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Articles

THE DUTY TO DIVERSIFY AND THE LOGIC OF INDEXING

RICHARD A. BOOTH[†]

Index funds, such as those that track the S&P 500, are popular with investors because they offer maximum diversification—and thus minimum risk—with management fees that are far lower than those charged by traditional, actively managed stock-picking mutual funds. As a result, investors have flocked to such funds, which have grown dramatically in size. But many observers find this trend alarming because they see index funds as a threat to both corporate governance and competition.

Most critics have focused on the passivity of index funds, which they see as a failure of fund managers to do their duty as stockholders to vote with care and otherwise to engage with portfolio companies to induce optimal performance. They also see index fund passivity as free riding on the efforts of other stockholders who do their duty to monitor investee companies. In other words, they see a case of market failure in which index funds offer higher returns at lower cost because they shirk their responsibility to participate in corporate democracy. Other critics focus on the idea that index funds own a large percentage of the market and then jump to the conclusion that they will use their market power to cajole or coerce portfolio companies to modify business strategies. In short, the critics are worried that index funds will both do too little and do too much. But it cannot be that index funds will use their power to meddle in the affairs of investee businesses and, at the same time, neglect to engage with the management thereof. This puzzling division of opinion suggests that index funds are not well understood—even by many sophisticated observers.

This Article addresses the confusion about index funds and concludes that the worries expressed by the critics are not only unfounded, but also that index funds make the market more efficient. Specifically, that critics have failed to see (1) the compelling logic that leads investors to invest in index funds, (2) the natural constraints on index fund managers that prevent abuses, and (3) the significant ways in which index funds augment the disciplinary forces of the market. This Article focuses solely on true index funds—those that track a broad-based capitalization-weighted

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market index (such as the S&P 500). Although there are many funds that track other indices—including industry sectors and even idiosyncratic investment theories—the argument here focuses on the logic of investing in the market as a whole (or as much of it as is reflected by the S&P 500).

First, ordinary investors in common stock—those who have no reasonable expectation of influencing company management or business policy—have no real choice but to invest in index funds, which offer the same expected return as stock-picking funds but at the least possible risk. Moreover, an index fund investor can expect a higher rate of return over the long-term than an investor who chooses a riskier fund—even though both funds offer the same average annual rate of return. Although this may sound too good to be true, it is a straightforward implication of compounding of returns. Finally, index investors ultimately drive stock prices higher because they are willing to pay more for a given stock because they assume less risk and expect higher returns by virtue of indexing. As a result, investors who decline to invest in an index fund must pay more for the stocks they buy than the prospect of expected returns justifies because they assume more risk than necessary.

It also follows that fiduciary duty requires investment advisers to recommend index funds to their ordinary-investor clients because the duty of care is measured by how a reasonably prudent person would act in the conduct of their own affairs. This is a radical proposition. It implies that much investment advice borders on fraud. It also explains why the securities industry has so vigorously opposed regulations that would classify broker-dealers as fiduciaries.

Second, the foregoing logic applies doubly to index fund managers, who are required by statute to be registered investment advisers and are thus fiduciaries. For an index fund manager, the logic of indexing leaves little room for discretion in connection with choosing or trading portfolio stocks, which must be held in proportion to market capitalization. Thus, indexing implies that research is a literal (and legal) waste because the fruits thereof it can have no use. To expend fund resources thereon or to charge the fund a fee to defray such costs is a per se breach of fiduciary duty. In contrast, the managers of a traditional stock-picking fund will almost always be protected by the business judgment rule in connection with any investment or trading decision they may make. This is true even to the extent of a decision to alter fund strategy, as long as the managers can provide some reasonable explanation for their decisions.

This same logic applies to voting and other forms of engagement with portfolio companies. Presumably, the purpose of engagement is to enhance performance and return. Consequently, managers of traditional stock-picking mutual funds have broad discretion both as to voting the shares they hold and otherwise kibbitzing with portfolio company management. But engagement is expensive. It requires delving into the operational details of individual portfolio companies. For index fund managers, whose portfolios are hedged by virtue of being fully diversified, it makes no sense to devote fund resources to such ends. One possible exception to this general rule arises when some improvement in corporate governance might make many companies better off. But ironically, such efforts have been dismissed by some critics as low-value engagement.

Third, despite their supposed passivity, index funds contribute significantly to the disciplinary forces of the market. The minimal trading they do for purposes of maintaining portfolio balance has the effect of rewarding companies who perform better and punishing companies who perform worse. Moreover, portfolio companies understand that indexing leaves no room for them to talk their way out of the consequences of mismanagement (as might be the case with the managers of a stock-picking fund). As for voting fund shares, index funds that follow the sensible practice of mirror voting—voting fund shares in proportion to the votes cast by other shares—effectively enhance the voting power of actively managed funds, which increases the voice of stockholders who have strong opinions. In other words, index funds reduce the separation of ownership from control.

The overarching point of this Article is that the logic of indexing has profound legal implications. For one, indexing should not be seen as opportunism (or market failure), but rather should be seen as an innovation that makes some investors better off without significant externalities, and without foisting any clear loss on other investors. For another, the benefits of indexing are so demonstrable that they imply that fiduciaries have no choice but to recommend that their clients who invest in common stocks invest in an index fund. In other words, it should be seen as a breach of fiduciary duty for an investment adviser not to recommend indexing to such clients, which may also explain much of the growth indexing. In short, index funds have made the financial world a much better place than it was in the past. And efforts to control their further growth and evolution should be undertaken only with an abundance of caution.

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INTRODUCTION

Since their birth in 1976, index funds have proven to be extraordinarily popular with investors because they offer maximum diversification—and thus minimum risk—with management fees that are far lower than those charged by traditional actively managed stock-picking mutual funds.¹ As a result, investors have flocked to index funds, which have grown dramatically in size. As of year-end 2021, they held 43 percent (by value) of all assets held by investment companies as compared to 20 percent just ten years earlier. Perhaps more to the point, index funds held 16 percent of the entire U.S. stock market as compared to the 14 percent held by actively managed mutual funds.² But legal scholars as well as politicians and pundits have decried the growth and consequent size of index funds, which they see as a threat to both corporate governance and competition.³

1. See Dan Culloton, *A Brief History of Indexing*, MORNINGSTAR: FUND SPY (Aug. 9, 2011), <https://www.morningstar.com/articles/390749/a-brief-history-of-indexing>.

2. See *2022 Investment Company Fact Book: A Review of Trends and Activities in the Investment Company Industry*, INV. CO. INST. 30 (2022), https://www.ici.org/system/files/2022-05/2022_factbook.pdf. The remaining 70% was held by hedge funds, pension funds, life insurance companies, and individuals (including nonprofits and endowments). *Id.* Much of this 70% is likely indexed as well. See also *Buttonwood: How to Think About the Unstoppable Rise of Index Funds*, ECONOMIST (Oct. 16, 2021), <https://www.economist.com/finance-and-economics/2021/10/16/how-to-think-about-the-unstoppable-rise-of-index-funds> (estimating that 40% (by value) of all the shares of U.S. companies is held in index funds).

To be precise, the term *mutual fund* refers to a particular type of (open-end) investment company. While the original Vanguard index funds were of this type, a large portion of index investments today is held in exchange traded funds (ETFs), which technically are closed-end companies rather than open-end mutual funds. Thus, the data relating to the aggregate size of indexed investments sometimes mixes apples with oranges (and even other fruits). Although these distinctions can be quite important to the details of how a fund operates, they do not matter much for present purposes except to the extent they affect management fees and other operating expenses. In any event, I use the word *fund* herein to refer generally to investment companies such as mutual funds and index funds (and not to the cash invested therein).

Aside from the foregoing ambiguities, there are numerous funds calling themselves index funds that are based on indices other than broad market indices like the S&P 500. While some such funds are based on good faith efforts to track individual industries, some are also based on idiosyncratic (and questionable) strategies designed to beat the market. See Jenna L. McCarthy, *Benchmarking the World: A Proposal for Regulatory Oversight of Stock Market Index Providers*, 51 VAND. J. TRANSNAT'L L. 1191, 1197 (2018). See generally Adriana Robertson, *Passive in Name Only: Delegated Management and "Index" Investing*, 36 YALE J. ON REGUL. 795 (2019). It is unclear how much of the aggregate investment in index funds is attributable to such faux index funds. In any event, the term *index fund* as used herein refers to a broad-market index fund such as one based on the SPX (unless the context requires otherwise). Note also that many actively managed funds come close to being index funds (as measured by R^2) and are thus sometimes called closet index funds. Investors who invest in such funds expecting fund managers to pick winners have been known to complain if their funds are too correlated with an index. See *infra* text accompanying note 77.

One further assumption built into the discussion that follows is that an index fund invests in common stock. Although it is possible to imagine an indexed bond fund (for example), it is unclear what indexing means in that context. In any event, the logic of indexing as discussed below is based on investing exclusively in common stock for reasons that should become apparent.

3. See Lucian Bebchuk & Scott Hirst, *Index Funds and the Future of Corporate Governance: Theory, Evidence, and Policy*, 119 COLUM. L. REV. 2029, 2030 (2019); Jill E. Fisch, Assaf Hamdani & Steven Davidoff Solomon, *The New Titans of Wall Street: A Theoretical Framework for Passive*

Regarding corporate governance, critics have focused on the passivity of index funds, which they see as a failure of fund managers to do their duty as stockholders—to vote with care and otherwise to engage with portfolio companies so as to induce optimal performance. Worse yet, critics see index fund passivity as free riding on the efforts of other stockholders who do their duty to monitor management of investee companies. In other words, critics allege that index funds offer higher returns at lower cost because they shirk their responsibility to participate in corporate democracy.

As for competition, critics fret that the Big Three of index fund sponsors—BlackRock, State Street, and Vanguard—who collectively manage \$22 trillion, will reduce competition among the companies in which they invest.⁴ If the Big Three come to control as much as 40 percent of voting shares in S&P 500 (SPX) companies as they might by 2040—it might induce investee companies effectively under common ownership not to compete with each other.⁵ In short, critics focus on the idea that index funds own a large percentage of the market and then jump to the conclusion that, of course, they will use their market power to somehow cajole or coerce portfolio companies to modify business strategies.

In other words, critics are worried that index funds will do both too little and too much. But it cannot be that index funds will both use their power to meddle in the affairs of investee businesses and at the same time neglect to engage with the management thereof. This puzzling division of opinion suggests that index funds are not well understood even by many sophisticated observers.

Investors, 168 U. PA L. REV. 17, 18 (2020); Sean J. Griffith, *Opt-In Stewardship: Toward an Optimal Delegation of Mutual Fund Voting Authority*, 98 TEX. L. REV. 983, 984–86 (2020); Dorothy S. Lund, *The Case Against Passive Shareholder Voting*, 43 J. CORP. L. 493, 494–95 (2018); John C. Coates, *The Future of Corporate Governance Part I: The Problem of Twelve 2* (Harvard Pub. L., Working Paper No. 19–07, 2018); see also Jill E. Fisch, *Confronting the Circularity Problem in Private Securities Litigation*, 2009 WIS. L. REV. 333, 346 (2009) (arguing that indexing is devastating to the markets). But see Marcel Kahan & Edward B. Rock, *Systemic Stewardship with Tradeoffs 2–3* (NYU L. & Econ. Rsch. Paper No. 22–01, 2021); Edward B. Rock & Marcel Kahan, *Index Funds and Corporate Governance: Let Shareholders Be Shareholders* 1772 (NYU L. & Econ. Rsch. Paper No. 18–39, 2019).

4. See Annie Lowrey, *Could Index Funds Be ‘Worse Than Marxism’? Economists and Policy Makers are Worried that the Vanguard Model of Passive Investment is Hurting Markets*, ATLANTIC (Apr. 5, 2021), <https://www.theatlantic.com/ideas/archive/2021/04/the-autopilot-economy/618497/>; Farhad Manjoo, *What BlackRock, Vanguard and State Street Are Doing to the Economy*, N.Y. TIMES (May 12, 2022), <https://www.nytimes.com/2022/05/12/opinion/vanguard-power-blackrock-state-street.html?smid=nytcore-ios-share&referringSource=articleShare> (citing Coates and Elhaugue).

In July 2022, Senator Bernie Sanders stressed this point via tweet and on the Sunday talk shows. See Theo Andrew, *Bernie Sanders Calls Out Obscene Asset Hoarding of Big Three*, ETF STREAM (July 19, 2022), <https://www.etfstream.com/articles/bernie-sanders-calls-out-obscene-asset-hoarding-of-big-three>.

5. Manjoo, *supra* note 4. See, e.g., Amanda M. Rose & Richard Squire, *Intraportfolio Litigation*, 105 NW. L. REV. 1679, 1705 (2015) (suggesting that litigation between firms largely held in the same portfolio might be contrary to investor interests and responding to the same).

This Article addresses the confusion about index funds and concludes not only that the worries expressed by the critics are unfounded, but also that index funds make the market more efficient. Specifically, critics have failed to appreciate (1) the compelling logic that leads investors to invest index funds, (2) the natural constraints on index fund managers that prevent the abuses about which they worry, and (3) the significant ways in which index funds augment the disciplinary forces of the market.

First, critics have largely ignored the most significant question of all: What motivates so many investors to invest in index funds? Critics seem to assume that the answer is obvious—investors have been tempted away from actively managed funds by the rock-bottom fees charged by index funds (and perhaps the idea that index funds are more tax-efficient). In other words, critics perceive a form of market failure in this story and thus, see index funds as opportunists who exploit market efficiency and thus the research done by others—to cut prices and siphon off the business of funds that do their homework. But critics fail to see the most important feature of index funds—namely the fact that they offer maximum diversification and thus minimum risk without any reduction in expected return. Indeed, indexing would be all the more compelling if the market were less efficient—if market prices were often wrong.

The prospect of the same return at less risk alone would be enough to attract many investors even if index funds charged the same management fees as other funds. Therefore, lower fees are nothing but gravy (although index fund managers are duty-bound to charge less for their services as will be seen presently). But an index fund investor can actually achieve a *higher* long-term rate of return than an investor who chooses a riskier fund even though both funds offer the same average annual rate of return. Although this may sound too good to be true, it is a straightforward implication of compounding. And to add insult to injury, index investors ultimately drive stock prices upward because they are willing to pay more for a given stock because they assume less risk by virtue of indexing. As a result, other investors are forced to pay more for the stocks they buy than the prospect of the expected returns can justify for them.

The unavoidable implication is that ordinary investors who choose to invest in equities should do so by investing in an index fund. To be sure, individual investors are free to invest their own money however they want. Still, it is irrational for an ordinary investor not to invest in an index fund. It also follows that investment advisers who cater to ordinary investors are required by fiduciary duty to recommend index funds for their clients. Since a fiduciary is duty-bound to act as a reasonably prudent person would in the conduct of their own affairs, the logic of indexing compels investment advisers to recommend that their ordinary investor clients invest in an index

fund.⁶ This is a radical proposition. It implies that much investment advice borders on fraud. It also explains why the securities industry has so vigorously opposed regulations that would classify broker-dealers as fiduciaries. And it certainly explains why so much money is now invested in index funds as compared to traditional stock-picking mutual funds. In other words, the argument for indexing proves much more than the modest point that it makes sense for ordinary investors to invest in index funds or even that indexing is more than an opportunistic strategy designed to take advantage of market efficiency by free riding on the research efforts of others. It proves not only that indexing is perfectly acceptable in polite financial society but also that, among ordinary investors, only a fool would fail to index.

Second, the logic of indexing applies doubly to index fund managers, who are required by statute to be registered investment advisers and are thus fiduciaries (which they would be anyway by virtue of their position in charge of a company owned by its stockholders—albeit an investment company). Index fund managers have little (if any) discretion in choosing or trading portfolio stocks, which must be held in proportion to market capitalization. Thus, indexing implies that research is a literal (and legal) waste because the fruits thereof can have no use. In other words, to expend fund resources on research or to charge the fund a fee to defray such costs is a *per se* breach of fiduciary duty. In contrast, managers of traditional stock-picking funds will almost always be protected by the business judgment rule regarding any investment or trading decision they may make—even to the extent of a decision to alter fund strategy—as long as they can provide some reasonable explanation of their decisions.⁷

This same logic applies to voting and other forms of engagement with portfolio companies. Presumably, the purpose of engagement is to enhance

6. I use the phrase *ordinary investor* herein to refer to investors who have no reasonable expectation of influencing company management or business policies. Thus, the argument for indexing does not apply (say) to a hedge fund (or investors therein). Although the focus here is on the motivation (if not compulsion) of ordinary investors to invest in index funds, the argument also has implications for how we should define a reasonable investor for purposes of interpreting the law of corporations and securities as well as other bodies of law where the interests of reasonable stockholders or investors may be relevant. But this is not to suggest that hedge funds (for example) are not also reasonable investors. *See infra* note 14.

I use the phrase *investment adviser* herein to include anyone who provides investment advice to individual investors, including those who are registered as such with the SEC under the Investment Advisers Act of 1940, as well as broker-dealers, financial planners, insurance agents, and anyone else who routinely makes investment recommendations to their clients or customers. Such other advisers are not necessarily fiduciaries. It depends on whether there has been established a relationship of trust and confidence as evidenced (for example) by the customer's tendency to adhere to the proffered advice. *See infra* note 16.

7. *See, e.g.,* Kamin v. American Express Co., 383 N.Y.S.2d 807 (1976) (rejecting a stockholder challenge to board decision to distribute shares that could have been sold to generate tax loss for company).

performance and return. So managers of traditional stock-picking mutual funds have broad discretion both as to voting the shares they hold and otherwise kibbitzing with portfolio company management. But engagement is expensive. It requires delving into the operational details of individual portfolio companies. For index fund managers, whose portfolios are hedged by virtue of being fully diversified, it makes little sense to devote fund resources to such ends—except possibly when some general improvement in corporate governance might make many companies better off (which, ironically, has been dismissed by some index fund critics as low-value engagement).⁸

Third, despite their supposed passivity, index funds contribute significantly to the disciplinary forces of the market. Index funds' minimal trading for purposes of maintaining portfolio balance rewards companies who perform better and punishes companies who perform worse. Moreover, portfolio companies understand that indexing leaves no room for them to talk their way out of the consequences of mismanagement (as might be the case with the managers of a stock-picking fund). As for voting fund shares, index funds that follow the sensible practice of mirror voting—voting fund shares in proportion to the votes cast by other shares—enhance the voting power of actively managed funds (including hedge funds), which increases the voice of stockholders who have strong opinions.⁹ In other words, index funds reduce the separation of ownership from control. The bottom line is that index funds have made the financial world a much better place than it was in the past. Efforts to control their further growth and evolution should be undertaken only with an abundance of caution.

This Article proceeds as follows. Part I summarizes the risk-return trade-off and its well-settled implications for the fiduciary duty of care. Specifically, it is a breach of fiduciary duty for an agent to enter into a no-win transaction on behalf of a principal—a transaction assuming extra risk without the prospect of extra return. If one can eliminate much of the risk of investing in common stocks without any sacrifice of return by holding a diversified portfolio, it is a breach of fiduciary duty not to do so.

Part II explains how diversification works in general. As will be seen, investors can eliminate almost all of the risk that goes with investing in individual stocks—company-specific risk—without any reduction in

8. See Lund, *supra* note 3, text at n.110.

9. To be clear, not all index fund managers follow the practice of mirror voting, although State Street does do so. See Lindsey Stewart, *New Proxy-Voting Options for IVV and Other Index Funds From BlackRock, State Street, and Vanguard*, MORNINGSTAR (Dec. 13, 2023), <https://www.morningstar.com/funds/new-proxy-voting-options-ivv-other-index-funds-blackrock-state-street-vanguard>.

expected return.¹⁰ Thus, it has been said that diversification is the only free lunch in the market.

Part III shows how diversification works *over time* and shows that by minimizing portfolio risk, investors can achieve higher long-term returns even at the same *annual* rate of return. It is impossible to overstate the importance of this point. Not only is it possible to eliminate almost all company-specific risk by holding a well-diversified portfolio of stocks without any reduction in average annual return, but it is also possible to generate higher long-term returns over the long run than would be possible with individual stocks or even with a less well-diversified portfolio. In other words, the benefits of diversification are not limited to achieving the same return at lower risk. Rather, reducing risk as much as possible actually *increases* the long-term rate of return.

Part IV describes how to construct a diversified portfolio of stocks and how to achieve as much diversification as possible. As explained, the argument for holding a portfolio of about five hundred stocks weighted in proportion to market capitalization is almost conclusive. Thus, the fact that the biggest and most successful index funds mimic SPX is no accident. But curiously one will search the literature in vain for a good explanation of why SPX is an optimal portfolio. This Article fills that gap.

Part V discusses the implications of indexing for fund management. In general, index fund managers are duty-bound to minimize expenses of fund operation in light of the reasons why investors invest in index funds. Because an index fund is fully diversified and has eliminated company-specific risk, there is no reason to spend anything on company-specific research. Indeed, to do so constitutes waste in the strict legal sense because there is no use to which any such research may be put. If an index fund is committed to holding stocks in proportion to market capitalization, it cannot also buy and sell stocks based on company-specific research. Accordingly, to spend anything on such research is a dead-weight loss that does nothing but reduce net return to investors. And it is a breach of fiduciary duty for an index fund manager to devote any fund resources to company-specific research.

On the other hand, because an index fund is committed to holding stocks in proportion to their market capitalization, such a fund must engage in some trading to keep fund holdings balanced. As it turns out, such portfolio balance trading (“PBT”) results in minimal turnover—as little as 2 percent per year compared to about 63 percent per year (on average) for actively managed mutual funds.¹¹ Thus, SPX index fund investors benefit

10. The only risk that remains is the risk that the market as a whole will rise or fall—that equities in the aggregate will generate more or less return depending on general economic conditions.

11. See Stephan A. Abraham, *Turnover Ratios and Fund Quality*, INVESTOPEDIA, <https://www.investopedia.com/articles/mutualfund/09/mutual-fund-turnover-rate.asp> (last updated July 31, 2022) (data according to Michael Lake of Morningstar). See *infra* Table 2 for turnover rates of sample index funds.

from both minimal advisory expenses and minimal trading expenses while locking in a market rate of return and avoiding company-specific risk. Incidentally, low turnover minimizes the effects of taxes on return, which is why index investing is often touted as tax efficient.¹²

Part VI addresses the contradictory worries that the growth and consequent size of index funds threatens to undermine corporate governance because of the passivity of index fund managers or their power to influence management of portfolio companies. In other words, some worry that index fund managers will do too little to engage with investee companies while others worry that they will do too much. Neither worry is truly worrisome.

As for worries about index fund passivity, mirror voting as practiced by some index funds (meaning, voting in proportion to the votes cast by other stockholders) effectively magnifies the voting power of other stockholders (such as activist hedge funds).¹³ Moreover, PBT has the effect of magnifying the discipline of market pricing. While these two examples do not necessarily respond to all conceivable reasons for concern, they do illustrate the fact that there are two sides to every story.

As for worries about the power of index funds to manipulate the market or to induce anticompetitive practices among portfolio companies, the logic of indexing implies that index investors will have no interest in any such machinations precisely because they are perfectly hedged by virtue of holding an indexed portfolio of stocks. Moreover, even if index fund managers are tempted to use their latent power for such ends or to exact side benefits for themselves or others, they are precluded by fiduciary duty from doing so because they have effectively promised index fund investors that they will do nothing of the sort. To be sure, fiduciary duty is no guarantee against a possible breach. But the very growth of indexing has demonstrated that investors will move their money to funds that do the right thing.

To summarize: Index funds offer maximum return at minimum risk and expense. Thus, one can argue that rational investors who have no reasonable expectation of influencing the management of investee companies—ordinary investors—are effectively compelled to invest in index funds. It follows that investment advisers, as fiduciaries, are duty-bound to recommend investing in an index fund to their ordinary investor clients who invest in common stock. Moreover, because indexing eliminates all of the risk that *can* be eliminated, index fund investors are willing to pay top-dollar for stocks. Thus, index fund investors drive market prices. As a result,

12. Tax efficiency is an incidental benefit but is often emphasized because it is easily understood both by investors and investment advisers.

13. *Cf.* SEC v. Carter Hawley Hale Stores, Inc., 760 F.2d 945, 946 (9th Cir. 1985); Hanson Trust PLC v. SCM Corp., 774 F.2d 47, 58 (2d Cir. 1985); Unocal Corp. v. Mesa Petroleum Co., 493 A.2d 946, 956–59 (Del. 1985) (discussing effects of buybacks in context of hostile tender offer).

undiversified stock-picking investors pay too much for the stocks they buy. In other words, the market has eaten their (free) lunch.

I. RISK AND RETURN

The iron law of investing is that if you take more risk, you must get more return. And if you want more return, you must take more risk. These are more than platitudes or buzzwords; they are the essence of the fiduciary duty of care and, as such, may be seen as statements of black letter law. For example, the business judgment rule dictates that, as fiduciaries, the directors and officers of a corporation cannot be held liable for a loss suffered as a result of a good faith business decision, even if the loss was foreseeable at the time of that decision. But the one (and perhaps only) *substantive* exception to the rule arises if management assumes extra risk without the prospect of extra return—if it makes a no-win bet for the company.¹⁴

Similarly, investment advisers—at least those who are fiduciaries—are duty-bound to avoid unnecessary risk for their clients. Investment advisers must assure that their clients diversify their holdings since, by investing in a diversified portfolio of stocks, an investor can achieve the same return as would be expected from a single stock, but at a fraction of the risk. For example, by investing in a well-diversified portfolio of thirty stocks (such as the Dow Jones Industrial Average (DJIA)), one can eliminate more than 80 percent of the risk that goes with a single-stock portfolio without any sacrifice of expected return. Indeed, the law of trusts—not to mention the

14. See, e.g., *Joy v. North*, 692 F.2d 880, 885–86 (2d Cir. 1982); *Litwin v. Allen*, 25 N.Y.S.2d 667, 699 (Sup. Ct. 1940). The business judgment rule recognizes that one must take risk to generate return. And to take a risk means that one will sometimes lose. So, it would hardly be fair to hold management liable for losses. Stockholders understand that companies will sometimes lose money. But they also expect that the losses they suffer will come from a good faith effort to make money. That is also the deal—literally.

The qualification that this may be the one *substantive* exception is meant to exclude cases in which management fails to act or fails to do its homework and is thus held liable for a decision that might otherwise be protected by the business judgment rule. See *Smith v. Van Gorkom*, 488 A.2d 858, 873 (Del. 1985) (failure to deliberate); see also *Barnes v. Andrews*, 298 F. 614, 618 (S.D.N.Y. 1924) (opinion by L. Hand) (failure to act but without proof of loss causation).

Note that I use the word *management* here as shorthand to comprehend both directors and officers although the contours of the duty of care and thus the business judgment rule may differ somewhat as between the two.

Note also that I use the word *company*—rather than *corporation* or *firm*—to refer to the businesses in which investors and investment companies invest (1) because investee businesses need not be corporations, and (2) because the word *firm*—usually favored by economists—tends to connote a theoretical construct that captures all sorts of cooperative ventures. In short, the word *company* is probably more familiar to readers as connoting a business separate from its owners in which one might invest.

Finally, the word *fund* is used to refer generally to investment companies such as mutual funds and index funds and not to the cash invested therein. Note also that many index funds are organized as mutual funds. But many such funds are organized as exchange traded funds (ETFs) which are similar to closed-end funds. Although these distinctions can be quite important to the details of how a fund operates, they do not matter much for present purposes except to the extent they affect management fees and other operating expenses.

Talmud—includes a duty to diversify.¹⁵ The point is that it is a breach of fiduciary duty for an investment manager to fail to diversify a client account because failure to diversify entails more risk than is necessary to achieve the expected return.¹⁶

If the duty to diversify is based on the idea that one should avoid unnecessary risk, then it also follows that one should take as little risk as possible to achieve a given rate of expected return. And while one can eliminate 80 percent of company-specific risk with a 30-stock portfolio, it is possible to eliminate 95 percent of such risk by investing in the five hundred stocks of the SPX.¹⁷ In other words, one can avoid even more risk by investing in an SPX index fund. Thus, the inescapable conclusion is that investment advisers are compelled by well-settled principles of fiduciary duty to recommend that their clients who invest in common stock do so by investing in an index fund.

Moreover, a fiduciary is presumably duty-bound to pay as little as possible for a given product or service because paying more than necessary

15. To be clear, the argument for diversification made here does not depend on whether the investor or decision-maker is a fiduciary, although it does imply that a fiduciary is duty-bound to assure that clients are diversified. The argument also implies that a reasonable investor would diversify and thus should inform the law with regard to any question that turns on the interests of reasonable investors. *See* *Mills v. Elec. Auto-Lite Co.*, 396 U.S. 375, 384 (1970); *TSC Indus., Inc. v. Northway, Inc.*, 426 U.S. 438, 445 (1976) (adopting a reasonable investor standard in construing the meaning of materiality under federal securities law); *Robertson v. Cent. Jersey Bank & Tr., Co.*, 47 F.3d 1268, 1273 (3d Cir. 1995) (“Prudence implies a duty to diversify.”) (citing *Com. Tr. Co. of N.J. v. Barnard*, 27 N.J. 332, 142 A.2d 865, 871 (N.J. 1958)); RESTATEMENT (THIRD) OF TRUSTS § 229 cmt. d (AM. L. INST. 1992); *see also Ecclesiastes* 11:2; WILLIAM SHAKESPEARE, *THE MERCHANT OF VENICE*, act 1, sc. 1 (Antonio); Ran Duchin & Haim Levy, *Markowitz Versus the Talmudic Portfolio Diversification Strategies*, 35 J. PORTFOLIO MGMT. 71, 71 (2009); *The Long March of Diversification — 1500 BCE to Today*, RUSSELL INVS. BLOG (Jan. 23, 2019), <https://russellinvestments.com/nz/blog/the-long-march-of-diversification-1500-bce>.

16. Needless to say, this assertion assumes that the investment adviser in question is a fiduciary. That is not always true. Indeed, the question whether someone who provides financial advice should always be considered a fiduciary has been debated and litigated at great length. The answer is that it depends on the person and the applicable legal regime. For example, a broker-dealer may or may not be a fiduciary depending on how much trust a customer reposes in them. *See, e.g., Miley v. Oppenheimer & Co.*, 637 F.2d 318, 324 (5th Cir. 1981). On the other hand, investment advisers registered with the SEC under the Investment Advisers Act of 1940 are presumed (at least) to be fiduciaries, and there is no doubt that the investment advisers who manage mutual funds and other such investment vehicles are fiduciaries as to the funds they manage. *See, e.g., Jones v. Harris Assocs. L.P.*, 559 U.S. 335, 340 (2010). And administrators of retirement plans (as governed by ERISA) are always fiduciaries. *See, e.g., Jander v. Ret. Plans Comm. of IBM*, 910 F.3d 620, 624 (2d Cir. 2018), *vacated and remanded*, 140 S. Ct. 592 (2020), *reinstated*, 962 F.3d 85 (2d Cir. 2020). *See also* Brian Menickella, *How Elizabeth Warren’s Vow to Bring Back Fiduciary Rule Affects You*, FORBES (Nov. 6, 2019, 11:27 AM), <https://www.forbes.com/sites/brianmenickella/2019/11/06/how-elizabeth-warrens-vow-to-bring-back-fiduciary-rule-affects-you/?sh=664d2a1b706c>. *See generally* Arthur B. Laby, *Reforming the Regulation of Broker-Dealers and Investment Advisers*, 65 BUS. LAW. 395 (2010).

17. SPX is the ticker for the price-only float-weighted version of the index, which is the one most widely followed and used for purposes of valuation. There are several other versions of the index.

is a literal waste of assets.¹⁸ Therefore, a fiduciary is duty-bound to opt for the lowest-cost strategy. As it happens, index funds charge the lowest possible management fees because fund managers have nothing to do but to mimic the index (which also entails very little trading). Accordingly, aside from minimizing risk, index funds also minimize the expenses of investment management.

Still, even if one agrees completely with the foregoing summary, questions remain: How exactly does diversification work to reduce risk? And what really do we mean by risk?

II. THE LOGIC OF DIVERSIFICATION

Index funds are popular with investors because they provide an inexpensive way to hold a diversified portfolio of stocks.¹⁹ Additionally, diversification is attractive because it permits investors to eliminate much of the risk that attends investing in individual stocks without any sacrifice of return. But why do investors dislike risk and how does diversification eliminate risk?

As for why investors dislike risk, it may suffice to say that one must minimize risk because, all else equal, one cannot sell a riskier investment to another investor for as much as a less risky investment.²⁰ But this explanation

18. Although this proposition follows from well-settled legal doctrine, see Culloton, *supra* note 1, it has found application elsewhere in the law of securities regulation, such as with regard to rules relating to obtaining soft-dollar services in exchange for directed brokerage.

19. Much of the discussion here is based on the premise that SPX is an optimum—and perhaps *the* optimum—index for purposes of achieving maximum diversification. Needless to say, it is one thing to assert that investors should diversify, but it is quite another to say that holding a SPX index fund is the best possible way to do so. As will be seen, the argument for holding a SPX index funds is powerful but not quite airtight. Subtle tweaks are possible. But they do not detract from the central argument here that ordinary investors should diversify. Nevertheless, indexing as discussed herein is more or less synonymous with investing in SPX. On the other hand, the possibility that reasonable investors may differ as to the best way to diversify does suggest a way to decide how much diversification is enough. Specifically, it should suffice to diversify up to the point that one cannot clearly get rid of any more risk. Finally, references herein to “diversified investors” should be assumed to mean fully diversified investors in common stocks—investors who are invested solely in common stocks either through an index fund or who follow indexing practices on their own. As discussed further below, diversification works differently (and better) with regard to common stock than it does with regard to other securities (such as bonds). *See infra* text accompanying note 36. Moreover, the argument(s) herein depend on a fully fledged diversification strategy and not merely the practice of holding ten or even twenty stocks without attention to the distribution of invested funds. To be sure, investors in common stocks run the gamut from stock-pickers who hold a single stock to investors who hold an index fund and nothing else. For investors who fall somewhere in the middle, their interests will be more or less aligned with those of index investors.

20. Admittedly, this fact of financial life assumes that investors are risk averse, which appears to be an almost universal trait, except for some individuals who appear to be genuinely risk-neutral and others who seem to be addicted to risk. On the other hand, risk-neutral individuals have been found to do better at opting for risky investments that offer superior returns. As discussed further below, investors can achieve superior returns over the long term through diversification—which amounts to an affirmative argument for risk-aversion. *See infra* Table 1 and accompanying discussion. To be sure, diversification neutralizes risk. So, diversified investors have made themselves risk-neutral and will make risky but superior investments. In contrast, there is no clear gain from risk-preference.

is no better than the idea that one must pay (or charge) interest on a loan merely because others do.

A better explanation for why investors tend to be risk-averse is that, all else equal, one would prefer to receive expected return *consistently* than to receive the same return merely on average with significant variations from one year to the next. If an investor can expect a particular stock to generate returns of 10 percent half of the time and zero percent half of the time, one would expect a 5 percent return on average. But it is still possible to book zero return for two or five or ten years in a row. Thus, as between two investments that offer the same return, the less volatile of the two is preferable even if one is risk-neutral.²¹

The proof of this pudding can be found in the bond market. Bonds are safer than stocks because bondholders get paid first. And investors accept lower returns on bonds in exchange for lower risk. In other words, investors actually pay for consistency.²² So to shed risk without any reduction in return, it is like free money. By holding a diversified portfolio of stocks, investors can have their cake and eat it too. They can shuck most of the risk without any sacrifice of return. Thus, it has been said, that diversification is the only free lunch in the market.²³ To be specific, by holding a diversified portfolio of stocks, an investor can expect the same return as with one well-chosen stock but without the risk that an individual stock may perform poorly. And index funds based on a broad market index such as SPX offer maximum diversification at the lowest price—with management fees that are much lower than the fees charged by actively managed stock-picking funds—all of which helps to explain the phenomenal growth of such funds in recent years.²⁴

The question remains: How exactly does diversification work this magic? How does it make risk disappear without a trace? The answer lies in the law of large numbers and can be explained with a simple coin-flipping example:

21. See *infra* text accompanying note 34 (discussing definition of risk as dispersion of returns or volatility).

22. Further proof (if necessary) can be seen in the very existence of hedging—such as with options, futures, and other derivatives and strategies—by which investors pay real money to avoid risk. See *infra* text accompanying notes 27, 76 (discussing zero-sum nature of hedging and the economy in general).

23. See generally Harry Markowitz, *Portfolio Selection*, 7 J. FIN. 77 (1952). Although Markowitz (Nobel 1990) made this comment in 1952, it was not nearly as true then as it is now. High sales charges (front-end loads) for mutual funds, high fixed commission rates (that were even higher for odd lots), and high bid-ask spreads had the combined effect of making diversification quite expensive in practice. See Richard A. Booth, *Five Decades of Corporation Law – From Conglomeration to Equity Compensation*, 53 VILL. L. REV. 459, 466 (2008).

24. Indeed, Fidelity offers several funds with a zero percent management fee: FNILX (large cap index fund), FZROX (total market index fund), FZIPX (extended market index fund), FZILX (international index fund). It is not clear why Fidelity offers such products. See Richard A. Booth, *The Proper Role of Index Funds in Corporate Governance* (manuscript on file with author).

With one flip of a coin, the chances are fifty-fifty that one will win a bet on heads. In other words, one will expect zero return half of the time.

With five hundred flips of a coin and betting heads each time, the chances are less than 2.5 percent that one will win any fewer than 455 times. To be precise, the odds are about 95 percent that heads will come up somewhere between 455 and 545 times.

To be sure, one may argue that the coin-flipping example is too simplistic. But coin-flipping is a much better analog for investing than it might seem. There is good reason to think that at any given time the chances are fifty-fifty that a stock's price will increase or decrease.²⁵ In other words, a stock's price is a weighted average of upside and downside potential. Thus, one of the leading methods for calculating the value of an option—the binomial option pricing model—depends precisely on such an estimate of upside and downside outcomes.²⁶

The implication of the foregoing exercise for investment purposes should be obvious: Investors can eliminate most of the risk that goes with investing in a single stock by holding many stocks. But this is not to say that (as with flipping a coin) one can expect only to break even in the stock market. To the contrary, stocks make money on average. In contrast to a casino, where the odds always favor the house, the odds in the stock market favor investors. In the years since 1930, U.S. stocks have generated a return of about 10 percent per year on average as measured by dividends and capital gains combined. In the years since 2000, the average has been a little over 6 percent combined.²⁷ Thus, if we can imagine a coin flip where we ante up 90

25. Indeed, this proposition was established rigorously by Paul Samuelson (Nobel 1970). See Paul A. Samuelson, *Proof that Properly Anticipated Prices Fluctuate Randomly*, 6 INDUS. MGMT. REV. 41, 44 (1965).

26. Specifically, the binomial option pricing model (BOPM) is based on an estimate of the high and low price at which a stock is likely to close at the end of the option period. See RICHARD A. BOOTH, FINANCING THE CORPORATION 7:16 (2020–21). Another reason for dwelling on the coin-flipping analogy is that it permits us to compare the risk inherent in portfolios of various sizes. In other words, we can compare the (non-market) risk inherent in a 500 stock portfolio with that of a 20 stock portfolio by comparing the risk in 500 coin flips to that of 20 coin flips (assuming equal weighting of each stock or flip).

27. On the other hand, one might characterize such returns as break-even in that these levels of return are presumably what the market requires in exchange for assuming the risk that goes with investing in stocks rather than bonds or something else. Cf. *Joy v. North*, 692 F.2d 880, 897 (2d Cir. 1982); *Litwin v. Allen*, 25 N.Y.S.2d 667, 699 (Sup. Ct. 1940) (finding bankers that lent funds at too-low interest rate liable for waste). If one defines winning in the stock market as beating the market rate of return, then the market is in fact quite similar to flipping a coin. As noted above, there is good reason to think that in an efficient market, the next change in price is equally likely to be up or down. See Samuelson, *supra* note 25.

This is not to suggest that a zero-sum bet cannot make economic sense even in the aggregate. For example, a futures contract is a zero-sum arrangement in which the gain to one party equals the loss to the other. But the trade may nevertheless be wealth increasing in that it reduces the risk of one party or the other or even both, thus increasing the value of underlying commodity (and possibly inducing additional investment). See *infra* text accompanying note 28 (further discussing zero-sum nature of hedging), 76 (discussing economy as largely zero-sum).

or 95 cents to win a dollar, such a bet is quite similar to an investment in common stock.²⁸

Consider an investment in a single stock—Acme Blasting Cap Company (“ABC”). There is a 50 percent chance that ABC will generate a 5 percent return and a 50 percent chance that it will generate a 15 percent return. Thus, our best guess is that ABC will pay a 10 percent return even though the actual result will be 5 percent higher or lower.²⁹ If we *invest* all our money in ABC, there is a 50 percent chance we will realize a 5 percent return all else equal.³⁰ But if we spread our money equally over five hundred different companies offering the same range of returns, there is only a 2.5 percent chance we will end up with less than a 9.55 percent return. But there is also a 2.5 percent chance we will end up with a return of 10.45 percent or more.³¹

Either way, what we truly expect is the same 10 percent return. This is not to deny that sometimes an investor who holds a single stock will enjoy a 15 percent return while a diversified investor will never do so. But even though one may dodge the downside bullet for a year or two—or even ten—it is purely a matter of luck to do so, unless one has access to inside information (which is mostly illegal to use).³² In short, there is no good

A similar question arises about intraportfolio litigation. See Amanda M. Rose & Richard Squire, *Intraportfolio Litigation*, *supra* note 5, at 1705 (addressing whether disputes between companies within the same portfolio are wasteful); see also Kahan & Rock, *supra* note 3, at 1 (arguing that it is unlikely that index fund managers would advocate for one portfolio company to defer to another); Richard A. Booth, *Stockholders, Stakeholders, and Bagholders (Or How Investor Diversification Affects Fiduciary Duty)*, 53 BUS. LAW. 429, 429–30 (1998) (arguing that investors expect managers to run their individual companies so as to maximize their individual value).

28. To be more precise, investing in a stock such as ABC is equivalent to betting 90 cents or so to win a dollar at the risk of losing some and occasionally all of the amount wagered.

29. Note that even though our best guess is that ABC will generate a 10% return, it will never actually do so. In other words, expected return need not be one of the possible results.

30. The all-else-equal proviso is important. The assumption is that the market as a whole generates the expected 10% return. So, to be more precise, the stated odds relate to the chances of enjoying a market rate of return—which may be higher or lower than 10% in any given year. In other words, 10% is an average of an average.

31. To be precise, the actual result will be within two standard deviations of the expected 10% return in 95 out of 100 cases (years). For the record, one standard deviation for a sample population of 500 flips is 22.36.

To be clear, the example assumes that the return for any one company in the portfolio must be 5% or 15% whereas in the real world of investing returns may also fall between those two numbers. Moreover, in the real world different stocks offer different ranges of returns. Some stocks may offer returns between 0% and 20% whereas others may offer returns between 8% and 12% but the 10% average remains. Finally, the market as a whole may go up or down. In other words, the experienced market average may fluctuate up and down and may even go negative. But a diversified investor—one who holds 500 different stocks—can expect results that are close to the market average no matter what that average turns out to be. To be sure, the argument is ultimately a tautology because the market result is measured by the same portfolio. But that does not detract from the ultimate wisdom of diversification as explained in the text immediately following.

32. Mutual funds (and their managers) often tout themselves as having beat the so-called Lipper Average for similarly focused funds. But studies indicate that the number of funds that do so is about the number one would expect by chance. See BURTON G. MALKIEL, A RANDOM WALK DOWN WALL STREET:

reason to take the risk of divergent returns because the upside is always offset by the downside. One can truly expect only an average return.

To be sure, if we could know for certain that ABC will return 5 percent this year but that XYZ, another stock, will return 15 percent, then we would buy XYZ and sell ABC. But it is costly to do the research required to predict the future. And we can never be sure that XYZ (rather than ABC) will be the one to defy the odds. To claim so is to deny the premise of the hypothetical we have posited for ourselves: If our *best* estimate is that the chances of a 15 percent return are fifty-fifty, it is nothing but doublethink to predict that XYZ will be the winner. Of course, we could bet (literally) on XYZ. And we will win half the time. But we will also lose half the time. Moreover, if we have somehow figured out that XYZ is the better investment, it is likely that others will have done so as well, in which case the price of XYZ will rise and the price of ABC will fall until the odds revert to fifty-fifty.³³

It is tempting to think of risk in the stock market as risk of mispricing. We might say that if ABC returns 5 percent in the end, then it was overpriced when we bought it. Similarly, if XYZ returns 15 percent in the end, we might say that it was underpriced when we bought it. But suffering a loss on an investment does not mean that it was mispriced—or a bad investment. ABC is correctly priced at 10 percent even though we know the chances that it will generate a 5 percent return are fifty-fifty. It is always possible that one may suffer a loss if one takes a risk. Thus, to suffer a loss does not imply that one paid too much. Rather, it is quite normal for results to vary from expectations. Indeed, it is almost certain that they will.³⁴

On the other hand, there is no doubt that individual stocks are sometimes genuinely mispriced—whether because of fraud or manipulation or innocent, collective mistake. Again, coin-flipping can illustrate the point.

THE BEST INVESTMENT GUIDE THAT MONEY CAN BUY 175–81 (13th ed. 2023). To return to the coin-flip example, if we have 1000 different flippers flip a coin 1000 times each, 25 of them will likely do better than 53% heads. Indeed, it would not be surprising for a few to achieve 60% heads (so to speak). Note that there are about 10,000 publicly available mutual funds (even though there are only about 4000 individual stocks traded in the US market).

33. As with pari-mutuel betting on a horse race, the market will see that traders are buying XYZ and selling ABC and will adjust accordingly. Indeed, stock-pickers depend on the market to see what they see—but to do so later. *Cf. id.* at 40–43 (likening market to English newspaper contests in which the goal is to guess the winner of a beauty pageant). Note that if the market bids up the price of XYZ (because more traders are betting that it will do better), its ROI will fall until it equals that of other similar stocks (all else equal). Thus, it is often said that stocks tend to revert to the mean. Although it may go without saying, the market works according to a form of Bayesian inference where probabilities are updated as more information becomes available. *See id.* at 235–36.

34. As is often said: Actual results may vary. What should be often said is that actual results will almost certainly vary. Thus, the logic of diversification does not depend on market efficiency. Indeed, diversification makes more sense if the market is less efficient. *See infra* note 61 and accompanying text (further discussing this point). Still, the amount paid must be commensurate with the possibility of loss: The greater the possibility that return will vary from what is expected, the less one should pay for a stock (all else equal). It follows that risk *is* the possibility that return will vary from what is expected. In other words, risk is a measure of the dispersion of possible returns—meaning, volatility.

A chance to win one dollar on a coin flip is fairly priced at one dollar assuming the coin is fair. Either I will end up with two dollars or with zero dollars. The chances are fifty-fifty. So, the value of the bet is one dollar. The fact that I lose one bet or even two or five or ten does not mean the bet was mispriced. But if the coin has been weighted so that heads is more likely, the value of a tails bet will be a bit less than one dollar (overpriced at one dollar), and the value of a heads bet will be a bit more than one dollar (underpriced at one dollar). That is true mispricing.

Diversification can address both forms of mispricing. By holding a diversified portfolio of stocks, one can eliminate most of the risk of random fluctuations in return as well as the risk that individual stocks may be overpriced or underpriced. And the larger the number of stocks one holds, the more assured one can be that results experienced will converge on the expected result. The law of large numbers dictates it.

It is also important to note that the argument here for diversification works much better for stocks than it does for bonds and other fixed-return securities. With stocks, it is possible for actual return to exceed expected return. Indeed, the argument for diversification depends on the idea that an equal number of stocks will do better than expected as do worse than expected. In contrast, a bond will never do better than expected. If a \$5000 bond carries a 5 percent coupon and is due in 10 years, the most that an investor can expect is \$250 per year and \$5000 in ten years. The issuer will never pay anything more than what is owed. And if the issuer is a corporation, it would be a breach of fiduciary duty to the stockholders to do so. To be sure, a bond may increase in value if interest rates decline generally. But such market-wide events will affect all bonds similarly. A rising tide lifts all ships. So it makes no difference in this regard if the bondholder-investor is diversified. The point for present purposes is that bonds entail only downside risk. You can do worse than expected, but not better.³⁵

35. Some commentators have noted that the diversification inherent in collateralized debt obligations (CDOs) did not protect investors from significant losses in the 2008 credit crisis and thus have argued that diversification does not protect investors in the stock market from the effects of misinformation—which in turn justifies a robust system of securities fraud litigation. See James Cameron Spindler, *We Have a Consensus on Fraud on the Market—And It's Wrong*, 7 HARV. BUS. L. REV. 67, 114 (2017). But this argument fails to consider the difference between the bond market (where there is no real possibility of better-than-expected returns other than from market forces) and the stock market (where half of all stocks do better than expected, all else equal). See Richard A. Booth, *Sense and Nonsense About Securities Litigation*, 21 U. PA. J. BUS. L. 1, 15 n.34 (2018). This does not imply that bondholders gain nothing through diversification. By spreading the risk of default across numerous bonds, bondholders can minimize such risks. But they can also do so directly by relying on research as provided by credit rating agencies (CRAs). So, bondholders face a trade-off that stockholders need not make: They can either spend a bit on research—which reduces returns—or diversify their portfolio—which also reduces returns because a few bonds will default without any windfall gains to make up the difference. To be sure, it is also possible for an obligor to become more credit-worthy—meaning, to have its credit rating upgraded—and thus for a bond to increase in value because of such company-specific developments. But it is also

III. THE LOGIC OF DIVERSIFICATION OVER TIME

The foregoing argument should suffice to convince any ordinary investor of the need to diversify. There is no good reason to assume unnecessary risk because there is no reward for doing so. But this argument misses a further and even more compelling argument for diversification for long-term investors: Over the long haul, reducing risk produces *higher* returns, all else equal. Not only is it possible to eliminate company-specific risk without any sacrifice of return, but the return itself is also increased through diversification.

Table 1 illustrates this point. The expected return of both Portfolio I and Portfolio II is 10 percent per year. Portfolio I, however, is riskier because its return fluctuates between zero percent and 20 percent per year. In contrast, Portfolio II is less risky because its return fluctuates between 8 percent and 12 percent per year. One might think that this difference would wash out over time. But not so. As shown in Table 1, an initial investment of \$100 in Portfolio I is worth \$248.83 after ten years for a cumulative average growth rate (“CAGR”) of 9.54 percent per year, while the same \$100 initial investment in Portfolio II is worth \$258.95 after ten years for a CAGR of 9.98 percent per year—a difference of 0.44 percent in return.

possible for a bond to suffer a down-grade—though possibly not equally so. Thus, bondholders can achieve some equity-like benefits from diversification: They can hedge away the risk of changes in credit ratings and do so for free. But they cannot hedge away the risk of default—which is probably much more significant. Moreover, although bond prices have become much more volatile over the last fifty years, trading in bonds remains less liquid and thus more expensive than trading in stocks. *How Much am I Paying for my Bonds?*, FIDELITY VIEWPOINTS (Feb. 14, 2023), <https://www.fidelity.com/viewpoints/investing-ideas/how-much-for-bonds>.

So the benefits of diversification as to changes in default risk are not likely to be as significant as they are for stocks where price is determined wholly by the trading market.

Incidentally, the benefits of diversification for stock investors challenge the traditional logic of investing in a mix of stocks and bonds, such as the almost standard 60/40 allocation recommended by many conservative investment advisers. While the 60/40 rule became somewhat questionable because of the very low interest rates of the early 2000s and the idea of TINA—there is no alternative (to stocks)—one must wonder if the 60/40 rule might have been the product of old timey thinking that did not account for the possibility of indexing.

YEAR	Portfolio I			Portfolio II		
	PRIN	RET%	RET\$	PRIN	RET%	RET\$
0	100.00		-100.00	100.00		-100.00
1	100.00	0.00	0.00	108.00	0.08	8.00
2	120.00	0.20	20.00	120.96	0.12	12.96
3	120.00	0.00	0.00	130.64	0.08	9.68
4	144.00	0.20	24.00	146.31	0.12	15.68
5	144.00	0.00	0.00	158.02	0.08	11.71
6	172.80	0.20	28.80	176.98	0.12	18.96
7	172.80	0.00	0.00	191.14	0.08	14.16
8	207.36	0.20	34.56	214.08	0.12	22.94
9	207.36	0.00	0.00	231.20	0.08	17.13
10	248.83	0.20	141.47	258.95	0.12	127.74
AAVG		0.1000			0.1000	
STD		0.1054			0.0211	
GAVG		0.0949			0.0980	
IRR			12.82%			14.16%
CAGR	0.0954			0.0998		
SHARPE ($\$/\sigma$)		0.9487			4.7434	
BOOTH ($\sigma/\$R$)		1.0541			0.2108	

Table 1: Effect of Risk Reduction on Long-Term Cumulative Return

Comparing the returns for Year Two explains the difference. Even though Portfolio I generates a 20 percent return, that 20 percent return is figured on a base of 100 from the previous year, resulting in a principal balance of 120 at the end of the year. On the other hand, Portfolio II begins the year with a base of 108 and generates a 12 percent return (12.96), resulting in a principal balance of 120.96 at the end of the year. In other words, one cannot simply add up the series $0 + 20 + 0 + 20$ and compare it to $8 + 12 + 8 + 12$. Because we are dealing with percentage returns, each next return must be applied to the previous principal balance to calculate the resulting principal balance. The latter series results in a higher balance over several periods because the lingering effects of lower earlier returns for Portfolio I operate to dilute the effects of later higher returns.³⁶

The practical implication is that long-term investors should be less focused on the simple arithmetic average (“AAVG”) return on an investment—which reflects a return that can be expected in any given year—and more attuned to the geometric average (“GAVG”)—which incorporates the effects of year-to-year fluctuations in return.³⁷ As illustrated by the

36. The effect is akin to climbing a sand dune where one step forward is followed by sliding a half step back with the result that it takes twice as many steps altogether to get to the top.

37. To calculate the familiar arithmetic average, one adds up the results from each year and divides by the number of years. To calculate the geometric average, one squares the results of each individual year and finds the square root of the sum thereof. Where the return is the same every year, the two averages are equal. But if the return fluctuates, the geometric average will always be less than the arithmetic average. And the greater the fluctuation, the greater the difference.

example, the simple arithmetic average return for both Portfolio I and Portfolio II is 10 percent per year. But the geometric average differs significantly—9.49 percent for Portfolio I and 9.80 percent for Portfolio II—because returns for the latter are less volatile. The difference translates into a higher return for Portfolio II over time.³⁸ And if one reinvests returns (as is typical in the context of a retirement account such as a 401(k) or a pension plan), returns are dramatically higher because of compounding.³⁹

This is not to say that AAVG returns are irrelevant. The example itself illustrates that an investor needs a 10 percent simple AAVG to generate the long-term returns shown. Since it is difficult to predict the order in which returns will arrive, it follows that investors should focus on AAVG returns in choosing the stocks to build a diversified portfolio. Indeed, it is not clear how one would go about using GAVG in building a portfolio. Rather, it is simply a fact that long term returns will always be lower than average annual returns if the investment entails any risk at all. Accordingly, the best way to maximize long term results is to maximize short term results *consistently*.

As a result, investors (the market) tend to focus on AAVG for individual stocks. And even diversified investors must worry about AAVG returns while recognizing that GAVG is what matters in the end. In other words, it is because GAVG return is always less than AAVG return that one is able to generate higher long-term returns through diversification even though AAVG return is the same 10 percent for individual stocks.

Incidentally, the same logic that shows how reducing risk leads to higher long-term returns also explains why diversified investors focus so much on fund management fees (as discussed further below). Anything that eats into the principal balance at the end of the year has the effect of reducing the base to which returns are added in the following year and requiring fund

38. Compare the result to an investment in a bond that yields 10% per year every year. With such an investment, the geometric average return equals the arithmetic average return. On the other hand, bonds do not offer implicit automatic reinvestment of returns. This may explain in part why stock investors have become so comfortable with distributions by repurchase rather than by dividend. To be sure, it is the company that decides how to make distributions, but it is not unreasonable to say that if companies rely mostly on repurchase it must be because stockholders prefer it that way. See generally Richard A. Booth, *The Mechanics of Share Repurchases or How I Stopped Worrying and Learned to Love Stock Buybacks*, 28 STAN. J. L. BUS. & FIN. 42 (2023).

39. Note that both the CAGR and the internal rate of return (“IRR”) are higher than GAVG (which does not reflect compounding). Note also that results differ slightly if higher returns come in earlier years—if the series begins with 20% rather than 0% or 12% rather than 8% (respectively). Although the average returns are the same no matter the order in which they arrive, both CAGR and IRR are higher for both Portfolio I and Portfolio II if the series starts out with 20% and 12% (respectively). As between CAGR and IRR, it is probably better for diversified investors to focus on CAGR in evaluating portfolio performance. In effect, CAGR is equivalent to the coupon return on a bond whereas IRR reflects repayment of principal at maturity (in effect)—which assumes that the investor cashes out in the end.

For the record, about 40% of all of the equity in US public companies is held in retirement accounts and pension plans. See Richard A. Booth, *Investment Companies and Investment Advice*, in BUSINESS BASICS FOR LAW STUDENTS tbl. 1 (5th ed. forthcoming) (manuscript on file with author).

managers to find even more lucrative opportunities to make up for past shortfalls—a fool’s errand if ever there was one.

Needless to say, the foregoing examples are quite stylized in that return fluctuates predictably between the high and low extremes. But these examples are not wholly unrealistic because diversification has the effect of narrowing the extremes—which explains why investors should be concerned about finding the very best diversification strategy. Nevertheless, even with optimal diversification, real-world portfolio returns are much more volatile than the examples shown here. Thus, the benefits of diversification are even more significant.

In sum, with diversification, an investor can avoid company-specific risk without any sacrifice of expected return by holding a diversified portfolio of stocks. In other words, one can avoid the risk of investing in the wrong stock by investing in a diversified portfolio of stocks. And one can do so at zero cost.⁴⁰ By holding a diversified portfolio of stocks an investor can eliminate the risk of mispricing without any reduction in expected return. So a diversified investor need not worry about whether the price of a stock is too high or too low. An individual stock may be mispriced on any given day. But the chances are that for every stock that is overpriced, another stock is underpriced.⁴¹ Again, if we knew for sure that a stock would pay a 10 percent return, for example, there would be no need to diversify. But by holding a diversified portfolio of stocks, we can eliminate almost all of the risk that return will be other than the expected return. Moreover, reducing risk enhances long-term return because of the effects of compounding. To paraphrase the old Lucky Strike slogan, less risk means higher returns.

IV. THE FURTHER LOGIC OF INDEXING

The foregoing argument for diversification remains incomplete. It is clear that costly research aimed at predicting the performance of individual companies is a waste of money for ordinary investors. But how does one select portfolio stocks in some rational way that has nothing to do with evaluating their individual prospects? It may be just as costly to determine which stocks make up an optimum portfolio as it is to pick winners—if not more so.

One possibility is to choose stocks at random. Indeed, that idea has been taken quite seriously.⁴² A better answer is to invest in the stocks comprised

40. Although such a strategy entails some expense in the form of brokerage commissions, so too does stock-picking: It is equally costly to buy 10,000 shares of ABC as it is to buy 100 shares of 100 different companies (all else equal).

41. To be clear, the logic of diversification applies to the decision to hold a stock from day to day, as well as the decision to buy or sell. It is an old adage on Wall Street that to hold is to buy.

42. For many years, the Wall Street Journal ran a regular column—Investment Dartboard—for which it invited a professional investment manager to pick five stocks and then compared the result to five stocks chosen by throwing darts at the charts. See MALKIEL, *supra* note 32, at 176.

by a well-constructed index. But how does a well-constructed index determine which stocks to include?

Clearly, one important factor is the number of stocks to be included. Again, studies show that one can eliminate almost all company-specific risk with a portfolio of twenty stocks.⁴³ But a portfolio of twenty different technology stocks or twenty different energy stocks would be over-exposed to industry-specific risk. A stockholder who holds a portfolio of twenty stocks in a single industry remains exposed to the risks peculiar to that industry and thus assumes some risk that can be avoided with more diversification.⁴⁴ So diversification depends both on the number of different stocks *and* on the distribution thereof over various industries—the amount invested in each. But the question remains: How do we know which stocks to include—and in what proportions—in order to be as diversified as possible?

The market provides the answer. For example, by holding the five hundred largest stocks in proportion to the market capitalization of each, an investor can be assured that invested funds are distributed according to an impartial assessment of business opportunities. But to see how this works requires some explanation.

43. *See supra* text following note 24. This should seem evident to anyone who follows the business news since there is seldom much difference (percentage wise) between the performance of the DJIA (thirty stocks) and the SPX. Note that the AMEX Major Market Index (“MMI”)—which once sought to compete with DJIA—comprises just twenty stocks. Note also that the logic of holding at least twenty different stocks is reflected in the Investment Company Act (ICA) 5(b), which defines a diversified investment company as one holding no more than 5% of AUM in the stock of any one company. Investment Company Act of 1940, 15 U.S.C. § 80a-5(b)(1). Technically, such a fund could hold as few as fifteen stocks since the ICA permits such a fund to hold 25% of AUM in assets other than securities and cash.

44. Thus, it is curious that the NASDAQ average—which is known to be heavy on technology stocks—is reported in the business news as if it is equally indicative of the market as SPX or DJIA. The NYSE average was also widely reported in the past, as were the prices of so-called bellwether stocks such as IBM or GE. On the other hand, technology stocks do account for the biggest single sector of the market. So, reporting NASDAQ may be seen as akin to reporting IBM or GE in the old days. But the idea that an investor might invest in the NASDAQ 100 (“QQQs”) as an alternative to SPX reflects a misunderstanding of how indexing works. On the other hand, such a strategy has worked well in the recent past. *See* Ryan Jackson, *An Illogical Approach Overshadows Excellent Performance*, MORNINGSTAR (May 14, 2021), <https://investor.morningstar.com/quotes/0P00002D82>.

In effect, the market allocates capital to companies (and industries) through the pricing process. The value of a company—and thus, the value of a share of its stock—is ultimately a function of the formula:

$$\text{VALUE} = \text{RETURN} / \text{DISCOUNT RATE}^{45}$$

For example, suppose that ABC Company is expected to generate a return of \$1000 annually for its common stockholders. And suppose that investors demand a return of 12 percent from ABC given the risk inherent in its business. If so, the value of ABC can be calculated as follows:

$$\text{VALUE} = 1000 / 0.12 = 8333$$

In short, ABC is worth \$8333 in the aggregate, and the price of each ABC share should be \$8333 divided by the number of shares outstanding. It follows that the aggregate value—market capitalization—of a company is proportional to the returns generated by the company. Thus, a capitalization-weighted index such as SPX holds ten times as much stock of a company worth \$100 billion as it holds of a company worth \$10 billion. Note also that the five hundred (or so) SPX stocks comprise about 83 percent of the value of the entire US market.⁴⁶ In other words, all the other 3200 (or so) U.S. publicly traded companies account for only about 17 percent of the total value of all publicly held equity in U.S. companies.⁴⁷ So by holding the five hundred largest stocks in proportion to the market capitalization of each, an

45. Note that this formula presumes level returns. That is quite unrealistic for purposes of the valuation of an individual company. But it is good enough for present purposes since the goal of diversification is to eliminate as much company-specific risk as possible.

46. One might ask why SPX holds 505 stocks rather than exactly 500 stocks. One justification for doing so might be that the very smallest stocks are close enough to each other in size that a more obvious breakpoint comes between the last stock and the next smallest. Another good reason to hold a few more than 500 stocks is that inclusion in the index affects the market price (positively). That is, when a stock gets added to the index its price increases a bit because demand for the stock increases (because of index investors). So, including just a few more stocks than 500 acts as a hedge against paying more to add a stock to the index.

47. See *infra* Table 2 (data for SPX and VTI (which tracks the entire market)). To be sure, there may be industries that are populated wholly by relatively small companies (or indeed private companies). For example, it seems unlikely that the index reflects the business of law or other professional practices. So, it is possible that a portfolio based on all publicly traded stocks is somewhat under-diversified in some ideal sense. But it is not clear that there is anything to be done about it. In most U.S. jurisdictions, it is illegal for anyone other than a member of the bar to own even a minority equity interest in a law firm. (D.C. is one notable exception.) On the other hand, one might gain some exposure to this market by investing in a company involved in the litigation finance business.

Moreover, the number of companies in each sector of the market may reveal that some sectors are more populated with smaller companies—which tend to carry higher capitalization rates and thus lower aggregate values all else equal—which might (in turn) suggest some possible improvements in diversification.

investor effectively allocates funds in proportion to the returns generated in the U.S. economy as a whole.⁴⁸

In the case of SPX, this means that about 29 percent of value comes from information technology, 13 percent from consumer discretionary, 13 percent from health care, 11 percent from financials, and so forth, as shown in the chart below.

01	INDEX >>>	SPX	DJIA	NASDAQ	QQQ	CRSP	SPW	GBMI
02	PRODUCT >>>	SPY	DIA	ONEQ		VTI	RSP	VT
03	DATE >>>	12/31/21	12/31/21	11/30/21	9/30/21	6/30/21	12/31/21	12/31/21
04	(Information) Technology	29.2	22.4	43.3	48.4	26.0	15.5	22.3
05	Consumer Discretionary (Cyclical)	12.5	15.4	17.3	17.3	12.0	12.6	12.7
06	Health Care	13.3	17.7	8.6	6.6	13.0	12.0	11.3
07	Financials	10.7	15.6	5.0	0.0	12.0	13.2	13.9
08	Communication Services	10.2	3.8	15.7	19.3	10.0	4.1	8.1
09	Industrials	7.8	14.4	4.3	2.7	9.0	14.5	10.9
10	Consumer Staples (Defensive)	5.9	7.6	3.4	4.8	6.0	6.2	6.2
11	Energy	2.7	2.1	0.4	0.0	3.0	4.9	3.4
12	Real Estate	2.8	0.0	1.1	0.0	4.0	5.9	3.5
13	Materials	2.6	1.0	0.2	0.0	3.0	5.6	5.1
14	Utilities	2.5	0.0	0.7	0.9	2.0	5.3	2.6
15	TOTAL	100.2	100.0	100.0	100.0	100.0	99.8	100.0
16	NO. STOCKS	505	30	1009	101	4156	505	9230
17	MKT CAP	42368	11846	19400	15000	48840	N/A	88576
18	FOREIGN (%)	0.00000	0.00000	0.42300	0.02220	0.00800	0.00000	0.39990
19	TOTAL RETURN (TR) (10Y through 2021)	16.55	14.21	20.85	22.38	13.66	15.60	12.35
20	STD (TR) (10Y per SPDTR)	13.08	13.46	15.11	15.41	13.51	14.56	13.34
21	COV (BOOTH)	0.79	0.95	0.72	0.69	0.99	0.93	1.08
22	BETA	1.00	0.99	1.08	1.07	1.03	1.08	1.01
23	BID	465.31	359.40	56.99	380.40	235.00	159.03	105.01
24	ASK	465.42	359.65	58.26	380.49	235.60	164.69	105.80
25	SPREAD (%BID)	0.0002364	0.0006956	0.0222846	0.0002366	0.0025532	0.0355908	0.0002366
26	EXPENSES	0.095	0.160	0.210	0.200	0.030	0.200	0.080
27	TURNOVER	0.02	N/A	0.19	0.09	0.08	0.24	0.06

Table 2: Composition of Leading Equity Indices with Ten-Year Total Return and Risk Metrics⁴⁹

The question remains why it matters that the five hundred largest U.S. companies generate their returns in these particular lines of business. Arguably, the statistical tail is wagging the portfolio-composition dog.⁵⁰ The

48. Some of the return generated by U.S. companies comes from operations outside the United States, and some returns from within the United States are generated by non-U.S. companies.

49. The data in this table is taken from the fact sheets for each of the products listed in line 02 based on the indices listed in line 01 as of the date shown in line 03 except as follows: Total Return, Standard Deviation, COV (BOOTH), and beta are calculated from historical closing prices for each product, with beta calculated using 24 months of monthly closing prices ending 12/31/2020 (using SPX as the benchmark portfolio). The spread shown in line 25 is calculated as a (decimal) percentage of the bid for each product as reported by Yahoo Finance as of February 2022.

50. Similarly, I once found it curious that the media were so fixated on indices such as the DJIA. It seemed as if statistics had become more important than the game itself—as one might say about baseball. I might also have pointed out that one must ultimately invest in particular stocks and not the market as a whole. But that is no longer true and has not been so since the advent of index funds if not stock index

answer is that investing is about finding opportunities to generate return. Presumably, companies invest where they find potential for return. It is almost implausible to think that the five hundred largest U.S. companies could have missed significant opportunities to generate returns. To be sure, this allocation is somewhat backward-looking in that it reflects how these companies have chosen to invest their assets in the past. But it is also forward-looking in that it is based on stock price—which reflects the collective opinion of thousands of investors as to the prospect of future returns. Because size (market capitalization) is directly proportional to returns, investing in an SPX index fund assures that funds are distributed as broadly and evenly as possible across the entire array of business opportunities. In other words, the logic of doing so is more than mimicry for its own sake.

The bottom line is that an investor who picks stocks to hold in a diversified portfolio other than in proportion to market capitalization is not truly diversified—or at least not as diversified as one might be. To be truly diversified one must invest in a value-weighted portfolio.

A. WHY SO MANY STOCKS—WHY NOT EVEN MORE?

The foregoing discussion raises the question: Why invest in so many stocks? There are several answers.

Recall that most of the benefits of diversification can be achieved by holding about twenty different stocks.⁵¹ That translates into investing no more than 5 percent in any one stock. But stocks increase and decrease in value as they trade. So, if one invests 5 percent in twenty different stocks, some stocks are bound to become worth more than 5 percent either because they rise in value or because other stocks fall in value, relative to each other. Thus, it would seem prudent to limit any one stock, for example, to 4 percent of portfolio value.

As shown in Table 3, Apple (AAPL) accounted for about 6.88 percent of the value of SPX as of EOY 2021 (a record high percentage for any one company), while Microsoft (MSFT) accounted for 5.96 percent and Amazon (AMZN) accounted for 3.99 percent thereof.⁵² This is a somewhat unusual situation in that for most years since 1980, no one company exceeded 5

futures. And as this Article itself attests, media fascination with averages turns out to have been prescient, although I doubt there are many business journalists who can explain why the averages matter more than the constituents.

51. *See supra* note 44.

52. *See* S&P Dow Jones Indices, Top Annual Percent of Index Issues (as of Dec. 31, 2021). As of Feb. 29, 2024, MSFT (at 7.19%) had surpassed AAPL (at 6.18%) as the largest holding in the index, and NVIDIA (NVDA) (at 4.57%) had replaced AMZN as the third largest holding. But unless otherwise noted, the discussion throughout this article is based on index holdings as EOY 2021. Nothing about the rank of specific component companies affects the argument. But as will be seen, the fact that the ranks can and do change is important to the logic of indexing and the practice of index management.

percent of the value of the entire index except for IBM (in 1982 to 1985) and AT&T (in 1981 and 1982).⁵³ In other words, in thirty-five out of forty-two years since 1980 (through 2021) no one company exceeded 5 percent of the value of the entire index.⁵⁴ This suggests that one needs to invest in about five hundred stocks *both* to hold a size-weighted portfolio *and* to invest no more than about 4 percent by value in the largest stock therein.

		MKT CAP (\$B)	% OF INDEX
1	Apple (AAPL)	2913	0.0688
2	Microsoft (MSFT)	2525	0.0596
3	Amazon (AMZN)	1691	0.0399
4	Tesla (TSLA)	1061	0.0251
5	Alphabet C (GOOG)	919	0.0217
6	Alphabet A (GOOGL)	871	0.0206
7	Meta Platforms A (FB)	796	0.0188
8	Nvidia (NVDA)	735	0.0174
9	Berkshire Hathaway B (BRK.B)	668	0.0158
10	Unitedhealth Group (UNH)	473	0.0112
TOTAL		12653	0.2987

Table 3: Top Ten S&P 500 Stocks by Market Capitalization and Weight (as of December 31, 2021)

Perhaps more worrisome, the ten largest SPX constituent companies accounted for almost 30 percent of index value as of EOY 2021.⁵⁵ On the one hand, that is roughly equivalent to the exposure one would get with a portfolio of about thirty-three stocks, which is coincidentally about the size

53. *Id.* (percentages as of year-end).

54. During that same period, the largest company in the index accounted on average for 3.83% of index value. *Id.*

55. *Id.* That is the highest such concentration of value since 1980 (which itself ranked as the third highest with 25.54% of value in the top ten stocks). For the record, the lowest level of top ten concentration since 1980 was 17.51% as of EOY 2014, and the average was 20.75% for the entire period. *Id.*

Although the ten largest holdings account for a large percentage of the aggregate value of the index (and thus any index fund), the specific stocks therein vary considerably from year to year. For example, ExxonMobil (XOM) was one of the three largest holdings every year from 2000 to 2014 and was the single largest holding in six of those years (from 2006 to 2011). But as of EOY 2019 (and since) XOM has not even been in the top ten holdings. *Id.*

Thus, XOM illustrates both the rationale for indexing and the need for periodic rebalancing, as well as the challenges thereof. One must wonder whether it really makes sense for energy stocks to account for as little as 2.7% of index value (as shown in the chart above). Indeed, it may be that the growth of index funds (and index investing generally) contributes to the demise (as it were) of stocks that fall out of favor by magnifying the effects of a price decrease. Then again, market capitalization is a function of return and not gross sales. So there may be some very big companies out there that do not make much money and thus do not show up in the index. Note also that only public float counts. So a company such as Wal-Mart whose stock is owned in large part by the founding family does not count for as much of index value as one might expect. Did the market really fall as it did in March / April 2020 or was it how we measured or adjusted?

of the DJIA. On the other hand, thirty or thirty-three stocks does not seem like many. Surely it is possible to be better diversified.

One might think that the solution is to invest in a still larger number of stocks. But even if one invests in the entire U.S. market, the largest constituent stock therein (AAPL) still accounted for 6.1 percent of index value as compared to 7.0 percent of the value of SPX as of December 31, 2023.⁵⁶

Another alternative might be to invest in the equal-weight version of the S&P 500 (“SPW”) where one would effectively invest the same amount in the largest company (AAPL, worth about \$2.9 trillion) as in the smallest company (FTI, worth about \$2.7 billion).⁵⁷ While holding an equal-weight portfolio would avoid placing almost 7 percent of one’s money in AAPL (or about 30 percent in the ten largest index companies), most of one’s money would also be invested in the smallest index companies. Although smaller companies tend to generate higher returns at lower risk than predicted by the capital asset pricing model (CAPM), it is not clear what the rationale would be for an investor who seeks the higher returns of small-cap companies to allocate some funds to large-cap companies. Moreover, such a strategy is doubly unclear because the individual stocks that comprise the S&P 500 are chosen according to size (as measured by market float). So what is the point of singling out the five hundred largest stocks in order to invest equal amounts in each?

Moreover, investing in SPW merely shifts the locus of risk and may actually increase it in the process. By definition, each company in the SPW accounts for 0.20 percent of index value. So, if a tiny company fails completely, the value of the index will fall accordingly. The question is whether a few likely failures of small companies is more worrisome than the unlikely failure of a big company. In addition, investing in stocks smaller than SPX stocks may entail subtle costs that outweigh the benefits of any increase in diversification. Such stocks may be less liquid and thus more expensive to trade and less efficient to price. Accordingly, it is possible that equal weighting would entail more portfolio balance trading (PBT).

It turns out that these questions are easy to answer. As shown above in Table 2, SPX is less volatile than SPW (as measured by standard deviation of total returns).⁵⁸ Admittedly, the risk inherent in SPX is only *slightly* less

56. Compare Vanguard Total Stock Market ETF (VTI) Factsheet (as of Dec. 31, 2023), https://institutional.vanguard.com/assets/corp/fund_communications/pdf_publish/us-products/factsheet/F0970.pdf, with Vanguard S&P 500 ETF (VOO) Factsheet (as of Dec. 31, 2023), https://institutional.vanguard.com/assets/corp/fund_communications/pdf_publish/us-products/factsheet/F0968.pdf.

57. See *SPDR S&P 500 ETF Trust*, S.E.C. S-3 (Jan. 19, 2018), <https://www.sec.gov/Archives/edgar/data/884394/000119312518014611/d469252d497.htm> (listing holdings).

58. Note that standard deviation here is measured according to total returns (assuming reinvestment) and not solely by price return, but that beta is measured solely by price return (which presumably includes

than the risk inherent in SPW—which suggests that the number of stocks held in a portfolio is much more important than their distribution—but the 10Y total return is also a bit lower. Moreover, turnover for SPW—the trading required to keep the portfolio balanced—was a whopping 24 percent compared to 2 percent for SPX for the most recent year.⁵⁹ Thus, five hundred appears to be the goldilocks portfolio. Not too small. Not too big. Getting the distribution just right shaves a bit more off the risk.

B. COMPANY-SPECIFIC RISK REVISITED

The foregoing discussion of the rationale for value-weighting suggests an important qualification to the idea that one can eliminate company-specific risk. It is not possible to eliminate company-specific risk entirely. The performance of any portfolio ultimately reflects an average of results for those individual companies. Every constituent company contributes to the average. And it is impossible to invest in a portfolio of stocks without selecting individual stocks in which to invest. Some company-specific risk, therefore, must remain. Again, in a market-weighted index fund based on SPX, the largest company therein (currently, AAPL) accounts for almost 7 percent of index value. If AAPL were to fail completely, the value of the index would suffer accordingly. Think Enron and WorldCom.

On the other hand, the argument for investing in a broad-market index fund depends only on the proposition that we have eliminated all of the risk we *can* eliminate. Thus, it may be more accurate to say that diversification can eliminate as much company-specific risk as *can* be eliminated. The fact that some company-specific risk remains does not mean that one should try to eliminate it. If we know it is impossible to eliminate any more company-specific risk, then it does not make sense to waste resources trying to do so.⁶⁰

Practically speaking, if one invests in SPX, the only risk that remains is the risk that the market as a whole will rise or fall. Admittedly, this is true *by definition* if one measures the market by SPX. If one invests in the stocks comprised by SPX, one will always match the performance of SPX. But that proves nothing unless SPX is known to be superior to every other measure of the market. So, the real question is why SPX is the best measure of the market.

the effects of reinvestment). Yet another version of the index reflects reinvestment of returns—presumably from an investment in the value-weighted version of the index. But this version of the index is useless for purposes of allocating funds going forward.

59. See *supra* Table 2.

60. Still, it is not clear that the risk that remains should be characterized as company-specific risk. As noted above, one form of risk is the risk of mispricing. See *supra* text accompanying note 35. But the fact that a stock performs worse (or better) than expected does not necessarily mean that we paid the wrong price for it. And we can eliminate the risk of errors in portfolio selection by eschewing stock-picking—by declining to seek out stocks that are misvalued.

To be sure, there is good reason to think that SPX is in fact an optimal portfolio—that it is the least risky portfolio at its level of risk. Nevertheless, measuring market returns by the same index effectively assumes the conclusion that we cannot eliminate the risk associated with investing so much money in the largest companies in the index.

V. THE IMPLICATIONS OF DIVERSIFICATION AND INDEXING

It should go without saying that for a fiduciary (agent) to incur unnecessary expense on behalf of a client (principal) is a literal and legal waste of assets and constitutes a breach of fiduciary duty. But it may not be self-evident why indexing implies that research into the merits of individual stocks—beyond monitoring market capitalization—is a waste of money (as asserted above). Why does elimination of company-specific risk imply no further gain from research?

The simplest answer is that once we have decided to invest in SPX based on the logic of its construction, we have no use for further research. There is nothing we can do with the insights provided by such research because to do anything to adjust our portfolio would be inconsistent with the logic of value-weighted indexing. A more nuanced answer is that if we have eliminated all company-specific risk, we have no reason to care about the risk entailed by specific companies or to do anything with information we might discover. Therefore, to devote any resources to seeking such information is a literal waste.

Similarly, the logic of diversification implies that research intended to identify mispriced stocks is a waste of money for an ordinary investor. It makes no sense for a diversified investor who has eliminated the risk of mispricing to pay for research designed to identify stocks that are mispriced.⁶¹ If an investor is confident that they have eliminated all risk that can be eliminated, there is nothing to be gained from paying for research about individual stocks.⁶²

Further, the same logic that militates against company-specific research militates against research relating to portfolio composition. If one buys into the logic of indexing, it is a waste of time to think about how to build a better portfolio. On the other hand, the rules of indexing do change now and then. For example, S&P decided some years ago to measure market capitalization by public float—the number of shares held other than by insiders—rather

61. To be clear, the argument for diversification is not based on the idea that the market is efficient. It is important to distinguish here between fundamental efficiency—the idea that market is accurate—and informational efficiency—the fact that one cannot beat the market consistently (any more often than would happen by chance). As noted above, if the market for a given security is fundamentally efficient, there is no need for an investor therein to diversify.

62. Again, there is nothing to be gained from holding a diversified portfolio of risk-free government bonds. *See supra* text accompanying notes 36.

than outstanding shares.⁶³ So it is not necessarily a waste of time to consider the merits of different approaches to indexing. But that is not something one would do routinely.

As shown above, indexing is the best way to achieve maximum diversification at the lowest possible cost—not only because it is cheap and easy to mimic an index, but also because a broad-market index such as the SPX relies on market prices to dictate how one should distribute funds among portfolio stocks. Thus, if one is committed to investing in a broad-market index fund, there is no point in second-guessing oneself by scrutinizing individual companies. To do so is a literal waste of assets. If such efforts cannot possibly make a difference in the end, why bother?⁶⁴

For a diversified investor the single most important factor to consider in choosing a fund is the management fee. Thus, index funds cater to investors who want diversification by declining to do research and thus keeping fees as low as possible. And indeed, management fees associated with index funds are significantly lower than those associated with actively managed mutual funds, averaging less than 0.10 percent per year of assets under management (AUM). In contrast, actively managed (stock-picking) funds incur management fees of about 0.82 percent on average.⁶⁵ Although 0.82 percent may not sound like much, total return for SPX has averaged about 6.36 percent over the last twenty years. At that rate of return, 0.82 percent makes a big difference.

Coincidentally (or not), studies show that on average managed funds underperform the market by about the average percentage management fee.⁶⁶ Moreover, the number of funds that beat the market several years running is about the number one would expect based on chance.⁶⁷ If I flip a coin enough

63. See John Spence, *S&P to Float-Adjust its Indices*, MARKETWATCH (Mar. 28, 2004, 7:40 PM), <https://www.marketwatch.com/story/sp-move-to-float-adjusted-indexes-will-create-turnover>. The primary rationale for using float-adjusted market capitalization for purposes of weighting is that it better reflects the true supply of shares available for trading and thus the liquidity of the stock. *Id.*

64. Cf. *Jander v. Ret. Plans Comm. of IBM*, 910 F.3d 620, 631 (2d Cir. 2018), *vacated and remanded*, 140 S. Ct. 592 (2020), *reinstated*, 962 F.3d 85 (2d Cir. 2020) (holding that trustee of ESOP cannot be held liable for purchase of shares expected to decrease in price unless trustee cannot have believed that failure to do so might do more harm than good).

65. The Investment Company Institute reports that the average-expense ratio paid by investors in actively managed equity funds is 0.82% as of 2016 (which does not include sales loads—one time entry or exit fees—that average another 1.1%). In contrast, the average-expense ratio for equity index funds is 0.09% annually. INV. CO. INST., *supra* note 2, at 38. Indeed, Schwab offers index funds with expenses of 0.03% and zero sales load. See Charles Schwab & Co., Charles Schwab & Co., *Summary Prospectus: Schwab S&P 500 Index Portfolio* at 1 (June 27, 2023) <https://connect.rightprospectus.com/Schwab/TADF/80850P206/SP?site=Funds>.

For SPDRs, the expense ratio is 0.0945% per year. SPDR S&P 500 ETF Trust, *supra* note 57, at 1. And again, Fidelity offers some index funds with zero management fees. See Booth, *supra* note 24.

66. This is no surprise really since the average return for the market as a whole is what it is.

67. See MALKIEL, *supra* note 32 (summarizing research indicating that on average, managed funds underperform the market by an amount about equal to the management fee). To be sure, an investor can avoid management fees altogether by constructing and maintaining a portfolio from scratch. But the

times, it will occasionally come up heads ten times in a row. But that does not mean I have skills.

Note that management fees as reported, and advertised, by mutual funds do not include the direct expenses of fund operations, such as brokerage commissions and custodial fees.⁶⁸ But index funds engage in very little trading as compared to actively managed funds. On average, portfolio turnover within index funds is about 4 percent (or less) per year, while turnover in actively managed funds is about 50 percent per year.⁶⁹ Assuming that both types of funds pay the same brokerage commission rates, actively managed funds pay more than twelve times as much in commissions as do index funds. Thus, index funds are all the more attractive because of lower operating expenses.⁷⁰

A. THE COMPULSION TO DIVERSIFY – AND INDEX

While the foregoing argument for diversification and indexing is compelling, it actually understates the case for such an investment strategy. Because diversified investors assume less risk for the same return, they are willing to pay a bit more for any given stock. Thus, a diversified investor

expenses associated with a do-it-yourself portfolio are significant. Mutual funds pay about one cent per share in brokerage commissions when they trade whereas the five dollars or so per trade charged by the deepest discount brokers works out to five cents per share assuming a round lot of one hundred shares. To be sure, mutual funds may also suffer additional implicit costs because their trades affect market prices. But individuals may suffer similar costs because of high-frequency trading (HFT) practices. Note that fund-level brokerage commissions are not included in the expense ratios set forth above because commissions are deemed to be expenses borne by the fund itself and not part of the management fee charged by the adviser. But since index funds trade far less than actively managed funds, commission expenses can be assumed to be proportionally smaller for index funds. *See generally* Roger Edelen, Richard Evans & Gregory Kadlec, *Shedding Light on “Invisible” Costs: Trading Costs and Mutual Fund Performance*, 69 FIN. ANALYSTS J. 33 (2013) (describing the various hidden costs of fund trading and their effect on investor returns).

68. Nor do they include so-called 12b-1 fees that many funds charge to defray promotional expenses. *See INV. CO. INST.*, *supra* note 2, at 110.

69. To be clear, turnover is typically measured by the ratio of the dollar amount of share sales over the course of a year to the total market capitalization of the shares held at the end of the year. Thus, turnover ratios are often said to be annualized. Turnover ratio often figures heavily in customer claims against their brokers for offenses such as churning. *See, e.g.*, *Miley v. Oppenheimer & Co.*, 637 F.2d 318 (5th Cir. 1981). Since brokers are typically paid wholly on commission—in proportion to the trading business they generate—the temptation to over-trade a customer account is obvious. In such cases, the traditional rule of thumb was that turnover of 200% or less per year is presumptively proper for any investor—despite the fact it is as much as 100 times the turnover of an index fund. Moreover, and more important for present purposes, churning was almost always accompanied by woeful under-diversification. As Woody Allen once said, a broker is someone who invests your money until it’s gone. *See* Roula Khalaf, *Even Woody Allen Would Be Lost for Words*, FIN. TIMES (Jan. 27, 2009), <https://www.ft.com/content/971d1838-ec9d-11dd-a534-0000779fd2ac>.

70. Moreover, because index funds trade less, they are less exposed to the cost of their own trading in terms of price effect (such as from frontrunning by other traders). And again, index funds are also more tax efficient although they are not tax driven. Rather, they are more tax efficient than other modes of investing in stocks both because they entail much less trading and because they force the sale of losers. *See supra* text accompanying note 17.

will outbid another investor who buys one stock at a time based on assessment of company-specific risk because diversified investors do not care about company-specific risk.⁷¹ It follows that market prices are set by diversified investors because diversified investors are willing to pay more. Given that diversified investors have hedged away all company-specific risk, they are willing to pay more for the stocks in which they invest (all else equal). Thus, the market does not compensate investors for assuming company-specific risk because it is not necessary to assume such risk. Market prices are portfolio prices. Indeed, as more investors have diversified—and indexed—over the years, stock prices have generally risen. In other words, the growth of diversification—and indexing—has effectively bid up the price of equities generally.⁷²

Thus, a stock-picking investor who declines to diversify must pay the higher prices set by diversified investors even though the stock-picking investor assumes more risk. Investors who choose not to diversify effectively pay too much by assuming more risk than necessary for the same return. As a result, investors have no real choice but to diversify.⁷³

The logic of investing in a diversified portfolio of stocks leads ultimately to the conclusion that most investors are effectively compelled to diversify. To be sure, individual investors are free to invest however they see fit. They are perfectly free not to diversify. But the logic of diversification implies that a *fiduciary* has a duty to diversify if not to recommend indexing for all their clients.⁷⁴

71. The fact that the market does not offer any return for the assumption of such risk does not prevent stock-picking investors from looking for such gems. Indeed, one of the most popular websites among traders is called Seeking Alpha, which describes itself as the largest investing community in the world. See SEEKING ALPHA, <https://seekingalpha.com> (Mar. 14, 2024). For the record, the alpha in its name refers to the portion of risk that can be diversified away as distinguished from beta risk which is the tendency of a stock to move with the market. Thus, Seeking Alpha is expressly pitched to stock-pickers. See MALKIEL, *supra* note 32, at 215–18.

72. Data suggests that over the period 1930 through 2016, increasing P/E ratios have accounted for a sizable portion of price return as shown in the chart below. See Richard A. Booth, *Appraisal Rights and Economic Growth*, 73 BUS. LAW. 1011, 1022 (2018) (noting that 0.62% of price return is attributable to a general increase in the value of equities as measured by the forward price/earnings ratio). It seems quite likely that this element of growth has been the result of increasing diversification as well as declines in commissions and other expenses of investing. See Booth, *supra* note 23, at 466 (stating that in the 1980s “[a]s brokerage commissions fell, it became almost costless to assemble a diversified portfolio”). This gain is part of the historical average return on stocks, but it cannot be repeated barring a mass exodus from diversified funds.

73. By analogy to Gresham’s Law—that bad money drives out good money—one might say that diversified investors drive stock-pickers from the market since stock-pickers are forced to pay prices that are determined as if there is no company-specific risk. Call it Booth’s Law. In other words, stock-pickers assume additional risk without the prospect of any additional return.

74. See RESTATEMENT (THIRD) OF TRUSTS § 229 cmt. d (AM. L. INST. 1992); *Robertson v. Cent. Jersey Bank & Tr. Co.*, 47 F.3d 1268, 1273 (3d Cir. 1995); see also Rob Berger, *How to Invest Money Based on Advice From Warren Buffett*, FORBES (Nov. 24, 2020, 10:57 AM), <https://www.forbes.com/sites/robertberger/2020/11/24/how-to-invest-money-based-on-advice-from-warren-buffett/?sh=3b932534526c>. Berger quotes Buffett’s 2013 letter to Berkshire Hathaway

The bottom line is that it is irrational for most investors not to diversify. But to diversify is to render research a literal and legal waste of resources. Thus, it is also irrational to spend anything more than the minimum possible amount on investment management.

Admittedly, it is perfectly rational for an investor who wants to influence management—such as an activist hedge fund—to put more eggs in one basket. But price pressure from diversified investors dictates that a hedge fund must pay a premium for the privilege of remaining undiversified.⁷⁵ That is probably a good thing. It means that hedge funds will seek out companies whose performance can be improved *significantly*. But for ordinary common stock investors with no reasonable expectation of influencing company management or business policy, it is irrational not to hold an index fund. And it follows that it is a breach of fiduciary duty for an investment adviser not to recommend indexing for such an investor.

B. SOME ADDITIONAL BENEFITS OF INDEXING

Although the foregoing discussion should suffice to explain why investing in a capitalization-weighted index fund is a compelling strategy for most investors—especially the fact that it generates higher compound returns—it does not capture all of the attendant benefits.

One additional benefit is that indexing forces investors to invest in industries that they might otherwise ignore. Indeed, while indexing is often seen as a passive strategy, it is really quite aggressive in that it seeks to uncover every possible source of return.

Another subtle benefit is that indexing acts as a costless hedge of sorts. Sometimes the losses suffered by one portfolio company generate gains for other portfolio companies—for example, when one portfolio company loses

shareholders, where Buffett described how he has advised trustees to manage the money he will leave to his wife: “Put 10% of the cash in short-term government bonds and 90% in a very low-cost S&P 500 index fund (I suggest Vanguard’s). I believe the trust’s long-term results from this policy will be superior to those attained by most investors—whether pension funds, institutions or individuals—who employ high-fee managers.” *Id.*

It is ironic that some investment advisers emphasize their status as fiduciaries but also express disdain for what they call cookie-cutter portfolios. For example, the website for Fisher Investments includes the following FAQ and answer thereto:

Q: What makes Fisher Investments different from other money managers?

A: Other money managers may offer cookie-cutter portfolios or strategies based on a single style of investing. That means you’re getting the same advice as everyone else, regardless of your situation. While other managers may consider just your age or risk tolerance, Fisher Investments learns about your goals, financial needs, health, age, family and more.

What Makes Fisher Investments Different From Other Money Managers, FISHER INVS., <https://www.fisherinvestments.com/en-us/resource-library/faqs/frequently-asked-questions/what-makes-fisher-different-from-other-money-managers> (last visited Mar. 12, 2024).

75. See *supra* text accompanying note 72.

a major customer to another portfolio company. Or in the case of a natural disaster, insurance companies may lose while construction companies gain.⁷⁶

Yet another benefit of indexing is that it encourages investor discipline. Investing in an index fund is akin to Odysseus lashing himself to the mast to resist the Sirens. Again, investors should avoid the expenses of investment advice and investment management to the extent possible. But even investors who are quite devout about diversification may be tempted to jump from fund to fund or indeed to invest in multiple funds.⁷⁷ Indexing permits and thus encourages investors to stop worrying about choosing stocks or even funds (other than based on the management fee). Similarly, indexing also encourages long-term investment. By eliminating the temptation to trade, investors are induced to hold stocks longer than they might otherwise be inclined to do.

Finally, and somewhat paradoxically, PBT requires index funds to sell losers—which is one reason why such funds are said to be tax-efficient. But for present purposes, indexing counteracts the reluctance of many investors to sell stocks that have declined in price—mostly because PBT requires it, but also because an investor who understands the logic of indexing (and eschewing stock-picking) will form no attachment to the stocks in their portfolio.

Aside from these direct benefits, indexing also avoids some hidden risks that go with investing in actively managed stock-picking funds that seek to beat the market. One such danger is the practice of so-called “window-dressing.” Under SEC regulations, funds must report their holdings to the public sixty days after the end of each quarter.⁷⁸ So fund managers may be tempted to sell losers and buy winners before the cut-off date. By doing so the fund manager can avoid reporting that they bought or held stocks that declined in value and rather bought or held stocks that increased in value. Thus, it may appear to anyone who reads such reports that the fund manager is quite talented. But because window dressing happens after the price of the subject stock has fallen or risen, the effect is to buy high and sell low. These losses will show up one way or another as will an increase in turnover. Savvy investors are not likely to be fooled by a report showing that the fund held

76. To be clear, this argument for indexing differs slightly from the central argument for diversification which relies on the law of large numbers and the random distribution of returns. In contrast, this argument relies on the idea that the economy is largely—but not entirely—a zero-sum game. Another possible benefit of indexing in general (and capitalization-weighting specifically) is a function of big-is-good—that (all else equal) the biggest company in a given industry enjoys a competitive advantage—which seems to be an article of faith among business scholars. *But see* E. F. SCHUMACHER, *SMALL IS BEAUTIFUL: ECONOMICS AS IF PEOPLE MATTERED* 9 (1973) (arguing that more small business makes more people better off).

77. *See, e.g.*, E. Napoletano, *What Is a Fund of Funds?*, FORBES ADVISOR (Jan. 5, 2023, 5:39 PM), <https://www.forbes.com/advisor/investing/what-is-fund-of-funds> (noting the problem of fee stacking and possible over-diversification from holding the same underlying stock through different funds).

78. *See* 17 C.F.R. § 270.30b1-5 (2004).

nothing but winners at the end of the previous quarter. Nevertheless, fund managers persist.

The practice of window dressing is closely related to the possibility of closet indexing—which many investors in actively managed funds see as verging on bad faith, if not a breach of fiduciary duty by fund managers.⁷⁹ The worry is that a fund's holdings may be so similar to those of an index fund as to obviate any possibility of beating the market. Why then should fund investors pay for active management? To be sure, fund managers may see the strategy as hedging against losses: While they are eager to report that they have beaten the market, they are more fearful of being beaten thereby. But the price of hedging is forgoing the prospect of extra return. In any event, investors who prefer actively managed funds worry about closet indexing.⁸⁰

Finally, index funds offer a way to lock in a fiduciary relationship. Whereas the manager of an actively managed fund can change investment strategy almost with impunity, an index fund manager is duty-bound to follow the logic of indexing. Thus, index funds offer another subtle way to minimize risk by avoiding the risk that a fund manager may change horses midstream by opting for a strategy disfavored by investors. In other words, indexing minimizes agency costs.

C. THE PASSIVITY PARADOX

As noted above, index funds do very little trading. But if there is no point in research and stock-picking, why would an index fund ever trade at all—even if such trading amounts to a mere 4 percent or so of aggregate value annually?⁸¹ In other words, why do index funds trade at all other than to deal with inflows and outflows of investor funds? If one can eliminate all of the risk that goes with stock-picking by investing in a diversified portfolio, why not avoid the expenses of trading altogether by following a strict buy-and-hold strategy?

Although indexing is often described as passive investing, it is not a buy-and-hold strategy. Quite to the contrary, indexing entails some periodic trading to keep the portfolio in balance. As explained at length above, many

79. See Selena Maranjian, *Closet Indexing: Window Dressing is Alive and Well in Fundville*, MOTLEY FOOL (Apr. 5, 2017, 9:36 PM), <https://www.fool.com/investing/mutual-funds/2008/04/22/closet-indexing.aspx>.

80. See *supra* text accompanying note 2. It is no surprise that data is readily available measuring the extent to which fund holdings match up with SPX. The most common such statistic is R^2 which regresses fund holdings against SPX. If R^2 equals 1.00 (100%), holdings are perfectly correlated. For example, Fidelity Magellan (FMAGX) was reported to be about 94% correlated with SPX as of late 2020 whereas all such similar large growth funds on average were about 91% correlated. See *FMAGX Investment Report*, MORNINGSTAR, <https://investor.morningstar.com/quotes/OP00002PNZ> (select “Download Report”) (data through Feb. 29, 2024).

81. See *supra* text accompanying note 68. This argument is a variation on the classic efficiency paradox. See *infra* text accompanying note 92. See also *infra* text accompanying note 84 (discussing price effects of trading and how ETFs compensate for them).

leading index funds seek to mimic the composition of SPX—a capitalization-weighted index comprising the stocks of the five hundred largest US companies held in proportion to the aggregate market capitalization of each constituent company. For example, if ABC is worth \$100 billion and XYZ is worth \$10 billion, the index would constructively hold ten times as much stock of ABC as it would hold of XYZ. But market prices change continually. ABC may fall in value to \$90 billion while XYZ may rise in value to \$20 billion. If so a capitalization-weighted index fund would need to sell ABC shares and buy XYZ shares until the proportion reaches nine parts of ABC for every two parts of XYZ.⁸² As a result, the composition of SPX changes over time as prices of constituent stocks rise and fall relative to each other. Thus, because stock prices rise and fall, the market portfolio must be rebalanced periodically and index funds that track SPX must do some trading to maintain holdings in proportion to market capitalization as a result.⁸³

The practice with SPX (the index itself) is to rebalance quarterly, while the leading SPX ETF (exchange-traded fund)—SPDRs (SPY)—rebalances at least monthly.⁸⁴ But the trading prompted thereby is minimal. For the year 2016, turnover for SPX itself was 4.69 percent and was an even lower 4 percent for SPY.⁸⁵ In contrast, the average turnover rate for actively managed equity funds is at least 50 percent per year and probably higher.⁸⁶

82. Note that holdings here are measured in the dollar amount of each stock and not the number of shares.

83. For example, XOM fell out of the top ten SPX holdings as of EOY 2018 even though it had been the very largest holding from 2006 to 2011. See S&P Dow Indices, S&P 500 Top 10 Issues Annually by Percent of Index Market Value from 1980–2020 [Microsoft Excel spreadsheet] (on file with publication). The question is should one adjust or not for changes that seem likely to be temporary?

84. See *S&P 500 Equal Weight Index Methodology*, S&P DOW JONES INDICES (Aug. 2016), <https://www.spglobal.com/spdji/en/indices/equity/sp-500-equal-weight-index/#overview> (noting rebalancing frequency within the S&P 500).

85. See SPDR S&P 500 ETF Trust, *supra* note 57, at 2 (recording SPDR rates of capitalization weighted turnover); *S&P Capitalization Weighted Turnover (One Way)*, S&P GLOBAL, <https://www.spglobal.com/spdji/en/indices/equity/sp-500/#overview> (under “Additional Info,” select “Capitalization Weighted Turnover”).

This data suggests that monthly rebalancing is better than quarterly. But it does not prove that monthly rebalancing is optimal.

Virtually all funds must engage in PBT to some extent. Even SPW—the equal weight version of the S&P 500—must rebalance to keep the weight of each stock therein equal. Indeed, the turnover rate for SPW is much higher than for SPX. See *supra* Table 2. The DJIA also rebalances periodically, although it does so at the discretion of index management. See *Dow Jones Average Methodology*, S&P DOW JONES INDICES 3, 5 (Dec. 2023), <https://www.spglobal.com/spdji/en/documents/methodologies/methodology-dj-averages.pdf>. The exception is a unit investment trust (“UIT”) wherein a fixed portfolio of securities is held for a specified period. Technically, SPY is a UIT but the holding period lasts only until the next rebalancing.

86. The Investment Company Institute (“ICI”) has reported that the average turnover rate for all equity funds was 26% as of 2016. Assuming that roughly half of investor funds are indexed, a 26% average turnover rate for all funds translates to an average turnover of 52% among managed funds. See *2017 Investment Company Fact Book*, INV. CO. INST. 38 (57th ed. 2017), <https://www.ici.org/doc->

To be sure, commissions and spreads today are minimal. But the cost of trading also includes the effect thereof on market prices. When a fund buys or sells a given stock, the price thereof may rise or fall even before the fund can complete its trade because the market knows how index funds work and when they are likely to buy or sell. Moreover, market makers and other traders may notice the increased volume—especially since the advent of high frequency trading (“HFT”). Indeed, studies indicate that for funds (of all sorts) these front-running costs are somewhat greater than the cost of commissions.⁸⁷

On the other hand, ETFs—as opposed to index mutual funds—can compensate to some extent for these costs because they trade during the day like individual stocks. Thus, the price of an ETF may vary a bit from the value of the index itself. In that sense, an ETF is a bit like a futures contract—albeit one that settles continuously. Indeed, ETFs have been used as a substitute for index futures in connection with index arbitrage program trading.⁸⁸ But the point for present purposes is that the market price of an ETF may reflect these subtle costs of trading at the fund level.⁸⁹ The implication is that investors in index ETFs are likely to do a bit better than investors in index mutual funds because the price of an ETF reflects the cost of trading. The difference is likely to be quite small. But in a world of generally low returns, every little bit helps.

server/pdf:2017_factbook.pdf (noting that the long-term average turnover for the period 1984 to 2016 was 57%).

Market-wide, turnover has been dropping steadily over the last fifteen years. See *United States NYSE: Turnover*, CEIC, <https://www.ceicdata.com/en/united-states/nyse-turnover> (recording that the average turnover rate for NYSE group listed stocks peaked at 179% (monthly annualized) in March 2009 and declined to 45% in August 2018 after which data is not available) (last visited Mar. 14, 2024). No doubt this trend is due in part to investor movement into index funds.

Needless to say, an index (as such) does not pay any brokerage commissions when it constructively trades. Nor does it charge any fee against itself for the expense of maintaining the index—gathering and analyzing price and return data. Thus, a fund that invests real money cannot ever quite match the performance of the index itself.

87. See Matteo Aquilina, Eric Budish & Peter O’Neill, *Quantifying The High-Frequency Trading “Arms Race”* 1 (Nat’l Bureau of Econ. Rsch., Working Paper 29011, 2021), <http://www.nber.org/papers/w29011>.

88. See generally Richard A. Booth, *The Uncertain Case for Regulating Program Trading*, 1994 COLUM. BUS. L. REV. 1 (1994).

89. It is well known that when a stock is added to an index, its price increases. And vice versa. Thus, it seems likely that when a stock is on the verge of being added to an index, its price will likely rise as traders anticipate more demand for such stocks. So even the index pays more. Some index funds effectively avoid these costs by investing in more than 500 stocks. Note also that ETFs effectively adjust for such costs because they trade throughout the day rather than at a price fixed at the end of the day. See Jay Fitzgerald, *Stock Price Reactions to Index Inclusion*, NBER (Nov. 2013), <https://www.nber.org/digest/nov13/stock-price-reactions-index-inclusion>.

VI. THE DARK SIDE OF DIVERSIFICATION

Some commentators have argued that indexing does affirmative harm to the markets by subtracting from the quantity and quality of investor research.⁹⁰ The suggestion seems to be that investors have a duty to do research whether they like it or not and whether they need it or not: Everyone should do their part to keep the market efficient—just like everyone should vote.⁹¹

Again, this worry is a variation on the efficiency paradox, which is really no paradox at all. The classic worry is that if investors believe that the market is efficient—in the sense that market prices react quickly to new information or that they reflect the best estimate of stock value—then they will stop doing research. The market will cease to be efficient. Prices will diverge from what they should be, and research will once again become an economically rational thing to do. But in the real world, we do not see wild swings in the quantum of research done by investors or the efficiency of the market. Rather, the paradox is an allegory of sorts about how the market works. If some investors think other investors are less informed, they will do research until a dollar spent thereon generates merely a dollar in gain. In other words, they will stop doing research when it is more costly than the extra return it generates. But that is exactly what we mean by equilibrium. Accordingly, the efficiency paradox is true, yet trivial.⁹²

More importantly, indexing is not about devotion to the efficient market. Rather, indexing derives from the logic of diversification, which is all the more compelling if one is worried that the market is inefficient—if one is worried about the risk of mispricing.⁹³

The argument that index funds shirk their duties as investors seems to be based on the idea that indexing is nothing more than a thinly veiled way of free-riding on the efforts of quality shareholders (as they are sometimes called).⁹⁴ To the contrary, indexing follows from the logic of diversification. And index fund investors affirmatively want index fund managers to spend as little as possible on research and monitoring of individual portfolio companies. This is not (so much) because they expect someone else will do

90. *See supra* text accompanying note 3.

91. Thanks to Professor Marvin Chirelstein who once argued (to himself) that voting made little sense since he was unable to affect the outcome. But then he asked himself: What if no one bothered to vote? Well, then I would vote, he said.

92. On the other hand, such wild swings do evolve in some slow-moving markets such as for agricultural products which is why the commodities markets were established. *Cf.* *Brane v. Roth*, 590 N.E.2d 587, 591 (Ind. Ct. App. 1992) (holding directors of cooperative grain elevator liable for failure to consider decision by general manager not to engage in hedging in the commodities market).

93. *See supra* text accompanying note 35.

94. *See supra* note 2. Regarding the idea of quality shareholders, see, for example, LAWRENCE A. CUNNINGHAM, *QUALITY SHAREHOLDERS: HOW THE BEST MANAGERS ATTRACT AND KEEP THEM* (1st ed. 2020).

the work, but rather because there is nothing that an index investor can do with the product of such efforts.⁹⁵

Some critics worry that index funds may have too much power, that too many investors have gravitated to index funds, and that fund managers may thus be able to exert excessive influence over portfolio companies.⁹⁶ While wholly different, these worries may be somewhat connected to worries about free-riding if index fund managers somehow subvert the corporate governance system by failure to vote or otherwise to show up when it is important to do so.

So there are two possibilities. One is that index fund managers might abuse their considerable influence; the other is that they will fail to exercise their rights as stockholders (and that their failure will somehow undermine the market). As I argue elsewhere, neither of these possibilities is a real worry.⁹⁷ But the point for present purposes is that they are two different worries.

The more relevant concern for present purposes is that the market may not work as well as it does now if too many stockholders tune in and turn on to indexing and drop out of doing company-specific research. So, the question is how much *informed* trading is necessary to keep the market efficient—to facilitate the process of price discovery (as it is sometimes called).⁹⁸ Some studies from the late 1990s and early 2000s found that only about one-quarter of trading was then motivated by stock-picking. The studies suggest that it would be enough if as little as about one-tenth of trading volume was attributable to informed investors—those who do company-specific (or fundamental) research—for the market to be as efficient as it needs to be.⁹⁹

95. SCOTUS has made a similar point in defining materiality, namely that a fact cannot be material if it makes no difference as a matter of law. See *Santa Fe Indus., Inc. v. Green*, 430 U.S. 462, 474–76 (1977); *Va. Bankshares, Inc. v. Sandberg*, 501 U.S. 1083, 1107–08 (1991).

96. See JOHN COATES, *THE PROBLEM OF TWELVE: WHEN A FEW FINANCIAL INSTITUTIONS CONTROL EVERYTHING* 27 (2023).

97. See Booth, *The Proper Role of Index Funds*, *supra* note 24.

98. The term informed trading was first used by Ronald Gilson and Reinier Kraakman in their classic article. Ronald J. Gilson & Reinier H. Kraakman, *The Mechanisms of Market Efficiency*, 70 VA. L. REV. 549, 578–79 (1984). Regarding the price discovery process, see Ekkehart Boehmer & Juan (Julie) Wu, *Short Selling and the Price Discovery Process*, 26 REV. FIN. STUD. 287, 287 (2013).

99. See Richard A. Booth, *The Buzzard Was Their Friend – Hedge Funds and the Problem of Overvalued Equity*, 10 U. PA. J. BUS. & EMP. L. 879, 894–95 n.51 (2008) (collecting studies). Compare data regarding non-competitive bidding for government securities. Neither is it clear how efficient the market needs to be. Given that market prices change continuously, it seems obvious that we do not need total precision. What would that even mean? Rather, it is good enough if prices are good enough. Note changes in market micro-structure from spreads of one-eighth dollar to one cent. Cf. FRANCIS FUKUYAMA, *THE ORIGINS OF POLITICAL ORDER: FROM PREHUMAN TIMES TO THE FRENCH REVOLUTION* 248–49 (2011) (discussing “good enough” government). For the record, trading volume for SPX stocks as measured by aggregate share volume divided by index value has been relatively stable since 1985 except for the years 2008 through 2012 but somewhat higher following that period than before that period. Data on file with author.

To be clear, the logic of diversification and indexing does not apply to activist investors—such as Warren Buffett—who seek to influence the business strategies of investee companies. For such investors, expected returns derive from active participation in management.¹⁰⁰ For them, it is no contradiction to expect a return to exceed an expected return (so to speak). Market efficiency does not imply that a business cannot be improved. So the logic of diversification (and indexing) does not apply as much to such investors as it does to ordinary investors who must invest in a company *as is*. Indeed, diversification is an affirmatively *bad* idea for activist investors who must carefully choose the businesses in which they invest. Although such an investor might build a somewhat diversified portfolio over time (as Buffett has), the more one knows about each target business or industry when making an investment, the better one will do.¹⁰¹

In addition, there will always be some ordinary investors (and traders) who disdain the idea of the efficient market—who think they know better than the crowd and think they can beat the market even though few ever succeed in doing so.¹⁰² But it seems an odd idea that we should depend at all on the efforts of arguably irrational investors, who trade on idiosyncratic whims and hunches.¹⁰³

As such, the trend toward indexing among ordinary investors does nothing to detract from the volume of informed trading by activist investors. Still, is such trading enough? Does it matter that stock-picking by individual investors has declined? Perhaps more specifically, does it matter that investors have moved away from actively managed funds, and that actively managed funds have responded by trading less? In the end, it is not clear how

100. See MALKIEL, *supra* note 32, at 40, 184.

101. This same logic applied in the rise and demise of conglomerate mergers and acquisitions. It was the idea of diversification—together with other factors—that prompted the formation of holding companies beginning in the 1960s on the theory that a diversified conglomerate would be worth more as a whole than the sum of its parts. However, the market ultimately discovered that it is easier and cheaper (and more rewarding) for investors to hold diversified portfolios of companies more focused on doing what they do and doing it very well. Booth, *supra* note 23, at 464.

Thus, one subtle benefit of diversification and indexing by large numbers of ordinary investors is that it makes takeovers more expensive. As noted above, activist investors (hedge funds, private equity funds, and other investors who seek to influence the management strategies of target businesses) must pay the premium prices that are effectively set by diversified investors in order to gain influence or control. It follows that they must perceive significant room for improvement. See *supra* text accompanying note 72. This should be somewhat reassuring to those who suspect that such investors are focused on short-term returns or otherwise seek to promote policies that are inconsistent with the interests of minority stockholders and the broader economy. In other words, because of diversification and indexing by the mass of investors and the consequent increase in stock prices, acquirors must pay higher prices to gain control. The presumable result is that there are fewer takeovers. And those that still make economic sense are presumably higher quality opportunities that generate greater gains.

102. Although stock pickers are unlikely to beat the market, neither are they likely to be beaten by the market (by much) because the market is quite efficient even for individual stocks. Cf. JAMES SUROWIECKI, *THE WISDOM OF CROWDS: WHY THE MANY ARE SMARTER THAN THE FEW AND HOW COLLECTIVE WISDOM SHAPES BUSINESS, ECONOMIES, SOCIETIES AND NATIONS* 580 (2004).

103. See *supra* text accompanying note 6 (regarding import of how to define a reasonable investor).

to answer these questions because it ultimately depends on knowing how much trading is necessary. It may be that there is more trading today than we really need.¹⁰⁴ It also raises the logically prior question of what constitutes informed trading. Have we lost anything of real value that helps to keep the market efficient?

Whatever the answer to this question—if there is an answer—it is not accurate to characterize PBT by index funds as uninformed trading. It is very much informed and disciplined as to the relative market capitalization of portfolio companies. As such, PBT serves to reward companies who do what they should do—who maximize share value—and to punish companies that do not do so.¹⁰⁵ Whereas activist investors and actively managed funds might give an underperforming portfolio company some slack, an index fund must do what it says it will do.¹⁰⁶

The critics would presumably concede that different investors and traders focus on different factors when they make investing and trading decisions.¹⁰⁷ And the critics would also likely concede that it takes all kinds (so to speak)—that the market is better off if investors and traders follow many different strategies in making their investing and trading decisions. It seems quite unlikely that anyone would argue that all investors and traders should focus on the same factors—that they should make their decisions in

104. One way to approach the question might be to look at volatility since volatility is presumably a function of trading volume. But how do we know how much volatility is enough or too much? While there is no obvious answer to this question, it is possible to trade futures based on the level of volatility in the market. And if we know the value of volatility, we know something about the optimum level of trading.

105. Needless to say, it is not universally agreed that the overriding goal of public corporations should be to maximize stockholder wealth. Indeed, there is much recent scholarship on the question of shareholder primacy. See Martin Lipton, *The Purpose of the Corporation*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Apr. 11, 2018), <https://corpgov.law.harvard.edu/2018/04/11/the-purpose-of-the-corporation>.

106. Thus, publicly held companies have become quite focused on market capitalization. One striking example may be seen in the recent litigation relating to the compensation package granted by Tesla to Elon Musk. See *Tornetta v. Musk*, C.A. No. 2018-0408-KSJM, 2024 WL 343699 (Del. Ch. Jan 30, 2024) (ordering rescission for lack of fair dealing and fair price where board of directors effectively failed to negotiate terms of the grant). As the court's lengthy opinion reveals, the single most important measure for the vesting of options granted under the plan was achievement of a series of market capitalization hurdles. a somewhat more entertaining example of focus on market capitalization—and how index funds operate to magnify the disciplinary force of the market—can be seen in Season 3, Episode 5 of the HBO series *Succession*, where Roman Roy worries that the market capitalization of the family company (Waystar Royco) has declined to less than that of the company it seeks to acquire, thus exposing the family company to the threat of itself being acquired. See Jamie Powell, *What Is Waystar Royco's True Valuation?*, FIN. TIMES (Nov. 30, 2021), <https://www.ft.com/content/0d92b938-fa8a-4019-8bcc-fb482eb1a7b4>.

107. For example, some investors and traders subscribe to various schools of fundamental analysis, while others follow the tenets of technical analysis. See MALKIEL, *supra* note 32, at 98. While most investors invest long, others engage in short selling. See, e.g., *GAMCO Invs., Inc. v. Vivendi Universal, S.A.*, 838 F.3d 214, 222–23 (2d Cir. 2016) (affirming finding that FOTM presumption of reliance on market price had been rebutted as to plaintiff class member who followed proprietary strategy to determine mispriced stocks).

lockstep with each other based on some single mode of analysis. Rather, the argument would likely be akin to the admonition to attend the church of your choice. But if so, it is difficult to see exactly what the argument would be.¹⁰⁸ To be sure, PBT contributes relatively little to aggregate volume. So, the argument might be that index funds should trade more than they do. But it is difficult to see how this argument would fare any better than the argument that index funds ought to do more research. Again, unless it can be argued that there is one true approach to analysis that one ought to follow as a righteous investor, the argument that one should trade more is bound to fail.¹⁰⁹

Moreover and perhaps more important, indexing acts as a check on wasteful efforts to beat the market by providing investors with an alternative to the costly casino version of investing.¹¹⁰ Thus, the emergence of indexing permits the market to fine-tune how much gets invested in research and in that sense makes the market even more efficient than it might otherwise be.

There is also a sense in which indexing by significant numbers of investors creates trading opportunities for *other* investors. Since PBT is based on the *past* performance of portfolio stocks, index funds and the index itself must lag the market in individual stocks. Accordingly, index investors effectively cede some gain to first movers—the active traders who collectively effect real change in the prices of individual stocks. And since everyone knows the trading strategy of index funds, other investors can engage in front-running—trading ahead of index funds on the basis of the likely effect index fund trading will have on market prices. So one might argue that indexing mildly encourages others to engage in more informed trading than they otherwise might.¹¹¹

108. I am reminded of the movie *What's Up Doc?* in which Ryan O'Neill, frustrated by the antics of Barbra Streisand, says with exasperation, "You're so different!" to which she replies, "I'll try to be the same." *WHAT'S UP, DOC?* (Warner Bros. 1972).

109. Again, the critics have misunderstood how indexing works. They seem to assume (incorrectly) that index funds do no trading at all—that they are akin to the UITs of old that assembled a fixed portfolio to be held for some specified number of years and then liquidated. Although many ETF index funds are indeed organized as UITs because that is the category that fits best for purposes of SEC rules, it is simply incorrect to think that index funds eschew all trading.

110. See Lynn A. Stout, *Are Stock Markets Costly Casinos? Disagreement, Market Failure, and Securities Regulation*, 81 VA. L. REV. 611, 664 (1995); see also Paul G. Mahoney, *Is There a Cure for "Excessive" Trading?*, 81 VA. L. REV. 713, 717 (1995); Lynn A. Stout, *Agreeing to Disagree Over Excessive Trading*, 81 VA. L. REV. 751, 751 (1995).

111. As noted above, PBT effectively requires an index fund to buy high and sell low. On the other hand (and as noted above), index ETFs may exploit the trading opportunities created by indexing (which explains why this rather exotic instrument was added to what might have seemed a surplus population of derivative instruments in the first place) since the price of an ETF may vary from both the underlying stocks and the index itself (whether in anticipation of pending PBT or for other reasons). As with program trading, if the index is overpriced relative to the underlying stocks (for example), they can bid down the price of the ETF accordingly. Indeed, ETFs have been heavily used for program trading. So, there is good reason to think that trading by index investors neutralizes much of any advantage that goes to active traders (and indeed may exploit its own mirror advantage). But this is itself a form of informed trading.

Similarly, the trend toward indexing has the effect of magnifying the efforts of activist investors to effect reform in the companies they target. Since some index funds engage in mirror voting—casting their votes in proportion to the votes of other investors—activist investors can exert more influence than they otherwise would be able to exert.¹¹² To be sure, the overall effect of diversification (and thus indexing) has been to raise stock prices by reducing investor risk and thus to make takeovers generally more expensive. But the tendency of indexing and PBT to magnify changes in the price of individual stocks both up and down may magnify the gains of activist investors and create more lucrative opportunities for activist investment in disfavored companies.

In short, it seems at least plausible to conclude that indexing and index funds live in a symbiotic relationship with activist stock-picking investors and the funds that cater to them. In other words, it is not at all clear that indexing detracts from the efficiency of the market. Quite to the contrary, indexing may make the market a bit more efficient than it otherwise would be by reducing the noise in the system.¹¹³

CONCLUSION

The idea that a prudent investor should be diversified is widely accepted if not incontrovertible for ordinary investors—investors who have no reasonable expectation of influencing company management or business policy. Indeed, fiduciary duty requires that trustees and other investment managers assure that their clients be diversified. But the idea of diversification is insufficiently articulated or understood even by sophisticated investors. As shown here, diversification can eliminate almost all of the company-specific risk that goes with investing in equities without any sacrifice of expected return. The only risk that remains is the risk that the market as a whole may do better or worse than expected. It follows that diversified investors who assume less risk by merit of their diversification will pay more for the shares in which they invest and will thus dictate market

112. See Booth, *The Proper Role of Index Funds*, *supra* note 24.

113. Indeed, it has been said that program trading (index arbitrage) is ultimately a service to actively managed mutual funds and other stock-pickers whose trading distorts the relationship of individual stocks to the market as a whole. On the other hand, the peculiar interests (and disinterests) of index investors may have implications for law, regulation, and public policy that differ from those that would serve the interests of other investors. For example, index investors might prefer market prices to adjust more quickly all else equal and might thus disfavor prosecution of insider trading that has the effect of accelerating price adjustments (while favoring the prosecution of cases where the defendants have perpetuated mispricing) because index investors eschew stock-picking and have no interest in identifying mispriced stocks. Similarly, index investors are likely to oppose securities fraud class actions that seek to recover from the company for misstatements of fact because as index investors they are likely to hold many more shares from before any such fraud than they are likely to buy during the fraud period. Thus, index fund investors will almost always lose more because the company pays than they gain from their share of any recovery. I discuss these and other differences between the interests of index investors and other more conventional stock-picking investors in a forthcoming piece. *See id.*

prices. It further follows that undiversified stock-picking investors assume more risk than necessary and thus pay too much for the stocks in which they invest.

The logic of diversification explains why investors have flocked to index funds, which offer maximum diversification for minimum fees. But the idea of diversification alone does not explain how much to invest in which companies. Fortunately, the market provides the answer to this question, and the answer turns out to be indexing. Generally speaking, we can depend on individual companies to maximize returns for their own stockholders by seeking out the most profitable opportunities in which to do business. Since market price is a function of expected return, ordinary investors should invest their funds in proportion to the aggregate market value of investee companies because by doing so, investors are assured that their money is spread evenly across all lines of business in the economy in proportion to prospects for return. Perhaps unsurprisingly, the value-weighted version of the SPX comprises exactly that portfolio. Thus, investing in an index fund that tracks SPX is a good way—and probably the best way—to achieve maximum diversification at the lowest possible expense. It is mostly a coincidence that investors favor index funds that track SPX as opposed to other indices. SPX was designed to measure the market, not as a normative strategy for investing. But it turns out that SPX provides the best guide for how to allocate investment funds within a portfolio of U.S. common stocks. In other words, if SPX did not exist, it would be necessary to invent it.

Moreover, by allocating funds, the expenses of investment management can be kept to a minimum because following an affirmative strategy of indexing precludes spending fund assets on company-specific research. To engage in such research would be a literal waste of assets—and thus a breach of fiduciary duty. Similarly, indexing keeps the expenses of trading at the fund level to a minimum because the only trading that is necessary or appropriate is portfolio balance trading to keep fund holdings proportional to the market capitalization of portfolio companies.

Finally, it is wrong to characterize indexing as a passive investment strategy or one by which index investors free-ride on the efforts of traditional stock-picking investors who engage in company-specific fundamental research. To the contrary, indexing magnifies the disciplinary effects of market prices on portfolio company management. Moreover, indexing by some investors creates trading opportunities for other investors, since index investors effectively cede first-mover advantages to those investors who engage in company-specific research. Thus, there is a symbiotic relationship between index investors and activist investors—and indeed among all investors of diverse interests—that arguably makes the market more efficient than it would otherwise be in the absence of indexing.