

TECHNOLOGY, TRANSACTIONS COSTS, AND INVESTOR WELFARE: IS A MOTLEY FOOL BORN EVERY MINUTE?

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ABSTRACT

Computer network technology promises to revolutionize the secondary securities market and particularly to reduce dramatically the marginal costs associated with trading corporate equities. Lowering transactions costs usually is presumed to increase trader welfare. Certain unique characteristics of the secondary securities market suggest, however, that reducing the marginal costs associated with trading stocks may have the perverse and counterintuitive effect of decreasing investor welfare. Policymakers should consider this possibility as they respond to the market's rapid evolution.

INTRODUCTION

Since at least the days of Adam Smith, students of economics have tended to assume that free trade benefits the trading parties. Suppose *A* and *B* meet in the marketplace, where *A* buys a horse from *B* for \$1000. Conventional economic wisdom presumes that such a trade leaves *A* better off than he was before, because he clearly prefers the horse to the \$1000; similarly, *B* is better off because she prefers the money to the horse. Thus (the standard story goes), if no one is made worse off by the deal, *A*'s and *B*'s trading has increased both their happiness and the level of happiness found in society as a whole.¹

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1. There are some well-recognized exceptions to the rule that trading promotes the mutual welfare of the traders. For example, if *A* buys a lame horse because *B* falsely claims the animal is sound, that deal benefits *B* at *A*'s expense. Similarly, if *A* buys *B*'s horse because *B* puts a gun to *A*'s head, *A* is unlikely to view the deal as having improved his situation. Both law and economic theory accordingly cast a jaundiced eye upon exchanges involving fraud or duress. *See generally* RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 109-17 (4th ed. 1992) (explaining inefficiency of exchanges

An essential corollary to this view is that eliminating obstacles to exchange—in economic parlance, reducing transactions costs—further trader welfare by making more mutually beneficial deals possible. This argument explains why many commentators applaud the development of new computer and information technologies that lower the marginal costs associated with trading corporate equities. After all, if *A* and *B* both benefit from the sale of *B*'s horse, should the same not be true if *B* sells shares of Microsoft? By the same token, if reducing the costs of horse trading benefits *A* and *B* by easing the way for the sale of old Dobbin, should not investors benefit from reducing transactions costs in the stock market?²

I would like to sail against the prevailing current by suggesting here that the correct answer to these questions may be a qualified “no.” Careful analysis of the secondary market for corporate equities—that is, the market where investors buy outstanding stocks from other investors, rather than buying from issuing corporations—reveals some peculiarities that distinguish the stock market from markets for other commodities, such as apples, cars, or horses, which people buy primarily to enjoy and consume. In particular, the stock market exhibits a very high degree of speculative trading—i.e., buying and selling motivated by investors' subjective beliefs that the market price is “too low” or “too high.”³ Although the point is often overlooked by even sophisticated commentators, the welfare consequences of speculative trading differ significantly from the welfare consequences of other forms of voluntary exchange. As a result, reducing the transactions costs associated with speculative stock trading may not significantly benefit investors. Indeed, in

based on fraud or duress). What has been generally been less well-understood, however, is that trading driven by uncertainty and subjective disagreement can also fail to promote trader welfare. *See infra* text accompanying notes 13-14.

2. In this Article I focus primarily on the market for corporate equities, both because that market appears to be changing rapidly in response to new technologies, and because there is a wealth of empirical information available about stock trading. My arguments can be easily extended to other speculative markets, however, such as the markets for corporate and government bonds and for financial derivatives. *See, e.g.,* Lynn A. Stout, *Betting The Bank: How Derivatives Trading Under Conditions of Uncertainty Can Increase Risks and Erode Returns in Financial Markets*, 21 J. CORP. L. 53 (1995).

3. A more complete discussion of the meaning of the word “speculation” is offered later. *See infra* text accompanying notes 15-25. Although speculative trading certainly can be found in the markets for housing, automobiles, and similar goods, stock markets are particularly likely to attract speculators because stock values are highly uncertain, *see infra* text accompanying note 8; the transport and storage costs associated with acquiring and holding stocks are minimal; and because lenders readily accept stocks as collateral, allowing speculators to take a position with relatively little sacrifice of liquidity.

some circumstances—and the development of the new electronic trading and information technologies may provide just such a case—reducing the marginal costs associated with stock trading can have the perverse and counterintuitive effect of decreasing the average investor's welfare.

I. WHY DO PEOPLE TRADE STOCKS?

To understand why the welfare consequences of decreasing transactions costs in the stock market may differ from the consequences of decreasing transactions costs in other markets, we must begin with an inquiry into why investors buy and sell stocks. As it turns out, there are several possible answers to this question. Moreover, the nature of the answer in any particular case determines whether that trade increases—or decreases—the net welfare of the trading parties.

A. *Liquidity Trading*

One reason why investors buy stocks, of course, is because they want to earn a positive return on their savings. If an individual is earning more than she is consuming, it seems natural that she might use the difference to purchase corporate equities: it is far more lucrative to park savings in stocks than under the mattress. Conversely, an individual's sale of stock may be motivated by nothing more than a need to raise cash, perhaps to pay bills or to make a purchase.

This sort of stock trading, which I shall dub "liquidity trading," conforms neatly to the "invisible hand" model of mutually beneficial trade. Suppose *A* is young and frugal, and wants to use some of his savings to buy stock so that he can earn a return on the cash he salts away for his retirement. *B*, who is already retired, wants to consume some of her savings by selling stock to raise funds to buy a boat to sail the Bahamas. In such a situation, *A* will want to buy *B*'s stock even if both parties share exactly the same subjective estimate of the likely risks and returns associated with holding the stock. (The importance of this qualification will become apparent later on.) If their joint estimate is correct, both *A* and *B* will be as satisfied with their deal after it is consummated, as they were before.

B. *Portfolio Balancing*

A second form of mutually beneficial trading that occurs in the stock market is what I will call "portfolio balancing" (or, alternatively, "risk

hedging") trading. Rational investors care both about the likely future returns they earn from corporate equities and the risk associated with those returns. To finance economists, "risk" is a term of art that describes fluctuations or variations in returns, including both gains and losses. Thus, a stock that produces high returns in some years but none in others is "riskier" than a stock that offers small but steady gains each year, even when both average the same return over time.

Although investors like high returns, they generally dislike risk. As an economist would put it, investors are "risk averse." Luckily, modern portfolio theory teaches us that investors can eliminate most firm-specific, or alpha, risk by holding a diversified portfolio of many different stocks whose individual ups and downs tend to counteract. Of course, some sources of risk cannot easily be diversified away: all firms tend to do poorly in a recession. Still, an investor can choose her optimal level of market, or beta, risk by holding a diversified portfolio of stocks in combination with some riskless asset, such as government bonds.⁴

The above analysis suggests that at least some stock trading may be motivated by investors' desires to keep their portfolios "in balance." For example, suppose *A* bought 500 shares of Microsoft some years ago. Because Microsoft has appreciated substantially in value, the stock now comprises too large a portion of *A*'s investment portfolio; *A* is no longer fully diversified. Similarly, suppose *B* bought 500 shares of Merck, which has also grown and now occupies too large a place in *B*'s portfolio. If *A* sells some Microsoft to *B* and *B* buys some Merck from *A*, both will be better off in the sense that, even though their expected returns have not changed, both have reduced their levels of alpha risk.⁵ Thus (as in the case of liquidity trading) portfolio balancing can be beneficial to both parties *ex post*, as well as appearing mutually beneficial *ex ante*.⁶

There seems little reason to doubt that at least some stock trading can be traced to investors' changing liquidity needs and to portfolio balancing. Yet

4. See generally RICHARD A. BREALEY & STEWART C. MYERS, *PRINCIPLES OF CORPORATE FINANCE* 129-74 (4th ed. 1991).

5. Similarly, an investor whose stock portfolio had grown too large relative to her risk-free assets might sell some stock to reestablish her preferred level of beta risk.

6. Another form of trading that might provide *ex post* mutual benefits to the trading parties is trading driven by tax considerations, such as a desire to limit capital gains. See Lynn A. Stout, *Are Stock Markets Costly Casinos? Disagreement, Market Failure, and Securities Regulation*, 81 VA. L. REV. 611, 657 (1995) (discussing tax motivated trading). From a social perspective, however, such trades do not create wealth but only shift wealth from the public fisc to investors.

even the most casual empiricism suggests more is going on in today's market. In 1995, the dollar volume of trading on the New York Stock Exchange ("NYSE") and the National Association of Securities Dealers' NASDAQ market alone totalled over \$5.4 trillion—nearly seventy percent of the total market value of the securities listed on those exchanges.⁷ This kind of turnover reflects something more than just investors saving and dissaving, or fine-tuning alphas and betas. Indeed, the vast majority of individual and institutional trading in today's stock market appears driven by another motive entirely: the desire to "beat the market." In other words, most investors seem to trade not for liquidity or portfolio balancing reasons, but because they disagree with market prices.

C. Disagreement-Based Trading

Disagreement is associated in economic theory with the condition known as statistical uncertainty. Although "risk" and "uncertainty" are often used as synonyms, the two words have quite distinct meanings. "Risk" describes situations where, although the outcome of an event is unknown, the probability distribution of possible outcomes is known. Flipping a coin is risky but not uncertain: although we do not know if the coin will turn up heads or tails, we know that the odds of either event are fifty percent. "Uncertainty," in contrast, describes situations where neither the outcome nor the probability distribution of outcomes is fully known.⁸ Thus, Microsoft's future earnings are not only risky, but uncertain.

Even in a world of certainty—that is, a world where all investors shared identical, objective opinions of the likely future risks and returns associated with Microsoft—trading driven by changing liquidity needs and portfolio

7. See NATIONAL ASS'N OF SEC. DEALERS, 1996 NASDAQ FACTBOOK & COMPANY DIRECTORY (1996) (In 1995, NASDAQ market saw \$2.4 trillion in trading on market capitalization of \$1.2 trillion.); NEW YORK STOCK EXCHANGE, FACT BOOK: 1995 DATA 11, 42 (1996) (In 1995, NYSE reported \$3.1 trillion in trading on market capitalization of \$6 trillion.).

8. The distinction between risk and uncertainty often is attributed to Frank Knight. See FRANK H. KNIGHT, RISK, UNCERTAINTY, AND PROFIT (Augustus M. Kelly, Bookseller 1964) (1921). However, Knightian uncertainty generally is associated with cases where probabilities are not "fully known" even to a person with access to all available information. In this Article I use the word in a more limited sense, to describe cases where an ideal observer might be able to form an unbiased or "best" probability estimate, but (given the huge wealth of information available) no individual enjoys the position of the ideal observer. Thus, no single individual has "full" knowledge of probabilities, and different investors can be expected to form different estimates based on differing and incomplete subsets of all the information available. See generally Stout, *supra* note 6, at 625-35 (describing a market where imperfect information leads to disagreement).

balancing could occur. Once we allow for uncertainty, however, a third motive for trading emerges. This is because uncertainty permits different individuals to hold different subjective expectations. Subjective disagreement in turn inspires trading, because investors now perceive opportunities to reap trading profits by buying stocks they believe are “underpriced” and selling those they believe are “overpriced.”

Disagreement-based trading of this sort is often simply described as speculation. And one of the most important attributes of speculation is that (unlike trading driven by the desire for consumption, changing liquidity needs, or portfolio balancing) speculative trades can appear to be mutually beneficial *ex ante* yet predictably prove not to be mutually beneficial *ex post*. In other words, speculative trading presents an important—if often overlooked—exception to the general rule that free trade furthers trader welfare.⁹

1. Disagreement-Based Trading and Trader Welfare

An example may help illustrate the point. Suppose that Investor *A* owns shares of Microsoft, which the market values at \$100 per share. *A* agrees with the market’s opinion, and also values the shares at \$100. Investor *B*, however, believes that Microsoft is really worth \$105. Because *B* disagrees with the market’s current price, she perceives an opportunity to increase her wealth by buying *A*’s shares at any price between \$100 and \$105. *A*, of course, believes he will increase his wealth if he sells at any price over \$100. Thus, if *A* sells his shares to *B* for \$102, *A* and *B* both initially expect to increase their wealth by trading.

But will both *A*’s and *B*’s expected wealth gain materialize *ex post*? The answer, of course, is no. When two parties trade on disagreement, it is impossible for both sets of expectations to be realized. Suppose, for example, that *B*’s prediction proves correct, and Microsoft shares rise to \$105. *B* indeed enjoys a \$3 per share wealth gain, but that gain has come from *A*’s pocket; *A* sold something for \$102 that was actually worth \$105. Thus, *A*’s \$2 per share expected gain in wealth has been transformed into a \$3 per share experienced

9. Jack Hirshleifer, *The Private and Social Value of Information and the Reward to Inventive Activity*, 61 AM. ECON. REV. 561 (1971). Although the legal literature has long understood the implications of Hirshleifer’s argument for other markets, such as the markets for litigation and legislation, the implications for securities markets have been largely overlooked. *But see* Stout, *supra* note 6, at 667-71.

loss.¹⁰

The iron laws of mathematics ensure that trading on disagreement is a zero-sum game for the trading parties—winners' wealth gains always reflect losers' losses. And when players who indulge in zero-sum games must pay to play, the games become negative-sum. Trying to outperform the stock market, it turns out, can be an expensive game.

Investors who trade stocks generally incur at least two kinds of transactions costs. The first is research costs. An investor incurs research costs whenever she puts time or money into acquiring and analyzing information relevant to determining a stock's value. Perhaps the investor does her own research and analysis; perhaps she prefers to pay for the counsel of a professional advisor or investment newsletter. In either case, research and analysis can be costly. And while even investors who trade for liquidity or portfolio-balancing reasons are likely to make a modest effort at valuation,¹¹ research costs are especially likely to mount up for speculators who try to identify mispriced securities.

The second type of transaction cost commonly associated with buying and selling corporate securities is trading costs. Once an investor has become informed about a stock's value and is ready to trade, she needs to find a willing counterparty. As a practical matter, the easiest and surest way to search out a counterparty is to go to either a specialist on an organized exchange such as the NYSE or a dealer on the NASDAQ market. Specialists and dealers are professional middlemen who offer liquidity to investors because they extract a price in the form of a bid-ask spread that ensures them a profit. Moreover, to get access to the specialist or dealer, NYSE and NASDAQ rules require many investors to first pay commissions to a professional intermediary—a broker. Thus, in addition to the costs of research, the trading process itself costs investors money.¹²

Research and trading costs ensure that stock trading inevitably reduces the ex post wealth of the trading parties. Suppose, for example, that *A* and *B* must

10. Similarly, if *A*'s valuation proves correct and Microsoft's price remains fixed at \$100, *A* reaps his expected \$2 windfall at *B*'s expense.

11. Some degree of investment in information is wise even for liquidity and portfolio-balancing investors, if only to ensure that they pay or receive a price no less favorable than the market price.

12. A third kind of cost sometimes associated with securities trading is "market impact" cost—that is, the loss suffered by a trader who places such a large buy or sell order that the order moves the market price, making the terms of the trade slightly less advantageous. Because market impact costs reflect a wealth transfer between the trading parties, they do not affect trader welfare on average. I consequently ignore them in this analysis.

each pay \$1 per share in brokers' commissions to trade. If *B* buys *A*'s Microsoft for \$102 and Microsoft rises to \$105, *B* enjoys a wealth increase of \$2 per share (\$3 price increase less \$1 commission). *A*'s wealth, however, has been reduced by a total of \$4 per share: he sold stock worth \$105 for \$102, and paid \$1 per share for the privilege of doing so. Because *A*'s ex post wealth loss of \$4 per share is greater than *B*'s ex post wealth gain of \$2, *A*'s and *B*'s trade inevitably has reduced their net wealth by \$2 and their average wealth by \$1. Thus, in a world of positive transactions costs, speculation predictably reduces the wealth—and welfare—of the average trader.¹³ Far from being mutually beneficial, speculative trading leaves traders, on average, worse off than they were before.¹⁴

2. *Disagreement-Based Trading and Social Welfare: The Information-Arbitrage Model*

It is possible, of course, that speculative trading that leaves investors worse off as a class may still provide some compensating benefits to the larger society. This possibility underlies the argument (frequently offered by those who defend speculation)¹⁵ that stock speculators provide an unintended social benefit because they search out new information and incorporate it into market prices, thereby promoting more accurate pricing. For example, suppose *B* values Microsoft shares at \$105 because she has invested in research that indicates that the company's earnings are about to increase. By buying from *A* at \$102, *B* drives the market price for Microsoft upward to more closely approximate the true value of the shares. This increase in price accuracy, it is argued, benefits society by promoting greater allocative efficiency.

The possibility that speculation may improve the accuracy of market prices does not change the basic reality that speculative trading remains a negative-sum game for the trading parties. In the example above, *B* had to invest time and money acquiring the information necessary to predict

13. Investors who trade for liquidity or portfolio-balancing reasons also incur transactions costs, of course. Their trading nevertheless benefits them because they generally receive ex post the liquidity and risk-reduction benefits they anticipated, and were willing to pay for, ex ante. In contrast, stock trades motivated by a disagreement with market prices inevitably disappoint at least one of the trading parties.

14. I have argued elsewhere that speculation on disagreement may also harm trader welfare if it induces traders to take on uncompensated risk. Stout, *supra* note 2, at 62-63.

15. See, e.g., POSNER, *supra* note 1, at 445.

Microsoft's increase in earnings. *B* also probably incurred brokers' commissions and specialists' or dealers' spreads. *B* did not incur these costs out of altruism; rather, she expected to recoup them out of the trading profits she reaped by exploiting the relative ignorance of less-informed investor *A*. Thus, *A* indirectly paid for *B*'s research and trading, without enjoying any compensating benefit.¹⁶

This analysis reveals why the claim that speculative stock trading serves a salutary economic function by improving the accuracy of stock prices suffers from an often-overlooked but potentially fatal limitation: it assumes that speculation's public benefits (in the form of more accurate prices) necessarily outweigh its private costs (in the form of the research and trading costs ultimately borne by speculators' less-informed counterparties). In fact, there is no reason to assume this is always or even often true, especially in the secondary stock market.¹⁷ For example, unless Microsoft happens to be issuing new shares, day-to-day changes in the market price for its shares are unlikely to affect the firm's cost of capital or, indeed, any other allocative decision. Thus, speculators who earn short-term profits by trading on information destined to become public within a few days or weeks anyway are unlikely to significantly improve society's allocation of resources.¹⁸ In the meantime, they may be racking up significant private losses in the form of the research and trading costs they incur in their quest to "beat the market."

16. Hirshleifer, *supra* note 9, at 565-67. For this reason, investors who trade for liquidity or portfolio-balancing reasons presumably would prefer to exclude better-informed speculators from the stock market if they could only find a way to do so.

17. *Id.* at 573. For example, suppose extensive (and expensive) research allowed a stock trader to predict that a particular company's assets would be destroyed at midnight by a meteorite strike. If no steps could be taken to prevent the resulting losses, the ability to predict the meteorite strike would have no social value. Nevertheless, the prediction would have substantial *private* value to the trader, because she could use it to extract wealth from uninformed traders by selling or shorting the firm's stock. Thus, the trader will invest in meteorite prediction, even if that research is wasteful from a social perspective.

18. Over a long period of time, a sustained rise or fall in share price might indeed influence how a firm allocates resources. (One would hope it would at least influence how much a company pays its managers.) However, as a general rule speculation that produces more accurate stock prices only furthers allocative efficiency *when resources are in fact being allocated* on the basis of those prices. See generally Lynn A. Stout, *The Unimportance of Being Efficient: An Economic Analysis of Stock Market Pricing and Securities Regulation*, 87 MICH. L. REV. 613 (1988).

3. *Disagreement-Based Trading and Social Welfare: The Pure Speculation Model*

Stock speculation's potential to produce private losses that outweigh its public benefits becomes even greater once we admit the possibility that a speculator who disagrees with the market's price because she thinks she has superior information may, in fact, be mistaken. The example presented above gives *B* the benefit of the doubt by assuming that her research had indeed uncovered information that allowed her to estimate the value of Microsoft more accurately than the market could. Because such truly superior information allows a trader to reap statistically certain (albeit risky)¹⁹ profits, from now on I shall refer to this kind of trading more precisely as "information arbitrage."²⁰

In a world of uncertainty and disagreement, however, it seems likely that at least some of those who buy and sell stocks because they disagree with the market's price are mistaken in believing they have superior information. Although they believe their opinion is better than the market's, they are wrong. For example, suppose *A* and *B* both invest time and money researching the value of Microsoft shares. Although neither collects and analyzes all relevant information—that would be prohibitively expensive—they each spend substantial resources gathering data, and each forms an opinion of tomorrow's likely price. In a world of uncertainty, *A* and *B* may well form different opinions; perhaps *A* is bullish and believes Microsoft shares will rise from their present market price of \$100 to \$105, while *B* is bearish and expects Microsoft to fall to \$95. Obviously, each will perceive an opportunity to increase his or her wealth by trading with the other. Equally obviously, at least one must be mistaken.²¹

19. See *supra* text accompanying note 8 (distinction between risk and uncertainty).

20. The information arbitrage model of speculation is often associated with a classic article by Sanford Grossman and Joseph Stiglitz. See Sanford J. Grossman & Joseph E. Stiglitz, *On the Impossibility of Informationally Efficient Markets*, 70 AM. ECON. REV. 393 (1980); see also Albert S. Kyle, *Informed Speculation with Imperfect Competition*, 56 REV. ECON. STUD. 317 (1989).

21. Investors may make mistakes in valuing securities because they suffer cognitive defects that render them incapable of rationally estimating risks and returns. This theory underlies the "noise trading" literature, see sources cited *infra* note 25. However, under conditions of statistical uncertainty and incomplete information it seems likely that even rational investors will form disagreeing and potentially erroneous opinions, because different investors are likely to base their decisions on different and incomplete subsets of public and private information. (Alternatively, different investors may interpret the same data differently in light of their differing past experiences, which is much the same thing.) This observation forms the basis for the extensive and growing literature on "heterogeneous expectations," see sources cited *infra* note 25.

If bullish *A* buys from bearish *B*, what can we say about the social consequences of this kind of trading? (From now on I shall refer to trading where at least one of the parties erroneously disagrees with the market price as purely speculative, or simply speculative, trading, to distinguish it from information arbitrage between a trader with superior information and a less-informed investor who agrees with the market price and is trading for liquidity, hedging, or other nonspeculative reasons.)²² Once we assume that either *A* or *B* (or, possibly, both)²³ may be mistaken in believing Microsoft is mispriced, we can no longer assume their exchange promotes more accurate market prices.²⁴ Indeed, depending on the extent to which either party's

22. Although most economists seem to equate speculation with information arbitrage, Jack Hirshleifer has written extensively on models of pure speculation between traders with heterogeneous expectations. See, e.g. Jack Hirshleifer, *Speculation and Equilibrium: Information, Risk, and Markets*, 89 Q. J. ECON. 519 (1975); Jack Hirshleifer, *The Theory of Speculation Under Alternative Regimes of Markets*, 32 J. FIN. 975 (1977). See also Stout, *supra* note 6.

One criticism that has been raised against the heterogeneous expectations approach is that trading on disagreement that stems from private information is inconsistent with "rational expectations." See Paul G. Mahoney, *Is There a Cure for "Excessive" Trading?*, 81 VA. L. REV. 713, 721-24 (1995); Jean Tirole, *On the Possibility of Speculation Under Rational Expectations*, 50 ECONOMETRICA 1163 (1982). Closer analysis suggests, however, that the rational expectations critique of trading on disagreement is not robust because it relies on some highly unrealistic assumptions, including the assumption that all traders start with identical information. JACK HIRSHLEIFER, *Two Models of Speculation and Information, in TIME, UNCERTAINTY, AND INFORMATION* 291-300 (1989); Lynn A. Stout, *Agreeing To Disagree Over Excessive Trading*, 81 VA. L. REV. 751 (1995); Lynn A. Stout, *Irrational Expectations*, 3 LEGAL THEORY 227 (forthcoming 1997).

23. Under conditions of uncertainty and subjective disagreement, it is possible to imagine disagreement-based trades that ultimately disappoint both parties. Thus, for example, when *A* buys Microsoft because he expects its price to rise while *B* sells because she expects Microsoft to fall, both will regret expending resources on trading if the market price for Microsoft remains unchanged.

24. "Accuracy" here refers to the price that would be set by an ideally positioned observer with access to all information relevant to a particular stock's value, not just a limited subset. See *supra* note 8 (ideal observer). In reality, no such observer exists: the information needed to predict the future with certainty is available only at an infinite cost. Thus we all make the best subjective estimates we can based on the limited information available to us, and it is impossible, *ex ante*, to determine with certainty whether any particular individual's estimate is superior to another's. Only time can tell whether a trader who disagrees with the market is an information arbitrageur, or a speculator. See *infra* text accompanying notes 30-33 (means of distinguishing market dominated by information arbitrageurs from market dominated by speculators).

Even if speculators—unlike arbitrageurs—are as likely to be wrong as right in believing a stock is mispriced, Professor Pirrong points out in his comments that speculators may nevertheless help make market prices more accurate through the operation of the law of large numbers. In other words, if traders' errors in estimating stocks' value are unbiased, the *average* of a large number of different traders' estimates is likely to be a more accurate measure of value than any *individual* trader's estimate. Thus, by increasing the number of traders in the market, speculators improve the accuracy of prices. This argument seems quite correct. I suspect, however, that adding speculators to a stock market already composed of millions of investors trading for liquidity, hedging, or information arbitrage reasons seems likely to provide an improvement in price accuracy so marginal it can be

estimate is erroneous, their trading could even make the market price less accurate.²⁵

D. An Aside on Pure Speculation and Speculator Attrition

The discussion above suggests that purely speculative trading—that is, trading driven by the natural dispersion of subjective probability estimates that occurs under conditions of uncertainty—benefits neither the trading parties nor society generally. Before I explore the implications of this idea further, however, I would like to address one objection that might be raised against it: if speculators on average lose money from trading, why on earth should they continue to trade?

There is evidence to suggest that at least some investors who suffer ex post losses while trying to beat the market do indeed learn from experience and stop trading.²⁶ Nevertheless, there are at least two reasons to believe that

discounted. An analogy can be drawn to the process of diversification. By holding as few as twenty different stocks, an investor can eliminate virtually all beta risk from his portfolio. Thus, increasing diversification—say, by holding 100 or 1,000 stocks—provides almost no marginal benefit. BURTON G. MALKIEL, *A RANDOM WALK DOWN WALL STREET* 231 (5th ed., 1990).

25. Readers who are interested in a more formal exposition of this intuition can consult a vast and growing literature in finance that explores the nature of asset prices when individuals disagree under conditions of uncertainty (in economic parlance, have “heterogeneous expectations”). *See, e.g.*, MORDECAI KURZ, *ASSET PRICES WITH RATIONAL BELIEFS* (Center for Economic Policy Research, Stanford Univ., CEPR Publication No. 375) (Feb. 1994); WILLIAM F. SHARPE, *PORTFOLIO THEORY AND CAPITAL MARKETS* 104-13 (1970) (chapter entitled “Disagreement”); Richard A. Booth, *Discounts and Other Mysteries of Corporate Finance*, 79 CAL. L. REV. 1053 (1991); Robert Jarrow, *Heterogeneous Expectations, Restrictions on Short Sales, and Equilibrium Asset Prices*, 35 J. FIN. 1105 (1980); John Lintner, *The Aggregation of Investors’ Diverse Judgments and Preferences in Purely Competitive Securities Markets*, 4 J. FIN. & QUANT. ANALYSIS 347 (1969); Joram Mayshar, *On Divergence of Opinion and Imperfections in Capital Markets*, 73 AM. ECON. REV. 114 (1983); Edward M. Miller, *Risk, Uncertainty, and Divergence of Opinion*, 32 J. FIN. 1151 (1977); Lynn A. Stout, *Are Takeover Premiums Really Premiums? Market Price, Fair Value, and Corporate Law*, 99 YALE L.J. 1235 (1990); Hal R. Varian, *Divergence of Opinion in Complete Markets: A Note*, 40 J. FIN. 309 (1985); Joseph T. Williams, *Capital Asset Prices with Heterogeneous Beliefs*, 5 J. FIN. ECON. 219 (1977); Jack Treynor, *Bulls, Bears and Market Bubbles* (1997) (unpublished manuscript on file with author).

A related branch of finance theory which explores how traders with cognitive defects can distort asset prices is so-called “noise trading” theory. *See, e.g.*, Fischer Black, *Noise*, 41 J. FIN. 529, 529-34 (1986); John Y. Campbell & Albert S. Kyle, *Smart Money, Noise Trading, and Stock Price Behaviour*, 60 REV. ECON. STUD. 1 (1993); J. Bradford De Long et al., *Noise Trader Risk in Financial Markets*, 98 J. POL. ECON. 703 (1990); J. Bradford De Long et al., *The Size and Incidence of the Losses from Noise Trading*, 44 J. FIN. 681 (1989); Andrei Shleifer & Lawrence H. Summers, *The Noise Trader Approach to Finance*, J. ECON. PERSP., Spring 1990, at 19.

26. *See* Stout, *supra* note 6, at 640 n.74 (citing evidence that individual investors who lose money trading stocks may stop trading); *cf.* JAMES B. WOY, *COMMODITIES FUTURES TRADING: A*

purely speculative stock markets can thrive in the face of trader learning. The first has to do with the natural volatility of stock prices, which makes it extremely difficult for speculating investors to detect whether their losses are due to poor prediction or plain bad luck. An amusing illustration of this point has been offered by Louis Chan and Josef Lakonishok, who calculated that it would take twenty-five years for an investor who outperformed the stock market by an impressive two percent each year to determine with ninety-five percent confidence that her superior performance reflected skill rather than good fortune.²⁷

The second reason why pure speculation can persist despite the discipline of the market has to do with the observation that financial “survival of the fittest” should not be confused with biological survival. If people were immortal, over time Darwinian selection should indeed ensure that information arbitrageurs grow wealthier and wealthier and eventually come to dominate the market, while speculators grow poorer and poorer and eventually either stop trading voluntarily or became bankrupt. People are not immortal, however, and even the most talented and wealthy information arbitrageur can expect to grow old and die. By the same token, the demographics of birth ensure that even as one disappointed cohort of speculators leaves the market, it will be replaced by a new generation eager to try its hand at trading. Thus, P.T. Barnum²⁸ offers a rejoinder to Charles Darwin: so long as a new speculator is born every minute, purely speculative markets can survive and thrive.²⁹

E. Distinguishing Information Arbitrageurs from Speculators: Which Form of Trading Dominates Today's Stock Market?

I would like to return to the distinction I have developed above between

BIBLIOGRAPHIC GUIDE 5 (1976) (citing sources suggesting that “the drop-out rate for beginning commodities speculators is very high”); Lester G. Telser, *Why There Are Organized Futures Markets*, 24 J. L. & ECON. 1, 7, 9 (1981) (reviewing studies finding that larger speculators earn positive returns in futures markets and smaller traders suffer losses, implying that there may be more turnover among small speculators and that small speculators who are successful become large while those who are unsuccessful leave the market and are replaced by other new small speculators).

27. Louis K.C. Chan & Josef Lakonishok, *Are the Reports of Beta's Death Premature?*, J. PORTFOLIO MGMT., Summer 1993, at 51, 54.

28. For an explanation of the Barnum reference, see Stout, *supra* note 6, at 639 n.72.

29. Cf. J. Bradford De Long et al., *The Survival of Noise Traders in Financial Markets*, 64 J. BUS. 1 (1991) (arguing that mistaken noise trading can persist if there is a constant supply of new noise traders).

information arbitrage and pure speculation, because I believe that distinction offers some insight into the welfare effects of disagreement-based stock trading. If most stock traders who disagree with market prices are really information arbitrageurs with truly superior information who are trading against rationally less-informed investors driven primarily by liquidity or hedging needs, such trading can produce an unintended social benefit in the form of more accurate market prices (although again, it is important to note that the private costs of information arbitrage may outweigh that public benefit). In contrast, if most stock trading is pure speculation in which at least one party to the transaction mistakenly believes she has superior information when in fact she does not, we can conclude that such trading likely drains investor wealth without providing any compensating private or public benefit. In other words, if the stock market in fact conforms to the pure speculation model rather than the information arbitrage model, we can avoid the difficult weighing of private costs and public benefits needed to assess the welfare consequences of information arbitrage, and conclude with greater certainty that speculative trading leads to deadweight social losses.

In reality, of course, the stock market almost certainly contains some mix of both information arbitrageurs and pure speculators (not to mention investors trading for liquidity, portfolio balancing, or a variety of other reasons that have nothing to do with disagreement with market prices). Moreover, it is difficult if not impossible to determine *ex ante* whether an individual trader who disagrees with the market is an information arbitrageur or a speculator; presumably, both start off believing they have superior information. If we focus on *ex post* results, however, distinguishing information arbitrageurs from pure speculators becomes far easier, especially if we focus on group rather than individual classifications. This is because information arbitrageurs as a class earn trading profits, while speculators as a class suffer trading losses.

To understand this point, consider a stock market in which there are no mistaken speculators; the only traders who disagree with market price are arbitrageurs armed with truly superior information. In such a market, the arbitrageurs will enjoy a systemic advantage over less-informed traders driven by liquidity or portfolio-balancing needs. This informational advantage should allow the arbitrageurs to reap certain, if risky, trading profits. Although arbitrageurs' counterparties may not be pleased about providing this subsidy, they do not find it worth their while to do the research necessary to avoid it.

Now imagine the other extreme: a stock market in which there are no

information arbitrageurs and (for ease of analysis) no liquidity or portfolio-balancing traders either. This purely speculative market is comprised entirely of traders who disagree with both the market, and each other. Although uncertainty permits these speculators to hold a wide range of subjective opinions regarding stocks' values—bullish and bearish in varying degrees—if their errors are unbiased, their opinions are just as likely to be wrong as right. In such a purely speculative market, bulls and bears will happily incur transactions costs trading with each other, expecting *ex ante* wealth gains but necessarily experiencing (as a class) *ex post* wealth losses.

Which scenario more closely resembles reality? The answer should be obvious to anyone with even a passing familiarity with the modern stock market: in the vast majority of cases, individual and institutional investors who seek to outperform the market by buying and selling “mispriced” equities are indulging in pure speculation.

Two empirical observations support this conclusion. First, liquidity needs and portfolio rebalancing appear to explain only a small percentage—probably twenty percent or less—of the trading volume found in the contemporary market.³⁰ Most stock trades appear to be driven by subjective disagreement with market prices, *i.e.*, traders' perceptions that stock prices are “too high” or “too low.” Recall that in order to earn trading profits, information arbitrageurs need less-informed counterparties who have declined to invest in information, presumably because they are trading primarily for liquidity or portfolio-balancing reasons. Yet if fewer than twenty percent of trades reflect these motives, where are the information arbitrageurs finding their counterparties? The natural implication is that most of the investors who buy and sell stocks in the secondary market because they believe those stocks are mispriced are dealing with counterparties who also believe those stocks are mispriced. In other words, most stock trading involves disagreeing speculators trading with each other.

The second important piece of evidence that bolsters this claim is the fact that investors who try to outperform the market by buying and selling

30. See Stout, *supra* note 6, at 662-64 (noting that while actively managed stock funds experience average annual portfolio turnover of 75%, passive index funds that trade only for liquidity or portfolio-balancing reasons experience turnover of only 4% to 18%). Although these figures apply only to trading by institutions such as mutual funds and pension funds, institutions account for more than half of all trading in today's market. *Id.* at 661. Moreover, the limited available evidence on individual trading supports the claim that most individual investors' trades also are inspired by disagreement with market prices, rather than liquidity needs or portfolio balancing. *Id.* at 666.

mispriced stocks generally lose money by doing so. Numerous studies of actively managed pension and mutual funds have found that, rather than beating the market, these “sophisticated” investors on average underperform the market’s return by something between one percent and two percent annually.³¹ (Not surprisingly, this figure closely matches the amount institutions spend annually on research and trading costs.)³² Indeed, as a general rule more than eighty percent of investment professionals who try to prove they can beat the market fail miserably in the attempt.³³ These results provide compelling evidence that speculation—rather than information arbitrage—drives the trading market.

If the lion’s share of trading in the stock market is purely speculative trading, these transactions likely further the ex post interests of neither the average trader nor society as a whole. Indeed, to the extent that stock traders incur research and trading costs in their quest for speculative profits, those costs represent a deadweight welfare loss that may detract significantly from the overall gains investors as a class would otherwise enjoy from simply buying and holding stocks.³⁴ This observation sets the stage for an inquiry into the likely welfare effects of recent developments in electronic trading and information technology.

II. TECHNOLOGY AND TRANSACTIONS COSTS

Among the many technological advances we have seen as the twentieth century draws to its close, two innovations in particular promise to dramatically reduce the transactions costs associated with securities trading.

31. Edwin J. Elton et al., *The Persistence of Risk-Adjusted Mutual Fund Performance*, 69 J. BUS. 133 (1996); Stout, *supra* note 6, at 623 n.30.

32. Stout, *supra* note 6, at 623 n.30, 673-75. The close correspondence between institutions’ transactions costs and their trading losses also cuts against the argument that institutional traders are underperforming the market because individual investors are outperforming it.

33. Elton et al., *supra* note 31, at 133-34; Stout, *supra* note 6, at 640. A recent analysis of investment newsletters similarly found that only a very small percentage seemed to be able to predict the market, and that on average investors would do just as well following a strategy of random purchases and sales. See John R. Graham & Campbell R. Harvey, *Market Timing Ability and Volatility Implied in Investment Newsletters’ Asset Allocation Recommendations*, 42 J. FIN. ECON. 397 (1996) (finding that newsletters on average cannot beat the market); see also John R. Graham & Campbell R. Harvey, *Grading The Performance of Market Timing Newsletters 3* (Feb. 1997) (unpublished manuscript on file with author) (only 8% to 15% of newsletters appear to provide advice that would allow an investor to outperform the market).

34. Indeed, it appears that investors as a class squander 20% of the total gains attributable to stock ownership on trading costs. Stout, *supra* note 6, at 675.

The first is the development of high-speed, relatively cheap computers that can process vast amounts of data. Because they allow investors to accumulate, store, manipulate, and analyze information regarding thousands of publicly traded stocks, computers are an extremely powerful research tool. In addition, computers can ease and speed the trading process by making it much simpler for specialists and dealers—or anyone else, for that matter—to keep track of and to match different investors' buy and sell orders.

The second innovation that promises to reduce greatly the transactions costs associated with securities trading is the rise of electronic information networks that allow millions of investors and other market participants to directly communicate and exchange information with each other. Like computers, information networks promise to reduce both investors' research costs and their trading costs. Research costs decrease because investors gain easy access to data compiled by others, such as the "Motley Fool" on-line investment advisory service³⁵ or the Securities Exchange Commission's EDGAR database of corporate filings.³⁶ Networks also hold out hope of eventually reducing investors' trading costs, because they can reduce or even eliminate investors' need to work through costly professional middlemen.³⁷ After all, why should a buyer pay a specialist and broker to find a counterparty when she can easily locate potential sellers herself in a bulletin board on the Internet?³⁸

Taken together, the new computer and information network technology promises to dramatically reduce the marginal costs associated with researching and with trading corporate equities. More investors will be able to trade more stocks, more quickly, and more often. Yet if stock trading does not necessarily benefit investors and may even harm them, what are the likely consequences for investors?

35. The website can be found at <<http://www.fool.com>> (visited Apr. 15, 1997).

36. The website can be found at <<http://www.edgar-online.com>> (visited Apr. 15, 1997).

37. Indeed, institutional investors are already using the new computer network technology to avoid middlemen. See Paul G. Mahoney, 75 WASH. U. L.Q. 815, 824-25 (1997).

38. It should be noted that, in addition to providing liquidity, professional middlemen such as brokers and dealers can also provide a valuable service by reassuring traders that their negotiated exchange will actually be performed, thus lowering the costs of clearing and settling stock trades. It is unclear whether the new technology will reduce this relative advantage in providing clearance and settlement.

A. Transactions Costs and the Elasticity of Demand for Speculation

On first inspection, the promise of a dramatic reduction in research and trading costs appears to offer an unleavened good to investors. After all, it is research and trading costs that turn stock speculation from a zero-sum game into a negative-sum game. Reducing transaction costs accordingly seems to hold out hope of improving investor welfare, albeit by a slightly different mechanism than ordinarily assumed. While reducing stock transactions costs does not make stock speculation mutually beneficial—speculative exchange still fails to conform to the “invisible hand” model of gains from trade—it at least makes speculation less costly.

Unfortunately, this argument ignores an important part of the analysis. Reducing research and trading costs may indeed reduce the deadweight loss associated with any particular speculative transaction. But reducing transactions costs also increases the number of speculative transactions.

This point becomes obvious once we recognize that high transactions costs discourage many speculative trades. For example, suppose *A* is convinced that the market price of Microsoft’s shares will soon rise from \$100 to \$102. Even if *A* must pay \$1 in broker’s commissions to trade, he will perceive an opportunity to reap a \$1 per share gain by buying shares in Microsoft. But if commissions rise to \$3 per share, *A* will no longer be interested in trading. Although he still subjectively perceives Microsoft to be underpriced, he no longer believes it is underpriced enough to justify the transactions costs involved in acquiring shares.

Of course, even when marginal transactions costs are high, some investors will disagree with the market enough to feel trading is worthwhile. But reducing transactions costs invites other investors who disagree with the market only a little also to try their hand at trading. The law of demand applies to stock speculation as to most other goods; as the perceived marginal costs of speculation go downward, investor demand for speculative trading goes upward.

Whether reducing the marginal costs associated with stock speculation also reduces the total costs associated with speculation consequently depends upon whether the demand for speculative trading is relatively elastic or inelastic.³⁹ If the demand for stock speculation is relatively inelastic, reducing

39. Economists describe consumer demand for a good as “elastic” when a price reduction of $x\%$ results in a greater-than- $x\%$ increase in the quantity of that good consumers are willing to buy. Conversely, demand is said to be inelastic if a price reduction of $x\%$ increases the quantity demanded

the marginal costs associated with speculation should also reduce the total costs. For example, suppose that new technology decreases the average cost of stock trading from two percent to one percent of the value of the trade, and that this decrease in marginal cost triggers an increase in trading volume from its present level of approximately \$6 trillion annually up to \$8 trillion annually. In such a case, reducing marginal costs also reduces total costs, from \$120 billion to \$80 billion.

Unfortunately, if the demand for stock speculation is relatively elastic, reducing the marginal costs associated with speculative trading can have the perverse effect of increasing total costs (and with it, deadweight losses). To see how this might work, imagine that a decrease in the marginal cost of stock trading from two percent to one percent of the value of the trade spurred a threefold increase in trading volume, from \$6 trillion annually to \$18 trillion annually. Reducing marginal cost now increases the total costs of trading from \$120 billion to \$180 billion annually.

Whether technological advances that reduce research and trading costs ultimately help or harm investors thus may depend, as a factual matter, on whether the demand for stock trading is relatively elastic or relatively inelastic. Unfortunately, there are both theoretical and empirical reasons to suspect that demand for speculative stock trading may be highly elastic. At the theoretical level, investor demand for speculative stock trading seems likely to be elastic if we adopt the plausible hypothesis that, under conditions of statistical uncertainty, subjective expectations for future stock prices are likely to follow a normal distribution. In other words, most investors' expectations lie close to the average; there are relatively fewer bulls or bears, and even fewer who are wildly bullish or bearish. In such a case, reducing transactions costs seems likely to trigger a disproportionate increase in the volume of trading. Before, only extreme bulls and bears found it worth their while to trade; now the mildly bullish and bearish (who are far greater in number) also wish to.⁴⁰

The available empirical evidence is far from dispositive on the elasticity question. Studies of the elasticity of demand for stock trading have produced

by a smaller percentage.

40. This result further relies on the assumption that the market price for a particular stock will either approximate the average estimate of value (if there are no restrictions on short sales), or be equal to or higher than the average (if short sales are restricted). See generally sources cited *supra* note 25 (investigating stock pricing under conditions of expectations heterogeneity).

conflicting results, and further research clearly is needed.⁴¹ Nevertheless, several studies support the claim that the demand for stock trading is relatively elastic.⁴² Moreover, history also offers instruction on the point. Although the deregulation of brokers' commissions during the late 1960s and early 1970s more than halved institutional investors' out-of-pocket trading costs, that decline was accompanied by dramatic increases in trading volume. Between 1960 and 1987, turnover on the NYSE rose from about ten percent to more than fifty percent annually.⁴³

The possibility that the demand for speculative stock trading may in fact prove highly elastic thus raises substantial doubt about whether technical innovations that decrease the marginal costs of trading can be presumed to benefit investors. Of course, if transactions costs could be reduced to zero, the net result would be to decrease social deadweight losses due to speculative trading. But transactions costs cannot be reduced to zero. Even if tomorrow all investors could suddenly make stock trades instantaneously by computer without paying a middleman, they would still need to spend time at the keyboard researching securities values. (I am struck by the image of a world in which millions of investors daily waste hours at their computers, surfing the Motley Fool and similar "resources" in their statistically hopeless quest to beat the market.)⁴⁴ Economic theory consequently counsels us to bring a high degree of agnosticism to the question of whether reducing transactions costs in the stock market translates into a social benefit, or a social loss.

B. Technology and the Dispersion of Investor Opinions

My discussion so far has focused on the possibility that reducing the marginal transactions costs associated with stock trading actually may increase deadweight losses from speculation by triggering a disproportionate increase in the number of speculative transactions. But there is a second

41. See G. WILLIAM SCHWERT & PAUL J. SEGUIN, SECURITIES TRANSACTION TAXES: AN OVERVIEW 19-20 (1993) (surveying literature and finding estimates of the elasticity of trading volume ranging from -.25 to -1.35.)

42. *Id.*

43. Stout, *supra* note 6, at 634-35.

44. I certainly hope this image proves exaggerated. Recent years, however, have seen the development of electronic news services that do not even require investors to log on to do research, but instead "let you keep close tabs on your investments during the day" by "deliver[ing] the news automatically to your PC, pager, or other wireless device." Dean Foust, *Your PC's Pipeline To Wall Street*, BUS. WK., Dec. 18, 1995, at 96, 96. To the observer sensitive to speculation's peculiar welfare effects, this is hardly a reassuring prospect.

reason to question whether progress can be equated with improvement. The new information technology may not only encourage speculation by decreasing marginal transactions costs; it may also encourage speculation by encouraging disagreement.

When investors share homogeneous expectations for securities' future risks and returns—in other words, when there is risk but not uncertainty—stock trading will be driven primarily by changing liquidity needs, portfolio balancing, and similar nonspeculative motives. In a world of uncertainty where investors disagree in their predictions for the future, however, speculation becomes far more likely. Thus, information technology which promotes investor agreement is likely to reduce welfare losses from speculation, while technology that promotes disagreement is likely to increase such losses. Into which category are computers and information networks likely to fall?

Let us begin with an inquiry into why investors disagree. Perhaps some investors disagree with each other and with the market because they are irrational, and suffer from cognitive defects and emotional impulses that make it impossible for them to coolly calculate the risks and returns of securities. (This possibility provides the basis for so-called “noise trading” theory, which has recently captured much scholarly attention.)⁴⁵ I do not believe we have to work so hard to explain subjective disagreement, however. In a world of uncertainty and incomplete information, even rational investors will likely form disagreeing opinions when they work from different and incomplete subsets of all available information. In other words, when investors base their opinions on similar information, they are likely to form similar opinions; conversely, when they form their expectations from heterogeneous information, their expectations are more heterogeneous.

At least in theory, the new information technology could promote homogeneous investor expectations by reducing the costs of delivering homogeneous information. For example, suppose the only information available on the Internet was the EDGAR database of company filings. In that case, investors researching stock values would have cheap electronic access to only a relatively limited and uniform sample of data. Although different investors might interpret the data somewhat differently in light of their personal experience (personal experience itself being a form of heterogeneous information), on the whole investors who reviewed EDGAR filings might

45. See sources cited *supra* note 25.

well come to share more homogeneous opinions, thus discouraging disagreement-based trading. (This analysis suggests a defense of the mandatory disclosure system largely overlooked by modern scholars: in addition to their other advantages, federal disclosure rules may also provide an important social benefit by reducing deadweight losses from speculation, because they promote agreement by providing investors with subsidized uniform information.)⁴⁶

There is reason to suspect, however, that the new technology may well produce the opposite effect, increasing the dispersion of subjective investor opinion and with it, the incidence of speculative trading. This is because information networks not only allow investors to access data more quickly; they also allow them to access far more data. Thousands, and indeed millions, of market participants can now cheaply communicate the results of their independent research (not to mention their theories, ideas, and analyses) directly with each other. Moreover, computer technology permits even amateurs to comb through and manipulate those numbers in the search for predictive patterns, in the process creating still more data.⁴⁷

The net result is that the universe of information available to investors seems likely to expand well beyond the human mind's capacity to absorb it. Indeed, this has surely happened already. Yet even as computer and network technology dramatically reduces the cost of and increases our access to information, our biological limits ensure that individual and institutional investors alike consider only a limited subset of all the data available.⁴⁸ Perhaps we will prove to favor the same subset: for example, perhaps investors as a class will gravitate toward EDGAR, ignoring the Motley Fool and its ilk. If so, the new technology ultimately may work to encourage investor homogeneity. It seems more likely, however, that expanding the universe of available information will have the opposite effect. Investors' opinions will become increasingly fragmented as different individuals come to rely on an ever-increasing number of different and disagreeing sources. If this is the way the world goes, the net result will be an increase in the incidence of speculation accompanied by a decline in investor welfare.

46. See Stout, *supra* note 6, at 693-97 (discussing argument).

47. The new technology may also create new data for investors if it increases the stock market's "transparency," providing more information about who is trading what, where, how much, and with whom. Some speculators may treat this sort of data as an information-carrying signal of whether other traders regard a security to be under- or over-priced.

48. Because institutions are run by human agents, they share these cognitive limitations.

III. CONCLUSION

The secondary market for corporate securities seems destined to evolve, and swiftly. Recent developments in information and trading technology have already reduced the average investor's research and trading costs, and there seems no reason why this trend should not continue. But while academics and policymakers weaned on neoclassical economics may assume that reducing transactions costs necessarily benefits investors, more careful analysis urges caution.

Stock markets tend to be highly speculative markets, and the welfare consequences of speculative trading for both traders and society differ significantly from the welfare consequences of other forms of voluntary exchange. At best, speculation that takes the form of information arbitrage can provide an indirect social benefit of lesser or greater magnitude in the form of improved allocative efficiency from more accurate pricing. Purely speculative trading that springs from the natural dispersion of investors' subjective opinions under conditions of uncertainty, however, drains investor wealth without providing any compensating public or private gain. And by reducing the transactions costs associated with speculative trading and possibly increasing the dispersion of investors' opinions, the new information technology may encourage just such speculation.

In other words, securities markets may be subject to the law of unintended consequences just as the rest of life is. In making this observation, I do not intend to suggest that lawmakers should try to halt the adoption of new technologies: even if such a course were possible, one of the lessons of the law of unintended consequences is that regulatory reforms themselves have unintended consequences. Rather, the point is that stock markets are unique and curious markets where things do not always work out quite as planned. Academics and regulators are well advised to stop, look, and listen before proceeding.

