIAL SITUATION INVESTING: HEDGING, ARBITRAGE, AND LIQUIDATION 61-67, 220-24 (1983) (non-risk-adjusted superiority of mechanical warrant hedging strategy from Jan. 1972-Dec. 1976); E. THORP & S. KASSOUF, BEAT THE MARKET 91-102 (1967) (describing the high non-risk-adjusted returns that would have been obtained from 1941-66 by following a simplified mechanical strategy of warrant hedging); *cf.* SECURITY PRICES, *supra* note 27, at 187-88 ("In sum, the performance of the warrants was worse than that of the underlying stocks and markedly worse than that of the general equity market . . . . There seems good reason to believe that short-dated warrants offer little compensation for the very high risks involved." *Id.* at 188 (citing E. THORP & S. KASSOUF, *supra*)); T. NODDINGS, HOW THE EXPERTS BEAT THE MARKET 202-15 (1976) (discussing the strategy of selling short warrants against a long position in the common and furnishing a two and a half year record of hedge recommendations that were profitable on a non-risk-adjusted basis) [hereafter EXPERTS]; T. NODDINGS, THE DOW JONES-IRWIN GUIDE TO CONVERTIBLE SECURITIES 115-26 (1973) (discussing the strategy of selling short warrants against a long position in the stock) [hereafter GUIDE]. For an anecdotal description of one recently profitable warrant hedge, see A. TOBIAS, MONEY ANGLES 63-66 (1984).

ity suggested that higher risk stocks generate lower return per unit of risk, meaning that they are overpriced.[37]

Some commentators have noted that analysts follow only a small fraction of the companies filing reports under the 1934 Act.[38] This phenomenon suggests that the neglected securities may be less efficiently priced.[39]

Perhaps the most dramatic demonstrations of *IA* inefficiency are identical securities selling at significantly different prices. Recently, a huge market has developed in zero-coupon bonds backed by United States Treasury obligations.[40] One vehicle, developed by Salomon Brothers, is called a CAT (certificate of accrual on Treasury securities). Almost all CAT's trade over-the-counter. A few, however, are listed on the New York Stock Exchange, and in the recent past investors

> trade[d] several hundred thousand dollars' worth daily at prices that are just plain ridiculous — as much as 30% more than identical o-t-c CATs. . . . Says Adrian Massie, a managing director of Salomon Brothers: "A

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[37] R. BREALEY, AN INTRODUCTION TO RISK AND RETURN FROM COMMON STOCKS 47-54 (1st ed. 1969). Brealey, however, labels this conclusion "one of the least reliable in this book." *Id.* at 54.

[38] H. KRIPKE, *supra* note 1, at 85-86; B. STARK, *supra* note 36, at 24 ("[P]rofessional investors . . . concentrate on a fairly narrow range of stocks . . . ."); *id.* at 25 ("[O]f the 9,000 companies on the Nelson data base, two thirds are ignored in Wall Street [by brokerage firm analysts]" (quoting Metz, *Market Place: Finding Value of a Stock*, N.Y. Times, Jan. 24, 1980, at D6)); Barry, *supra* note 1, at 1349. In 1977, the Financial Analysts Federation reported to the SEC that analysts were following only about 1000 companies out of about 10,000 total corporations reporting under the Exchange Act. H. KRIPKE, *supra* note 1, at 85-86; Barry, *supra* note 1, at 1349 n.159.

[39] *See* Arbel, *Generic Stocks: An Old Product in a New Package*, J. PORTFOLIO MGMT., Summer 1985, at 4 (using several measures of general neglect by institutional investors and concluding that degree of institutional neglect explains the superior returns of small firms and low price-earnings ratio stocks); *cf.* Arbel, Carvell & Strebel, *Giraffes, Institutions and Neglected Firms*, FIN. ANALYSTS J., May-June 1983, at 57 (analysis of random sample of 510 publicly traded firms over the 10 year period 1971-80; about one third of the companies were held by no institution at all or just one; adjusting for risk, shares of these companies significantly outperformed the shares of firms widely held by institutions, over and above any "small firm" effect).

[40] For a discussion of zero-coupon bonds backed by United States Treasury obligations, see *Zero-Coupon Treasuries are Here to Stay*, BUS. WEEK, Oct. 15, 1985, at 160 (total face value of such bonds was at least $100 billion, with an estimated $40 billion of CAT's issued to date by Salomon Brothers); *Zingy Zeros: Wall Street's Hot Bonds*, TIME, Mar. 12, 1984, at 55. For a discussion of zero-coupon bonds issued directly by the United States Treasury, see *Treasury Jumps Into the Zero-Coupon Game*, BUS. WEEK, Jan. 28, 1985, at 98.

> rational buyer should never buy them, and those that have them should sell and replace them."[41]

This example involves bonds, rather than stocks; but such a dramatic imperfection in the bond market undermines one's confidence in the efficiency of the stock market. Valuation of stocks is more difficult than the valuation of bonds.

In the example just discussed, an identical security sold at substantially different prices in different markets. An even more dramatic anomaly occurs when two classes of securities are virtually identical, but one class is superior in one respect, and the superior class sells at a lower price than the inferior class. Corporations sometimes issue two classes of stock, identical in all respects except that one class has greater voting power. Remarkably, with some issuers the class possessing greater voting power has traded on average at a discount relative to the class of otherwise identical shares with less voting power.[42] Such mis-

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[41] *Stray CAT's*, FORBES, Oct. 22, 1984, at 247.

[42] Lease, McConnell & Mikkelson, *The Market Value of Control in Publicly-Traded Corporations*, 11 J. FIN. ECON. 439 (1983) (During period 1940-78, for 26 firms that had two classes of otherwise identical common stock outstanding, the class with superior voting rights traded at a premium to the other class. Surprisingly, however, in four firms that had a class of voting preferred stock in addition to the two classes of otherwise identical common, the class of common with superior voting rights traded at a statistically significant average discount relative to the class of common with inferior voting rights.) [hereafter *Publicly Traded Corporations*]; Lease, McConnell & Mikkelson, *The Market Value of Differential Voting Rights in Closely Held Corporations*, 57 J. BUS. 443, 451-56, 466 (1984) (case study of six companies with two classes of *publicly traded* common stock, identical in all respects except that one class has superior voting rights; for five companies the class with superior voting rights tended to trade at a premium relative to the other class; for one company "The class of common stock with superior voting rights traded predominantly at a discount relative to the class with inferior rights." *Id.* at 454) [hereafter *Closely Held Corporations*]; *cf.* Levy, *Economic Evaluation of the Voting Power of Common Stock*, 38 J. FIN. 79 (1983) (doing a study similar to those of Lease, McConnell & Mikkelson, *supra*, but of 25 stocks listed on the Israeli Stock Exchange; 22 higher-voting otherwise identical classes sold at a relatively high premium; three higher-voting otherwise identical classes sometimes sold at small discounts, occasionally for extended periods). *See generally* Dodd & Warner, *On Corporate Governance: A Study of Proxy Contests*, 11 J. FIN. ECON. 401 (1983) (finding that stock prices tend to rise before the announcement of a proxy contest, but during part of the sample period tended to fall between the contest announcement and election outcome announcement; possible explanations, such as a decline in the value of the vote, were explored, but provided only part of the answer; a strategy of selling short immediately after a proxy contest announcement would have generated above-average returns; the authors state: "This result is seemingly inconsistent with semi-strong market efficiency . . . ." *Id.* at 402).

pricing cannot be reconciled with stock market efficiency.[43]

C. *Studies or Phenomena Questioning "Fundamental-Valuation" Efficiency*

Several phenomena suggest that the stock market is not "fundamental-valuation" efficient. In the past, stocks sometimes have obviously been mispriced in relation to future dividends. At the beginning of the 1970's, extremely high projected dividend growth rates were required to justify the prices of approximately fifty major-company "growth" stocks.[44] For example, during the first three quarters of 1973, Avon Products stock moved in a range between $140 and $102.50. In October of that year, *Fortune* noted that a discount rate of 9.5 percent and the following annual dividend growth projections were required to justify a present value of $109.21: steady dividend growth at fourteen percent over the next ten years, followed by five years at twelve percent, another five years at ten percent, and finally, six percent indefinitely thereafter. (The 9.5 percent discount rate was only slightly higher than the eight percent rate on high quality bonds.)

Fortune thought a more realistic annual dividend growth projection would be growth rates of fourteen, twelve, ten, and eight percent respectively, over the next four five-year periods, with five percent indefinitely thereafter. A discount rate of fourteen percent would result in a present value of $33.14. Even a discount rate of twelve percent would make the stock worth $45.20. A discount rate of nine percent (only one

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[43] For discussion of the somewhat similar anomaly of convertible securities selling at conversion value, see *infra* part II(*B*).

[44] Bhirud, *Is Growth Overpriced?*, FIRST B. CORP. PORTFOLIO STRATEGY NOTES (No. 10 1981), (discussed and summarized in Lowenstein, *supra* note 30, at 287); *cf.* INVESTMENT GUIDE, *supra* note 9, at 38-41 (noting the "pathological" mania for "growth" stocks, which resulted in price earnings ratios in the 60's, 70's, 80's, and 90's in 1972); H. KRIPKE, *supra* note 1, at 80 (questioning the 1972 and 1973 "growth stock" price-earnings ratios of 30, 40, and 50); RANDOM WALK, *supra* note 9, at 72-74 (same as INVESTMENT GUIDE, *supra*); *id.* at 48-50 (noting craze for "growth" stocks during 1959-61, which resulted in price earnings ratios in 1959 of 50 to 100, or even 200); Bernstein, *Watch Earnings, Not the Ticker Tape*, 51 HARV. BUS. REV., Jan.-Feb. 1973, at 63, 67-68 (questioning whether classic "growth companies" could continue earnings growth necessary to justify current valuation); Fruhan, *Levitz Furniture: A Case History in the Creation and Destruction of Shareholder Value*, FIN. ANALYSTS J., Mar.-Apr. 1980, at 31-36 ("During most of Levitz's history as a public company up until about mid-1973, the market price of Levitz's common stock was almost *always* irrationally high." *Id.* at 35 (emphasis in original)); Note, *A Reconsideration*, *supra* note 3, at 1039 & n.63 (commenting on the high prices of growth stocks at the end of 1972).

percent above the high quality bond rate) would raise the value only to $88.21.[45] In the next several years, the bubble burst for "growth stocks" like Avon, which "sank like stones in the ocean."[46]

Other studies have suggested that variations in common stock prices cannot be explained by differences in projected dividends.[47] After con-

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[45] Seligman, *The Terrible Two-Tier Market* (Cont.), FORTUNE, Oct. 1973, at 105, 106, 111.

[46] INVESTMENT GUIDE, *supra* note 9, at 40; RANDOM WALK, *supra* note 9, at 74; *see* Lowenstein, *supra* note 30, at 286. For discussion of speculative bubbles in various types of stocks during the 1960's and 1970's, and in 1983, see RANDOM WALK, *supra* note 9, at 46-80.

[47] S. SHEFFRIN, RATIONAL EXPECTATIONS 141-46 (1983); Lowenstein, *supra* note 19, at 753 n.82; Shiller, *supra* note 11, at 491-94; Shiller, *Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends?*, 71 AM. ECON. REV. 421 (1981) ("[M]easures of stock price volatility over the past century appear to be far too high — five to thirteen times too high — to be attributed to new information about future real dividends if uncertainty about future dividends is measured . . . around their long-run exponential growth path." *Id.* at 433-34) [hereafter *Shiller I*]; *see* R. BREALEY, *supra* note 5, at 73-75 (describing and citing various studies by Shiller and by Grossman & Shiller); Ackley, *supra* note 12, at 13-14; Mankiw, Romer & Shapiro, *An Unbiased Reexamination of Stock Market Volatility*, 40 J. FIN. 677 (1985) (eliminating certain statistical problems with Shiller's work; new results are less striking than Shiller's, but author does find evidence that prices do not reflect the dividend discount model); Shiller, *The Use of Volatility Measures in Assessing Market Efficiency*, 36 J. FIN. 291 (1981) (surveying the literature on excessive volatility) [hereafter *Shiller II*]; Tobin, *supra* note 3, at 6 (citing *Shiller I*, *supra*); *cf.* Arrow, *supra* note 24, at 4-5 ("[I]t seems intuitively clear that daily variations in the futures and securities markets are excessive relative to the daily changes in information." *Id.* at 4); Note, *A Reconsideration*, *supra* note 3, at 1039-49 & n.65 ("wide fluctuations occur in market price that presumably are not matched by simultaneous fluctuations in the intrinsic values of the shares"; *id.* at 1039-40). *Contra* Marsh & Merton, *Dividend Variability and Variance Bounds Tests for the Rationality of Stock Prices*, Working Paper 1584-84 (MIT, Alfred P. Sloan School of Management, Aug. 1984) (dividends may be less volatile than stock prices because corporate managers "smooth" out dividends); *but see* Flavin, *Excess Volatility in the Financial Markets: A Reassessment of the Empirical Evidence*, 91 J. POL. ECON. 929 (1983) (questioning validity of Shiller's and similar studies; evidence of excess volatility may be due to small sample bias); LeRoy, *Efficiency and the Variability of Asset Prices*, 74 AM. ECON. REV. 183 (1984) (questioning whether Shiller's results support the hypothesis of stock market irrationality). *See generally* Renshaw, *Stock Market Panics: A Test of the Efficient Market Hypothesis*, FIN. ANALYSTS J., May-June 1984, at 48; Rohrer, *supra* note 1, at 75 (describing Shiller's work and rebuttal by Professor Robert Merton of Massachusetts Institute of Technology (MIT) that dividends are not as volatile as stocks because corporate managers "smooth" them out); Shiller, *supra* note 11, at 499-500, 503-04 (comments of Stanley Fischer) (describing the debate over the validity of Shiller's conclusions, including the rebuttal by Professors Marsh and Merton that corporate managers "smooth" out dividends.).

sidering the historic volatility of both stock prices and dividends, these studies find that the volatility of stocks is far higher than would be expected.[48]

Two distinguished professors have argued that from the late 1960's to the late 1970's the stock market consistently failed to price equities according to their fundamental value and that in 1979 stock prices should have been twice as high as they were. The reason for the persistent undervaluation was (1) the incorrect use of nominal interest rates, rather than real interest rates, to discount current equity earnings, and (2) the failure of analysts to understand the effects of inflation on corporate profits. Analysts adjusted profits downwards to reflect understated depreciation and phony inventory gains, but did not adjust profits upwards for offsetting gains created by the reduced value of nominal corporate indebtedness.[49]

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[48] Bond prices also fluctuate much more than the variability of long term interest rates can justify. Shiller, *The Volatility of Long-Term Interest Rates and Expectations Models of the Term Structure*, 87 J. POL. ECON. 1190 (1979); *see Shiller II*, *supra* note 47, at 291. Professor Tobin has also stated that "[b]ond prices fluctuate much more than the variability of short [term] rates can justify." Tobin, *supra* note 3, at 6.

[49] Modigliani & Cohn, *Inflation, Rational Valuation, and the Market*, FIN. ANALYSTS J., Mar.-Apr. 1979, at 24; *see* R. BREALEY, *supra* note 5, at 72-73 (summarizing part of Modigliani and Cohn's analysis); Rose, *The Stock Market Should Be Twice as High as It Is*, FORTUNE, Mar. 12, 1979, at 138; *cf.* Brainard, Shoven & Weiss, *The Financial Valuation of the Return to Capital*, BROOKING PAPERS ON ECONOMIC ACTIVITY 453 (No. 2, 1980). Robert E. Hall summarizes the verdict of Brainard, Shoven, and Weiss as "a strong confirmation of the hypothesis of gross undervaluation of corporate earnings. All respectable economic explanations of the weak stock market are found wanting." *Id.* at 506 (comment by Robert E. Hall). Professor Tobin summarizes the Brainard, Shoven and Weiss study as demonstrating that equity prices had fallen "well below . . . the present value of the pay-outs those assets could be expected to earn." Tobin, *supra* note 3, at 6 & n.4. *But cf.* J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at 29 (recognizing that Modigliani and Cohn's thesis is inconsistent with the efficient market theory but asserting that their thesis is "conjecture."); RANDOM WALK, *supra* note 9, at 305, 307 (suggesting that investors in the 1980's may have been rational to use a higher rate to discount future dividends because the increased variability in inflation would lead to increased volatility in interest rates and in stock prices; author acknowledges, however, that "paper assets had adjusted and perhaps overadjusted to inflation and the greater uncertainty associated with it." *Id.* at 307). *See generally* DeBondt & Thaler, *supra* note 24 (study contrasting two portfolios: "loser" stocks that have had extreme capital losses and "winner" stocks that have had extreme capital gains; "loser" portfolios of prior "losers" outperform prior "winners"; authors note that this evidence is consistent with the hypothesis that the stock market overreacts to unexpected events); Wallich, *Radical Revisions of the Distant Future: Then and Now*, J. PORTFOLIO MGMT., Fall 1979, at 36, 37 (*"Discounting inflation and discounting real growth are different matters, and the discount rates to be applied are*

Professor Lowenstein has commented that the premiums paid in going private and in leveraged buyout transactions suggest that the shares purchased were undervalued by the market.[50] Management changes are rare in these plans.[51] Lowenstein also mentions the numerous takeovers of natural resource companies whose reserves apparently were undervalued by the stock market and whose managements were retained after the takeovers.[52] In addition, he argues that the short-term trading focus of the increasingly dominant institutional investors has led to inefficient stock market prices.[53]

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differently determined. Expectations of real growth for a company could be sadly disappointing, and yet inflation will increase its sales, and unless profit margins shrink, also its dividends. Expectation of dividend increases in a time of inflation does not seem to be a very high risk assumption. Yet, the market today seems to place about the same discount on inflationary growth of dividends as it does on real growth." (emphasis in original)).

Modigliani and Cohn's thesis is that stock prices did not reflect fundamental values. Accordingly, their hypothesis questions *FV* efficiency. The thesis also questions *IA* efficiency if one expands the definition of relevant information to include not only news about issuers and the economy, but also information about financial theory. The information regarding proper discount rates and inflation adjustments was available but not utilized by the investment community. I am indebted to Professor William Bratton for this point.

[50] Lowenstein, *supra* note 30, at 295-97. As Professor Roberta Romano has commented, however, a going private transaction reduces agency costs by eliminating the separation of ownership and control. The firm's increased profitability from these incentive effects may explain the premiums. Letter from Professor Roberta Romano to William Wang (July 1, 1985) (copy on file with *U.C. Davis Law Review*). In a subsequent article, Professor Lowenstein extensively discusses various possible explanations for the premiums paid in management buyouts. Lowenstein, *supra* note 19, at 748-64.

[51] Lowenstein, *supra* note 30, at 295.

[52] In Lowenstein's words: "The cheapest oil was on Wall Street." *Id.* at 274; *cf.* Tobin, *supra* note 3, at 6-7 ("Takeover mania, motivated by egregious undervaluations, is testimony to the failure of the market on this fundamental-valuation criterion of efficiency." *Id.* at 6). ***But see*** Jensen, The Takeover Controversy: Analysis and Evidence Part 3 (paper presented at Columbia Law School Conference on Takeovers and Contests for Corporate Control, Nov. 13-15, 1985) (oil companies have been takeover targets because these firms have been over-retaining earnings for projects with inferior rates of return either in their own deteriorating industry or in other industries in which management lacks expertise).

[53] Lowenstein, *supra* note 30, at 304; *cf.* Lowenstein, *supra* note 19, at 751-54 ("The market in shares of firms has become more short-term . . . [I]nvestors are paying a high degree of attention to what their fellow investors are about to do . . . and paying less attention to asset values and other measures that would influence a buyer — or seller — of the business as a whole." *Id.* at 752-53); Tobin, *supra* note 3, at 7 ("Keynes's views [that the stock market is like a 'beauty contest'] would be confirmed today if he observed how professional portfolio managers seek safety from criticism in

D. Attacks on Studies or Phenomena Supporting IA *Efficiency*

The two major types of studies supporting *IA* efficiency are those that focus on (1) the speedy adjustment of securities prices to a particular kind of information announcement (for example, a stock split,[54] dividend change,[55] annual earnings,[56] or a purchase or sale of a significant percentage of stock[57]) or (2) the inability of professional investment managers (for example, managers of mutual funds) to outperform the market averages adjusted for risk.[58]

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short run performances that match [their competitors'] market indices."). For related discussion, see *supra* note 23 and accompanying text.

[54] *See* R. BREALEY, *supra* note 5, at 32-37 (citing Fama, Fisher, Jensen & Roll, *infra*); T. COPELAND & J. WESTON, *supra* note 2, at 336-37, 338 (discussing Fama, Fisher, Jensen & Roll *infra*); E. ELTON & M. GRUBER, *supra* note 2, at 394-96; E. FAMA, FOUNDATIONS OF FINANCE: PORTFOLIO DECISIONS AND SECURITIES PRICES 154-64 (1976); H. LEVY & M. SARNAT, *supra* note 1, at 678-81; J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at 65-69; J. LORIE & M. HAMILTON, *supra* note 1, at 83-86; R. RADCLIFFE, INVESTMENT CONCEPTS AND ANALYSIS 632-35 (1982); Charest, *Split Information, Stock Returns and Market Efficiency — I*, 6 J. FIN. ECON. 265 (1978) (studying price adjustments to proposals, approvals, and realizations of stock splits; no significant gains were found after approvals and realizations); Fama, Fisher, Jensen & Roll, *The Adjustment of Stock Prices to New Information*, 10 INT'L ECON. REV. 1 (1969); Note, *Economic Theory*, *supra* note 1, at 1044-45. *But cf.* Charest, *supra* (finding some significant gains after issuers *propose* stock splits for approval, but concluding that the evidence against semi-strong efficiency was "weak at best"; *id.* at 266).

[55] *See* Aharony & Swary, *Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis*, 35 J. FIN. 1 (1980); Pettit, *Dividend Announcements, Security Performance, and Capital Market Efficiency*, 27 J. FIN. 993 (1972) (rapid adjustment, with two exceptions: with dividend omissions, the stock price continued to drift down after the announcement month; with first-time dividend payments, the stock price continued to drift up). For discussion of Pettit's study, see R. BREALEY, *supra* note 5, at 26-29. For related discussion, see *infra* notes 60 & 62 and accompanying text.

[56] *See* Ball & Brown, *An Empirical Evaluation of Accounting Income Numbers*, 6 J. ACCT. RESEARCH 159 (1968) (showing that prices begin adjusting to new information in annual earnings announcements well before the announcement date and that most of the price adjustment occurs prior to the annual report). This study is summarized in T. COPELAND & J. WESTON, *supra* note 2, at 324-26; J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at 99-101; Note, *Economic Theory*, *supra* note 1, at 1045-46.

[57] *See* E. ELTON & M. GRUBER, *supra* note 2, at 398-99.

[58] *See* R. BREALEY, *supra* note 5, at 54-55; T. COPELAND & J. WESTON, *supra* note 2, at 339-40; INVESTMENT GUIDE, *supra* note 9, at 58-62; H. LEVY & M. SARNAT, *supra* note 1, at 542-44; J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at 73-75; J. LORIE & M. HAMILTON, *supra* note 1, at 88-95; RANDOM WALK, *supra* note 9, at 160-70; Boldt & Arbit, *supra* note 30, at 24, 28.

With regard to studies of the speed of price adjustment, the crucial question is what kinds of information are relevant. If information is already anticipated by the stock markets, the price will not change when the corporation finally makes its announcement.[59] Some recent research has concluded that prices adjusted relatively slowly to unanticipated or "surprise" information about dividends or earnings and that abnormal returns could have been earned by purchasing immediately after the "surprise" announcement.[60] One study found that "the market

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[59] *See* Boldt & Arbit, *supra* note 30, at 27; *cf.* Lowenstein, *supra* note 30, at 283 ("These market reaction tests are of limited value. If they had proved that the market responded very slowly, the data would have been significant, but that is not the case. They test the market's response to what is, however, distressingly simple information . . . . The needs of the researchers to test relatively simple and discrete pieces of information limit the usefulness of the results.").

[60] *See* Brown, *Earnings Changes, Stock Prices, and Market Efficiency*, 33 J. FIN. 17 (1978); Charest, *Dividend Information, Stock Returns and Market Efficiency — II*, 6 J. FIN. ECON. 297 (1978); Jones, Rendleman & Latane, *Earnings Announcements: Pre-and-post Responses*, J. PORTFOLIO MGMT., Spring 1985, at 28 (the market makes substantial adjustments before and on earnings announcement days, but "a substantial adjustment in stock returns still occurs after the earnings announcements, and this adjustment is gradual rather than immediate." *Id.* at 31); Latane & Jones, *Standardized Unexpected Earnings — 1971-77*, 34 J. FIN. 717 (1979) (finding a general delay in adjustment, but a less significant one for stocks closely followed by analysts); Latane & Jones, *Standardized Unexpected Earnings — A Progress Report*, 32 J. FIN. 1457 (1977); Watts, *Systematic "Abnormal" Returns After Quarterly Earnings Announcements*, 6 J. FIN. ECON. 127 (1978) (significant postannouncement abnormal returns are observed, but these do not cover transaction costs, except those for brokers); *see also* Boldt & Arbit, *supra* note 30, at 27 (discussing some of the above articles). *Contra* Aharony & Swary, *supra* note 55; Pettit, *supra* note 55. (Aharony & Swary, *supra*, and Watts, *supra*, are both summarized in T. COPELAND & J. WESTON, *supra* note 2, at 325-26.) *See generally* Pearce & Roley, *Stock Prices and Economic News*, 58 J. BUS. 49 (1985) (analyzing the speed of stock price adjustment to discount rate announcements and to "unexpected" announcements about the money supply, inflation, and real economic activity; some types of announcements had no effect on stock prices; other types had a pronounced effect, that in some cases persisted beyond the announcement day).

For a summary of several studies demonstrating rapid price adjustment to "surprise" earnings announcements and several studies showing slow adjustment, see R. RADCLIFFE, *supra* note 54, at 636-37 (concluding that the speed of the adjustment process is "questionable"). For related discussion, see *supra* notes 55-56 and accompanying text.

A recent article reported on the after-effects of the failure of Penn Square Bank. That bank had sold more than two billion dollars in loan participations "upstream" to several larger banks. After studying the price adjustment of the common shares of these larger banks after the Penn Square failure, the article concluded: "*It appears that the market required almost four months to fully assimilate the new information!*" Fraser & Richards, *The Penn Square Bank Failure and the Inefficient Market*, J. PORTFO-

does not respond instantaneously to financial analysts' forecast (FAF) revisions: significant abnormal returns are observed during the two months following the month of the revision."[61] A 1978 article surveyed nineteen previous studies of stock price reaction to earnings or dividend announcements (plus one study based on reaction to announcement of Value Line ratings, which are based on dividends and earnings variables). The author found consistent excess returns in the post-announcement periods,[62] but concluded that the likely explanation is partially, if not entirely, due to problems with the capital asset pricing model rather than to stock market inefficiency.[63]

Professor Michael Jensen authored the classic article studying mutual fund performance during the period 1945 to 1964; he reported that mutual funds failed to outperform a buy-the-market-and-hold strategy and that no individual fund was able to do significantly better than would be expected from mere random chance.[64] Subsequently, Mains pointed out problems with Jensen's study, one of which was Jensen's use of annual rather than monthly data.[65] After recasting Jensen's study using monthly data from a subset of the original group of mutual funds, Mains found that approximately eighty percent of the funds generated above-average risk-adjusted gross returns (disregarding expenses).[66] After expenses were deducted, approximately sixty percent of

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LIO MGMT., Spring 1985, at 34, 35 (emphasis in original).

[61] Givoly & Lakonishok, *supra* note 27, at 165, 183-84; *cf.* Bierring, Lakonishok & Vermaelen, *supra* note 27 (analyzing price effects of recommendations of a Canadian brokerage house; investors following recommendations would have "achieved positive abnormal returns during the recommendation period. Moreover, the information content of the recommendations was not 'immediately' reflected in market prices." *Id.* at 202-03). For related discussion, see *supra* note 27.

[62] Ball, *supra* note 28, at 103. For discussion of Ball's article, see S. SHEFFRIN, *supra* note 47, at 140.

These studies question the efficiency of the stock market by showing that stock prices do not adjust quickly to new information. Some commentators conclude that the eventual price adjustment (slow or fast) is an overreaction to the new information. *See* DeBondt & Thaler, *supra* note 24; *see also supra* note 49.

[63] Ball, *supra* note 28, at 114. For discussion of the risk measurement problems of the capital asset pricing model and other models, see *infra* part I(*E*).

[64] Jensen, *The Performance of Mutual Funds in the Period 1945-1964*, 23 J. FIN. 389, 415 (1968).

[65] Mains, *Risk, the Pricing of Capital Assets, and the Evaluation of Investment Portfolios: Comment*, 50 J. BUS. 371 (1977). For additional criticism of the Jensen article, see Boldt & Arbit, *supra* note 30, at 29.

[66] Mains, *supra* note 65, at 384. For discussion of Mains' work, see T. COPELAND & J. WESTON, *supra* note 2, at 340; Boldt & Arbit, *supra* note 30, at 29. Professor Merritt Fox has noted that the efficient market hypothesis is not vindicated even if the

the mutual funds earned above-average risk-adjusted returns.[67] Mains concluded that on a net return basis, mutual funds in general were "neutral" performers, generating sufficiently high gross returns to justify their expenses.[68] This conclusion conflicts with the pure form of the semi-strong efficient market hypothesis.[69]

E. Risk-Measurement Problem with Many Studies Supporting or Attacking Stock Market Efficiency

Thus far, this Article has discussed numerous studies whose results question the efficient market theory and some research supporting the theory. Unfortunately, many of these studies are of questionable validity.

The fundamental difficulty is that of measuring "risk," a term that

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average performance of mutual funds is poorer than that of the market. The pure form of the semi-strong efficient market theory is wrong if just one fund can outperform the market through superior analysis. M. FOX, FINANCE AND INDUSTRIAL PERFORMANCE IN A DYNAMIC ECONOMY: THEORY, PRACTICE AND POLICY ch. I, § (C)2.2123(b)(2) (1986) (forthcoming).

[67] Mains, *supra* note 65, at 384.

[68] *Id.*; *cf.* Shawky, *An Update on Mutual Funds: Better Grades*, J. PORTFOLIO MGMT., Winter 1982, at 29 ("The performance of the mutual fund industry in the 1970's seems to be better than what has been reported earlier for the 1950's and 1960's. Specifically, they seem to earn a [net] return that is generally commensurate with their systematic risk." *Id.* at 33-34) *But cf.* Chang & Lewellen, *An Arbitrage Pricing Approach to Evaluating Mutual Fund Performance*, 8 J. FIN. RESEARCH 15 (1985) (using an arbitrage pricing approach to evaluate mutual fund performance; concluding that mutual fund portfolios did not outperform a passive buy-and-hold strategy) [hereafter *Arbitrage Pricing*]; Chang & Lewellen, *Market Timing and Mutual Fund Investment Performance*, 57 J. BUS. 57 (1984) (using a new statistical procedure to test for either superior market-timing or security-selection skills in managed portfolios; the new technique produces a more favorable judgment about mutual fund timing and security selection; nevertheless, few funds displayed superior skill; authors concluded that funds collectively are unable to outperform a passive investment strategy). For related discussion of the arbitrage pricing theory and the work of Chang & Lewellen, see *infra* note 85. *See generally* Kon & Jen, *The Investment Performance of Mutual Funds: An Empirical Investigation of Timing, Selectivity, and Market Efficiency*, 52 J. BUS. 263 (1979) (relaxing Jensen's incorrect assumption that each mutual fund's risk remained constant during the measurement period; using one pricing model, many individual funds demonstrated superior ability to select stocks and, on average, the funds selected superior portfolios; using another pricing model, many individual funds were able to generate superior performance, but on average, the funds did not do so).

[69] A finding that mutual funds' gross returns exceed the market return is inconsistent with pure semi-strong efficiency because the results indicate that better informed investors can outperform the market. M. FOX, *supra* note 66, ch. I, § (C)2.2123(b)(1). For related discussion, see *infra* part I(*F*).

financial theory uses to describe the degree of dispersion or variation of possible future incomes. To illustrate, suppose the United States government issues a note with the following terms: One year from issuance, a coin will be flipped. If the coin comes up heads, the government will then pay $2000 on the note. If the coin comes up tails, the government will pay nothing. The note's "expected value" is $1000. Nevertheless, the typical investor is risk-averse. Consequently, she would place a lower value on the note than on a government note that would definitely pay $1000 a year from now.[70]

The above example illustrates the risk of a single asset. By diversifying, investors can eliminate much of the risk associated with a single asset. To illustrate, suppose the United States government issues two different types of notes, *A* and *B*. One year from issuance, a coin will be flipped once. If the coin comes up heads, the government will then pay $2000 on the first type of note (*A*) and nothing on the second type (*B*). If the coin comes up tails, the government will pay $2000 on the second type of note (*B*) and nothing on the first type (*A*). By purchasing one note of each type, the investor can diversify away the risk of each note and guarantee a return of $2000 on the two notes together. In the example above, if an investor already held one note of type *A*, the addition of a type *B* note would decrease rather than increase risk. On the other hand, if an investor already held a large number of both types of notes, the addition of one note of either type would have only a minimal effect on the risk of his entire portfolio.[71] Therefore, for an

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[70] For a general discussion of risk and risk-aversion, see R. BREALEY & S. MEYERS, *supra* note 1, at 117-23; V. BRUDNEY & M. CHIRELSTEIN, *supra* note 5, at 59-70; T. COPELAND & J. WESTON, *supra* note 2, at 85-101, 142-50; J. FRANCIS, *supra* note 1, at 343-86; R. HAGIN, THE DOW JONES IRWIN-GUIDE TO MODERN PORTFOLIO THEORY 99-103 (1979); INVESTMENT GUIDE, *supra* note 9, at 65-75; N. JACOB & R. PETTIT, *supra* note 27, at 59-123; W. KLEIN, *supra* note 5, at 147-48, 152-55; H. LEVY & M. SARNAT, *supra* note 1, at 104-265; J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at 93-95, 127-30; J. LORIE & M. HAMILTON, *supra* note 1, at 123-24, 191-96, 205; R. POSNER, ECONOMIC ANALYSIS OF LAW 315-16 (2d ed. 1977); RANDOM WALK, *supra* note 9, at 187-209; W. SHARPE, INVESTMENTS 93-117, 122-25 (3d ed. 1985); J. VAN HORNE, FINANCIAL MANAGEMENT AND POLICY 29-36 (6th ed. 1983); Bines, *supra* note 1, at 738-41; Cohen, *supra* note 3, at 1607-08; Langbein & Posner, *Market Funds and Trust Investment Law*, 1976 AM. BAR FOUND. RESEARCH J. 1.

[71] For a general discussion of diversification, see R. BREALEY, *supra* note 5, at 102-03, 111-24; R. BREALEY & S. MEYERS, *supra* note 1, at 123-26, 140-48; V. BRUDNEY & M. CHIRELSTEIN, *supra* note 5, at 1151-55; T. COPELAND & J. WESTON, *supra* note 2, at 150-81; J. FRANCIS, *supra* note 1, at 476-527; R. HAGIN, *supra* note 70, at 115, 131-33; INVESTMENT GUIDE, *supra* note 9, at 112-15; N. JACOB & R. PETIT, *supra* note 27, at 271-306; W. KLEIN, *supra* note 5, at 153-55; J. LORIE, P. DODD &

investor with a diversified portfolio, the relevant risk of an asset is not the future volatility of the asset itself but the contribution of that asset to the volatility of the investor's entire portfolio.[72]

Any valid test of an investment strategy (for example, buying low price/earnings ratio stocks[73] or imitating insiders[74]) must measure performance adjusted for risk. A higher return with higher risk is not necessarily superior to a lower return with lower risk. Similarly, any valid assessment of the performance of professional investment managers must adjust for the risk of the managed portfolio.[75]

If an investor adds a group of securities to her portfolio, the relevant risk of the group of securities is the effect of the group on the volatility of the investor's entire portfolio of assets.[76] This effect is difficult to predict, however. One can attempt to measure the effect by comparing

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M. KIMPTON, *supra* note 1, at 23, 110-18; J. LORIE & M. HAMILTON, *supra* note 1, at 41, 174-83; R. POSNER, *supra* note 70, at 316-20; RANDOM WALK, *supra* note 9, at 193-202; W. SHARPE, *supra* note 70, at 119-22, 126-34; J. VAN HORNE, *supra* note 70, at 46-50; Bines, *supra* note 1, at 741-50; Cohen, *supra* note 3, at 1611-14; Langbein & Posner, *supra* note 70, at 8-9; Pozen, *supra* note 12, at 940-54.

[72] T. COPELAND & J. WESTON, *supra* note 2, at 193 ("The correct definition of an individual asset's risk is its contribution to portfolio risk."); W. SHARPE, *supra* note 70, at 119 ("[A] security's *total* risk is not of prime importance, only its *contribution* to the total risk of a portfolio." (emphasis in original)); J. VAN HORNE, *supra* note 70, at 60, 63; Miller & Scholes, *Rates of Return in Relation to Risk: A Re-examination of Some Recent Findings*, in STUDIES IN THE THEORY OF CAPITAL MARKETS 47, at 48-49 (M. Jensen ed. 1972); *see* R. BREALEY, *supra* note 5, at 136, 174; E. ELTON & M. GRUBER, *supra* note 2, at 566; H. LEVY & M. SARNAT, *supra* note 1, at 519-21; RANDOM WALK, *supra* note 9, at 202-06; *cf.* Levy, *The CAPM and Beta in an Imperfect Market*, J. PORTFOLIO MGMT., Winter 1980, at 5 (arguing that beta is an imperfect measure of risk because investors do not in fact hold diversified portfolios).

[73] *See supra* note 30 and accompanying text.

[74] *See supra* note 29 and accompanying text.

[75] *See* R. BREALEY, *supra* note 5, at 173-76; H. LEVY & M. SARNAT, *supra* note 1, at 667 ("In any empirical test of market efficiency, the risk must be held constant. To illustrate, suppose that we observe an investor who consistently makes an average profit higher than the average profit on the S & P index . . . . It might be that this investor invests in a highly risky portfolio and hence his return is higher than the average return . . . . [W]e have to test if he systematically achieves profit in excess of the reward he should get in accordance with the risk characteristic of his portfolio."); J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at 154-66 (discussing the desirability of measuring both return and risk when evaluating investment performance and means of doing so); J. LORIE & M. HAMILTON, *supra* note 1, at 228-47 (same); Jensen, *supra* note 64, at 389; Thompson, *supra* note 26, at 204 ("In judging investment performance the financial planner should consider not only return but also risk."). For related discussion, see *supra* note 26.

[76] *See supra* note 72 and accompanying text.

the given group's past volatility with the past volatility of a larger relevant portfolio.

Unfortunately, past volatility may not be a valid indicator of future volatility. One model often used to measure a security's risk is the capital asset pricing model. This model measures risk based on the security's "beta," or past volatility relative to a larger "relevant" portfolio. In practice, the larger portfolio is a general stock market index.[77] For several reasons, such observed betas may not be accurate measures of the true risk of a managed group of securities. Observed betas for individual stocks have not been stable over time,[78] although the larger the

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[77] *See* Thompson, *supra* note 26, at 203-05. For a general discussion of betas and of their use in the capital asset pricing model, see R. BREALEY, *supra* note 5, at 125-39, 157-69 (especially easy to understand); R. BREALEY & S. MYERS, *supra* note 1, at 126-36, 150-59, 166-72; V. BRUDNEY & M. CHIRELSTEIN, *supra* note 5, at 1155-66; T. COPELAND & J. WESTON, *supra* note 2, at 187-209; R. HAGIN, *supra* note 70, at 137-41, 184-97; N. JACOB & R. PETTIT, *supra* note 27, at 319-408; H. LEVY & M. SARNAT, *supra* note 1, at 395-459; J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at 132-43; J. LORIE & M. HAMILTON, *supra* note 1, at 198-210, 218-25; R. POZEN, FINANCIAL INSTITUTIONS: CASES, MATERIALS AND PROBLEMS ON INVESTMENT MANAGEMENT 158-61 (1978); RANDOM WALK, *supra* note 9, at 199-227 (especially easy to understand); W. SHARPE, *supra* note 70, at 145-81; J. VAN HORNE, *supra* note 70, at 54-64; *cf.* R. POSNER, *supra* note 70, at 315-24 (discussing beta, systematic risk, and their impact on portfolio design); Langbein & Posner, *supra* note 70, at 9-13 (same). For a summary of the theory behind the capital asset pricing model, see Gilson, *Value Creation by Business Lawyers: Legal Skills and Asset Pricing*, 94 YALE L.J. 239, 250-51 (1984).

The capital asset pricing model furnishes not only the relevant risk of an asset but also the asset's "normal" or expected return (given the level of risk). *See supra* note 26.

Actually, the capital asset pricing model is derived from a set of assumptions that are very similar to those of *IA* efficiency. *See* T. COPELAND & J. WESTON, *supra*, at 306; W. SHARPE, *supra*, at 48 ("Every investor is assumed to have the same information and to analyze and process it in the same way."). In effect, the capital asset pricing model assumes that the stock market is *IA* efficient. *See* T. COPELAND & J. WESTON, *supra* ("the CAPM . . . assumes market efficiency for its derivation"); J. VAN HORNE, *supra*, at 54 (the model "assume[s] that capital markets are highly efficient"). For related discussion, see *infra* note 83.

[78] N. JACOB & R. PETTIT, *supra* note 27, at 699; R. POZEN, *supra* note 77, at 160; *see* J. LORIE & M. HAMILTON, *supra* note 1, at 224; RANDOM WALK, *supra* note 9, at 219-25; W. SHARPE, *supra* note 70, at 373; Kon & Lau, *Specification Tests for Portfolio Regression Parameter Stationarity and the Implications for Empirical Research*, 34 J. FIN. 451 (1979); McDonald, *Making Sense Out of Unstable Alphas and Betas*, J. PORTFOLIO MGMT., Winter 1985, at 19; Mehta & Beranek, *Tracking Asset Volatility by Means of a Bayesian Switching Regression*, 17 J. FIN. & QUANTITATIVE ANALYSIS 241 (1982); Ohlson & Rosenberg, *Systematic Risk of the CRSP Equal-weighted Common Stock Index: A History Estimated by Stochastic-Parameter Regression*, 55 J. BUS. 121 (1982); Sunder, *Stationarity of Market Risk: Random Coefficients*

collection of securities, the stronger the relationship between portfolio betas for consecutive periods.[79] The true risk of mutual fund portfolios may be harder to estimate from historic data because managers may deliberately try to change the risk of the portfolio.[80] In addition, an investor's or investment manager's superior knowledge may affect her own perception of the future volatility of certain securities. This perception may differ from that of the market in general. If so, a rational investor or manager should act on her own perception of risk. Conventional risk-return measures based on past volatility would not identify the risk perceived by the individual investor or manager. Therefore, these conventional measures are inappropriate.[81]

Tests for Individual Stocks, 35 J. FIN. 883 (1980); *cf.* W. SHARPE, *supra* note 70, at 369-74 (discussing changes in beta values over time). *Contra* J. VAN HORNE, *supra* note 70, at 57 ("[M]easured betas show stability over time even at the individual security level."); *but see* R. BREALEY & S. MYERS, *supra* note 1, at 167-68 (discussing the results of Sharpe & Cooper, *infra*); Roenfeldt, Griepentrog & Pflaum, *Further Evidence of the Stationarity of the Beta Coefficients*, 13 J. FIN. & QUANTITATIVE ANALYSIS 117 (1978) (The findings "indicate a tendency for individual security betas to remain in the same or adjacent quintile." *Id.* at 118); Sharpe & Cooper, *NYSE Stocks Classified by Risk, 1931-1967*, 28 FIN. ANALYSTS J. 46, Mar.-Apr. 1972 (dividing securities into 10 risk-return classes; five years later most securities exhibited moderate stability; a large percentage were either in the same risk class or a class only one away from the original class); *but cf.* R. BREALEY, *supra* note 5, at 130-33 ("[E]stimates of beta based on past data do tell you something about how a stock is likely to be affected by future market movements." *Id.* at 130). *See generally* Fisher & Kamin, *Forecasting Systematic Risk: Estimates of "Raw" Beta that Take Account of the Tendency of Beta to Change and the Heteroskedascity of Residual Returns*, 20 J. FIN. & QUANTITATIVE ANALYSIS 127 (1985).

[79] N. JACOB & R. PETTIT, *supra* note 27, at 699; RANDOM WALK, *supra* note 9, at 224-25; W. SHARPE, *supra* note 70, at 373; Blume, *On the Assessment of Risk*, 26 J. FIN. 1 (1971); Levy, *On the Short-Term Stationarity of Beta Coefficients*, 27 FIN. ANALYSTS J. 55, Nov.-Dec. 1971; *see* J. LORIE & M. HAMILTON, *supra* note 1, at 224; R. POZEN, *supra* note 70, at 158-61; W. SHARPE, *supra* note 70, at 373-74; J. VAN HORNE, *supra* note 70, at 57.

[80] RANDOM WALK, *supra* note 9, at 224; *see* Kon & Jen, *supra* note 68, at 285-86 (finding that many mutual funds in sample significantly changed their risk levels during the measurement period of Jan. 1960-Dec. 1971); *cf.* H. LEVY & M. SARNAT, *supra* note 1, at 447 ("[B]eta[s] for most [mutual] funds [are] quite unstable."). *But see* Fielitz & Greene, *Shortcomings in Portfolio Evaluation via MPT*, J. PORTFOLIO MGMT., Summer 1980, at 13 (excess return rankings and various other measures of portfolio performance depend much on the time period selected (when and for how long), but risk rankings over the time are considerably more stable).

[81] Admati & Ross, *Measuring Investment Performance in a Rational Expectations Equilibrium Model*, 58 J. BUS. 1 (1985); Dybvig & Ross, *Differential Information and Performance Measurement Using a Security Market Line*, 40 J. FIN. 383 (1985); *cf.* J. VAN HORNE, *supra* note 70, at 66 (with heterogeneous expectations, "the lack of

Even if a group of securities' past volatility relative to a relevant larger portfolio is an accurate measure of future risk, a more serious problem arises. One must identify the appropriate larger portfolio. Professor Richard Roll has demonstrated that with the capital asset pricing model the appropriate larger portfolio (for comparison purposes) is not a broad stock market index, but the "true market portfolio" of all assets (marketable and unmarketable, including human capital, jewelry, and real estate).[82] Many of the studies of investment performance discussed

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precise description [of the capital asset pricing model] must be recognized."). *See generally* T. COPELAND & J. WESTON, *supra* note 2, at 204 (discussing the effect of heterogeneous expectations on the capital asset pricing model); N. JACOB & R. PETTIT, *supra* note 27, at 351-53 (same); H. LEVY & M. SARNAT, *supra* note 1, at 468-69, 481-83 (discussing the capital asset pricing model's assumption of homogeneous expectations and describing Lintner's derivation of a heterogeneous expectation model).

[82] 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 (1977) [hereafter *Critique*]; *see* R. BREALEY, *supra* note 5, at 161 ("A second assumption [of the capital asset pricing model] was that all investments can be freely bought and sold . . . . [A] person's most valuable possession is often his own talent, and this cannot easily be sold to others."); *id.* at 161 n.4 ("In this case, the beta also depends on how the nonmarketable asset moves with other assets."); *id.* at 162 ("A second difficulty [with the capital asset pricing model] is that in principle the market portfolio contains all risky investments, but in practice stock market indexes measure the returns on only a sample of these investments."); *cf.* Dybvig & Ross, *The Analytics of Performance Measurement Using a Security Market Line*, 40 J. FIN. 401 (1985) (discussing the difficulty of measuring investment performance using the traditional model of risk and return and the errors caused by the choice of an inappropriate reference portfolio); Levy, *The CAPM and Beta in an Imperfect Market*, J. PORTFOLIO MGMT., Winter 1980, at 5 (the capital asset pricing model assumes (1) that all investors hold in their portfolios all risky securities available in the market and (2) that all investors hold the risky assets in the same proportions as these assets are available in the market; once these assumptions are relaxed, beta becomes an imperfect measure of risk); Miller & Scholes, *supra* note 72, at 63-66 (discussing possible errors resulting from improper choice of index in capital asset pricing model); Roll, *Ambiguity When Performance is Measured by the Securities Market Line*, 33 J. FIN. 1051 (1978) (because of difficulty of measuring risk, difficult to evaluate performance; much performance evaluation is faulty); Roll, *Performance Evaluation and Benchmark Errors (I)*, J. PORTFOLIO MGMT., Summer 1980, at 5 (performance evaluations may be inaccurate because of errors in the choice of benchmark for the capital asset pricing model). *But cf.* Rosenberg, *Prediction of Common Stock Betas*, J. PORTFOLIO MGMT., Winter 1985, at 5 (combining industry and company-fundamental factors with historic price performance to develop measurements of risk which have performed well over 10 years). For additional discussion of Rosenberg's work on "fundamental" betas, see *infra* note 85. *See generally* E. ELTON & M. GRUBER, *supra* note 2, at 563-91 (discussing the problems of measuring the performance of mutual funds and various alternative measures of such performance); H. LEVY & M. SARNAT, *supra* note 1, at 515-59 (discussing various alternative measures of the performance of mutual funds); J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at

or cited earlier use the capital asset pricing model to generate "normal" risk-adjusted returns; but none of these uses Roll's "true market portfolio" as a benchmark. Instead, the studies use some broad stock market average (for example, the Standard and Poor's 500). Consequently, the validity of these studies is questionable.[83] Even worse, the volatility of

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41-54 (discussing some problems with stock market indexes); J. LORIE & M. HAMILTON, *supra* note 1, at 51-69 (same); H. PHILLIPS & J. RICHIE, INVESTMENT ANALYSIS & PORTFOLIO SELECTION 774-78 (2d ed. 1983) (discussing various alternative measures of the performance of mutual funds); French & Henderson, *How Well Does Performance Evaluation Perform?*, J. PORTFOLIO MGMT., Winter 1985, at 15 ("We indicate that you will not only be unable to tell winners from random performers, but you will not even be able to label winners unless they are spectacularly successful." *Id.* at 17); Thompson, *supra* note 26, at 203-05 (discussing the use of a stock market index in the capital asset pricing model and the problem of choosing among the different stock market indexes available); *Tenth Anniversary Issue — Risk and Return: A Critique of Theory and an Analysis of Practice*, J. PORTFOLIO MGMT., Fall 1984.

For discussion of Roll's analysis, see R. BREALEY, *supra* note 5, at 162 (a nonmathematical explanation); T. COPELAND & J. WESTON, *supra* note 2, at 209-11; N. JACOB & R. PETTIT, *supra* note 27, at 398-99, 401-04; H. LEVY & M. SARNAT, *supra* note 1, at 498-502, 533, 548-49; H. PHILLIPS & J. RICHIE, *supra* at 296-97; R. RADCLIFFE, *supra* note 54, at 202-05; RANDOM WALK, *supra* note 9, at 226-27 (a nonmathematical explanation); S. SHEFFRIN, *supra* note 47, at 137-39; Wallace, *Is Beta Dead?*, INSTITUTIONAL INVESTOR, July 1980, at 23 (nonmathematical explanation).

[83] J. VAN HORNE, *supra* note 70, at 70 ("As the proxy market index is only a subset of the true market portfolio, it is unlikely to capture the basis of the underlying market equilibration process. Therefore, the measurement of security performance for various investment strategies will be ambiguous."); *see* T. COPELAND & J. WESTON, *supra* note 2, at 209-11; R. RADCLIFFE, *supra* note 54, at 204 ("In conclusion, Roll's observations have raised fundamental questions about the CAPM's [capital asset pricing model's] truth, testability, and use in evaluating investment performance."); Ball, *supra* note 28, at 116-17; Boldt & Arbit, *supra* note 30, at 28 ("The central controversy is whether these effects [abnormal performance of low price/earnings ratio stocks and small capitalization stocks, *see supra* notes 30-31 and accompanying text] reflect market inefficiencies or merely result from a misspecification of the model used to adjust return for systematic risk." (footnote omitted)); *cf.* T. COPELAND & J. WESTON, *supra* note 2, at 318 ("[R]esidual analysis [in studies of stock market efficiency] which employs the CAPM or the empirical market line may be subject to criticism [under Roll's analysis]."); J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at 163 ("Roll's message is important: when evaluating performance, it is crucial to carefully consider the appropriateness of the benchmark used for comparison."); Wallace, *supra* note 82, at 25 ("[A]s Roll himself points out, 'It's a mistake to justify index funds on the grounds that managers don't have ability.' "; for related discussion, see *infra* note 192 and accompanying text). *But cf.* H. LEVY & M. SARNAT, *supra* note 1, at 533 (recognizing the "strong implications" of Roll's critique for traditional measures of investment performance but noting: "It is not easy to construct such a composite risk index. However, investors may perceive the beta as a proxy to the true risk when the beta is

the Roll "true market portfolio" is unknowable.[84] In addition to the capital asset pricing model, other models can be utilized to generate risk-adjusted "normal" returns.[85] Discussion of the accuracy of these

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calculated against some portfolio which adequately reflects the market trend, *e.g.*, the S & P index, the Dow-Jones index, or any other acceptable proxy of the market portfolio.").

For suggestions that the apparent superiority of specific strategies may be due to inaccurate measurement of risk by the capital asset pricing model, see sources cited *supra* notes 28 (Value Line recommendations), 30 (low price-earnings ratio stocks) & 31 (small-firm stocks).

The capital asset pricing model itself assumes stock market efficiency. *See supra* note 77. "Therefore, any test of market efficiency which uses the CAPM to adjust for risk is . . . a joint test of the CAPM *which assumes market efficiency for its derivation* and of market efficiency itself." T. COPELAND & J. WESTON, *supra* note 2, at 306 (emphasis added).

[84] *See* T. COPELAND & J. WESTON, *supra* note 2, at 211 ("[B]ecause the market portfolio contains all assets (marketable and nonmarketable, *e.g.*, human capital, coins, houses, bonds, stocks, options, land, etc.), it is impossible to observe."); R. RADCLIFFE, *supra* note 54, at 203 ("The 'market' portfolio consists of all risky assets which can never be totally observed."); *cf.* H. LEVY & M. SARNAT, *supra* note 1, at 502 ("[T]esting the efficiency of the [true] market portfolio is almost a hopeless task."); *Critique*, *supra* note 82, at 129-30 ("The two parameter asset pricing theory [the capital asset pricing model] is testable *in principle*; but . . . (a) No correct and unambiguous test of the theory has appeared in the literature, and (b) there is practically no possibility that such a test can be established in the future.") (emphasis in original)); Wallace, *supra* note 82, at 24 (" 'If you don't know what the market portfolio is, you can't measure it and you can't test the theory [the capital asset pricing model]. And if you can't test it, you don't know whether it is right or wrong.' ") (quoting Roll); *id.* (" 'We cannot, without a shadow of a doubt, establish the validity of the capital asset pricing model.' ") (quoting Professor William Sharpe). *But cf.* N. JACOB & R. PETTIT, *supra* note 27, at 365-66 (attempting to minimize the impact of nonmarketable assets on the capital asset pricing model, but failing to explain how to measure a new asset's convariance with nonmarketable asset returns).

[85] For discussion of the "market model," see *supra* note 26.

Another alternative is the "arbitrage pricing model," which states that the change in a security's value over time is affected by any number of "factors"; the model does not depend on knowledge of the "market" portfolio. For an example of the application of this model, see *Arbitrage Pricing*, *supra* note 68 (after using the arbitrage pricing model to evaluate mutual fund performance, the authors concluded that the mutual funds did not outperform a passive buy-and-hold investment strategy). For related discussion of the work of Chang & Lewellen, see *supra* note 68.

The validity and utility of the arbitrage pricing model are controversial. *See* R. BREALEY & S. MYERS, *supra* note 1, at 156-57; J. LORIE, P. DODD & M. KIMPTON, *supra* note 1, at 141 ("Whether these variables [in the arbitrage pricing model] can be identified and whether they explain more of the variability in stock returns than a simple one factor market model . . . is still to be decided."); J. VAN HORNE, *supra* note 70, at 71 ("[M]ore empirical work needs to be done before we can feel comfortable in applying . . . [the arbitrage pricing model] to problems in corporate finance.").

alternative models is beyond the scope of this Article. Nevertheless, many of the studies either supporting or attacking stock market efficiency may be based on models with questionable assumptions. In the words of one commentator:

> Since results of past studies may have been affected by serious misspecifications [in the model of securities prices], these should be considered as conditional evidence only.[86]
>
> Tests of the Efficient Market Hypothesis (EMH) are in general "weak" tests. The null hypothesis has always been that the market is efficient with no specific alternative of inefficiency. Thus, the power of these tests is not known. The tests usually rely on a certain market model without questioning the validity of the model that was used. A misspecified model may provide test statistics that indicate the market is efficient when

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Compare Dhrymes, *The Empirical Relevance of Arbitrage Pricing Models*, J. PORTFOLIO MGMT., Summer 1984, at 35 (model's "major implications are not supported by the evidence currently available"; *id.* at 44); Dhrymes, Friend & Gultekin, *A Critical Reexamination of the Empirical Evidence on the Arbitrage Pricing Theory*, 39 J. FIN. 323 (1984); Dhrymes, Friend, Gultekin & Gultekin, *New Tests of the APT and Their Implications*, 40 J. FIN. 659 (1985) ("It is difficult to imagine a more complete rejection of the crucial implication of such APT models . . . ." *Id.* at 674); Shanken, *Multi-Beta CAPM or Equililbrium-APT?: A Reply*, 40 J. FIN. 1189 (1985) (replying to Dybvig & Ross, *infra*); *and* Shanken, *The Arbitrage Pricing Theory: Is It Testable?*, 37 J. FIN. 1129 (1982) (arguing that the arbitrage pricing theory is susceptible to Roll's critique and challenging the view that the arbitrage pricing theory is inherently more susceptible to empirical verification) *with* Dybvig & Ross, *Yes, the APT Is Testable*, 40 J. FIN. 1173 (1985) (disagreeing with Shanken's 1982 article, *supra*); Roll & Ross, *A Critical Reexamination of the Empirical Evidence on the Arbitrage Pricing Theory: A Reply*, 39 J. FIN. 347 (1984); Roll & Ross, *An Empirical Investigation of the Arbitrage Pricing Theory*, 35 J. FIN. 1073 (1980) (empirical tests provide some support for the model); *and* Ross, *A Reply to Dhrymes: APT Is Empirically Relevant*, J. PORTFOLIO MGMT., Fall 1984, at 54. For general discussion of the arbitrage pricing model, see T. COPELAND & J. WESTON, *supra* note 2, at 211-22; N. JACOB & R. PETTIT, *supra* note 27, at 409-20; H. LEVY & M. SARNAT, *supra* note 1, at 472-77; R. RADCLIFFE, *supra* note 54, at 205-08; W. SHARPE, *supra* note 70, at 182-201, 304-05; J. VAN HORNE, *supra* note 70, at 70-71; Rohrer, *supra* note 1, at 72; Ross, *The Arbitrage Theory of Capital Asset Pricing*, 13 J. ECON. THEORY 341 (1976).

In addition, Barr Rosenberg has attempted to use the fundamental characteristics of each company to calculate risk. *See* D. FISCHER & R. JORDAN, SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT 542-45 (3d ed. 1983); R. HAGIN, *supra* note 70, at 264-67, 270-76; N. JACOB & R. PETTIT, *supra*, at 702-03; RANDOM WALK, *supra* note 9, at 225-26; Rosenberg, *supra* note 82 (combining industry and company-fundamental factors with historic price performance to develop measurements of risk); Welles, *Who is Barr Rosenberg? And What the Hell Is He Talking About?*, INSTITUTIONAL INVESTOR, May 1978, at 59. The validity of Rosenberg's approach also is controversial. *See* Wallace, *supra* note 82, at 24-25.

[86] Brenner, *The Effect of Model Misspecifications on Tests of the Efficient Market Hypothesis*, 32 J. FIN. 57, 66 (1977).

it is not efficient and vice versa.[87]

F. Theoretical Problem with the Pure Form of Semi-Strong Efficiency, Either IA *or* FV

The pure form of semi-strong efficiency (either *IA* or *FV*) asserts that prices fully reflect all public information either about future investor preferences or future payouts.[88] In the real world, much information is costly to obtain and analyze. Consequently, equilibrium prices could not be semi-strong efficient in the pure form. If they were, investors would have no incentive to obtain and analyze information.[89] In the words of Professors Grossman and Stiglitz:

> [B]ecause information is costly, prices cannot perfectly reflect the information which is available, since, if it [sic] did, those who spent resources to obtain it would receive no compensation. There is a fundamental conflict between the efficiency with which markets spread information and the incentives to acquire information.[90]

Therefore, prices should at least be sufficiently inefficient to reward those who seek and analyze information.[91] The substantial amounts spent on investment research in the real world confirm stock price inefficiency.[92] If the pure form of the semi-strong efficient stock market hypothesis were correct, one would have to conclude that the market for investment research was extremely inefficient.

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[87] *Id.* at 57.

[88] *See supra* notes 1-10 and accompanying text.

[89] Grossman & Stiglitz, *On the Impossibility of Informationally Efficient Markets*, 70 AM. ECON. REV. 393 (1980) [hereafter *Impossibility*]; Grossman & Stiglitz, *Information and Competitive Price Systems*, 66 AM. ECON. REV. 246 (1976); *see* T. COPELAND & J. WESTON, *supra* note 2, at 299-301; Gilson & Kraakman, *supra* note 3, at 577-78, 622-26; *cf.* J. LORIE & M. HAMILTON, *supra* note 1, at 98 ("In order for the [efficient market] hypothesis to be true, it is necessary for many investors to disbelieve it."); Sorensen, *An "Essential Reservation" About the EMH*, J. PORTFOLIO MGMT., Summer 1983, at 31 (disagreement with the efficient market hypothesis is a necessary condition for its truth; therefore, unlike most other propositions, it is impossible for the pure form of the semi-strong version of the hypothesis to merit a high degree of confidence).

[90] *Impossibility*, *supra* note 89, at 405.

[91] *See supra* sources cited note 89.

[92] Investors use this research. *See* Stanley, Lewellen & Schlarbaum, J. PORTFOLIO MGMT., Summer 1980, at 20 (finding that recommendations by a large retail brokerage firm influenced the trading by the firm's individual customers).

G. Summary of Part I and Introduction to Part II

In summary, a fair amount of evidence indicates that the securities market is not efficient in the "fundamental-valuation" sense, and a much smaller amount of evidence suggests that the stock market may not be efficient in the "information-arbitrage" sense. Admittedly, many studies suggest the opposite. Because of the difficulty of measuring risk, however, many of these studies supporting or negating market inefficiency are of questionable validity. One article concludes:

> The earlier empirical evidence in support of the EMH seems to pale in comparison with the results of later studies using more efficient statistical procedures, which have uncovered an array of apparent anomalies. On the other hand, except for factors such as company size or price-earnings ratio, which may actually represent model specification anomalies rather than true economic return opportunities, the evidence remains inconclusive.[93]

The next part of this Article discusses two types of anomalies involving securities blatantly mispriced relative to each other. Regardless of (or in one case, because of) the difficulty of measuring risk,[94] these anomalies raise questions about whether the stock market is *IA* or *FV* efficient.

Part II first describes an anomaly that questions both "information-arbitrage" and "fundamental-valuation" efficiency. Convertible bonds or preferred shares often sell at the same or lower price than the underlying common even though the convertible in effect contains the common but is superior in yield and liquidation preference. Regardless of the difficulty of measuring risk,[95] the convertible must be less risky than the common. Moreover, even if the securities market is an irrational "beauty contest,"[96] the convertible is underpriced relative to the common. If the common is a "pet rock"[97] the convertible is a "pet rock" in an attractive cage. The rock with the cage should not sell for the same price as the rock alone. On a "fundamental valuation" basis,

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[93] Boldt & Arbit, *supra* note 30, at 33.

[94] *See supra* part I(*E*).

[95] *See supra* part I(*E*).

[96] *See supra* notes 12-13 and accompanying text.

[97] In 1975, a California advertising executive conceived the idea of obtaining rocks from a Mexican beach and selling them as "pet rocks" at a retail price of four dollars each. Each rock, roughly the size of a large egg, was nestled in excelsior inside a small cardboard carrying case. Included was an instruction manual on the care and the training of the "pet." In late 1975, the rocks were selling at the rate of 3000 to 6000 a day at prestige stores across the nation. *Fads: Hot Rocks*, NEWSWEEK, Nov. 10, 1975, at 95.

the convertible is also relatively underpriced because its future returns will be higher.[98]

Part II then discusses an anomaly that presents a paradox for "information-arbitrage" efficiency. In the past, an unleveraged package of shares (common plus preferred) in a dual purpose fund traditionally has sold at a price significantly lower than net asset value. If the market is "information-arbitrage" efficient, one diversified portfolio should not sell at a discount relative to another diversified portfolio of similar risk.[99] Especially if risk is difficult to measure[100] (and if stock prices are "information-arbitrage efficient"), investors will tend to view diversified portfolios as roughly equivalent *ex ante*. Open-end mutual fund shares sell at net asset value or higher.[101] Therefore, in an *IA* efficient market, the dual purpose fund shares are underpriced relative to the mutual funds.

In both the convertible/common and the dual purpose fund/mutual fund examples, investors should substitute one security for another until the mispricing is eliminated. The absence of sufficient convertible-for-common substitution is inconsistent with both *IA* and *FV* efficiency. The absence of enough dual-fund-for-mutual-fund substitution is inconsistent with *IA* efficiency.

II. Two Types of Mispricing Anomalies That Demonstrate Stock Market Inefficiency

A. Convertible Securities Selling at Conversion Value

Sometimes a corporation may issue a senior security (for example, a bond or preferred stock) that is convertible at the holder's option into common stock.[102] Generally, the interest or dividend on this convertible

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[98] For discussion of somewhat similar anomalies, see *supra* notes 40-43 and accompanying text.

[99] *See infra* sources cited in note 171.

[100] *See supra* part I(*E*).

[101] *See infra* note 140.

[102] *See generally* R. Auster, Option Writing and Hedging Strategies 78-83 (1975); R. Brealey, *supra* note 27, at 190-203; R. Brealey & S. Myers, *supra* note 1, at 529-32; D. Fischer & R. Jordan, *supra* note 85, at 438-46; B. Gup, The Basics of Investing 454-62 (2d ed. 1983); S. Huang, Investment Analysis and Management 327-40 (1981); S. Mittra & C. Gassen, *supra* note 2, at 723-41; T. Noddings, Low Risk Strategies for the High Performance Investor 21-108, 147-97 (1985); H. Phillips & J. Richie, *supra* note 82, at 599-608; R. Radcliffe, *supra* note 54, at 374-80; W. Sharpe, *supra* note 70, at 483-85; J. Van Horne, *supra* note 70, at 582-601; J. Weston & E. Brigham, Managerial Finance 879-98 (7th ed. 1981); Bierman, *Convertible Bonds as Investments*, Fin. Analysts J.,

senior security exceeds the dividends on the common into which the senior security can be converted.[103] Even so, convertible securities have sometimes sold at conversion value, that is, at a price equal to the market value of the common into which the senior security is convertible. In the words of one commentator: "[S]ome convertibles . . . are actually better buys than their underlying common. These issues — and there are always a few of them around — yield several percentage points more than the stocks, yet trade with virtually no conversion premium. Investors can profit from these market imperfections and pick up the extra interest for nothing."[104] The commentator listed five examples of such convertible bonds. One example, the Castle & Cooke 5⅜'s of 1994, were actually selling for less than conversion value. The price of the bond was $800. Conversion value was $826.[105]

A 1984 article in *Forbes* lists two convertibles selling slightly below conversion value: The Citicorp 5¾'s of 2000 (0.3% below conversion value; current-yield advantage over equivalent common 0.8%) and the Deere & Co. 5½'s of 2001 (1.7% below conversion value; current-yield advantage over equivalent common 2.73%). Also listed was the Equitable Resources 9½'s of 2006, which sold at a negligible 0.3% premium over conversion value, with a current-yield advantage of 2.93%. (The yield advantage would cover the premium over conversion value in just one tenth of a year).[106]

Mar.-Apr. 1980, at 59; Bratton, *The Economics and Jurisprudence of Convertible Bonds*, 1984 WIS. L. REV. 667; Brigham, *An Analysis of Convertible Debentures: Theory and Some Empirical Evidence*, 21 J. FIN. 33 (1966); Davis, *Convertible Securities*, in ENCYCLOPEDIA OF INVESTMENTS 180 (M. Blume & J. Friedman eds. 1982); Katzin, *Financial and Legal Problems in the Use of Convertible Securities*, 24 BUS. LAW. 359 (1969); Klein, *The Convertible Bond: A Peculiar Package*, 123 U. PA. L. REV. 547 (1975); Liebowitz, *Analysis of Convertible Bonds*, in 1 FINANCIAL ANALYSTS HANDBOOK 278-96 (S. Levine ed. 1975); *Value Line Convertible Survey*, MORE PROFIT AND LESS RISK: CONVERTIBLE SECURITIES AND WARRANTS 1-28 (1970) (published by Arnold Bernhard & Co.) [hereafter CONVERTIBLE].

[103] *See* Pittel, *Playing Safe — and Sporty, Too*, FORBES, Oct. 22, 1984, at 248 ("An investor who buys a convertible gets . . . a fixed coupon yield that is nearly always higher than the dividend on the common stock."); Stovall, *Hedging with Convertibles*, FIN. WORLD, May 29-June 11, 1985, at 93 ("Yields on convertible securities, naturally, tend to be higher than those on the underlying common shares.").

[104] Greenebaum, *The Climate is Right for Convertibles*, FORTUNE, Oct. 6, 1980, at 107; *cf.* Walter & Que, *The Valuation of Convertible Bonds*, 28 J. FIN. 713, 730 (1973) ("At the upper end of the conversion value scale, the difference between the coupon rate and adjusted cash dividends was not reflected in the bond premium.").

[105] Greenebaum, *supra* note 104, at 108.

[106] Pittel, *supra* note 103, at 250.

In his book, *Merger Mania*,[107] Ivan Boesky discusses arbitrage and hedging[108] opportunities with convertibles.[109] The convertible bond he uses as an example is Financial Corporation of American 11½'s of 2002. On January 30, 1984, these bonds sold for $1530, a $38 discount from conversion value.[110] The current yield on the bond was 7.5%, which far exceeded the 3% yield on the common.[111]

Any investor who wants to buy a common issue should always consider the alternative of buying the convertible. Even if the convertible has a slight premium, this premium may be "recovered" quickly if the convertible is not called and the current yield of the convertible is higher than that of the common. (This oversimplified analysis ignores the time value of money.[112]) After the premium is "recovered," the convertible may continue to earn a higher yield than the common. Furthermore, the purchase of convertibles often involves lower brokerage commissions than the purchase of an equivalent amount of stock.[113]

Value Line publishes a newsletter, *Value Line Convertibles*, that lists 585 publicly traded convertibles. The November 19, 1984 issue listed thirty-five convertibles (6.0% of the total) with current yields higher than the equivalent common and with prices equal to or below conversion value.[114] The March 25, 1985 issue also listed thirty-five

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[107] I. BOESKY, *supra* note 35.

[108] For discussion of convertible hedging, see *infra* notes 127-32 and accompanying text.

[109] I. BOESKY, *supra* note 35, at 146-48.

[110] *Id.* at 148.

[111] Wall St. J., Jan. 31, 1984, at 60, col. 4.

[112] For discussion of "break-even time" as a means of evaluating a conversion premium, see EXPERTS, *supra* note 36, at 9-10; T. NODDINGS, *supra* note 102, at 31-32; T. NODDINGS, ADVANCED INVESTMENT STRATEGIES 15 (1978); Greenebaum, *supra* note 104, at 107-08.

[113] Commissions on bonds tend to be lower than those on an equivalent dollar amount of stock. R. RADCLIFFE, *supra* note 54, at 378-79; J. VAN HORNE, *supra* note 70, at 592; Weil, Segall & Green, *Premiums on Convertible Bonds*, 23 J. FIN. 445, 445 (1968).

[114] Of the 35, 20 were bonds (maturity date listed), and 15 were preferreds (no maturity date listed). These 35 convertibles exclude issues that had been called and include only those convertibles selling at a 0.0% premium or less. When listing premiums, the *Value Line Convertibles* newsletter rounds to the nearest whole percentage. Therefore, a convertible with a premium between 0.0% and 0.5% is listed by *Value Line* as having a "zero" premium. These negligible-premium convertibles are *excluded* from the count of 35 in the test. If one included these negligible-premium convertibles in the count, the total number of zero premium convertibles with yields higher than the common was 49 (8.4% of the total of 585). (This count of 49 excludes all issues that had been called.)

convertibles (6.0% of the total) with current yields higher than the equivalent common and with prices equal to or below conversion value.[115] For an investor planning to purchase the common, all thirty-five November issues and all thirty-five March issues would have been a clearly superior alternative, even if the issue were called in the near future.[116] Transaction costs for buying the convertible are often lower;[117] if the convertible were called, the holder would simply convert at no cost. Furthermore, some of the above-mentioned thirty-five November 1984 issues and thirty-five March 1985 issues enjoyed substantial call protection.[118] Moreover, much of the mispricing was persistent. Fourteen of the convertibles appeared on both the November 1984 list (of thirty-five) and the March 1985 list (of thirty-five).[119]

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[115] Of these 35, 19 were bonds (maturity date listed), and 16 were preferreds (no maturity date listed). Again, these 35 convertibles excluded issues that had been called and included only those with premiums of 0.0% or less. If one included the negligible-premium convertibles (those with premiums between 0.0% and 0.5%), the total number of zero premium convertibles with yields higher than the common was 40 (6.8% of the total of 585).

[116] At least theoretically, the issuer should call the convertible as soon as market value rises to the call price. *See* R. BREALEY & S. MYERS, *supra* note 1, at 532; T. COPELAND & J. WESTON, *supra* note 2, at 423-24; Brennan & Schwartz, *Convertible Bonds: Valuation and Optimal Strategies for Call and Conversion*, 32 J. FIN. 1699 (1977); Ingersoll, *An Examination of Corporate Call Policies on Convertible Securities*, 32 J. FIN. 463 (1977). In fact, many issuers do not call convertibles when this point is reached. R. BREALEY & S. MYERS, *supra* note 1, at 532-33; T. COPELAND & J. WESTON, *supra* note 2, at 423-24. To prevent a cash drain, a corporation that calls a convertible generally prefers that convertible holders convert rather than demand the call price. Many issuers regard a 20% premium of conversion value over call price as a sufficient cushion against possible decreases in market price and to entice holders to convert. J. VAN HORNE, *supra* note 70, at 586. One study of companies that called their convertibles found that most waited until conversion value was substantially more than the call price and that the average difference was 44%. Ingersoll, *supra*. For a theory to explain this delay, see Harris & Raviv, *A Sequential Signalling Model of Convertible Debt Call Policy*, 40 J. FIN. 1263 (1985) (describing a model in which managers call a convertible only if they have private unfavorable information).

[117] *See supra* note 113.

[118] Of the 35 convertibles on the November 1984 list, five were not callable until a year or more in the future; one was callable at a price of 20% or more above the market price of the convertible. Of the 35 convertibles on the March 1985 list, three were not callable until a year or more in the future, and one was callable at a price of 20% or more above the market price of the convertible.

[119] Of the 35 convertibles on the November list, 21 did not appear in the March list of 35. Of those 21, six had been dropped from the *Value Line Survey*. Four of the six had been called; two issuers had been taken over. Telephone conversations with Mr. Mark Hunt, Asst. Editor of the *Value Line Convertible Survey* (June 7 & July 10, 1985).

In addition, the November 19, 1984, Value Line survey lists eleven convertibles meeting the following criteria: (1) premiums of between zero and ten percent; (2) current annual yield advantages sufficient to recover the premiums within six months; and (3) either not callable for a year or more or callable at a price twenty percent or more over current market price. Similarly, the March 25, 1985 survey has two convertibles meeting the above three criteria.

An interesting total is the sum of the two earlier counts: (1) the issues selling at or below conversion value and with higher yields, plus (2) the issues meeting the three criteria in the paragraph above (0-10% premium, recovery of premium within six months, and some call protection). For November 19, 1984, the total is forty-eight (8.2% of all 585). For March 25, 1985, the total is thirty-nine (6.6% of all 585).

A convertible selling at conversion value (or even slightly above) offends anyone who believes in an efficient market. Everyone who holds the common should sell it and purchase the convertible. Every investor who plans to buy the common should buy the convertible instead.[120] The latter offers higher income,[121] lower chance of price decline, and

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Of the remaining 15 not dropped from the *Value Line Survey*, one issue (with a 0.0% premium in November 1984) had a premium of only 0.7% in March 1985 and a yield advantage that would result in recovery of the premium in less than six months. If this convertible were not called, the yield advantage would quickly compensate for the slight premium.

Of the 35 convertibles on the March list, 21 did not appear in the November list (of 0.0% premium convertibles with a yield advantage). Of those 21, all appeared in the November *Value Line Survey*. Nevertheless, four of those 21 convertibles had premiums between 0.0 and 0.5% and yield advantages that would result in recovery of the premium in less than six months.

[120] *See supra* notes 112-13 and accompanying text.

[121] This analysis assumes that the investor pays the same tax rate on income from the convertible and the common. Taxes on dividends from a convertible preferred and from a common share should be the same.

More complicated is the comparison of interest on convertible bonds with dividends on the equivalent common. Individuals can exclude the first $100 of dividends on common stock ($200 for married persons filing a joint return). I.R.C. § 116 (1985). Therefore, an individual with little dividend income might prefer the dividends on the common to the interest on a convertible bond, even if the bond were selling at conversion value. Furthermore, corporations can exclude 85% of dividends received from a domestic corporation. I.R.C. § 243 (1985). A corporate investor might prefer the dividends on the common to interest on a convertible bond, even if the bond were selling at conversion value.

Nevertheless, most investors in publicly traded common stocks fall into one of the following categories: (1) tax exempt (*e.g.*, a pension fund, I.R.A., or Keogh plan), or (2) individuals with more than minimal dividend income. For both types of investors, the tax rate on convertible bond interest will be the same as that on common share

equal (or almost equal) profit potential in the event the common increases in price. In effect, the convertible contains inchoate the underlying common. Therefore, the convertible has all the appreciation potential of the common "within" it, plus the extra protection of a senior security (including senior status in the event of insolvency and a more secure and currently higher income).[122] Regardless of the difficulty of measuring risk,[123] the convertible is clearly less risky than the common.

One possible drawback of the convertible is that it usually lacks a vote. The typical investor does not value her vote, however.[124] Even if

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dividends.

For a separate count of convertible preferreds and convertible bonds, see *supra* notes 114-15.

[122] *See* Weil, Segall & Green, *supra* note 113, at 445-47 (discussing lower transaction costs, higher income, pure-bond-value price floors, and lower price volatility as advantages of convertible bonds traditionally thought to justify premium; authors ultimately found, however, that these advantages did not seem to influence premiums much; *id.* at 457-61); *cf.* Baumol, Malkiel & Quandt, *The Valuation of Convertible Securities*, 80 Q.J. ECON. 48, 49-51 (1966) (describing a model for valuing convertible securities). For other convertible valuation models, see sources cited *supra* note 102.

[123] *See supra* part I(*E*).

[124] *See* A. BERLE & G. MEANS, THE MODERN CORPORATION AND PRIVATE PROPERTY 129 (rev. ed. 1967); Easterbrook & Fischel, *Voting in Corporate Law*, 26 J.L. & ECON. 395, 395-96 (1983); *cf.* A. BERLE & G. MEANS, *supra*, at 78-83 (discussing the pattern of management control of corporations whose stock is widely dispersed); R. NADER, M. GREEN & J. SELIGMAN, TAMING THE GIANT CORPORATION 90 (1976) ("Most financial institutions, according to the SEC's 1971 *Institutional Investor Study*, follow what is known as 'The Wall Street Rule': . . . if the financial institution ceases to like what management is doing, the institution sells the stock."); N. WOLFSON, *supra* note 3, at 75-80 (discussing the illusion of corporate democracy); Lowenstein *supra* note 30, at 299 ("The hope that the institutional investors would provide . . . enlightened leadership died stillborn . . . ."); *id.* at 300 ("The institutions do not vote their shares as meaningful owners of the business."). *Contra* Easterbrook & Fischel, *supra*, at 406-08 (describing several considerations suggesting that voting does matter to shareholders, at least under some circumstances); *but see* Jog & Riding, *Price Effects of Dual-Class Shares*, FIN. ANALYSTS J., Jan.-Feb. 1986, at 58 (a significant fraction of Canadian firms exhibit declining share prices in conjunction with the actual issuance of shares with restricted voting privileges); *but cf. Closely Held Corporations*, *supra* note 42, at 451-56, 466; *id.* at 456-59 (case study of six firms with two classes of stock outstanding, identical in all respects except voting power; in four of the six firms, the officers and directors as a group controlled a majority of the firm's superior voting class shares); DeAngelo & DeAngelo, *Managerial Ownership of Voting Rights: A Study of Public Corporations with Dual Classes of Common Stock*, 14 J. FIN. ECON. 33, 34-38, 62 (1985) (suggesting that managers of publicly held corporations might be interested in voting rights); Dodd & Warner, *supra* note 42, at 424-34 (finding that stock prices tend to rise before the announcement of a proxy contest, but tend to fall between the contest announcement and election outcome announce-

investors do occasionally value their votes, the price of a nonvoting convertible should reflect the value of the voting rights of the underlying common. If the right to vote became important, for example, in a proxy contest or approval of an important articles amendment, the holder of the convertible could still vote by converting to common. Indeed, if transaction costs were nominal, a convertible holder could convert, vote, sell the common, and buy back the convertible.

As noted earlier,[125] even if the stock market is a "beauty contest,"[126] and the common shares are like a "pet rock," the convertible is like an attractive cage with the rock inside. The cage with the rock inside should not sell for the same price as the rock alone. Even if not all investors are sophisticated enough to substitute the convertible for the common, one would expect a sufficient amount of shrewd substitution to create at least some premium above conversion value. Furthermore, "hedgers" could purchase the convertible, sell short the common into which it is convertible, and wait for a premium to appear. Such an operation is called a convertible hedge.[127] Because of section 220.18(d) of Federal Reserve Regulation T, such hedgers need post only 100 percent margin on the short sale (which can be financed from the proceeds of the short sale itself).[128] Therefore, if a large yield difference exists

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ment; part of the decline may be due to the decline in the value of the vote; part of the decline could not be explained); Levy, *supra* note 42; *Publicly Traded Corporations*, *supra* note 42.

Recently, some institutional investors have shown a greater interest in voting against management recommendations, especially in the area of anti-takeover articles amendments. *See* Robinson, *Institutional Investors Display Control Over Corporate Destinies*, N.Y.L.J., June 4, 1984, at 27, col. 1; Heard, *Institutional Investors Are Flexing Their Muscles*, Legal Times, Oct. 24, 1983, at 11, col. 1. *But cf.* Brudney, *Corporate Governance, Agency Costs, and the Rhetoric of Contract*, 85 COLUM. L. REV. 1403, 1413 n.25 ("Yet shareholders are reported to vote regularly for such [anti-takeover] charter amendments, and more recently for forms of recapitalization that entrench management against hostile takeover efforts."). *See generally* Lowenstein, *supra* note 30, at 297-304 (arguing that the institutional investor has a large role in determining securities prices). Any development of independent institutional voting is so recent, however, that it could not be a factor in past convertibles selling at conversion value.

[125] *See supra* text accompanying note 96.

[126] *See supra* notes 12-13 and accompanying text.

[127] For discussion of convertible hedging, see R. AUSTER, *supra* note 102, at 90-95; I. BOESKY, *supra* note 35, at 146-48; CONVERTIBLE, *supra* note 102, at 72-81, 83-87; EXPERTS, *supra* note 36, at 24-39; GUIDE, *supra* note 36, at 105-14; T. NODDINGS, *supra* note 112, at 97-106; E. THORP & S. KASSOUF, *supra* note 36, at 141-67. For an anecdotal description of a recently profitable convertible hedge, see A. TOBIAS, *supra* note 36, at 67-68.

[128] 12 C.F.R. § 220.18(d) (1985); *cf.* E. THORP & S. KASSOUF, *supra* note 36, at

between the convertible and common, hedgers could get a reasonable yield on their investment while waiting for a premium to appear.

Indeed, in the past the hedge was sometimes worth entering for the yield alone. To give just one example, in mid-December 1970, American Motors 6's of 1988 (a convertible bond issue) were selling for approximately $520 over-the-counter.[129] Each bond was callable at a price of $1053.30 and convertible into 83.333 common shares.[130] The common paid no dividend and was trading at about $6¼ on the New York Stock Exchange.[131] Because the American Motors bonds were selling at approximately conversion value, a shrewd investor could have purchased the bonds and sold short the common into which the bonds were convertible. Under no circumstances could the hedge produce a loss. The proceeds of the original short sale equalled the original cost of the bonds. The short position could always be covered by converting the bonds; the hedger would then receive back its original investment.

The American Motors hedge would earn about thirteen percent on the initial investment as long as the common paid no dividend and as long as the bonds were not called. Furthermore, the investor might obtain a capital gain upon closing out the position if the bond were selling at a premium over conversion value. The thirteen percent yield on the hedge far exceeded the approximately four and three quarters percent yield on thirteen and twenty-six month Treasury bills available at that time.[132] If the market were efficient in either the "information-arbi-

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121-22, 147 (discussing § 220.3(d)(3) of Federal Reserve Regulation T, the predecessor of current § 220.18(d) (*see* Comparison Chart of Old and New Regulation T, 2 Fed. Sec. L. Rep. (CCH) ¶ 22,236A, at 16,126)).

[129] *Value Line Convertible Survey*, Dec. 14, 1970, at V-2.

[130] *Id.*

[131] *Id.* at V-3.

[132] *Treasury 13-Week Bill Yield Falls to 4.775%, 26-Week Rate to 4.785%*, Wall St. J., Dec. 15, 1970, at 31, col. 3 (reporting results of weekly auction held on Monday, Dec. 14, 1970).

In late 1970, at least one institutional investor entered into an American Motors convertible hedge (shorting the common against a long position in the American Motors 6's of 1988). Letter from Dr. Edward O. Thorp, General Partner, Princeton/Newport Partners, L.P., to Professor William Wang (June 19, 1985) (copy on file with *U.C. Davis Law Review*); letter from Mr. James S. Regan, General Partner, Princeton/Newport Partners, L.P., to Professor William Wang (June 18, 1985) (copy on file with *U.C. Davis Law Review*). For discussion of Princeton/Newport Partners, L.P., see A. TOBIAS, *supra* note 36, at 68-72.

In 1970, brokers did not pay interest on short sale proceeds. "[C]urrently, hedgers receive interest on the short sale proceeds of the common stock and therefore, were the American Motors hedge to exist today, the current yield would be substantially higher." Letter from Mr. James S. Regan, *supra*.

trage" or the "fundamental-valuation" sense, one would expect that such hedging would push the convertible to a premium over conversion value.

At least one convertible sold below conversion value for extended periods. The Citizens Utilities Company has two classes of common, Series *A* and Series *B*. The two classes are identical in all respects with two exceptions. First, each share of Series *A* is convertible into one share of Series *B*. Second, each share of *A* receives only stock dividends, while each share of *B* receives an equivalent cash dividend. Under an IRS ruling granted to the company in 1955 and a "grandfather" clause in the Tax Reform Act of 1969, the stock dividends on Series *A* are not taxable as ordinary income.[133] For virtually all taxable investors, the after-tax yield on Series *A* (the convertible) is higher than the after-tax yield on Series *B* (the common).[134] Examination of the populations holding Series *B* in 1956 and 1975 revealed at most only a small fraction of Series *B* holders whose total cash dividend income was less than the individual dividend exclusion.[135] Therefore, for the overwhelming majority of the non-tax-exempt Series *B* holders, as well as for the overwhelming majority of taxable investors generally, the Series *A* is superior to Series *B*. Even if an investor wanted periodic cash for consumption, she would be better off purchasing the Series *A* and frequently selling a portion of her shares at capital gains rates. One commentator writing in 1974 noted that "in practice, brokerage fees will virtually always be insignificant compared to the tax advantage, given the current structure of both tax rates and brokerage fees."[136] Surprisingly, however, during the period April 1956 to December 1976, the series *A* rarely traded at a premium relative to the series *B* and sometimes traded at a tiny discount relative to *B* for extended periods.[137]

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[133] Long, *The Market Valuation of Cash Dividends: A Case to Consider*, 6 J. FIN. ECON. 235, 237-39 (1978). For additional description of the two classes of Citizens Utilities capital stock, see 1 MOODY'S PUB. UTIL. MANUAL 429 (1985).

[134] *See* Long, *supra* note 133, at 246-52.

[135] *Id.* at 260-62. For a brief discussion of the dividend exclusion for individual taxpayers, see *supra* note 121.

[136] Cohen, *Taxing Stock Dividends and Economic Theory*, 1974 WIS. L. REV. 142, 152 (footnotes omitted). Professor Cohen gives an example demonstrating that the tax advantage almost always exceeds the brokerage fees for individual investors. *Id.* at 152 n.29.

[137] Long, *supra* note 133, at 252-54. During the same period a small percentage of class A holders converted into series B. *Id.* at 257-58. During the period April 1956 to December 1976, both series were traded over-the-counter. *Id.* at 246.

The series A and series B still trade over the counter. Recently, the series A traded at a substantial premium relative to the series B. On Thursday, Sept. 26, 1985, the series

In summary, convertibles often sell at approximately conversion value even though the convertible is significantly superior to the common into which it is convertible. In an efficient market, such mispricing should not occur.[138]

A closed at 39¾; the series B closed at 35¼. Wall St. J., Sept. 27, 1985, at 48, col. 2.

[138] *Cf.* Kaplan, *Convertibles Come of Age*, DUN'S BUS. MONTH, Aug. 1985, at 58, 60:

> The dearth of serious convertible investors has spawned inefficiencies in the market — and large undervalued pockets of opportunities for the handful of money managers and traders who specialize in the security. "With less than twenty professionals playing the market, there are not enough people to arbitrage all the opportunities," says Christopher Lewis, managing director of McKay Shields Financial Corp., which runs about $250 million in convertible funds. "Year after year, we get major [returns] that we wouldn't expect," says Weirich [managing director of Trust Co. of the West]. "The only explanation is that it's an imperfect market."

Id. at 60; Weberman, *Pebbles on the Beach*, FORBES, Jan. 16, 1984, at 127 (one way the small investor can compete with giant institutions is to look for "pockets in the market so small that mega-institutions can't be bothered with them — imperfections in the market that smart investors can take advantage of. Convertible debentures, for example." *Id.*).

I have corresponded with some professional money managers active in investing in convertibles and have spoken with an analyst specializing in convertibles. These experts agreed that a convertible selling at conversion value with a yield higher than the common is an anomaly suggesting that the stock market is not efficient. Letter from Dr. Edward O. Thorp, General Partner, Princeton/Newport Partners, L.P., to Professor William Wang, *supra* note 132; letter from Mr. James S. Regan, General Partner, Princeton/Newport Partners, L.P., to Professor William Wang, *supra* note 132; telephone conversation with Mr. Mark Hunt, Asst. Editor of the *Value Line Convertible Survey*, July 10, 1985. One of the money managers, Mr. James Regan, added: "I think a very similar market anomaly exists in the form of convertible bonds that sell at very small premiums when, in fact, logic would dictate much higher premiums." Letter from Mr. James S. Regan, *supra*.

Mr. Regan further noted: "Institutions frequently switch from common to convertible bonds [selling at conversion value] and back in order to pick up extra profits." He mentioned, however: "[C]onvertible bonds are frequently illiquid, and sophisticated institutional investors simply stay away. The only players are perhaps unsophisticated individuals." *Id.*; *cf.* Liebowitz, *supra* note 102, at 295 ("By astute tracking of . . . short-term price movements, there may be a whole sequence of profitable interim convertible-to-common-stock moves and reversals, even for an intrinsically long-term investor within the framework of a basically stable equity outlook.").

Mr. Mark Hunt advanced two possible explanations for convertibles selling at conversion value with a yield higher than the common. First, many convertibles are thinly traded, and institutions are not interested in buying them. Second, some convertibles have a relationship between market and call prices such that the issuer might decide to call the issue at any time. Admittedly, an investor buying the common could purchase the convertible instead, perhaps with lower brokerage commissions. Nevertheless, if the

B. Dual Purpose Fund Shares Selling at a Discount from Net Asset Value

For investors who wish to outperform the stock market averages, Professor Burton Malkiel has suggested a strategy of buying unleveraged packages of dual purpose funds at a discount from net asset value.[139] The typical dual purpose fund is a closed-end investment company[140] that starts with a capital structure of half common and half preferred (and no debt; thereafter debt is kept at an insignificant level[141]). The proceeds of the initial issue are generally invested in a

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convertible were called, the holder would have to convert. Although the conversion would involve no cost, the investor might view the process as an inconvenience. Telephone conversation with Mr. Mark Hunt, *supra*.

This section has discussed the anomaly of a convertible security selling at conversion value. For discussion of somewhat similar anomalies, see *supra* notes 40-43 and accompanying text.

[139] INVESTMENT GUIDE, *supra* note 9, at 173-77; B. MALKIEL, A RANDOM WALK DOWN WALL STREET 328-34 (2d college ed. 1981) [hereafter RANDOM WALK 2d ed.]; Malkiel & Firstenberg, *A Winning Strategy for an Efficient Market*, J. PORTFOLIO MGMT., Summer 1978, at 20; *see An (Almost) Sure Way to Beat the Market*, FORBES, Oct. 2, 1978, at 111 [hereafter *Sure*].

[140] For a general discussion of closed-end investment companies (also called closed-end funds), see B. GUP, *supra* note 102, at 43-44; T. HERZFELD, THE INVESTORS GUIDE TO CLOSED-END FUNDS (1980); R. RADCLIFFE, *supra* note 54, at 429-31; W. SHARPE, *supra* note 70, at 568-70; Herzfeld, *Closed-End Funds*, ENCYCLOPEDIA OF INVESTMENTS 81 (M. Blume & J. Friedman eds. 1982) [hereafter ENCYCLOPEDIA OF INVESTMENTS]. In contrast to closed-end investment companies, open-end investment companies (also called mutual funds) continuously redeem their shares at net asset value and offer newly issued shares at net asset value or above. *See The Mutual Fund Industry: A Legal Survey*, 44 NOTRE DAME LAW. 732, 742-43 (1969) [hereafter *Survey*]. For a general discussion of mutual funds, see F. AMLING, INVESTMENTS: AN INTRODUCTION TO ANALYSIS AND MANAGEMENT 190-202 (5th ed. 1984); B. GUP, *supra* note 102, at 43-46; R. RADCLIFFE, *supra* note 54, at 426-29; D. RUGG & N. HALE, THE DOW JONES-IRWIN GUIDE TO MUTUAL FUNDS 29-35 (2d ed. 1983); W. SHARPE, *supra* note 70, at 570-72; Bogle, *Mutual Funds*, in ENCYCLOPEDIA OF INVESTMENTS, *supra*, at 509.

[141] *See* 2 MOODY'S BANK AND FINANCE MANUAL 3100 (1980) (balance sheet of Hemisphere Fund showing insignificant liabilities); *id.* at 3160 (balance sheet of Income & Capital Shares, Inc., showing insignificant liabilities); *id.* at 3603 (balance sheet of Putnam Duofund, Inc., showing insignificant liabilities); *id.* at 3631 (balance sheets of Scudder Duo-Vest showing insignificant liabilities); *see also* prospectus of Gemini II (a dual purpose fund), Feb. 15, 1985, at 6-7 ("The Company will not . . . borrow money except as a temporary measure for extraordinary or emergency purposes, and in no event in excess of 10% of the lower of the market value or cost of its total assets (the Company will not purchase any securities at any time while such borrowings exceed 5% of total assets)."); prospectus of ML Convertible Securities (a dual purpose fund), July 25, 1985, at 11-12 ("The Company may not . . . [b]orrow

diversified portfolio of other companies' common shares. The fund's preferred shares have the right to all the income from the investment company's portfolio. At a pre-set redemption date, the preferred gets its liquidation preference; the common receives the entire balance.[142] In other words, the common gets all the capital appreciation (or depreciation).[143]

Suppose a dual purpose fund has an equal number of common and preferred shares (and no debt). By purchasing one share of the common and one share of the preferred, the investor undoes the leverage of the common shares.[144] (Because the fund has no debt, an investor who bought all the common and the preferred would own the entire com-

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amounts in excess of 10% of its total assets, taken at market value, and then only from banks as a temporary measure for extraordinary or emergency purposes. The Company will not purchase securities during periods when it has outstanding borrowings in excess of 5% of its total assets."). *But see* 2 MOODY'S BANK AND FINANCE MANUAL 3089 (1980) (1979 balance sheet of Gemini Fund showing liabilities equal to 5.5% of total assets; 1978 balance sheet of Gemini Fund showing liabilities equal to 5.8% of total assets).

[142] At the redemption date, the fund may either liquidate entirely or instead redeem the preferred and then continue as an open-end mutual fund. In the latter event, a holder of the common has the continual right to redeem the shares at net asset value. *See supra* note 140.

[143] For a general discussion of dual purpose funds, see T. HERZFELD, *supra* note 140, at 135-44; INVESTMENT GUIDE, *supra* note 9, at 173-75; R. RADCLIFFE, *supra* note 54, at 431; RANDOM WALK 2d ed., *supra* note 139, at 328-33; W. SHARPE, INVESTMENTS 503-05 (2d ed. 1981); *A Dual-Purpose Stock Fund May Fit Your Needs*, BUS. WEEK, Nov. 24, 1973, at 72; *For Leverage Lovers*, FORBES, Feb. 1, 1976, at 68 [hereafter *Leverage*]; Gentry & Pike, *Dual Funds Revisited*, FIN. ANALYSTS J., Mar.-Apr. 1968, at 149; Litzenberger & Sosin, *The Performance and Potential of Dual Purpose Funds*, J. PORTFOLIO MGMT., Spring 1978, at 56; McGough, *Parts Worth More Than the Whole*, FORBES, Feb. 25, 1985, at 180; Phalon, *Ugly Ducklings*, FORBES, Nov. 23, 1981, at 188; Shelton, Brigham & Hofflander, *An Evaluation and Appraisal of Dual Funds*, FIN. ANALYSTS J., May-June 1967, at 131; Note, *The Regulation of Dual Funds*, 54 VA. L. REV. 1396 (1968).

[144] INVESTMENT GUIDE, *supra* note 9, at 176-77; RANDOM WALK 2d ed., *supra* note 139, at 333-34; Malkiel & Firstenberg, *supra* note 139, at 22; *see* W. KLEIN, *supra* note 5, at 239-40; *cf.* R. BREALEY & S. MYERS, *supra* note 1, at 357 (discussing Modigliani and Miller's argument in favor of leverage irrelevance; part of the argument is that an investment in a certain fraction of an unleveraged firm is equivalent to an investment in the same fraction of both the debt and equity of an otherwise identical but leveraged firm); Modigliani & Miller, *The Cost of Capital, Corporation Finance and the Theory of Investment*, 48 AM. ECON. REV. 261, 270 (1958) ("acquisition of a mixed portfolio of stock of a leveraged company . . . and of bonds . . . may be regarded as an operation which 'undoes' the leverage, giving access to an appropriate fraction of the unleveraged return"). For discussion of the Modigliani and Miller leverage irrelevance hypothesis, see *infra* note 161.

pany.) Two of Professor Malkiel's books list discounts from net asset value (per package) on unleveraged packages of dual purpose funds.[145] Below are the figures (for the start of 1979):

Name of Dual Purpose Fund	Package Discount	Redemption Date
Gemini Fund	0.74%	1984
Hemisphere Fund	25.05%	1985 (income shares)
Income & Capital Share Corp.	10.43%	1982
Leverage Fund of Boston	12.35%	1982
Putnam Duo-Fund	17.35%	1983
Scudder Duo-Vest	16.89%	1982[146]

In the past, common shares of traditional unleveraged closed-end investment companies have also often sold at discounts from net asset value.[147] The discount has various possible explanations. One is the unrealized capital gains tax liability that the investor sometimes incurs by buying into any investment company, closed-end or open-end.[148]

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[145] INVESTMENT GUIDE, *supra* note 9, at 178; RANDOM WALK, 2d ed., *supra* note 139, at 335.

[146] INVESTMENT GUIDE, *supra* note 9, at 178; RANDOM WALK 2d ed., *supra* note 139, at 335. Redemption dates are from *Leverage*, *supra* note 143, at 68; *Sure*, *supra* note 139. For a chart listing similar dual purpose fund discounts as of January 1980 and the mostly disappeared dual purpose fund discounts of August 1984, see RANDOM WALK, *supra* note 9, at 345.

[147] W. SHARPE, *supra* note 70, at 591-92; *see* E.I. Dupont de Nemours & Co. v. Collins, 432 U.S. 46, 49 (1977) ("[A]s is often the case with closed-end investment companies, Christiana's own stock has historically sold at a discount from the market value of its . . . holdings." (footnote omitted)); F. AMLING, *supra* note 140, at 190-91; D. DREMAN, *supra* note 30, at 210; B. GRAHAM, THE INTELLIGENT INVESTOR 126-28 (4th ed. 1973); T. HERZFELD, *supra* note 140, at 7-18; R. RADCLIFFE, *supra* note 54, at 429-30; Lowenstein, *supra* note 30, at 278; *Survey*, *supra* note 140, at 743-45 (discussing discounts from 1931-1968). For additional discussion of closed-end fund discounts, see Brauer, *'Open-Ending' Closed-End Funds*, 13 J. FIN. ECON. 491, 491-92 (1984) and sources cited therein.

This phenomenon of closed-end funds selling at a discount is not confined to the United States. In the United Kingdom, closed-end investment trusts, with assets of $18 billion, are the fourth largest sector of the stock market. In mid-1985, shares of these trusts sold at an average 24% discount from net asset value. Makin, *Shaking Up Britain's Investment Trusts*, INSTITUTIONAL INVESTOR, July 1985, at 149. In recent years, however, discounts on American closed-end fund shares have declined. *See infra* note 150.

[148] R. RADCLIFFE, *supra* note 54, at 430; Malkiel, *The Valuation of Closed-End Investment Company Shares*, 32 J. FIN. 847, 847-50 (1977); Malkiel & Firstenberg, *supra* note 139, at 23. *But see* T. HERZFELD, *supra* note 140, at 10 ("[M]y studies have not been able to establish an obvious correlation between discounts and unrealized capital gains."); Thompson, *The Information Content of Discounts and Premiums on Closed-End Fund Shares*, 6 J. FIN. ECON. 151, 153 (1978) (if unrealized capital gains

Other conceivable explanations include poor performance, excessive turnover, excessive management fees, and the holding of restricted shares ("letter-stock").[149] One study analyzed all these possible explanations (including unrealized capital gains liability) and concluded: "the rational explanations we have studied explain only a small part of the discounts that exist. [The variation of discounts over time] suggests that market psychology has an important bearing on the level and structure of discounts."[150] Indeed, two authorities observed that closed-

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were cause of discounts, tax-exempt investors could realize superior returns by purchasing the shares); *but cf. Another Look at Dual-Purpose Funds*, FORTUNE, April 1973, at 25, 26 (American DualVest, Hemisphere, and Putnam Duofund had tax *loss* carry-overs, but the capital shares of America DualVest and Putnam Duofund were selling at substantial discounts from net asset value).

[149] Malkiel, *supra* note 148, at 849-52; Malkiel & Firstenberg, *supra* note 139, at 23-24; Thompson, *supra* note 148, at 152-53.

[150] Malkiel, *supra* note 148, at 857; *see* RANDOM WALK, *supra* note 9, at 341; Malkiel & Firstenberg, *supra* note 139, at 24 ("[S]tatistical analysis indicates that these factors explain only a small portion of the average discounts available."); *cf.* Pratt, *Myths Associated with the Closed-End Investment Company Discounts*, FIN. ANALYSTS J., July-Aug. 1966, at 79 (rejecting the following explanations for the discount: built-in capital gains liability, management fees, poor performance, and non-redeemability); Seligman, *supra* note 2, at 90 (" 'I've heard a hundred convoluted explanations of the discount,' says Stephen Ross of Yale, 'and not one that makes any sense.' "). *But see* Boudreaux, *Discounts and Premiums on Closed-End Funds: A Study in Valuation*, 28 J. FIN. 515, 516-17 (1975) (rejecting the following explanations for the discount: fund transaction costs and management fees, depressant effects of large block sales on market price, inadequate portfolio diversification, and irrationality and/or market inefficiency; past turnover is a measure of future alterations in portfolio; past turnover correlates with discounts ("bad" turnover) *or* premiums ("good" turnover)); Roenfeldt & Tuttle, *An Examination of the Discounts and Premiums of Closed-End Investment Companies*, 1 J. BUS. RESEARCH 129 (1973) (concluding that discounts or premiums on closed-end funds accurately reflected below-average or above-average performance of underlying portfolios); *but cf.* Ingersoll, *A Theoretical and Empirical Investigation of the Dual Purpose Funds*, 3 J. FIN. ECON. 83, 91-92 & n.6 (1976) (arguing that closed-end funds should always sell at some discount if the negative value of the management fee exceeds the positive value of economies of scale in transaction costs or information collecting); *id.* (using a variation of an option-valuation model to formulate a price model for capital shares of dual purpose funds; model predicted price fluctuations well, but with some discrepancies; author attributes discrepancies to errors in model rather than to market inefficiency).

For an anecdotal description of an institutional investor's profitable transactions in the shares of Bancroft Convertible Fund, a closed-end investment company selling at a discount from net asset value, see A. TOBIAS, *supra* note 36, at 71-72.

Interestingly, closed-end fund share discounts have declined in recent years. *See* RANDOM WALK, *supra* note 9, at 344-45; Makin, *supra* note 147, at 150 ("factors . . . squeezed discounts on U.S. closed-end funds to near zero in recent years"); Seligman, *supra* note 2, at 90 ("After several of the heavily discounted closed-end funds

end fund discounts generally narrow when the market falls and widen when the market rises. This counter-cyclical narrowing and widening of discounts tended to lower the volatility and risk of closed-end funds.[151] In short, closed-end fund discounts may suggest that the market is not very efficient,[152] especially in the case of closed-end bond funds, whose yields would be higher because of the discount (the inves-

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went open-end a decade ago, the discounts began to shrink. . . ."). For discussion of open-end versus closed-end funds, see *supra* note 140.

Some diversified common stock closed-end funds recently sold at a premium over net asset value. On Friday, July 26, 1985, Source sold at a 7.3% premium and Tri-Continental at a 1.3% premium. Wall St. J., July 29, 1985, at 21, col. 3. The other six diversified common stock closed-end funds listed by the *Wall Street Journal* sold at discounts. *Id.* On March 7, 1986, Source common sold at a premium of 7.5%. The common shares of the other eight diversified equity closed-end funds listed in Barron's sold at a discount. Barron's, Mar. 10, 1986, at 139, col. 2. (Included in these eight was the capital stock of Gemini II, a dual purpose fund. The *income* shares of Gemini II sold at a 48.9% premium. *Id.*; *see infra* note 164).

Of the specialized equity and convertible funds listed in Barron's, the common shares of seven sold at a premium, and 10 at a discount on March 7, 1986. (For these three issues, data was not available.) Barron's, Mar. 10, 1986, at 139, col. 2. (Included in the 10 common shares selling at a discount was the capital stock of ML Convertible Securities, a dual purpose fund investing in convertible securities. The *income* shares of ML Convertible Securities were trading at a 39.9% premium. *Id.*; *see infra* note 164).

The March 10, 1986 Barron's also provided data as of February 28, 1986 for 24 closed-end bond funds. Of these, 15 had common shares selling at a premium over net asset value per share; nine funds had common shares trading at a discount. Barron's, Mar. 10, 1986, at 139, col. 2.

[151] Malkiel & Firstenberg, *supra* note 139, at 22-23.

[152] *See* W. SHARPE, *supra* note 70, at 592-93 ("Explanation of the behavior of closed-end fund prices provides a challenge for the person who believes that capital markets are perfectly efficient." *Id.* at 593); Malkiel & Firstenberg, *supra* note 139, at 24 ("*In our judgment, the most reasonable possibility is that on average closed-end companies sell at discounts because they are not supported by an active marketing campaign.*" (emphasis in original)); Malkiel, *supra* note 148, at 857-58 (brokers do not like to sell closed-end funds; commissions are lower than on open-end funds and investors are unlikely to trade from one closed-end fund to another); Pratt, *supra* note 150, at 82 (same; also, closed-end fund discounts are primarily the result of a lack of sales effort and the resulting lack of investor awareness of closed-end funds); Thompson, *supra* note 148 (discounted closed-end fund shares, adjusted for risk, tended to outperform the market during the period 1940-1975; author concludes that either the market is inefficient or the commonly-used two-parameter capital asset pricing model is deficient); *cf.* B. GRAHAM, *supra* note 147, at 128-29 (arguing that discounted closed-end fund shares are superior to mutual fund shares because each dollar invested in discounted closed-end fund shares receives distributions on more than one dollar of assets); T. HERZFELD, *supra* note 140, at 11-12 (same); RANDOM WALK, *supra* note 9, at 344 (same); Malkiel, *Closed-End Funds: Blue Chips at Bargain Prices*, INVESTING, Mar. 1974, at 20 (same).

tor can purchase one dollar worth of bonds for less than a dollar).[153] Nevertheless, unlike the dual purpose funds, the traditional unleveraged closed-end fund has no pre-set redemption date. Someone who buys such shares at a discount has no guarantee that the discount may not persist indefinitely or even increase.[154]

In contrast, dual purpose funds have a designated redemption date when the discount must disappear.[155] The figures in Table I are for the beginning of 1979. At that time, one knew that by the redemption dates, the discounts had to disappear. Unleveraged packages of dual purpose funds selling at a discount from net asset value present a paradox for "information-arbitrage" efficiency. Oversimplifying, if the market is *IA* efficient, ***ex ante*** one diversified portfolio should be roughly equivalent to another of similar risk.[156] Especially if risk is difficult to measure[157] (and common share prices are *IA* efficient), investors should view diversified portfolios as roughly equivalent ***ex ante***. Open-end mutual fund shares sell at or above net asset value.[158] Because mutual funds are so numerous, any given dual purpose fund should have at least several load or no-load mutual funds[159] viewed as roughly equivalent in risk. In an "information-arbitrage" efficient market, one would have expected all new and existing long-term investors in these equivalent load or no-load mutual funds to switch to unleveraged dual purpose fund packages selling at a discount from net asset value.[160]

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[153] Richards, Fraser & Groth, *The Attractions of Closed-End Bond Funds*, J. PORTFOLIO MGMT., Winter 1982, at 56; *see* Greenebaum, *Closed-End Funds for Bond Bulls*, FORTUNE, May 17, 1982, at 131.

[154] *See* Lowenstein, *supra* note 30, at 278.

[155] Malkiel & Firstenberg, *supra* note 139, at 22; *see* Johnston, Curley & McIndoe, *Are Shares of Dual-Purpose Funds Undervalued?*, FIN. ANALYSTS J., Nov.-Dec. 1968, at 162.

[156] *See* sources cited *infra* note 171; *cf.* Litzenberger & Sosin, *The Theory of Recapitalizations and the Evidence of Dual Purpose Funds*, 32 J. FIN. 1433, 1442-44 (1977) (if the stock market is efficient in the semi-strong sense, a dual purpose fund after expenses should be equivalent to an unmanaged portfolio holding the same securities as the fund).

[157] *See supra* part I(*E*).

[158] For a general discussion of mutual funds, see sources cited *supra* note 140; *infra* note 159.

[159] "Load" mutual fund shares sell at above net asset value. No-load mutual fund shares sell at net asset value. B. GUP, *supra* note 102, at 44, 46; R. RADCLIFFE, *supra* note 54, at 429; S. MITTRA & C. GASSEN, *supra* note 2, at 655; W. SHARPE, *supra* note 70, at 571.

[160] *See* Lieberman, *Assured Pay-Off: It Lends Attraction to Deep-Discount Dual Funds*, Barrons, Nov. 6, 1972, at 9, col. 3 ("Current market prices allow dual fund investors to acquire at discounts the same basic portfolios and managements for which

Indeed, a self-employed professional could buy dual purpose fund common shares for her own personal account and preferred shares for her tax-exempt Keogh plan (or professional corporation's pension plan). Massive switching from mutual funds to dual purpose funds should have drastically diminished the discounts on the latter's shares. The absence of such switching is inconsistent with "information-arbitrage" efficiency.[161]

Although the redemption dates of all the old dual purpose funds have

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other investors pay 9% premiums (sales charges) or net asset values (no-loads)."); *cf.* T. NODDINGS, *supra* note 112, at 38 ("A combination of selected income shares and capital shares, in different funds, provides a superior alternative to most conventional portfolios of common stocks . . . ."); EXPERTS, *supra* note 36, at 243 (same).

[161] For a general discussion of dual purpose fund discounts and market efficiency, see T. COPELAND & J. WESTON, *supra* note 2, at 342-45.

Investors' failure to substitute dual purpose fund packages for mutual fund shares also raises questions about the validity of Modigliani and Miller's leverage irrelevance hypothesis. *See supra* note 144. Part of the justification for this thesis is the assumption that investors would use (1) "home-made" leverage to compensate for a corporate issuer's insufficient leverage and (2) "home-made anti-leverage" to compensate for a corporate issuer's excessive leverage. "Home-made" leverage consists of an investor's borrowing personally to buy shares. "Home-made anti-leverage" consists of an investor's buying common and debt of the same issuer. *See* R. BREALEY & S. MYERS, *supra* note 1, at 357; V. BRUDNEY & M. CHIRELSTEIN, *supra* note 5, at 405-09; W. KLEIN, *supra* note 5, at 235-40; J. VAN HORNE, *supra* note 70, at 249-52; Modigliani & Miller, *supra* note 144, at 270.

If investors are dissatisfied with the leverage of dual purpose fund common, they can undo the leverage by purchasing a package of common and preferred. As noted above, such a package should be roughly equivalent *ex ante* to at least several load or no-load mutual funds viewed as roughly equivalent in risk. *See supra* text accompanying notes 156-59. The failure of the investment community to substitute dual purpose fund packages for *ex ante* equivalent mutual fund shares creates doubt as to whether the Modigliani and Miller "home-made" substitution or arbitrage process really works in practice. *See* Litzenberger & Sosin, *supra* note 156, at 1444-45 (deviations from net asset value of unleveraged packages of dual purpose funds "is sufficient evidence to refute the Modigliani-Miller hypothesis"; *id.* at 1444).

Extrapolating from the Modigliani and Miller leverage irrelevance hypothesis, Professor Alan Schwartz has questioned why corporations issue some debt on a secured basis and other debt on an unsecured basis. Schwartz, *Security Interests and Bankruptcy Priorities: A Review of Current Theories*, 10 J. LEGAL STUD. 1 (1981); Schwartz, *The Continuing Puzzle of Secured Debt*, 37 VAND. L. REV. 1051 (1984), *reprinted in* 27 CORP. PRAC. COMMENTATOR 293 (1985). Schwartz's arguments triggered a debate between himself and Professor Homer Kripke. *See* Jackson & Schwartz, *Vacuum of Fact or Vacuous Theory: A Reply to Professor Kripke*, 133 U. PA. L. REV. 987 (1985); Kripke, *Law and Economics: Measuring the Economic Efficiency of Commercial Law in a Vacuum of Fact*, 133 U. PA. L. REV. 929 (1985).

been reached,[162] new ones are now being created.[163] Interestingly, at least initially, unleveraged packages of the capital and income shares of two new dual funds sold at a premium over net asset value.[164]

III. Legal Commentary Assuming *IA* or *FV* Market Efficiency

Much legal commentary has assumed the validity of the semi-strong hypothesis, often without distinguishing between "information-arbitrage" and "fundamental-valuation" efficiency. Some of this analysis expressly or implicitly assumes the market is *IA* efficient. Examples of such writing include the use of the efficient market hypothesis to support the fraud on the market theory (to avoid the requirement of demonstrating reliance in a rule 10b-5 action);[165] to question the "protec-

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[162] *See supra* text accompanying note 146.

[163] McGough, *supra* note 143; *see supra* note 141 (discussing the prospectuses of two new dual purpose funds, Gemini II and ML Convertible Securities).

[164] On April 22, 1985, the capital shares of Gemini II sold at a 10.3% premium over net asset value per share, and the income shares at a 20.5% premium. Gemini II, First Quarter Report, Mar. 31, 1985. On June 30, 1985, the capital shares of Gemini II sold at a 6.8% premium, and the income shares at a 25.0% premium. Gemini II, Semi-annual Report, June 30, 1985. On September 30, 1985, the capital shares of Gemini II sold at a 0.9% discount and the income shares sold at a 16.7% premium. Gemini II, Third Quarter Report, Sept. 30, 1985. On September 6, 1985, over a month after the initial issue on July 25, 1985, the capital shares of ML Convertible Securities sold at a 17.7% discount, and the income shares sold at a 25.3% premium. Wall St. J., Sept. 9, 1985, at 36, col. 1.

On March 7, 1986, Gemini II capital shares traded at a discount of 11.5% and the income shares sold at a premium of 48.9% over net asset value per share. On the same date, ML Convertible Securities had capital shares trading at a 21.3% discount and income shares selling at a 39.9% premium. Barron's, Mar. 10, 1986, at 139, col. 3.

[165] Note, *The Fraud on the Market Theory: Efficient Markets and the Defenses to an Implied 10b-5 Action*, 70 Iowa L. Rev. 975 (1985); *see* T.J. Raney & Sons v. Fort Cobb, Okla. Irrigation Fuel Auth., 717 F.2d 1330, 1332 (10th Cir. 1983) ("The [fraud on the market] theory is grounded on the assumption that the market price reflects all known material information."); *In re* Ramada Inns Sec. Litig., 550 F. Supp. 1127, 1131 n.6 (D. Del. 1982) (discussing the efficient market theory as one possible basis of the fraud on the market theory); Fausett v. American Resources Management Corp., 542 F. Supp. 1234, 1238 (D. Utah 1982) (noting that an efficient market is a critical assumption of the fraud on the market theory); *In re* LTV Sec. Litig., 88 F.R.D. 134, 144 (N.D. Tex. 1980) (discussing the efficient market theory as the premise on which fraud on the market theory is built); Black, *Fraud on the Market: A Criticism of Dispensing with Reliance Requirements in Certain Open Market Transactions*, 62 N.C.L. Rev. 435, 437-38 (1984) (one factor in development of fraud on the market theory is increased recognition of efficient market thesis); Pickholz & Horahan, *The SEC's Version of the Efficient Market Theory and Its Impact on Securities Law Liabil-*

tion of unsophisticated investors" rationale for mandatory disclosure under the securities laws;[166] to argue that trustees do not breach their duties by investing in index funds (which attempt to recreate a stock market index);[167] to refine investment management law;[168] and to refine the suitability rule (governing stockbroker recommendations to clients).[169] One commentator has even proposed a cautionary legend on all stockbrokerage confirmations warning investors of the evidence that the market is *IA* efficient.[170]

If the stock market is efficient in an *IA* sense, investors should hold diversified portfolios.[171] Some commentators have even argued that in

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ities, 39 WASH. & LEE L. REV. 943, 956 (1982). *See generally* Fischel, *supra* note 3.

[166] Easterbrook & Fischel, *Mandatory Disclosure and the Protection of Investors*, 70 VA. L. REV. 669, 693-95 (1984); *cf.* N. WOLFSON, *supra* note 3, at 121-22 (efficient market theory undermines SEC emphasis on past earnings and on selection of individual securities); Barry, *supra* note 1, at 1333 (if the efficient capital market hypothesis is correct, "[t]he SEC and the securities laws waste resources, by requiring issuers . . . to spend money disclosing information that already is reflected in stock prices"); Kripke, *Fifty Years of Securities Regulation in Search of a Purpose*, 21 SAN DIEGO L. REV. 257, 273-77 (1984) (because of efficient market theory, the typical investor will have little use for full disclosure); Note, *Economic Theory*, *supra* note 1, at 1057-73 (SEC mandated disclosures contain little new information; average investor is not directly involved in the process of security price formation; present disclosure laws should be relaxed). *But cf.* Coffee, *Market Failure and the Economic Case for a Mandatory Disclosure System*, 70 VA. L. REV., 717, 747-51 (1984) (arguing that even if the stock market is efficient, mandatory disclosure might still help investors to diversify efficiently and to assess the risk of individual securities when revising portfolios). *See generally* H. KRIPKE, *supra* note 1, at 96-116.

[167] Langbein & Posner, *supra* note 70; Langbein & Posner, *Market Funds and Trust Investment Law: II*, 1977 AM. BAR FOUND. RESEARCH J. 1.

[168] Pozen, *supra* note 12, at 933-35; *cf.* Bines, *supra* note 1, at 780-81 (speculating on the impact on investment management law of both the efficient market hypothesis and the capital asset pricing model).

[169] Cohen, *supra* note 3, at 1626-27, 1632-33. Professor Cohen proposes a rule "[s]hould the theory of efficient markets become adequately established . . . ." *Id.* at 1626; *see* Kerr, *Suitability Standards: A New Look at Economic Theory and Current SEC Disclosure Policy*, 16 PAC. L.J. 805, 826 (1985) ("The ECMH [efficient capital market hypothesis] should be integrated into any standard of suitability since it is a necessary corollary to portfolio theory.").

[170] Note, *Broker Recommendations*, *supra* note 1, at 1100-01; *cf.* N. WOLFSON, *supra* note 3, at 121 (discussing the "shingle" theory that a broker cannot recommend a security without a reasonable basis and noting: "But if the . . . efficient-market thesis is correct, then no broker-dealer or adviser can rationally recommend an individual security.").

[171] *See* R. RADCLIFFE, *supra* note 54, at 644; J. WESTON & E. BRIGHAM, *supra* note 3, at 743; Barry, *supra* note 1, at 1333 & n.104; Cohen, *supra* note 3, at 1615; *FASB*, *supra* note 2, at 65-77, *reprinted in* J. COX, *supra* note 2, at 164-75; Langbein

conflict-of-interest transactions involving a publicly traded parent and publicly traded subsidiary (for example, parent squeeze-out of subsidiary's minority shareholders, parent sale of control of subsidiary at a premium, parent/subsidiary merger, and parent usurpation of subsidiary's corporate opportunity), investors can deal with the risk of "losing" by diversifying. They are then just as likely to hold shares of "winners" as "losers."[172] The likelihood that investors will actually hold diversified portfolios depends in part on whether they believe the stock market is *IA* efficient.

Other legal commentary expressly or implicitly assumes that the market is efficient in the "fundamental-valuation" sense. Examples of such analysis include the use of the efficient market hypothesis to assist in defining materiality;[173] to question a broad prohibition on insider trading;[174] to defend freezeouts at above market price;[175] and to defend

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& Posner, *Social Investing and the Law of Trusts*, 79 MICH. L. REV. 72, 81-83 (1980); Note, *Broker Recommendations*, *supra* note 1, at 1096-99; *cf.* Bines, *supra* note 1, at 758, 775-76 ("The capital asset pricing model makes diversification not merely wise but mandatory." *Id.* at 758).

[172] Easterbrook & Fischel, *Corporate Control Transactions*, 91 YALE L.J. 698, 711-14 (1982); *cf.* Securities and Exchange Commission Advisory Committee on Tender Offers: Report of Recommendations, Separate Statement of Frank H. Easterbrook and Gregg A. Jarrell, at 83 (July 8, 1983) ("The small, risk-averse shareholder may . . . . buy a mutual fund or some other diversified portfolio. Then the investor is sure to hold bidders as well as targets and bystanders.") [hereafter Easterbrook & Jarrell]. *But see* Cox, *Compensation, Deterrence, and the Market as Boundaries for Derivative Suit Procedures*, 52 GEO. WASH. L. REV. 745, 749-51 (1984) (pointing out the low likelihood in a freezeout that a diversified investor will own the same proportion of the parent firm as he does of the *minority shares* in the subsidiary; also commenting that investors will probably find their portfolios over represented by either freezer-out or freezee-out securities).

[173] Dennis, *Materiality and the Efficient Capital Market Model: A Recipe for the Total Mix*, 25 WM. & MARY L. REV. 373 (1984).

[174] Heller, Chiarella, *SEC Rule 14e-3 and* Dirks: *Fairness versus Economic Theory*, 37 BUS. LAW. 517 (1982); *cf.* Barry, *supra* note 1, at 1352-54 ("Trading on outside information . . . is one of the ways in which the market removes informational inefficiencies and corrects itself." *Id.* at 1354); Note, *Economic Theory*, *supra* note 1, at 1073-75 ("economic considerations do not justify restrictions on insider trading"; *id.* at 1073). *See generally* Herzel & Colling, *The Chinese Wall and Conflict of Interest in Banks*, 34 BUS. LAW. 73, 94-99 (1978) (discussing the strong form of the efficient market hypothesis, which suggests that even insider traders have no advantage over other investors; *see supra* note 2); Lorie, *Insider Trading, Rule 10b-5, Disclosure, and Corporate Privacy: A Comment*, 9 J. LEGAL STUD. 819 (1980) ("Trading, which brings current prices closer to equilibrium prices, promotes efficiency.").

[175] *See* Easterbrook & Fischel, *supra* note 172, at 729 & n.84 (citing Easterbrook & Fischel, *infra* note 179, at 1165-68) (although article talks in terms of *IA* efficiency, *FV*

the stock market exception to the appraisal remedy against the criticism that the market may grossly undervalue the shares.[176] Furthermore, the efficient market thesis (apparently the *FV* version) is one premise of the integrated disclosure program recently adopted by the SEC.[177] Profes-

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efficiency would seem to be necessary to justify such freezeouts; otherwise, the frozen out shareholders might be deprived of the opportunity eventually to receive expected future payouts whose present value exceeded the freeze-out price; *see generally* Note, *"Fair Value" Determination in Corporate "Freeze-Outs," and in Security and Exchange Act Suits:* Weinberger, *Other, and Better Methods*, 19 VAL. U.L. REV. 521, 555-57 (1985)).

[176] *See* Fischel, *The Appraisal Remedy in Corporate Law*, 1983 AM. BAR FOUND. RESEARCH J. 875, 884-85. Again, Fischel's article talks in terms of *IA* efficiency, but *FV* efficiency would seem to be necessary to defend the stock market exceptions to the appraisal remedy; otherwise, the complaining minority shareholder might be deprived of the opportunity eventually to receive expected future payments whose present value exceeded the merger price. Professor Fischel accepts another criticism of the stock market exception to the appraisal remedy. *Id.* at 885; *see* J. SELIGMAN, THE SEC AND THE FUTURE OF FINANCE 312-15 (1985) (relying in part on the validity of the semi-strong form of the efficient market hypothesis to support the stock market exception to the appraisal remedy in *disinterested* merger transactions); Seligman, *Reappraising the Appraisal Remedy*, 52 GEO. WASH. L. REV. 829, 837-38 (1984) (supporting the stock market exception to the appraisal remedy in *disinterested* merger transactions); *cf.* J. SELIGMAN, *supra*, at 317-27 (criticizing judicial attempts to determine "intrinsic worth" in appraisal proceedings and praising market value as a valuation standard). *But cf.* Smith v. Van Gorkom, 488 A.2d 858, 875 (Del. 1985) ("A substantial premium [over market price] may provide one reason to recommend a merger, but in the absence of other sound valuation information, the fact of a premium alone does not provide an adequate basis to assess the fairness of an offering price [by the other party to a merger]."). For an argument in favor of retaining the appraisal right because the stock market price may be less than intrinsic value, see Eisenberg, *The Legal Roles of Shareholders and Management in Modern Corporate Decisionmaking*, 57 CALIF. L. REV. 1, 83-84 (1969) (commenting that fluctuations in stock market prices seem arbitrarily large); Note, *A Reconsideration*, *supra* note 3, at 1036-44.

[177] *See* Securities Act Rel. No. 6235, Proposed Comprehensive Revision to the System for Registration of Securities Offerings, [1980 Transfer Binder] FED. SEC. L. REP. (CCH) ¶ 82,649, at 83,484; Black, *supra* note 165, at 468; Fox, *Shelf Registration, Integrated Disclosure, and Underwriter Due Diligence: An Economic Analysis*, 70 VA. L. REV. 1005, 1008 (1984); Gilson & Kraakman, *supra* note 3, at 550 & n.4; *cf.* Pickholz & Horahan, *supra* note 165, at 954 (SEC's final rulemaking on integrated disclosure system largely accepted the efficient market system for widely followed issuers). *See generally* Securities Act Rel. No. 6592, Proxy Rules — Comprehensive Review (July 1, 1985), [Current] FED. SEC. L. REP. (CCH) ¶ 83,901 (proposing to streamline proxy disclosure by applying the principles of the integrated disclosure system to proxy and information statements); Banoff, *Regulatory Subsidies, Efficient Markets, and Shelf Registration: An Analysis of Rule 415*, 70 VA. L. REV. 135, 136, 177-80 (1984) (using the efficient market theory to defend shelf registration (SEC rule 415), which is part of the integrated disclosure system).

sor Fox has called this program "the most important set of changes in the regulation of the sale of new issues since the passage of the Securities Act."[178]

A controversial issue in tender offer regulation is why takeover bidders are able to offer a premium over the market price. One hypothesis is that the takeover somehow produces more efficient use of resources.[179] The reason may be that the change in control of the target ousts less efficient management[180] or that synergy results from the combination of the target and acquirer.[181] If takeovers increase efficiency, they benefit society.

An alternative hypothesis is that target shares trade in the stock market for less than intrinsic value.[182] If so, takeover bids may produce

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[178] Fox, *supra* note 177, at 1007-08.

[179] *See* Easterbrook & Fischel, *The Proper Role of a Target's Management in Responding to a Tender Offer*, 94 HARV. L. REV. 1161, 1182-83 (1981); Easterbrook & Jarrell, *supra* note 172, at 72.

[180] N. WOLFSON, *supra* note 3, at 45-50; *Annual Report of the Council of Economic Advisers*, ECONOMIC REPORT OF THE PRESIDENT 188-89, 196, 198-99 (Feb. 1985) [hereafter ECONOMIC REPORT]; Bebchuk, *The Case for Facilitating Competing Tender Offers*, 95 HARV. L. REV. 1028, 1030-31 (1982); Coffee, *Regulating the Market for Corporate Control: A Critical Assessment of the Tender Offer's Role in Corporate Governance*, 84 COLUM. L. REV. 1145, 1152-53, 1163 (1984); Dodd & Ruback, *Tender Offers and Stockholder Returns*, 5 J. FIN. ECON. 351, 354 (1977); Easterbrook & Fischel, *supra* note 179, at 1169-73, 1175; Easterbrook & Jarrell, *supra* note 172, at 72; Fischel, *Efficient Capital Market Theory, the Market for Corporate Control, and the Regulation of Cash Tender Offers*, 57 TEX. L. REV. 1, 5-9 (1978); Gilson, *A Structural Approach to Corporations: The Case Against Defensive Tactics in Tender Offers*, 33 STAN. L. REV. 819, 841-42 (1981); Greene & Junewicz, *A Reappraisal of Current Regulation of Mergers and Acquisitions*, 132 U. PA. L. REV. 647, 682-84 (1984); Jarrell & Bradley, *The Economic Effects of Federal and State Regulations of Cash Tender Offers*, 23 J. L. & ECON. 371, 380-82 (1980); Manne, *Mergers and the Market for Corporate Control*, 73 J. POL. ECON. 110, 113 (1965); *see* Dennis, *Two-Tiered Tender Offers and Greenmail: Is New Regulation Needed?*, 19 GA. L. REV. 281, 310 (1985).

[181] *See* ECONOMIC REPORT, *supra* note 180, at 198; Bebchuk, *supra* note 180, at 1031-32; Coffee, *supra* note 180, at 1166-67; Easterbrook & Jarrell, *supra* note 172, at 72.

[182] *See* Lowenstein, *supra* note 30, at 274-75, 291-94, 306. For discussion and criticism of Lowenstein's hypothesis, see Dennis, *supra* note 180, at 313-16.

Incumbent managements often justify takeover defense tactics on the basis that the hostile tender offer price is inadequate. Even when the hostile bid is substantially above the pre-offer stock market price, management argues that the pre-offer stock market price was inaccurately low. *See* Unocal Corp. v. Mesa Petroleum Co., [1984-85 Transfer Binder] FED. SEC. L. REP. (CCH) ¶ 92,046, at 91,210 (Del. S. Ct. oral opinion, May 17, 1985) ("Unocal contends that [Mesa Petroleum's] offer, although substantially above market, is grossly inadequate in terms of paying Unocal's shareholders the in-

only "paper profits" with no increase in economic productivity and may therefore be less valuable to society.[183] The second hypothesis is inconsistent with the "fundamental-valuation" version of the efficient market theory.[184] Therefore, an important element of the policy debate on

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trinsic value of their stock."); Lang, Block, Barton & Duberstein, *The Dramatization of a Hostile Tender Offer* (Part 1), A.B.A. J., Mar. 1984, at 68, 71-73. Such price inaccuracy is contrary to the efficient capital market hypothesis. In permitting management to engage in defensive tactics against a hostile bid, the courts may implicitly accept management's argument of stock price inaccuracy. For examples of cases permitting defensive tactics, see Moran v. Household Int'l, Inc., 500 A.2d 1346 (Del. 1985); Unocal Corp. v. Mesa Petroleum Co., 493 A.2d 946 (Del. 1985). In *Unocal*, the court stated "If [a] defensive measure is to come within the ambit of the business judgment rule, it must be reasonable in relation to the threat posed. This entails an analysis by the directors of the nature of the takeover bid and its effect on the corporate enterprise. Examples of such concerns may include: ***inadequacy of the price offered*** . . . ." *Id.* at 955 (emphasis added). *See generally* Smith v. Van Gorkom, 488 A.2d 858, 875 (Del. 1985), *reh'g denied*, 488 A.2d 858 (Del. 1985) ("A substantial premium [over market price] may provide one reason to recommend a merger, but in the absence of other sound valuation information, the fact of a premium alone does not provide an adequate basis to assess the fairness of an offering price [by the other party to a merger].").

In addition to the economic efficiency or the undervaluation rationales, commentators have advanced other explanations for takeover bid premiums. For a discussion of the "empire building" and the "exploitation" hypotheses, see Coffee, *supra* note 180, at 1167-73. Tax considerations may also motivate some takeovers. *See* ECONOMIC REPORT, *supra*, note 180, at 200-01. *See generally Tax Treatment of Hostile Takeovers: Hearings on S.420, S.476, and S.632 Before the Subcomm. on Taxation and Debt Management of the Senate Comm. on Finance*, 99th Cong., 1st Sess. (1985).

[183] *See* ECONOMIC REPORT, *supra* note 180, at 190 ("[C]ritics of the takeover process question whether takeovers are beneficial for the economy. They suggest that many takeovers result from a pursuit of paper profits that does not contribute to productivity."); *cf.* Lowenstein, *supra* note 30, at 268 (without the efficient market theory, "the issue of whether tender offers are good for the world would become remarkably complex"); *id.* at 273 ("pruning deadwood" thesis relies on assumption that stock market is efficient); Lowenstein, *Regulation of Tender Offers: A Critical Comment*, 16 REV. SEC. REG. 829, 830 (1983) (thesis that tender offers single out poorly managed companies "depends on a version of the efficient market hypothesis").

[184] *See* Easterbrook & Fischel, *supra* note 179, at 1183 ("Only proof that markets are not efficient in pricing shares could support the argument that tender offers do not improve the use of resources."). *But see* Coffee, *supra* note 180, at 1154 (the claim that the stock market is inefficient "has only a limited relevance because it fails to appreciate that bidders should still focus disproportionately on marginal firms whose weak managements make possible a turnaround profit, even if the stock market does, as they claim, systematically undervalue all public corporations"); Easterbrook & Jarrell, *supra* note 172, at 116 (the demonstration of social gains from tender offers "does not depend on the efficiency of markets. Evaluation of the gains and losses from offers depends only on the assumption that the degree of efficiency does not change rapidly.").

tender offers is whether the stock market is *FV* efficient.[185]

In short, the validity of the "information-arbitrage" or "fundamental-valuation" forms of the efficient market hypothesis has important consequences for regulatory policy. In the words of two commentators, "the ECMH is now *the* context in which serious discussion of the capital markets takes place."[186] With perhaps some exaggeration, one authority stated: "Taken at face value, the ECMH throws into doubt traditional justifications for almost every phase of securities regulation."[187]

Commentators on a variety of legal and regulatory issues have assumed that the stock market is either *IA* or *FV* efficient. In fact, the stock market may not be efficient in either sense. Such inefficiency undermines the arguments in much of the legal literature discussed above. Most importantly, an inefficient market casts doubt on the thesis that takeovers benefit society.[188] In addition, freezeouts at above market price become more questionable.[189] An inefficient stock market would also eliminate one argument in favor of the stock market exception to

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[185] *See* Lowenstein, *supra* note 30, at 268-73; *cf.* ECONOMIC REPORT, *supra* note 180, at 196-97 ("Stock market prices thereby provide a reliable barometer of the likely consequences of takeover transactions. If the aggregate net change in the value of acquirers' and targets' shares is positive as a result of a takeover, then the transaction creates wealth and is beneficial." *Id.* at 197); Coffee, *supra* note 180, at 1162-66, 1206-11 (discussing the hypothesis that takeover bids discipline inefficient managements; noting that the hypothesis may be invalid if poor stock market performance results from undervaluation rather than poor management); Easterbrook & Jarrell, *supra* note 172, at 71-72, 116-18 (suggesting that perhaps gains observed in tender offers come from synergy or from the fact that bidders' managers make more efficient use of targets' resources; then vigorously defending efficient market theory). *See generally* ECONOMIC REPORT, *supra* note 180, at 201-02 (takeovers will not reduce long-term investment by business because "the market accurately reflects all publicly available information about a corporation's finances and strategic plans." *Id.* at 202).

[186] Gilson & Kraakman, *supra* note 3, at 550 (emphasis in original).

[187] Barry, *supra* note 1, at 1333 (referring to implications of accuracy of all forms of the efficient capital market hypothesis, including the "strong" form that asserts that all material nonpublic information is continuously reflected in stock market prices; for discussion of the "strong" form of efficiency, see *id.* at 1331-32; *supra* note 2). *But see* Bratton, Book Review, 1985 DUKE L.J. 237, 254-55 ("[I]f when a market is 'very' as opposed to 'perfectly' efficient its efficiency leads to no normative imperative, then exactly what lies behind the Chicago school's critique?"); *but cf.* Levmore, *supra* note 34, at 649-57 ("the efficiency of a market matters to the law only occasionally — and then only in small areas"; *id.* at 649).

[188] *See supra* notes 179-85 and accompanying text.

[189] For a defense of such freezeouts, see Easterbrook & Fischel, *supra* note 172, at 729 & n.85. For related discussion, see *supra* notes 171-72 and accompanying text.

the appraisal remedy.[190] Professors Langbein and Posner once warned: "When market funds [that buy and hold a broad stock market index] have become available in sufficient variety and their experience bears out their prospects, courts may one day conclude that it is imprudent for trustees to fail to use such vehicles."[191] If no one can demonstrate that the stock market is *IA* efficient, the argument in favor of index funds becomes far weaker.[192] These are just a few examples of undermined commentary taken from the numerous articles cited above.[193]

CONCLUSION

Even if the stock market is efficient in the "information-arbitrage" sense of quickly reflecting all available public information, the stock market may not be efficient in the "fundamental-valuation" sense of reflecting the discounted present value of rational expectations of future dividends. The first form of efficiency does not imply the second.

A fair number of studies indicate that the stock market is not "fundamental-valuation" efficient. A much smaller body of evidence questions "information-arbitrage" efficiency. Admittedly, many contrary studies suggest that the market is efficient in either the *IA or* the *FV* sense. Because of the difficulty of measuring risk, however, many of the studies supporting or negating the efficient market theory are of questionable validity.

Part II of this Article described two types of anomalies involving clearly mispriced securities. Regardless of (or, in one case, because of) the difficulty of measuring risk, these examples suggest that the stock market is not efficient.

One way to question the efficiency of the market is to identify two

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[190] For discussion of the stock market exception to the appraisal remedy, see *supra* note 176 and sources cited therein.

[191] Langbein & Posner, *supra* note 70, at 30.

[192] *See* Wallace, *supra* note 82, at 25 ("[A]s [Professor Richard] Roll himself points out, 'It's a mistake to justify index funds on the grounds that managers don't have ability.' "); *cf.* R. BREALEY, *supra* note 5, at 55-59, 149 (studies suggest a small .15 correlation between analysts' forecasts and actual returns; simulations can be used to determine the optimal portfolio for someone whose forecasts have a .15 correlation with actual outcome; in such optimal portfolio, on average each years, over 20% of fund was concentrated in just one stock; in addition, annual portfolio turnover was nearly 40%); *id.* at 60 ("Although such a policy [passive investment in a broad and representative sample of stocks] guarantees average performance at minimum cost, it would be stretching both theory and empirical evidence to insist that this is the only sensible portfolio strategy.").

[193] *See supra* notes 165-70, 172-76 & 179-81 and accompanying text.

packages of securities of equal value that sell at significantly different prices. In the past, an unleveraged package (common plus preferred) of most dual purpose funds sold at a significant discount from net asset value. If the market were "information-arbitrage" efficient: (1) these unleveraged dual purpose fund packages were roughly equivalent *ex ante* to shares of certain mutual funds that sold at or above net asset value per share (ironically, in part because of the difficulty of measuring risk) and (2) substitution of dual purpose fund shares for mutual funds shares should have eliminated the discount on dual funds. The absence of such switching is inconsistent with *IA* efficiency.

Another way to question the efficiency of the market is to find two packages of securities selling at the same price, one of which is clearly superior to the other. Convertible securities have sometimes sold at conversion value, despite the convertible's higher yield. In such cases, the convertible clearly has been superior to the package of common into which it was convertible. This is inconsistent with both *FV* and *IA* efficiency. On a *FV* basis, the convertible is undervalued relative to the common. The convertible has a higher expected future payout. Regardless of the difficulty of measuring risk, the convertible must be less risky than the common. On an *IA* basis, the convertible is underpriced relative to the common even if the stock market is irrational and expected to remain so. The convertible contains inchoate within it the common. If the common shares are like a "pet rock," the convertible is like a "pet rock" *plus* a valuable cage.

The "information-arbitrage" form of the efficient capital market hypothesis states that, based on publicly available information, all securities are correctly priced relative to each other. If a convertible bond can be mispriced relative to the common into which it is convertible, it seems even more likely that common shares of different companies could be mispriced relative to each other.

Many legal commentators have assumed that the stock market is efficient. These commentators should recognize that the validity of this hypothesis is questionable. Even if they presume the efficiency of the market for the sake of analysis, they should make clear whether they are assuming "information-arbitrage" or "fundamental-valuation" efficiency.