

COMMITTEE ON CAPITAL MARKETS REGULATION

THE RISE OF INDEX INVESTING: PRICE EFFICIENCY AND FINANCIAL STABILITY



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The Rise of Index Investing: Price Efficiency and Financial Stability

Executive summary

Index investing is based upon a set of predefined, mechanical rules for choosing a publicly known set of stocks.¹ The strategy of index investors is to gain exposure to the performance of the market as a whole or a particular segment of the market.² Given its mechanical, rules-based nature, index investing does not require investment in fundamental research about security prices and typically entails significantly less trading activity than active investment.³ As a result, index investing tends to provide low-cost access to diversified portfolios.⁴

In this report, we begin by tracking the growth of index investing in U.S. equity markets from a small niche strategy in the 1970s into an investment style comparable in scale to the active management of mutual funds.⁵ We then consider whether the rise of index investing has reduced the extent to which prices of individual stocks reflect their underlying value (price efficiency).⁶ We then examine whether the rise of index investing has increased risks to financial stability through three channels: (a) stock market bubbles and crashes; (b) concentration of asset managers; and (c) liquidity and redemption concerns. In conclusion, we find that the empirical evidence, while mixed, indicates that the rise of index investing has not had negative effects on price efficiency or financial stability. We recommend continued study of index investing in the years to come.

¹ See Clifford Asness, *The Value of Fundamental Indexing*, INSTITUTIONAL INVESTOR (Oct. 15, 2006), <https://www.institutionalinvestor.com/article/b150nsjcm4ph3y/the-value-of-fundamental-indexing> (“What is an index? ... [A]ny rule-based method of constructing a portfolio. The method can be completely mechanical — this is how we usually think of it — but it can also be the result of a committee decision, such as that undertaken to construct the Standard & Poor’s 500 index. What is important is that it is defined ex ante, so we know the components before we see the results.”); Jeffrey Wurgler, *On the Economic Consequences of Index-Linked Investing*, in Gerald Rosenfeld, Jay W. Lorsch, and Rakesh Khurana, *Challenges to Business in the Twenty-First Century* 20 (2010).

² See Wurgler, *On the Economic Consequences of Index-Linked Investing*, supra note 1, at 31–33.

³ See Wurgler, *On the Economic Consequences of Index-Linked Investing*, supra note 1, at 31–33.

⁴ See Asness, *The Value of Fundamental Indexing*, supra note 1 (“Traditional indices and the funds based on them are market-capitalization-weighted and provide the investor with exposure to markets, usually at a very low, all-in cost.”).

⁵ See Wurgler, *On the Economic Consequences of Index-Linked Investing*, supra note 1, at 21. Indexing has also grown dramatically in bond and commodity markets. See Vladyslav Sushko and Grant Turner, *The implications of passive investing for securities markets*, BIS QUARTERLY REVIEW 113, 114–15 (March 2018), https://www.bis.org/publ/qtrpdf/r_qt1803j.pdf.

⁶ See, e.g., Inigo Fraser-Jenkins, *The Silent Road to Serfdom: Why Passive Investing is Worse Than Marxism*, BERNSTEIN RESEARCH (Aug. 23, 2016).

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1. Index investing in U.S. equity markets

In this section we examine the rate of growth and share of public stock ownership by index mutual funds and ETFs. We follow with an explanation of certain drivers of that growth and conclude this section with a discussion of the nuances of measuring the absolute size of index investing in U.S. equity markets.

a. Mutual funds and ETFs

The growth of indexing in U.S. equity markets has been largely driven by increases in stock ownership by index mutual funds and index ETFs. Mutual funds are investment funds that issue common shares directly to investors, which can be redeemed with the fund on a daily basis for cash equal to a pro rata share of the fund's net asset value.⁷ ETFs are similar to mutual funds with respect to the pooling of investor money and offering of shares that represent a pro-rata share of the fund's net asset value, but unlike traditional mutual funds, ETF shares trade on stock exchanges.⁸ Index ETFs comprise roughly 99% of all ETFs.⁹

A unique feature of ETFs is their creation and redemption process, which is managed by financial institutions known as "authorized participants."¹⁰ ETFs depend on these authorized participants to ensure that the price of an ETF is adjusted to reflect the underlying value of its securities.¹¹ When the price of an ETF temporarily exceeds the value of its underlying securities, authorized participants bring prices into line by purchasing the underlying securities and delivering the securities to the ETF issuer in exchange for newly created ETF shares that the authorized participant then sells into the market.¹² Authorized participants do the opposite when the price of an ETF is lower than the price of its underlying securities.¹³

⁷ The Investment Company Act of 1940 requires open-end mutual funds to redeem shares within seven days of an investor's redemption demand. See 15 U.S.C. § 80a-22(e).

⁸ See U.S. SEC. & EXCH. COMM'N, *Investor Bulletin: Exchange-Traded Funds (ETFs)* (Aug. 10, 2012), <https://www.investor.gov/introduction-investing/general-resources/news-alerts/alerts-bulletins/investor-bulletins-24>.

⁹ See Sushko & Turner (2018), *supra* note 5, at 114 (noting that only approximately 1% of ETF assets are active ETFs).

¹⁰ See *Investor Bulletin: Exchange-Traded Funds (ETFs)*, *supra* note 8.

¹¹ See *id.* See also BLACKROCK, *iShares Investigates: The ETF Ecosystem* (2019), <https://www.blackrock.com/corporate/literature/investor-education/ishares-investigates-authorized-participants-market-makers-part-1-en-us.pdf>.

¹² *iShares Investigates: The ETF Ecosystem*, *supra* note 11, at 2.

¹³ *iShares Investigates: The ETF Ecosystem*, *supra* note 11, at 2.

b. The rise of index investing in U.S. equity markets

Equity indexing experienced an early period of rapid growth during the late 1970s and early 1980s, with assets invested in index mutual funds swelling from 0.5 percent of S&P 500 market capitalization in 1975 to 3.1 percent in 1983.¹⁴ In 1993, the first index ETF was introduced in the United States.¹⁵ However, index investment languished through the end of the dot-com boom: in 2001, index mutual funds and ETFs still held just 3 percent of U.S. equity market capitalization.¹⁶ Once the tech bubble burst, indexing began to grow again. As Figure 1 demonstrates, the fraction of U.S. equity market capitalization held by index mutual funds and ETFs grew from 4 percent in 2005 to 15 percent as of year-end 2019.¹⁷ Over the same period of time, the fraction of market capitalization held by actively managed funds declined from 20 percent to 15 percent.¹⁸ In other words, the ratio of actively managed funds to index funds declined from 5-to-1 in 2005 to 1-to-1 in 2019.¹⁹ As of January 31, 2020, according to Morningstar, equity index funds that invest primarily in U.S. companies had \$4.7 trillion in assets under management, compared to \$4.5 trillion for similarly-focused active equity funds.²⁰

¹⁴ See Andrei Shleifer, *Do Demand Curves for Stocks Slope Down*, 41 J. OF FIN. 579, 584 (July 1986).

¹⁵ See Asjlynn Loder, *As First ETF Turns 25, Exchange-Traded Funds Dominate Investing World*, WALL STREET JOURNAL (Jan. 22, 2018) <https://www.wsj.com/articles/as-first-etf-turns-25-exchange-traded-funds-dominate-investing-world-1516626000>.

¹⁶ See INVESTMENT COMPANY INSTITUTE, *2018 Investment Company Fact Book*, at 43 (2018), https://www.ici.org/pdf/2018_factbook.pdf.

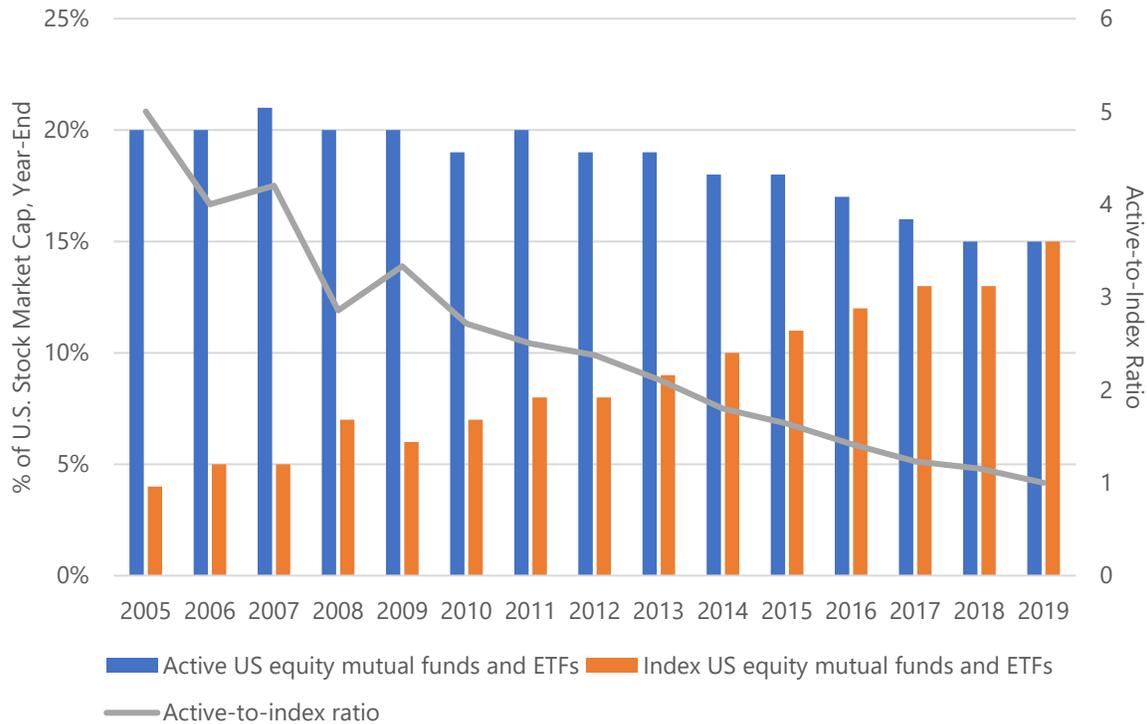
¹⁷ INVESTMENT COMPANY INSTITUTE, *2020 Investment Company Fact Book* at “Facts at a Glance” (60th Ed. 2020), https://www.ici.org/pdf/2020_factbook.pdf. See also INVESTMENT COMPANY INSTITUTE, *2019 Investment Company Fact Book*, at 41 (2019), https://www.ici.org/pdf/2019_factbook.pdf; INVESTMENT COMPANY INSTITUTE, *2018 Investment Company Fact Book*, at 43 (2018), https://www.ici.org/pdf/2018_factbook.pdf. Compare Sushko and Turner (2018), *supra* note 5, at 116.

¹⁸ *2020 Investment Company Fact Book*, *supra* note 17, at 40.

¹⁹ *2020 Investment Company Fact Book*, *supra* note 17, at 40.

²⁰ See Tony Thomas and Nick Watson, *Morningstar U.S. Fund Flows Commentary*, MORNINGSTAR RESEARCH 3 (Jan. 2020).

Figure 1. Percent of U.S. stock market held by active and passive mutual funds and ETFs.



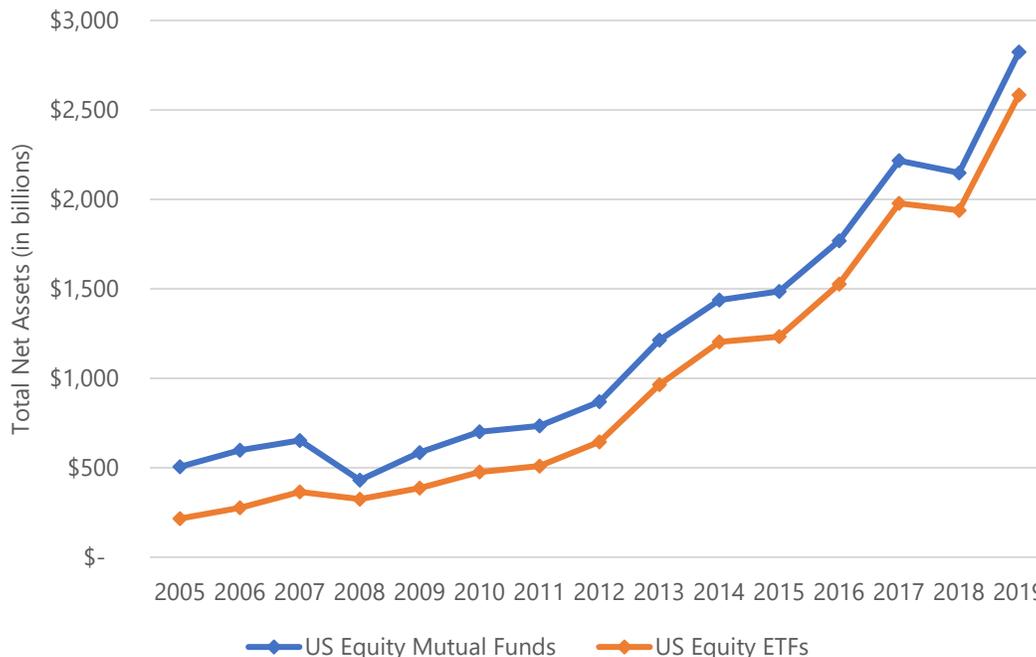
Between 2005 and 2019, the total net assets held by U.S. domestic equity index mutual funds grew from \$505 billion to more than \$2.8 trillion (see Figure 2).²¹ The rise of index ETFs has been equally dramatic. The total net assets held by U.S. domestic equity ETFs, the overwhelming majority of which are indexed,²² increased from \$216 million in 2005 to more than \$2.58 trillion by year-end 2019 (see Figure 2).²³

²¹ 2020 Investment Company Fact Book, supra note 17, at 237.

²² Approximately 1% of assets held by equity ETFs are held by actively-managed equity ETFs, which do not seek to track an index, but instead offer investors an active investment strategy designed to deliver absolute returns or high returns relative to a benchmark. Because active equity ETFs account for just a small share of ETFs overall, these figures treat all equity ETFs as passive. See Sushko and Turner (2018), supra note 5, at 114; 2020 Investment Company Fact Book, supra note 17, at 206 (showing that 97.7% of all 1940 Act ETFs are indexed).

²³ 2020 Investment Company Fact Book, supra note 17, at 206. See also FEDERAL RESERVE SYSTEM: FEDERAL RESERVE BANK OF ST. LOUIS, Exchange-Traded Funds; Total Financial Assets in Domestic Equity Funds, Level, (last accessed 2019), <https://fred.stlouisfed.org/series/BOGZ1FL564091600Q>.

Figure 2. US index mutual funds and ETFs, total net assets (billions of dollars).



The rise of index funds in the U.S. has been paralleled globally. According to Sushko & Turner (2018), index funds and ETFs managed about \$8 trillion globally as of June 2017, which represented 20% of aggregate fund assets, up from 8% in 2007.²⁴ And according to one analysis by the Investment Company Institute, index-tracking funds managed over \$10 trillion world-wide as of year-end 2019, compared to approximately \$2 trillion in 2007.²⁵

c. Cost of index investing as a driver of growth

One factor driving the growth of index equity funds relative to active equity funds is the relatively low cost of index investing. As noted earlier, index investing does not typically involve significant fundamental research about security prices or high levels of trading activity, which helps to keep index fund fees low.²⁶ Nobel Laureate William Sharpe has argued that due to the higher costs of active management, “the average actively managed dollar must underperform the average passively managed dollar, net of fees.”²⁷ Indeed over the past decade, the majority of active equity

²⁴ Sushko & Turner (2018), supra note 5, at 114.

²⁵ Robin Wigglesworth and Alex Janiaud, *Index funds break through \$10tn-in-assets mark amid active exodus*, THE FINANCIAL TIMES (Jan. 7, 2020), <https://www.ft.com/content/a7e20d96-318c-11ea-9703-eea0cae3f0de>.

²⁶ See text accompanying notes 2–4.

²⁷ William F. Sharpe, *The Arithmetic of Active Management*, <https://web.stanford.edu/~wfs Sharpe/art/active/active.htm>.

funds have failed to outperform their benchmark index net of fees,²⁸ and funds that have outperformed their benchmark have often failed to do so consistently.²⁹ Historically, empirical research has also found that over long horizons, the average active equity fund underperforms its benchmark due in part to the higher costs associated with active investing.³⁰ And more recent research shows that “the majority of active U.S. mutual funds underperformed their benchmarks over [a] 10-year period, even before accounting for fees.”³¹

Index mutual funds are also larger, on average, than active funds: in 2018, the size of the average index equity mutual fund (\$6.3 billion) was four times the size of the average actively managed equity mutual fund (\$1.5 billion).³² The relatively large size of index funds helps reduce fund expense ratios through economies of scale --the fixed costs associated with managing the fund becomes a lower percentage of the total assets under management, further reducing the expense ratios.³³ A large asset base also allows asset managers to invest in cost reductions and gives them more leverage to negotiate with brokers for more favorable trading fees.³⁴ As fees drop, even more investment dollars are attracted to these larger funds, and the cost-lowering cycle continues.

The net result from 2000 to 2019 was a lowering of the average expense ratio of index equity mutual funds from 0.27 percent to 0.07 percent.³⁵ Index ETFs also offer low expenses and diversification, with an average expense ratio of 0.18 percent in 2019.³⁶ However, it is important to note that average expense ratio for active mutual funds also declined between 2000 and 2019, from 1.06 percent to 0.74 percent.³⁷

²⁸ See Berlinda Liu, *SPIVA U.S. Scorecard: Year-End 2019*, S&P DOW JONES INDICES RESEARCH (April 2, 2020).

²⁹ See Berlinda Liu and Philip Brzenk, *Does Past Performance Matter? The Persistence Scorecard: December 2019*, S&P DOW JONES INDICES RESEARCH (December 4, 2019).

³⁰ See e.g., Mark M. Carhart, *On Persistence in Mutual Fund Performance*, 52 J. OF FIN. 57 (1997) (the best past-performance active mutual funds earn back their expenses and transaction costs; the majority of active funds underperform by approximately their investment costs).

³¹ Berlinda Liu and Hamish Preston, *SPIVA Institutional Scorecard: How Much Do Fees Affect the Active versus Passive Debate?*, S&P Dow Jones Indices Research (December 2018).

³² INVESTMENT COMPANY INSTITUTE, *2019 Investment Company Fact Book*, at 122 (2019), https://www.ici.org/pdf/2019_factbook.pdf.

³³ See *id.*

³⁴ See Soseph Chen, Harrison Hong, Ming Huang, and Jeffrey Kubik, *Does Fund Size Erode Mutual Fund Performance? The Role of Liquidity and Organization*, 94(5) THE AMERICAN ECONOMIC REVIEW 1276, 1293 (2004), <http://www.columbia.edu/~hh2679/AER-SIZE.pdf> (“It is well known that there are tremendous economies of scale associated with trading commissions and lending fees at the family level. Bigger families like Fidelity are able to get better concessions on trading commissions and earn higher lending fees for the stocks held by their funds.”); Gjergji Cici, Laura Dahm, and Alexander Kempf, *Trading efficiency of fund families: Impact on fund performance and investment behavior*, 88(C) JOURNAL OF BANKING & FINANCE 1-12 (2018).

³⁵ *2020 Investment Company Fact Book*, supra note 17, at 127.

³⁶ *2020 Investment Company Fact Book*, supra note 17, at 129.

³⁷ *2020 Investment Company Fact Book*, supra note 17, at 127.

d. Ambiguity regarding the “true” size of the indexed market

It is important to note that index mutual funds and index ETFs do not represent the entire universe of index investment. Indeed, in a 2017 review of global investment, BlackRock estimated that \$6.8 trillion, representing 10 percent of the market cap of global equity stocks, is indexed outside of mutual funds and ETFs.³⁸

One reason for this is that many institutional investors manage their investments internally, without investing in mutual funds or ETFs or otherwise delegating investment decisions to an asset manager. For example, of the \$181 trillion in global financial assets owned by pension funds (\$33.9tn), insurance companies (\$24.1tn), sovereign wealth funds (\$5.2tn), endowments (\$1.4tn), and other asset owners in 2012, only 23.9% were externally managed by asset managers.³⁹ Many of these large sophisticated investors that manage their own assets have implemented index investment strategies.⁴⁰ Anecdotal evidence also suggests that internal indexing is growing in the United States: California Public Employees' Retirement System (CalPERS)—the largest public pension fund in the United States—recently shifted its public equity investment strategy to focus largely on internal, index-tracking strategies.⁴¹

Another reason is that when investors do rely on asset managers to manage their investments, they may invest through vehicles other than mutual funds and ETFs. For example, they may invest via separately managed accounts, whereby an asset manager advises with respect to a portfolio of securities that is owned entirely by the investor.⁴² According to Pensions & Investments data on U.S. asset managers, of the \$64 trillion in total worldwide assets under management as of December 2018, 38.2% was in separately managed accounts.⁴³ Indexing strategies may be adopted with

³⁸ BLACKROCK, *Index Investing Supports Vibrant Capital Markets*, 6(2017), <https://www.blackrock.com/corporate/literature/whitepaper/viewpoint-index-investing-supports-vibrant-capital-markets-oct-2017.pdf>.

³⁹ BLACKROCK, *Who Owns the Assets, Developing a Better Understanding of the Flow of Assets and the Implications for Financial Regulation* (May 14, 2012), <https://www.blackrock.com/corporate/literature/whitepaper/viewpoint-who-owns-the-assets-may-2014.pdf>.

⁴⁰ Robin Wigglesworth and Alex Janiaud, *Index funds break through \$10tn-in-assets mark amid active exodus*, FINANCIAL TIMES (Jan. 7, 2020), <https://www.ft.com/content/a7e20d96-318c-11ea-9703-eea0cae3f0de>; Kate Smith, *After Shift to Passive Investing, Endowments Now Are Staying Put*, Bloomberg (June 8, 2017), <https://www.bloomberg.com/news/articles/2017-06-08/after-shift-to-passive-investing-endowments-now-are-staying-put>.

⁴¹ CHIEF INVESTMENT OFFICER, *Exclusive: CalPERS Fires Most of Its Equity Managers* (Dec. 4, 2019) <https://www.ai-cio.com/news/exclusive-calpers-fires-equity-managers/>. See also CALPERS, *California Public Employees' Retirement System Total Fund Investment Policy* (June 17, 2019) (“CalPERS will use index tracking strategies where we lack conviction or demonstrable evidence that we can add value through active management.”).

⁴² *Id.*

⁴³ PENSIONS & INVESTMENTS, *The Largest Money Managers*, 18, 25 (May 27, 2019), <https://www.pionline.com/assets/docs/CO119854528.PDF>.

respect to separately managed accounts and other investment vehicles outside of mutual funds and ETFs.

Managers of active funds may also pursue investment strategies that are similar to index tracking. Wurgler (2010) notes that, given the choice between a stock that is a member of the benchmark index and a stock that is not a member, an active manager will prefer the index member stock, as long as both stocks are expected to perform equally well.⁴⁴ Choosing the index member stock over the nonmember stock reduces the likelihood that the active portfolio will deviate from the benchmark index, thereby minimizing the probability of underperformance.

To account for such investment behavior by active funds, Cremers and Petajisto (2009) propose a measure called “active share” that quantifies the fraction of a fund’s holdings that differs from its benchmark index.⁴⁵ They find that funds with an active share of less than 50% grew from less than one percent of active equity mutual fund assets in the 1980s to nearly 35 percent of active equity mutual fund assets in 2003. In other words, as of 2003, nearly 35% of active equity mutual funds were primarily tracking an index.⁴⁶ However, Cremers (2016) finds that, by the end of 2015, the percentage of assets in active funds that are primarily tracking an index had declined from 35 to 12 percent of assets in active equity mutual funds.⁴⁷ Gottesman and Morey (2017) find a similar decline, with active funds primarily tracking an index dropping from 30% in 2009 to 11% in 2014.⁴⁸

Similarly, some index funds may implement investment strategies that seek to mimic investment strategies that involve investment discretion. Smart-beta or factor index funds, for example, track indices that are constructed using alternative rules (such as weighting for value, volatility or dividend yield) that are meant to provide investors with patterns of returns differing from those of a capitalization-weighted market index. Though these funds track an underlying index, the underlying index in question is often built specifically by the very fund that tracks it.⁴⁹ In fact, more than 75 percent of published indices are tracked by only a single fund (albeit representing an average of only \$1.4 billion in assets under management per fund).⁵⁰ Accordingly, while these funds are index funds in the sense that they track indices constructed using mechanical rules, the

⁴⁴ See Wurgler, *On the Economic Consequences of Index-Linked Investing*, supra note 1.

⁴⁵ K. J. Martijn Cremers and Antti Petajisto, *How Active Is Your Fund Manager? A New Measure That Predicts Performance*, 22(9) REVIEW OF FINANCIAL STUDIES 3329 (2009).

⁴⁶ See *id.*

⁴⁷ Martijn Cremers, *Active Share and the Three Pillars of Active Management: Skill, Conviction and Opportunity*(2016), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2860356 (based on a sample of active equity mutual funds that primarily invest in U.S. equity stocks).

⁴⁸ Aron A. Gottesman and Matthew R. Morey, *Active Share and Emerging Market Equity Funds* (Feb. 27, 2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2761660.

⁴⁹ Adriana Robertson, *Passive in Name Only: Delegated Management and 'Index' Investing* (June 2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3244991.

⁵⁰ See Adriana Robertson, *Passive in Name Only: Delegated Management and 'Index' Investing* (June 2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3244991.

construction of these indices involves varying degrees of discretion by the index providers, based on the stated objective of the particular index.⁵¹ In turn, the fund manager ultimately has discretion in selecting which index to use and deciding how closely to track the index.

These examples illustrate the challenge in measuring the aggregate size of index investing in U.S. and global equity markets. Rather than simply summing the value of the shares held by index mutual funds and index ETFs, a more nuanced approach would recognize that investment strategies can be measured along different axes, including the degree of investment discretion involved, and that certain investors may execute index investing strategies without investing in a fund.

⁵¹ BLACKROCK, *Index Investing Supports Vibrant Capital Markets*, 6(2017), <https://www.blackrock.com/corporate/literature/whitepaper/viewpoint-index-investing-supports-vibrant-capital-markets-oct-2017.pdf>.

2. Effects of indexing on stock market efficiency

Efficient stock markets are important for economic growth, as they ensure that capital is allocated to the most promising companies so they can grow and innovate. The rise of index investing has sparked concern about its potential effects on stock market efficiency.

Under standard finance theory, an efficient stock price should incorporate only fundamental information, which includes both stock-specific information that is relevant to the future cash flows of the individual firm as well as market-wide information that is relevant to the overall risk faced by all firms (so-called systematic risk).⁵² A stock's price is said to be perfectly efficient when it is *solely* determined by all available fundamental information.⁵³ Conversely, stock prices become less efficient when they incorporate non-fundamental information, such as the mere effects of index inclusion.⁵⁴

Active investors seek fundamental information, and their trading incorporates that information into public stock prices.⁵⁵ If stock prices deviate from their fundamental underlying value, active investors exploit the mispricings until prices realign.⁵⁶ Without such trading by active investors, mis-pricings would perpetuate. In this way, the presence of active investors promotes market efficiency.⁵⁷ Index investors, by contrast, do not trade based upon stock-specific fundamental information. As index investing grows and replaces active investing, the concern arises that markets become less efficient.⁵⁸ However, an important counter is that when assets move from active funds to index funds, the least skilled (i.e., worst-performing) active managers are likely to experience the largest withdrawals. In addition, it is active *trading* that promotes market efficiency, not merely active assets under management.⁵⁹ While the total assets under management of index funds have increased significantly, the share of trading by index funds versus active funds has been less so. For example, an analysis by S&P Dow Jones illustrates that even if index funds constituted more than 90% of assets under management, they would only account for less than 50% of trading.⁶⁰ Fur-

⁵² See Lawrence Summers, *Does the Stock Market Rationally Reflect Fundamental Values*, JOURNAL OF FINANCE (July 1986).

⁵³ See Joseph Stiglitz and Sanford Grossman, *On the Impossibility of Informationally Efficient Markets*, AMERICAN ECONOMIC REVIEW (June 1980), <http://www.dklevine.com/archive/refs41908.pdf>.

⁵⁴ See Andrei Shleifer, *Do Demand Curves for Stocks Slope Down?*, THE JOURNAL OF FINANCE (1986).

⁵⁵ See Stiglitz and Grossman (1980), *supra* note 53.

⁵⁶ See *id.*

⁵⁷ See *id.* Sushko and Turner (2018), *supra* note 5.

⁵⁸ See Wurgler, *On the Economic Consequences of Index-Linked Investing*, *supra* note 1, at 8; Martijn Cremers, Miguel Ferreira, Pedro Matos and Laura Starks, *Indexing and active fund management: International evidence*, 120(3) JOURNAL OF FINANCIAL ECONOMICS 539 (2016).

⁵⁹ See Craig Lazzara, *Too Much Indexing?*, INDEXOLOGY BLOG (Feb. 12, 2015), <https://www.indexology-blog.com/2015/02/12/too-much-indexing/>.

⁶⁰ Craig Lazzara, *Too Much Indexing?*, INDEXOLOGY BLOG (Feb. 12, 2015), <https://www.indexology-blog.com/2015/02/12/too-much-indexing/>.

thermore, the substantial trading of index-linked products, which often exceeds the trading volumes in the individual stocks,⁶¹ itself contributes to market efficiency at a macro level, i.e. reflecting investors' views of the appropriate value of the market as a whole.⁶²

The potential price efficiency impact of index investing would manifest itself as an “index premium” associated with inclusion in an index and co-movement (or correlation) of stock prices within an index. We now evaluate empirical research related to the index premium and co-movement of stock prices. We then consider the effect of the rise of index ETFs on pricing efficiency.

a. Index premium

Numerous empirical studies have examined whether the inclusion of a stock in an index causes a price increase for the added stock (an “index premium”), with early studies finding significant evidence of such a premium, while more recent studies suggest it has disappeared.⁶³ The index premium is arguably indicative of inefficient pricing, since the price changes are not driven by fundamental information, either firm-specific or economy-wide.⁶⁴ Moreover, persistent index premiums are much more problematic for market efficiency than temporary prices changes that are relatively short-lived surrounding the inclusion date.

A prominent example of the index premium occurred in July 2002 when seven foreign companies were removed from the S&P 500 and replaced with comparable U.S. companies.⁶⁵ On the day of the announcement the newly added stocks returned 5.9 percent more than the market, while excluded stocks returned 3.7 percent less than the market.⁶⁶ Over the next two weeks, the additions posted 12.3 percent in market-adjusted returns, while the excluded companies declined 6.6 percent relative to the market.⁶⁷

The existence of a historical index premium has been supported by several empirical studies over the past three decades. Lynch and Mendenhall (1997) examined changes in the S&P 500 index from 1990 to 1995, finding that stocks added to the index received a 3.2% market-adjusted gain and stocks removed from the index suffered a 6.3% market-adjusted loss on the day the change

⁶¹ See Chris Bennett, Tim Edwards, Sherifa Issifu, and Craig J. Lazzara, *A Window on Index Liquidity: Volumes Linked to S&P DJI Indices*, S&P DOW JONES INDICES (Aug. 2019), <https://us.spindices.com/documents/research/research-a-window-on-index-liquidity.pdf>.

⁶² See Craig Lazzara, *The Gift of a Benevolent Providence*, INDEXOLOGY BLOG (Oct. 15, 2019), <https://www.indexologyblog.com/2019/10/15/the-gift-of-a-benevolent-providence/>.

⁶³ Antti Petajisto, *The index premium and its hidden cost for index funds*, 18(2) JOURNAL OF EMPIRICAL FINANCE 271 (2011); Scott Hirst and Kobi Kastiel, *Corporate Governance by Index Exclusion*, 99 BOSTON UNIVERSITY LAW REVIEW 1229 (2019).

⁶⁴ See Andrei Shleifer, *Do Demand Curves for Stocks Slope Down?*, THE JOURNAL OF FINANCE (1986).

⁶⁵ Antti Petajisto, *Why Do Demand Curves for Stocks Slope Down?*, 44(5) JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS 1013 (2009), <https://www.petajisto.net/papers/petajisto%202009%20jfq%20-%20demand%20curves.pdf>.

⁶⁶ *Id.*

⁶⁷ *Id.*

was announced.⁶⁸ Similarly, Elliot et al. (2006) examined changes to the S&P 500 index from 1993 to 2001, finding a market-adjusted announcement-day gain of 5.67% for stocks added to the index.⁶⁹ Finally, Petajisto (2011) examined changes to the S&P 500 index from 1990 to 2005, finding that newly added stocks received a 8.8% market-adjusted gain and removed stocks experienced a 15.1% loss over a 5-day period after inclusion.⁷⁰ However, each of these studies only measure price impacts immediately after index inclusion. They do not consider the more important question of whether the index premium persists over the long-term or whether the index premium has effects on capital allocation. Kasch and Sarkar (2012) study the issue of persistence and find that index inclusion does not have a permanent effect on price.⁷¹

Kaptein (2016) analyze the price impact of index inclusion in the major large, mid and small cap stock indices of the Dutch stock market.⁷² They find that: (i) for stocks included in the large cap index, the initial positive return from index inclusion fully reverses within 50 days; but (ii) for stocks included in the mid cap index, the initial positive abnormal returns persist – suggesting that index inclusion makes previously less-known, less-liquid stocks more valuable by increasing the supply of public information about them.⁷³ For index exclusion, they find no significant price patterns, and suggest this may be attributable to short-sale constraints.⁷⁴

Massa et al. (2005) examined S&P 500 index changes from 1981 to 1997, finding that companies added to the index experienced a reduction in the cost of capital of 1.2% on average, as reflected in their stock price.⁷⁵ The study further finds that firms responded to the positive impact on their stock price and cost of capital by issuing new equity and investing in mergers and acquisitions.⁷⁶ However, these investments proved largely counterproductive, as firms that issued equity and increased investment after index inclusion tended to underperform both the overall market

⁶⁸ Anthony Lynch & Richard Mendenhall, *New Evidence on Stock Price Effects Associated with Changes in the S&P 500 Index*, 70(3) THE JOURNAL OF BUSINESS 351 (July 1997), <http://people.stern.nyu.edu/alyynch/pdfs/jb97lm.pdf>.

⁶⁹ William Elliot, Bonnie Van Ness, Mark Walker and Richard Warr, *What Drives the S&P 500 Inclusion Effect? An Analytical Survey*, 35(4) FINANCIAL MANAGEMENT 31 (Dec. 2006).

⁷⁰ Antti Petajisto, *The Index Premium and Its Hidden Cost for Index Funds*, J. OF EMPIRICAL FINANCE (March 2011).

⁷¹ See Maria Kasch and Asani Sarkar, *Is There an S&P 500 Index Effect?*, NY FED STAFF REPORT (Nov. 2012).

⁷² Robert Kaptein, *The effect of index inclusion*, ERASMUS UNIVERSITEIT ROTTERDAM, ERASMUS SCHOOL OF ECONOMICS (May 2016), <https://thesis.eur.nl/pub/33763/MA-Thesis-Robert-Kaptein.pdf>.

⁷³ Kaptein (2016), *supra* note 72, at 30.

⁷⁴ Kaptein (2016), *supra* note 72, at 30.

⁷⁵ Massimo Massa, Urs Peyer and Zhenxu Tong, *Limits of Arbitrage and Corporate Financial Policy*, CEPR DISCUSSION PAPER 4829 (2005), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=702981.

⁷⁶ *Id.*

and other comparable firms.⁷⁷ These findings suggest that the index premium can translate into suboptimal capital allocation.⁷⁸

However, more recent studies find that the index premium has decreased or even disappeared in recent years, suggesting that such suboptimal capital allocation may not be an issue. Petajisto (2011) finds that the index premium *declined* from 10.3% in 1990–2000 to 4.6% in 2001–2005.⁷⁹ Scari (2016) finds that the index premium declined starting in the late 1990s and disappeared entirely by 2010.⁸⁰ Schitzler (2016) and Patel and Welch (2017) also find that the index premium has effectively disappeared.⁸¹ Therefore, while the presence of an index premium has been established historically to varying degrees, its continued existence has been challenged by recent empirical studies, most of which find a decline in or disappearance of the index premium over the time period that coincides with the greatest growth of index investing.

b. Co-movement

Another potential issue of concern regarding index investing is that it can increase the co-movement of stock prices within an index. Co-movement can be caused by the trading patterns of index funds: when money flows into (out of) index funds, the index constituents are bought and sold in unison, causing the stock prices of the index components to move together.⁸² It is important to note, however, that increased co-movement resulting from fund flows will only materialize while the funds are flowing into (out of) the index fund, reverting to normal co-movement after the fund flows stabilize. While co-movement of stock prices based on *market-wide* fundamental

⁷⁷ *Id.*

⁷⁸ Massa et al. (2005), *supra* 75.

⁷⁹ Antti Petajisto, *The Index Premium and Its Hidden Cost for Index Funds*, J. OF EMPIRICAL FINANCE (March 2011).

⁸⁰ Cameron Scari, *On the Changes to the Index Inclusion Effect with Increasing Passive Investment Management* (2016), https://repository.upenn.edu/cgi/viewcontent.cgi?article=1020&context=joseph_wharton_scholars.

⁸¹ Jan Schitzler, *S&P 500 Inclusions and Stock Supply*, J. OF EMPIRICAL FIN. (2016), <http://janschnitzler.com/wp-content/uploads/2016/12/sp500.pdf>; Nimesh Patel & Ivo Welch, *Extended Stock Returns in Response to S&P 500 Index Changes*, REVIEW OF ASSET PRICING STUDIES, 7(2) THE REVIEW OF ASSET PRICING STUDIES 172 (2017). *See also* Konstantina Kappou, *The diminished effect of index rebalances*, UNIVERSITY OF READING (2018), http://centaur.reading.ac.uk/76714/1/Diminished%20effect%20of%20index%20rebalances_kkappou.pdf.

⁸² *See* Robert Pindyck and Julio Rotemberg, *The Co-movement of Stock Prices*, 108(4) THE QUARTERLY JOURNAL OF ECONOMICS 1073 (1993), <https://pdfs.semanticscholar.org/2607/0aadd1e6ec859b06ab4fd434b0b22c726e9f.pdf>; Rodney Sullivan and James Xiong, *How Index Trading Increases Market Vulnerability*, 68(2) FINANCIAL ANALYSTS JOURNAL (2012).

information is consistent with efficient prices, co-movement resulting from non-fundamental factors is not.⁸³ Co-movement may also exacerbate market shocks⁸⁴ and decrease the benefits of diversification, which relies on a relative lack of co-movement.⁸⁵

Barberis et al. (2005) examine changes to the S&P 500 index from 1976 to 2000, finding that after a stock is added to the S&P 500, the co-movement of its price with other S&P 500 stocks increases, while co-movement with non-index stocks decreases.⁸⁶ Specifically, a stock that is added to the S&P 500 index experiences an increase in beta (i.e. an approximate measure of correlation) with the S&P 500 of 0.357 and a decrease in beta with non-S&P 500 stocks of 0.373.⁸⁷ Coles et al. (2017) find a similar effect with respect to the Russell 2000 index, finding an increase in correlation of 0.055 between the included stock and the Russell 2000 index.⁸⁸ Finally, Da & Shive (2018) show that ETFs contribute to co-movement of index-component stocks, finding that a one-standard-deviation increase in ETF turnover (i.e. a change in the ETF's underlying portfolio, which is driven by index changes) corresponds with "a 1% increase in the average correlation among its component stocks."⁸⁹

However, the empirical evidence is mixed as to whether the co-movement effect has increased with the growth of index investing overall. Kamara, Lou, and Sadka (2008, 2010) show that average co-movement of large stocks increased between 1968 and 2008.⁹⁰ Similarly Bolla, Kohler, and Wittig (2017) examine co-movement in the U.S. and Europe, finding that co-movement generally increased from 2002 to 2014, consistent with the growth period of index investing.⁹¹ However, when Chen, Singal, and Whitelaw (2016) examine index inclusion over differing time periods, they find that co-movement effects were smaller from 2001 to 2012 than in the previous

⁸³ See Robert Pindyck and Julio Rotemberg, *The Co-movement of Stock Prices*, 108(4) THE QUARTERLY JOURNAL OF ECONOMICS 1073 (1993), <https://pdfs.semanticscholar.org/2607/0aadd1e6ec859b06ab4fd434b0b22c726e9f.pdf>.

⁸⁴ See Kenechukwu Anadu, Mathias Kruttli, Patrick McCabe, Emilio Osambela, Chae Hee Shin, *The Shift from Active to Passive Investing: Potential Risks to Financial Stability?*, FEDERAL RESERVE BANK OF BOSTON (Aug. 27, 2018), <https://www.bostonfed.org/-/media/Documents/Workingpapers/PDF/2018/rpa1804.pdf>.

⁸⁵ See Sushko & Turner (2018), *supra* note 5.

⁸⁶ Nicholas Barberis, Andrei Shleifer, Jeffrey Wurgler, *Comovement*, 75(2) JOURNAL OF FINANCIAL ECONOMICS 283 (2005) (specifically, a stock that is added to the S&P 500 index experiences an increase in beta with the S&P 500 of 0.357 and a decrease in beta with non-S&P 500 stocks of 0.373).

⁸⁷ Barberis et al. (2005), *supra* note 86.

⁸⁸ Jeffrey Coles, Davidson Heath, and Matthew Rigggenberg, *On Index Investing*, (2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3055324.

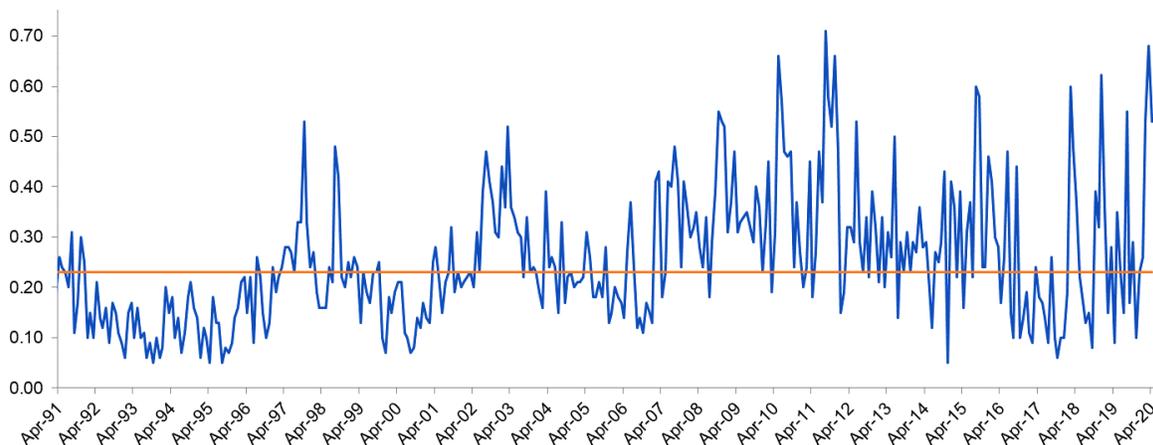
⁸⁹ Zhi Da & Sophie Shive, *Exchange Traded Funds and Asset Return Correlations*, EUROPEAN FINANCIAL MANAGEMENT (Sept. 2017).

⁹⁰ A. Kamara, X. Lou, and R. Sadka, *The Divergence of Liquidity Commonality in the Cross-section of Stocks*, 89 JOURNAL OF FINANCIAL ECONOMICS, 444 (2008).

⁹¹ Lidia Bolla, Alexander Kohler, and Hagen Wittig, *Index-linked investing—A curse for the stability of financial markets around the globe?*, 42 JOURNAL OF PORTFOLIO MANAGEMENT 26 (2017).

decade, even though index investing had become much more widespread in the latter period.⁹² Most importantly, S&P Global notes that correlations among S&P 500 stocks recently have been at the lowest levels since 1991.⁹³

Figure 3. S&P 500 correlation (1991-2020).



On the other hand, increased co-movement may not necessarily be indicative of pricing inefficiencies. Barberis (2005) posits that increased co-movement may actually be reflective of more efficient incorporation of systematic fundamental information into stock prices.⁹⁴ According to Barberis (2015), systematic fundamental information can be incorporated more efficiently into the prices of index stocks, because stocks included in indices have higher liquidity and lower trading costs than non-index stocks.⁹⁵ These benefits may also be found in indices of smaller companies if index funds make their component stocks *relatively* more liquid, even if not as liquid as stocks in major indices. Similarly, Madhavan and Morillo (2018) examine volume changes in ETFs and their underlying securities, attributing cross-stock correlations to the macro environment rather than ETF growth.⁹⁶

Overall, the empirical evidence is mixed as to whether index inclusion leads to greater co-movement of index stocks. In addition, it may be that increased co-movement actually reflects an improvement in—rather than a deterioration of—price efficiency.

⁹² Chen Honghua, Vijay Singal, Robert Whitelaw, *Co-movement revisited*, 121(3) JOURNAL OF FINANCIAL ECONOMICS 624 (Sept. 2016).

⁹³ S&P INDICES, *The Slings and Arrows of Passive Fortune*, 14 (last accessed May 13, 2020), <https://us.spindices.com/indexology/core/the-slings-and-arrows-of-passive-fortune>.

⁹⁴ Nicholas Barberis, Andrei Shleifer, Jeffrey Wurgler, *Comovement*, 75(2) JOURNAL OF FINANCIAL ECONOMICS 283 (2005)

⁹⁵ *Id.*

⁹⁶ Ananth Madhavan and Daniel Morillo, *The Impact of Flows into Exchange-Traded Funds: Volumes and Correlations*, 44(7) THE JOURNAL OF PORTFOLIO MANAGEMENT 96 (Summer 2018), <https://jpm.pm-research.com/content/44/7/96.abstract>.

c. Price efficiency impact of ETFs

As a first order matter, it is worth considering the price efficiency of ETFs themselves. In other words, do ETFs reflect the value of their underlying constituents? The answer is yes. Typically, ETF prices are aligned with the price of their underlying securities, as arbitrageurs, including authorized participants, trade on any disparities, quickly aligning these prices. However, the imposition of single stock circuit breakers due to excessive volatility in specific stocks (or ETFs) can cause a delay in the alignment of equity ETF share prices with the price of underlying stocks.⁹⁷ That is because when there is a trading halt in individual underlying securities (or ETF shares), authorized participants responsible for creating and redeeming ETF shares can no longer accurately price shares of the fund.⁹⁸ In 2016, the three major U.S. exchanges—the New York Stock Exchange, NASDAQ and CBOE Global Markets—adopted uniform rules for reopening trading after circuit breakers for individual stocks are tripped, in order to avoid prolonged price dislocations and significant market swings.⁹⁹ As a result, although these circuit breakers have caused brief price dislocations, trading generally resumes normally after they are tripped without any significant negative effects on ETF investors.¹⁰⁰

As to the impact of ETFs on the price efficiency of their underlying constituents, Israeli, Lee and Sridharan (2017) find that an increase in a stock's ownership by ETFs reduces the pricing efficiency of the stock,¹⁰¹ arguing that ETFs—like other comingled investment vehicles such as mutual funds—remove the underlying shares of stock from the supply available to investors looking to trade on company-specific information.¹⁰² In addition, demand for the underlying stock decreases since traders who would otherwise trade the underlying stocks instead trade the ETF (of course, in that case the traders were *not* looking to trade on company-specific information).¹⁰³ These

⁹⁷ See Lara Crigger, *How Trading Halts Impact ETFs*, ETF.COM (March 9, 2020), <https://www.etf.com/sections/features-and-news/how-trading-halts-impact-etfs>.

⁹⁸ See *id.*; Dave Nadig, *Understanding ETF 'Flash Crashes'*, ETF.COM (Aug. 24, 2016), <https://www.etf.com/sections/blog/understanding-etf-flash-crashes>.

⁹⁹ See Drew Voros, *Exchanges Propose New Unified Trading Rules*, ETF.COM (Aug. 11, 2016), <https://www.etf.com/sections/features-and-news/exchanges-propose-new-unified-trading-rules>.

¹⁰⁰ See Lara Crigger, *How Trading Halts Impact ETFs*, ETF.COM (March 9, 2020), <https://www.etf.com/sections/features-and-news/how-trading-halts-impact-etfs>. In bond ETFs, however, price dislocations can persist for much longer, as the underlying bonds are less liquid than stocks and authorized participants can have difficulty finding a buyer or seller. Dawn Lim, *Bond ETFs Flash Warning Signs of Growing Mismatch*, WALL STREET JOURNAL (March 23, 2020), <https://www.wsj.com/articles/bond-etfs-flash-warning-signs-of-growing-mismatch-11584964801>; Peter Chatwell, *The liquidity 'doom loop' in bond funds is a threat to the system*, FINANCIAL TIMES: MARKETS INSIGHT (March 25, 2020), <https://www.ft.com/content/b7c15426-6e1b-11ea-89df-41bea055720b>.

¹⁰¹ Doron Israeli, Charles Lee & Suhas Sridharan, *Is There a Dark Side to Exchange Traded Funds? An Information Perspective*, REVIEW OF ACCOUNTING STUDIES (Sep. 2017).

¹⁰² Israeli et al. (2017), *supra* note 101.

¹⁰³ Israeli et al. (2017), *supra* note 101.

supply and demand effects combine to lower liquidity in stocks owned by ETFs, thereby increasing transaction costs through higher bid-ask spreads – a 1% increase in ETF ownership leads to a 1.6% increase in average bid-ask spread over the next year.¹⁰⁴ In turn, the increase in the cost of trading reduces the profitability of acquiring and trading on new information, which in turn drives a reduction in information gathering in underlying stocks. As a result, the informational efficiency of the ETF’s underlying stocks observed in the study decreased.¹⁰⁵

By contrast, Glosten et al. (2017) find that an increase in ETF ownership improves the price efficiency of underlying stocks.¹⁰⁶ Glosten et al. attribute the increase in price efficiency to improved incorporation of systematic fundamental information (information that relates to a broader market segment, rather than a specific company): since ETFs allow investors to trade a basket of stocks, ETF trading allows systematic information to be reflected more quickly in a broader cross-section of stock prices. Notably, this effect is concentrated in small-cap stocks.¹⁰⁷ Small-cap stocks are less likely than large-cap stocks to be well-followed by analysts and sophisticated investors that cause new information to be quickly incorporated into stock prices. As a result, increased ETF trading is more likely to noticeably improve small cap stocks’ information environment.¹⁰⁸

Overall, these contrasting studies demonstrate that the empirical evidence on the impact of ETFs on price efficiency is mixed.

¹⁰⁴ Israeli et al. (2017), *supra* note 101.

¹⁰⁵ Israeli et al. (2017), *supra* note 101.

¹⁰⁶ Lawrence Glosten, Suresh Nallareddy & Yuan Zou, *ETF Activity and Informational Efficiency of Underlying Securities* (April 27, 2017). See also Thomas Ernst, *Online Appendix to Stock-Specific Price Discovery From ETFs* (Feb. 8, 2020), http://www.mit.edu/~ternst/docs/online_appendix.pdf.

¹⁰⁷ Glosten et al. (2017), *supra* note 106 (noting also the absence of a similar increase in informational efficiency for large-cap stocks and stocks that trade in competitive markets).

¹⁰⁸ Glosten et al. (2017), *supra* note 106.

3. Index investing and financial stability

The rise of index investing raises three distinct sources of potential financial instability: (1) contribution to stock market bubbles and crashes; (2) the increased concentration of asset management companies; and (3) the potential inability of index funds to meet redemption demands.

a. Potential contribution to stock market bubbles

To the extent that the rise of index investing boosts the price of index constituents, as discussed in the prior section, it is possible that their rising prices can lead to even more index investing, creating an “index bubble.”¹⁰⁹ An index bubble may arise due to the price increases associated with any index premium. However, as discussed in the previous section, the evidence shows that the index premium, and possible index bubble that would result, has either declined or disappeared entirely.¹¹⁰

Some commentators have argued that index bubbles may also arise as a result of market-cap weightings as index funds are contributing to the over-valuation of the largest U.S. companies, since indices are typically weighted by market capitalization and fund inflows are primarily directed to the largest companies, regardless of performance.¹¹¹ Meanwhile, the decreasing number of dollars being invested on an active basis could weaken countervailing forces to push the valuations of the largest companies down based on fundamentals.¹¹² However, this line of criticism is fundamentally flawed, as index fund inflows do not increase the size of largest U.S. companies by market capitalization relative to other index constituents. For example, assume an institutional investor is seeking to invest \$10 billion in the S&P 500 and Microsoft is the largest stock in the index at a 4% weighting, so \$400 million will go into MSFT. Microsoft is 4% of the S&P 500 prior to the investment, Microsoft is 4% of what the institutional investor buys, and Microsoft

¹⁰⁹ See James Ledbetter, *Is Passive Investment Actively Hurting the Economy*, THE NEW YORKER (Mar. 9, 2016), <https://www.newyorker.com/business/currency/is-passive-investment-actively-hurting-the-economy>.

¹¹⁰ See text accompanying notes 75–81.

¹¹¹ See generally Joe Rennison and John Authers, ‘Momentum’ investing bubble worries fanned by focus on market cap, FINANCIAL TIMES (Oct. 9, 2017), <https://www.ft.com/content/d16ba076-ac98-11e7-aab9-abaa44b1e130>; Heejin Kim and Myungshin Cho, *The Big Short’s Michael Burry Sees a Bubble in Passive Investing*, BLOOMBERG NEWS (Aug. 28, 2019), <https://www.bloomberg.com/news/articles/2019-08-28/the-big-short-s-michael-burry-sees-a-bubble-in-passive-investing?sref=2lCQoM0A>.

¹¹² See William A. Ackman, *Letter to Shareholders of Pershing Square Holdings Ltd.*, PERSHING SQUARE CAPITAL MANAGEMENT, LP (Jan. 26, 2016); Matt Levine, *Bill Ackman Runs an Anti-Index Fund*, BLOOMBERG OPINION (Jan. 27, 2016), <https://www.bloomberg.com/opinion/articles/2016-01-27/bill-ackman-runs-an-anti-index-fund>. On the other hand, some studies have found that an increase in index ownership of individual stocks makes it easier to bet against those stocks, and thus increases the efficiency of their prices, by increasing the supply of the stock available for short-selling. See Darius Palia and Stanislav Sokolinski, *Does Passive Ownership Help Relax Ownership Constraints?* (2019), https://sites.rutgers.edu/darius-palia/wp-content/uploads/sites/218/2019/07/Paper_July_2019.pdf; Melissa Porras Prado, Pedro A. Saffi, Jason Sturgess, *Ownership Structure, Limits to Arbitrage, and Stock Returns: Evidence from Equity Lending Markets*, 29(12) THE REVIEW OF FINANCIAL STUDIES, 3211 (Dec. 2016).

remains at 4% of the S&P500 after the investment. Whether the largest U.S. companies are overvalued relative to other index constituents is therefore not a function of index investment, rather it is determined by investment decisions made by active investors.

b. Concentration of asset managers

The growth of index investing has been associated with an increase in the concentration of the asset management industry, with the largest asset managers accounting for an increasing share of index fund assets. For example, since 2010 the three largest asset managers—Vanguard, BlackRock and State Street—have received 70 percent of cumulative index fund inflows¹¹³ and, the share of all mutual fund and ETF assets at the five largest fund families increased from 35 to 51 percent over 2005 to 2018.¹¹⁴

The increased concentration of funds and asset managers gives rise to the possibility that an idiosyncratic risk affecting a single asset manager could have spillover effects on the industry. However, there is no empirical evidence to support that idiosyncratic problems at an asset manager would have an effect on other managers and their funds; rather than resulting in redemptions from the fund industry as a whole, an event that affects one asset manager may just cause investors to shift their money from funds at one manager to another.¹¹⁵

Furthermore, although concentration in the registered fund industry has increased, it remains a competitive market. According to Anadu (2017), between 2005 and 2018, the Herfindahl-Hirschman Index (“HHI”)—a commonly-used measure of industry concentration—of registered funds

¹¹³ Anadu et al. (2018), *supra* note 84; Kaptein (2016), *supra* note 72.

¹¹⁴ Itzhak Ben-David, Francesco Franzoni, Rabih Moussawi, and John Sedunov, *The Granular Nature of Large Institutional Investors*, CEPR DISCUSSION PAPER (2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2620271.

¹¹⁵ In 2014, for example, the departure of Bill Gross from PIMCO triggered outflows of nearly €200 billion, which were largely shifted to other asset managers. See ALLIANZ, *Allianz – A Strong Community* (Feb. 26, 2015), https://www.allianz.com/content/dam/onemarketing/azcom/Allianz_com/investor-relations/en/results/2014_fy/fy14_analyst_presentation.pdf; Kirsten Grind, *Rivals Outdo Gross in Race for Bond Cash*, WALL STREET JOURNAL (Nov. 10, 2014), <https://www.wsj.com/articles/bill-gross-new-janus-fund-took-in-364-million-in-his-first-month-1415636219>. See also FINANCIAL STABILITY OVERSIGHT COUNCIL, *Notice Seeking Comment on Asset Management Products and Activities*, 79 FED. REG. 77488, 77493 (2014), <https://www.federalregister.gov/documents/2014/12/24/2014-30255/notice-seeking-comment-on-asset-management-products-and-activities> (“[C]lients have routinely replaced asset managers without significant impact in non-stressed situations.”). See FINANCIAL STABILITY BOARD AND OICU-IOSCO, *Consultative Document: Assessment Methodologies for Identifying Non-Bank Non-Insurer Globally Systemically Important Financial Institutions*, 30 (2014), https://www.fsb.org/wp-content/uploads/r_140108.pdf (“[F]unds close (and are launched) on a regular basis with negligible or no market impact. In other words, the investment fund industry is highly competitive with numerous substitutes existing for most investment fund strategies (funds are highly substitutable). A fund may close for a variety of reasons, for example not attracting sufficient investor interest or performing poorly over a given period, leading investors to gradually withdraw their money.”).

(including mutual funds and ETFs) has increased from approximately 500 to more than 800.¹¹⁶ The increase has largely been driven by the growth of index funds, which tend to be more concentrated than active funds.¹¹⁷ However, the concentration of registered funds is still relatively low—a market is not considered concentrated for antitrust purposes unless its HHI is above 1,500 and the HHI of registered funds is approximately half of that at 800.¹¹⁸

c. Liquidity and redemption risk

The redemption process for index funds can potentially lead to liquidity concerns in the underlying stocks. If index funds face unusually high redemption requests by investors in a period of market stress, for example, the selling of the underlying stocks may trigger destabilizing fire sales.¹¹⁹ Moreover, if the redemptions themselves are already the result of a negative shock to stock

¹¹⁶ Kenechukwu Anadu, Mathias Kruttli, Patrick McCabe, Emilio, Osambela, and Chae Hee Shin, *The Shift from Active to Passive Investing: Potential Risks to Financial Stability?*, FEDERAL RESERVE BOARD: FINANCE AND ECONOMICS DISCUSSION SERIES 15-16 (2018), <https://www.federalreserve.gov/econres/feds/files/2018060pap.pdf>

¹¹⁷ The average HHI for index funds over that period was about 2,800, compared to 450 for active funds. *The Shift from Active to Passive Investing: Potential Risks to Financial Stability?*, *supra* note 116, at 109. HHI is calculated by squaring the market share of each company competing in the market and then summing the resulting numbers. For example, for a market consisting of four companies with shares of 30, 30, 20, and 20 percent, the HHI is 2,600 ($30^2 + 30^2 + 20^2 + 20^2 = 2,600$). For purposes of antitrust enforcement, the department of Justice and Federal Trade Commission generally consider markets in which the HHI is between 1,500 and 2,500 points to be moderately concentrated, and markets in which the HHI is in excess of 2,500 points to be highly concentrated. See U.S. DEPARTMENT OF JUSTICE & FED. TRADE COMM'N, *Horizontal Merger Guidelines* § 5.3 (2010), <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010>.

¹¹⁸ Jeff Tjornehoj, *Exploring Fund Industry Concentration: The Good, The Bad, and The Unknown*, BROADRIDGE 3-4 (2018), https://www.broadridge.com/_assets/pdf/broadridge-exploring-fund-industry-concentration.pdf.

¹¹⁹ See, e.g., Michael Feroli, Anil Kashyap, Kermit Schoenholtz, and Hyun Song Shin, *Market Tantrums and Monetary Policy*, CHICAGO BOOTH RESEARCH PAPER NO. 14-09 (2014), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2409092&rec=1&srcabs=2382839&alg=1&pos=10; Itay Goldstein, Hao Jiang, and David Ng, *Investor flows and fragility in corporate bond funds*, 126 JOURNAL OF FINANCIAL ECONOMICS 592 (2017), <http://finance.wharton.upenn.edu/~itayg/Files/bondfunds-published.pdf>; FINANCIAL STABILITY OVERSIGHT COUNCIL, *2016 Annual Report*, 9 (2016), <https://www.treasury.gov/initiatives/fsoc/studies-reports/Documents/FSOC%202016%20Annual%20Report.pdf>; Sergey Chernenko and Adi Sunderam, *Liquidity Transformation in Asset Management: Evidence from the Cash Holdings of Mutual Funds* (Jan. 2016); FINANCIAL STABILITY BOARD, *Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities* (Jan. 12, 2017), <https://www.fsb.org/wp-content/uploads/FSB-Policy-Recommendations-on-Asset-Management-Structural-Vulnerabilities.pdf>; Chris Giles and Owen Walker, *BoE governor Mark Carney calls for change to investment regulation*, THE FINANCIAL TIMES (June 26, 2019), <https://www.ft.com/content/e6d5bf04-980b-11e9-8cfb-30c211dcd229>.

prices, redemptions by index funds could amplify stock market losses. However, such concerns have not materialized during the COVID-19-related market stress as of May 2020.¹²⁰

Kamara, Lou, and Sadka (2008, 2010) and Bolla, Kohler, and Wittig (2017) find increases in correlated liquidity shocks among stocks in the U.S. equity market, which they attribute to the spread of index investing.¹²¹ Their findings suggest that the growth of index investing might make stocks more likely to become illiquid simultaneously, which would magnify the effect of a “run” on index funds.

On the other hand, Anadu et al. (2018) provide evidence that the sensitivity of investor inflows and outflows to performance for index funds is weaker than for active funds: while a one percent decrease in monthly net return is associated with a 2.5 percent outflow from active stock funds, the same decrease correlates with only a 0.7 percent outflow from index funds.¹²² Recent prominent liquidity crises at mutual funds (such as those at H2O, Woodford and GAM) have all occurred at active funds that held illiquid assets, including stock of private companies and illiquid debt securities, that are typically not held by index equity funds.¹²³

Sushko and Turner (2018) analyze several recent stress episodes and compare the stability of fund flows across index mutual funds, index ETFs and active mutual funds.¹²⁴ They find that index mutual fund flows were the least volatile; index ETFs exhibited the largest fund inflows and outflows relative to asset size (active mutual fund flows were the largest in absolute terms); and active mutual funds experienced the most persistent outflows.¹²⁵ Their findings are consistent with evidence from Ben-David, Franzoni and Moussawi (2017) that ETFs attract short-term investors.¹²⁶ Their findings also suggest that while index mutual funds are a stabilizing influence in times of market stress, index ETFs (and their investors) tend to be more sensitive to market conditions.¹²⁷

¹²⁰ For example, in 2020 U.S. ETFs have seen year-to-date net inflows of \$115.8 billion, up from the net inflows of \$70.9 billion over the same time frame in 2018. See Sumit Roy, *First Weekly ETF Outflow Since March*, ETF.COM (May 8, 2020), <https://www.etf.com/sections/weekly-etf-flows/weekly-etf-flows-2020-05-07-2020-05-01>.

¹²¹ See A. Kamara, X. Lou, and R. Sadka, *The Divergence of Liquidity Commonality in the Cross-section of Stocks*, 89 JOURNAL OF FINANCIAL ECONOMICS, 444 (2008).; Lidia Bolla, Alexander Kohler, and Hagen Wittig, *Index-linked investing-A curse for the stability of financial markets around the globe?*, 42 JOURNAL OF PORTFOLIO MANAGEMENT 26 (2017).

¹²² Anadu et al. (2018), *supra* note 84.

¹²³ Anadu et al. (2018), *supra* note 84.

¹²⁴ Sushko & Turner (2018), *supra* note 5.

¹²⁵ Sushko & Turner (2018), *supra* note 5.

¹²⁶ Itzhak Ben-David, Francesco Franzoni, Rabih Moussawi, and John Sedunov, *The Granular Nature of Large Institutional Investors*, CEPR DISCUSSION PAPER (2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2620271.

¹²⁷ Ben-David et al. (2019), *supra* note 126.

4. Conclusion

The first section of our report measured the rise of index investing, finding that approximately 15% of U.S. equities were owned by index mutual funds and ETFs as of year-end 2019.¹²⁸ We also considered the drivers of index fund growth and challenges in measuring the rise of index investing.

The second section of the report considered whether there is evidence that the rise of index investing has had an effect on price efficiency. We found evidence to support a temporary “index premium” after a company is included in an index. However, the magnitude of the index premium and its long-term effects have decreased in recent years and appear to be nonexistent today. We also found mixed evidence surrounding the link between index inclusion and an increase in the co-movement of stocks in an index.

In the third section of the report we considered the impact of index investing on financial stability. The evidence that index investing negatively impacts financial stability is weak. First, since the long-term effects of index inclusion are minimal, it appears unlikely that index inclusion could cause a stock market bubble. Second, although the rise of index investing has been concentrated at the largest asset managers, there is no evidence to suggest that the idiosyncratic failure of an asset manager would cause widespread problems across financial markets. Third, empirical studies generally find that investors in index funds do not engage in correlated selling during periods of market stress.

In conclusion, while the rise of index investing in recent years has been significant, the empirical evidence, while mixed, indicates that the rise of index investing has not had negative effects on price efficiency or financial stability. We recommend continued study of the effects of the rise of index investing in the years to come.

¹²⁸ *2020 Investment Company Fact Book*, supra note 17, at 40.

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