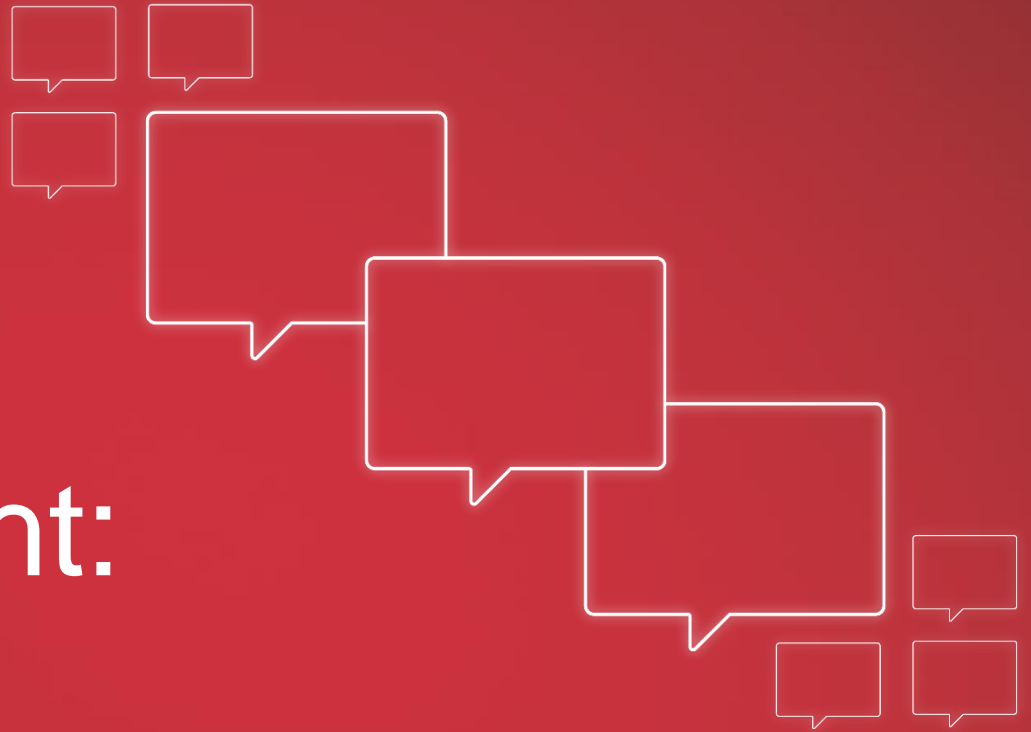
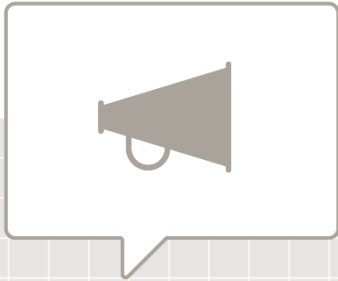


Setting the record straight: Truths about indexing



Agenda



Advocating for indexing

Benefits of the
strategy and
wealth creation



Defining indexing

Misconceptions
about market size
and characteristics

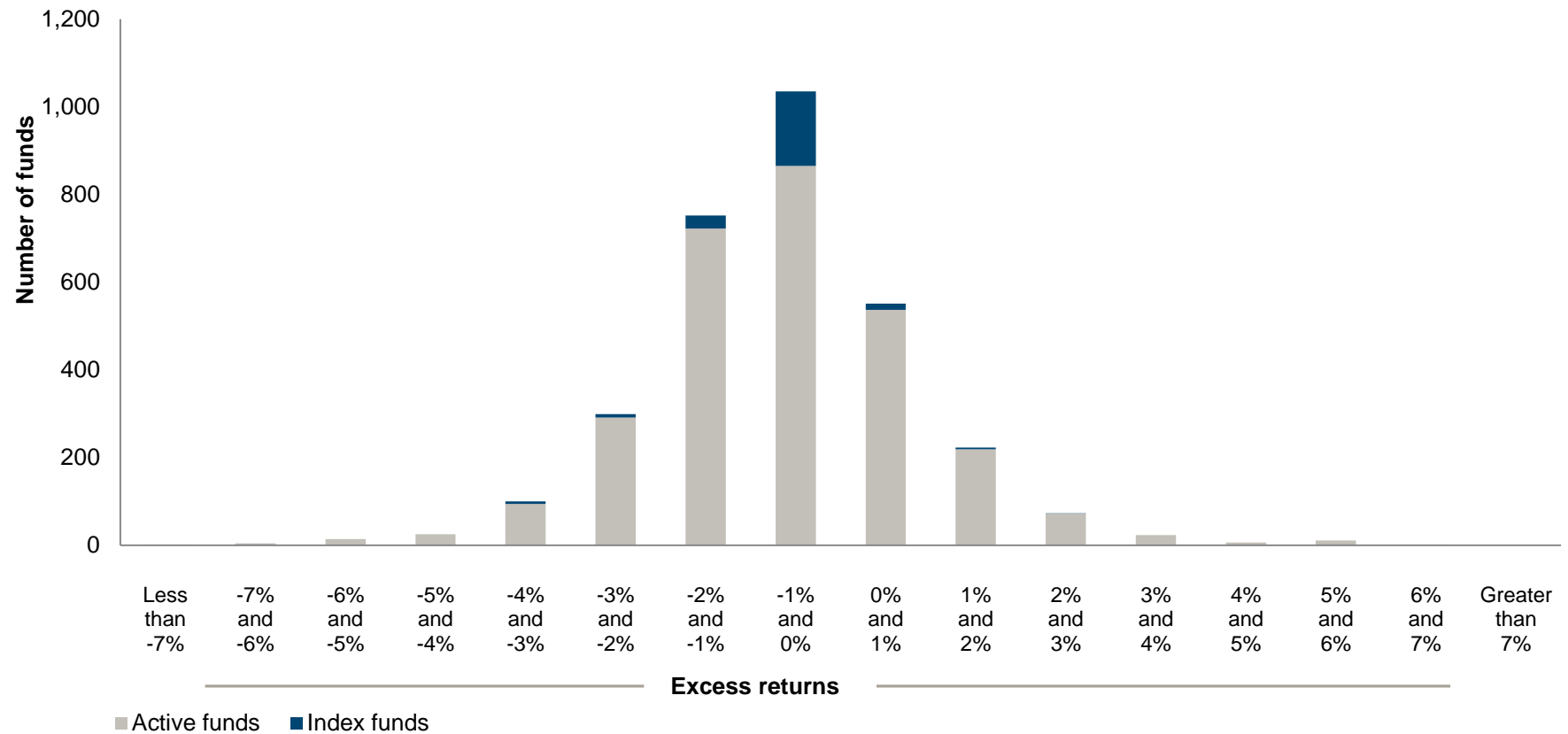


Defending indexing

Truths behind market
impact and industry
concentration

Relative investing is a zero-sum game

Performance has been consistent with theory

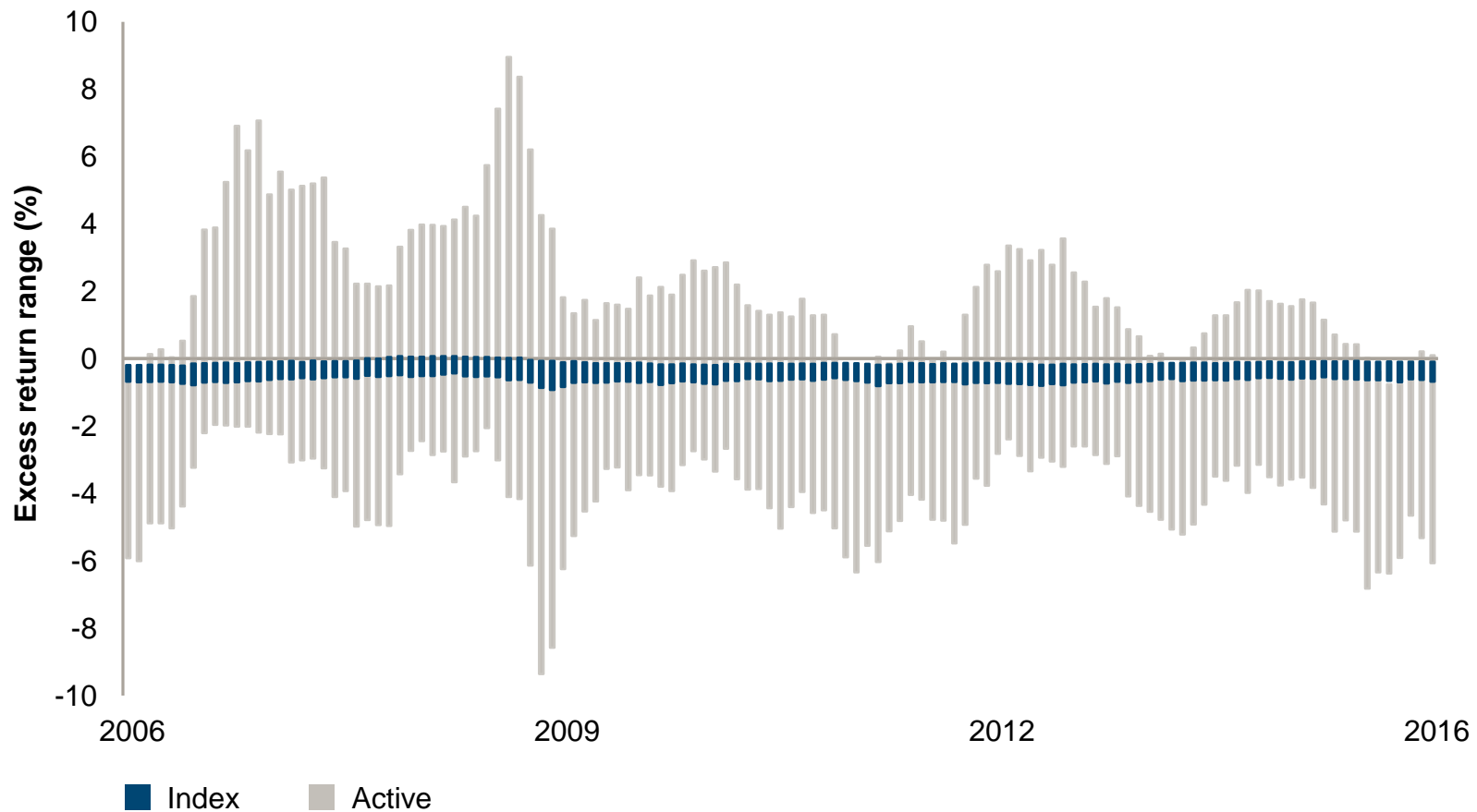


Notes: Past performance is no guarantee of future results. The chart displays distribution of equity funds' excess returns relative to their prospectus benchmarks, for the 15 years ended December 31, 2016. Our survivor bias calculation treats all dead funds as underperformers. It's possible, of course, that some of those funds outperformed the relevant index before they died. If we splice fund category average returns onto the records of dead funds, we see a modest decline in the percentage of funds that trail the index. The differences from our existing calculations are not material.

Source: Vanguard calculations, using data from Morningstar, Inc.

Index funds provide relative performance predictability

Range of excess returns

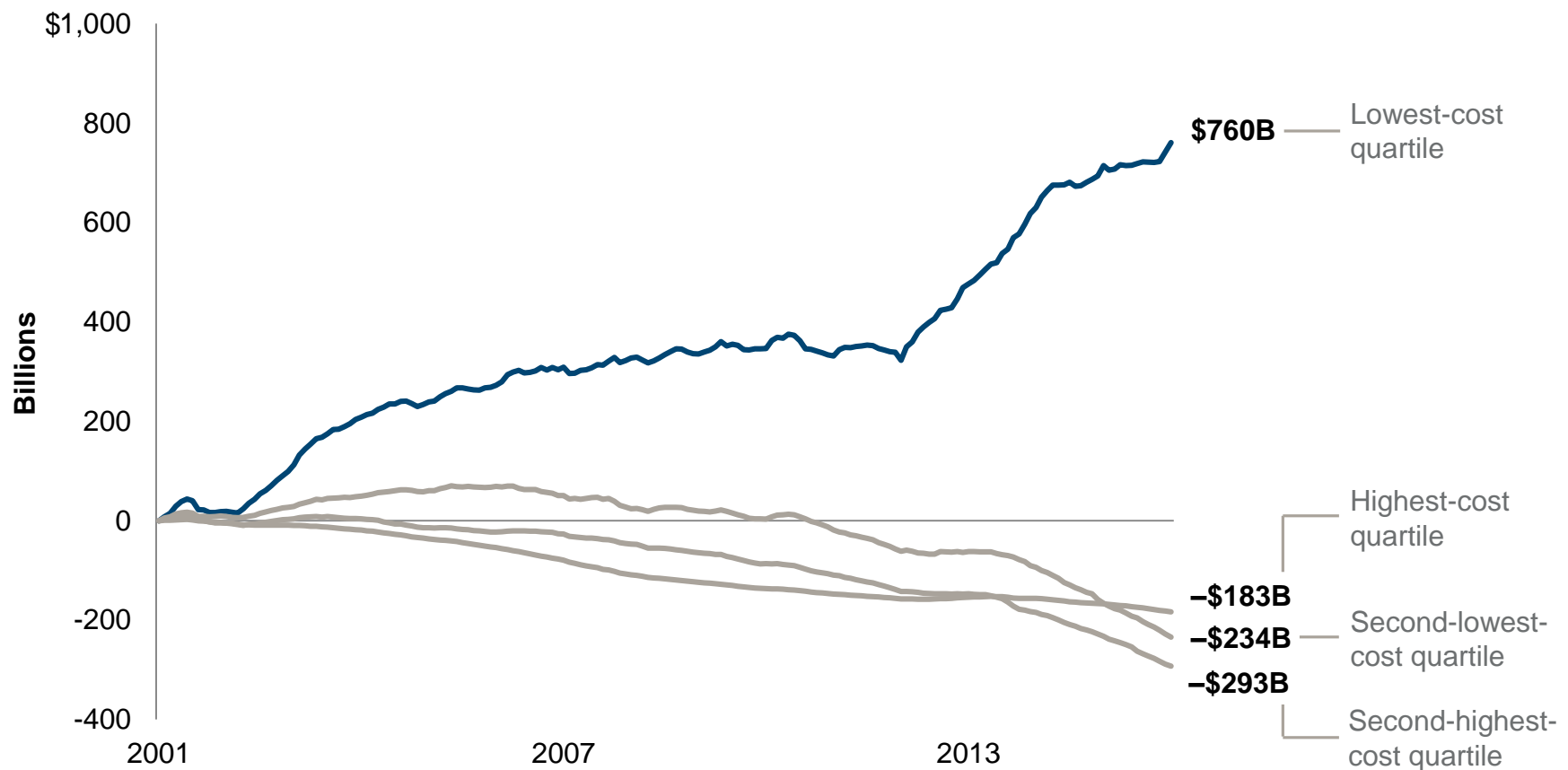


Notes: Shaded regions depict the range of returns between the 75th and 25th percentiles for U.S. equity active and index strategies. Returns are defined as rolling 12-month excess returns relative to a prospectus benchmark on a monthly basis. The sample of U.S. equity funds is defined by Morningstar U.S. category group. Source: Vanguard calculations, using data from Morningstar, Inc.

Investors recognize the benefits of low costs

High-cost funds are under pressure

Cumulative equity fund net cash flows by cost quartiles



Notes: Expense-ratio quartiles were calculated annually. Equity funds represented by Morningstar U.S. equity category. Each quartile represents 2016 asset-weighted average expense ratios, determined by multiplying annual expense ratios by year-end assets under management and dividing by the aggregate assets in each quartile. Data are as of December 31, 2016.
Source: Vanguard calculations, based on data from Morningstar, Inc.

Indexing is a small part of the **U.S. market**

~35% Percentage of total **open-ended mutual fund assets** in index strategies

~45% equity funds
~25% bond funds

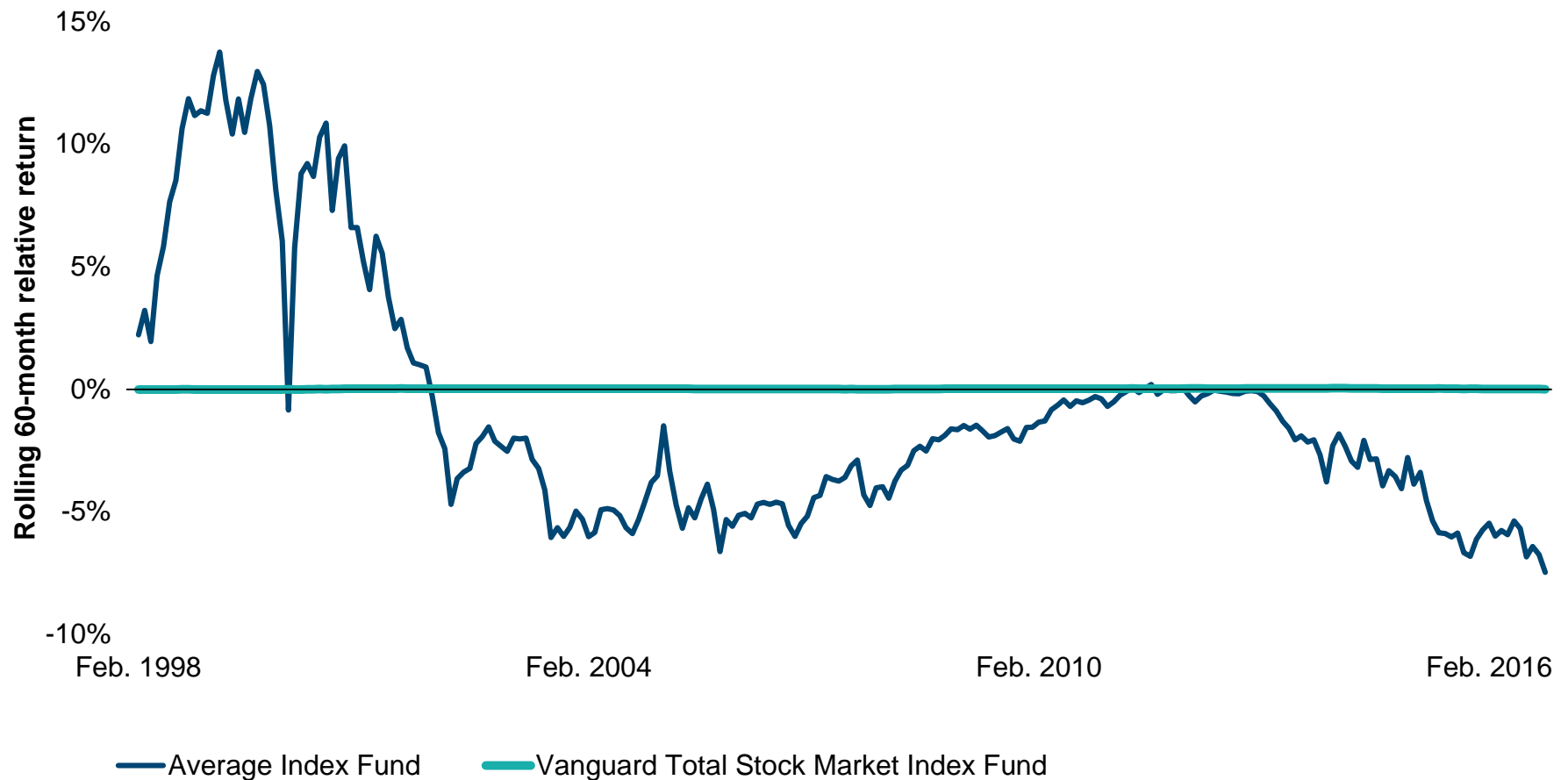


Notes: All data are as of September 30, 2017. U.S. registered fund assets as represented by Morningstar excluding fund of funds, and money market funds. U.S. equity fund market share is represented by Morningstar category group U.S. equity and sector equity mutual funds and ETFs. Fixed income fund market share is represented by Morningstar category group taxable bond mutual funds and ETFs. U.S. equity market-cap is represented by CRSP Total Market Index. U.S. fixed income market-cap is represented by Bloomberg Barclays U.S. Universal Index. Ownership share of outstanding securities and trading volume are best estimates based on available data.

Source: Vanguard calculations, based on data from Morningstar, Inc., Factset, CRSP, Barclays, and ArcaVision.

Index fund investors haven't necessarily tracked the market

Investors use index funds, but build active portfolios

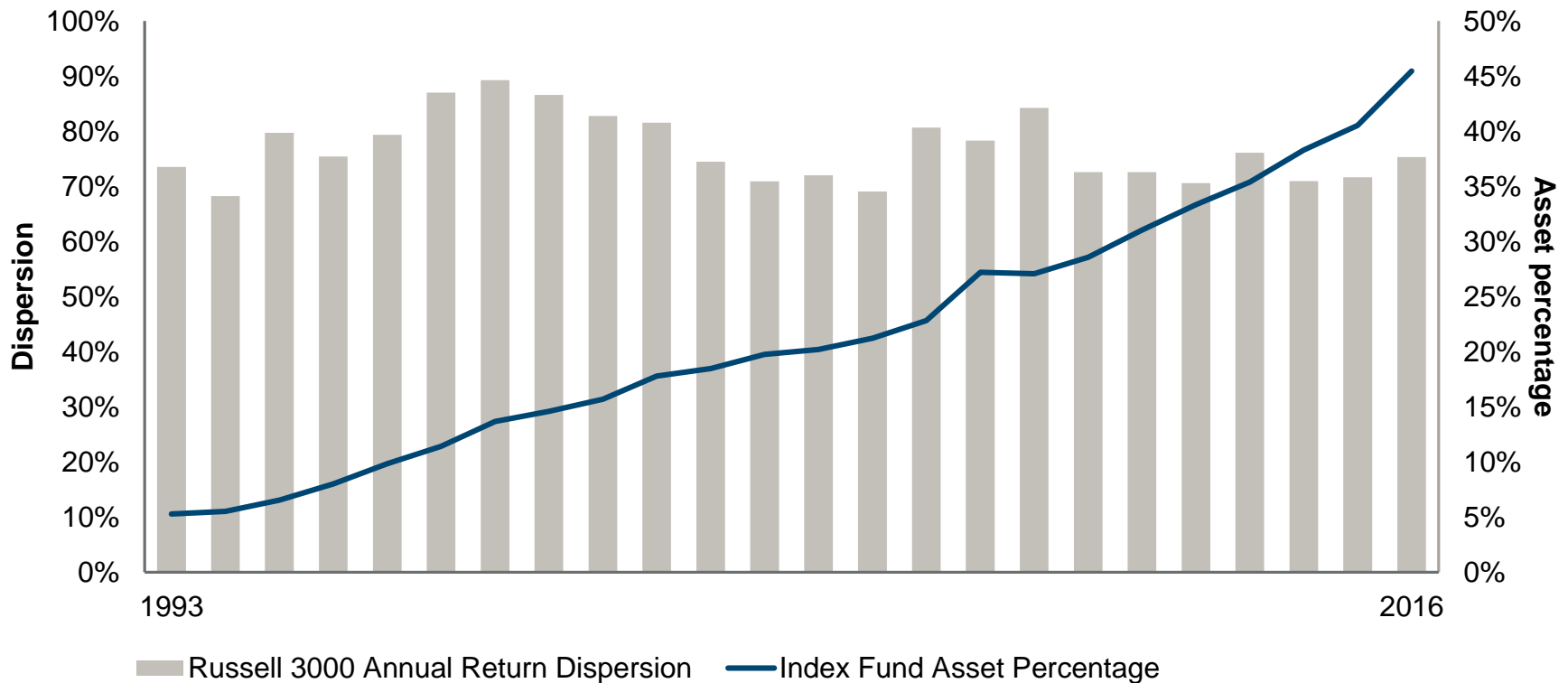


Notes: Average index fund includes U.S.-domiciled index mutual funds and ETFs in the U.S. equity and sector equity categories, and its returns are asset-weighted. Average index fund returns and Vanguard Total Stock Market Index Fund returns are relative to a total market index represented by the Wilshire 5000 Index. Data are from 1993 to 2016.

Source: Vanguard calculations, based on data from Morningstar, Inc.

Indexing's growth and price dispersion: No connection found

No more, no less challenging for active

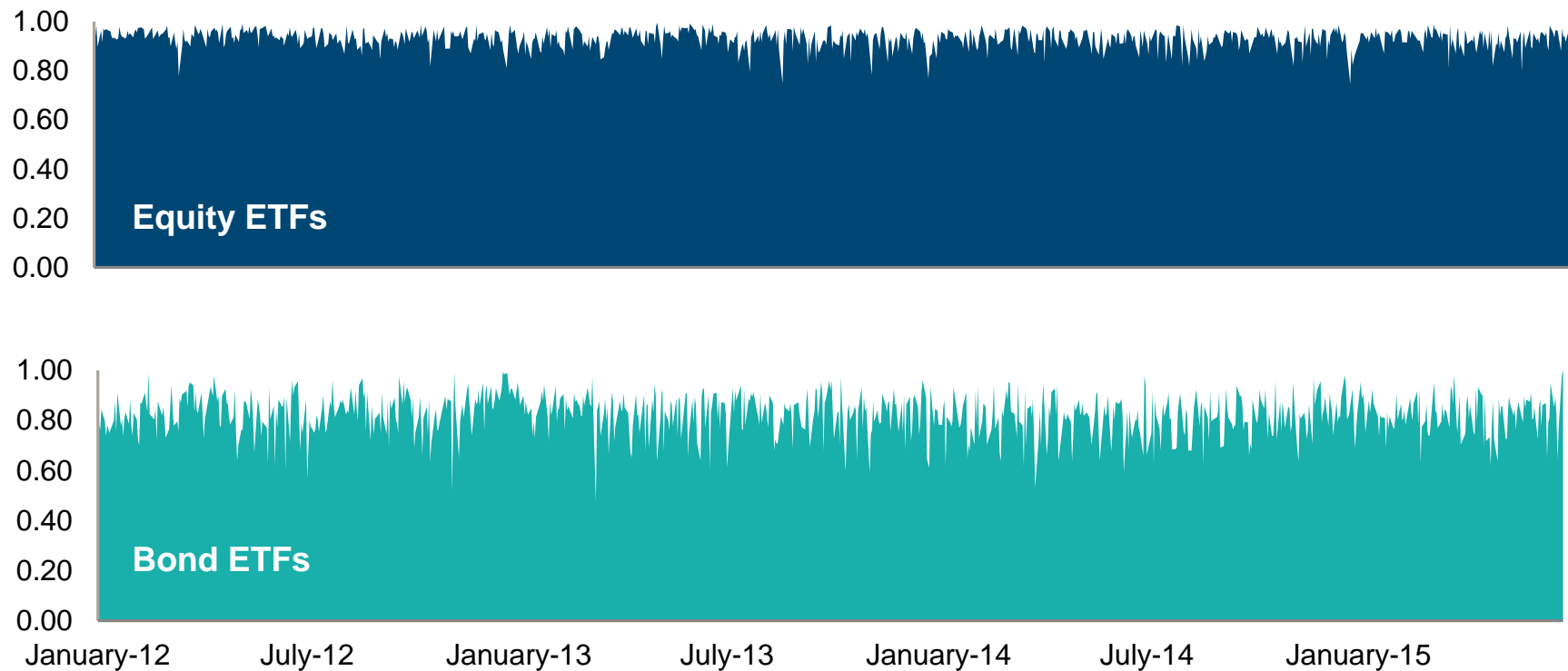


Note: Dispersion is defined as the percentage of stocks in the Russell 3000 Index that have either outperformed or underperformed the index by at least 10 percentage points. Index fund asset percentage is the percentage of assets in U.S.-domiciled equity funds invested in index funds. Sector funds are included. Source: Vanguard calculations, using data provided by FactSet and Morningstar, Inc.

Majority of ETF trading is conducted on the secondary market

ETF secondary market ratio

Secondary market activity divided by the sum of primary market and secondary market activity



Notes: Data cover the period from July 1, 2012, through June 30, 2015. The ten largest equity ETFs and bond ETFs by assets are used as proxies. Primary market activity is computed as daily creations or redemptions for each ETF, estimated by daily change in shares outstanding multiplied by net asset value. Source: Vanguard calculations, based on daily data from Bloomberg Inc.

Passive shareholders are powerful stewardship advocates

Vanguard takes an active approach to investment stewardship



Board

A high-functioning, well-composed, independent, diverse, and experienced board with strong ongoing evaluation practices



Structure

Governance structures and provisions that empower shareholders



Pay for performance

Compensation that incentivizes relative outperformance over the long term



Risk

Effective and integrated ongoing oversight of relevant industry- and company-specific risks

Summary

1

Indexing has clear benefits that we believe will endure.

2

No connection has been found between the growth of indexing and adverse market impact.

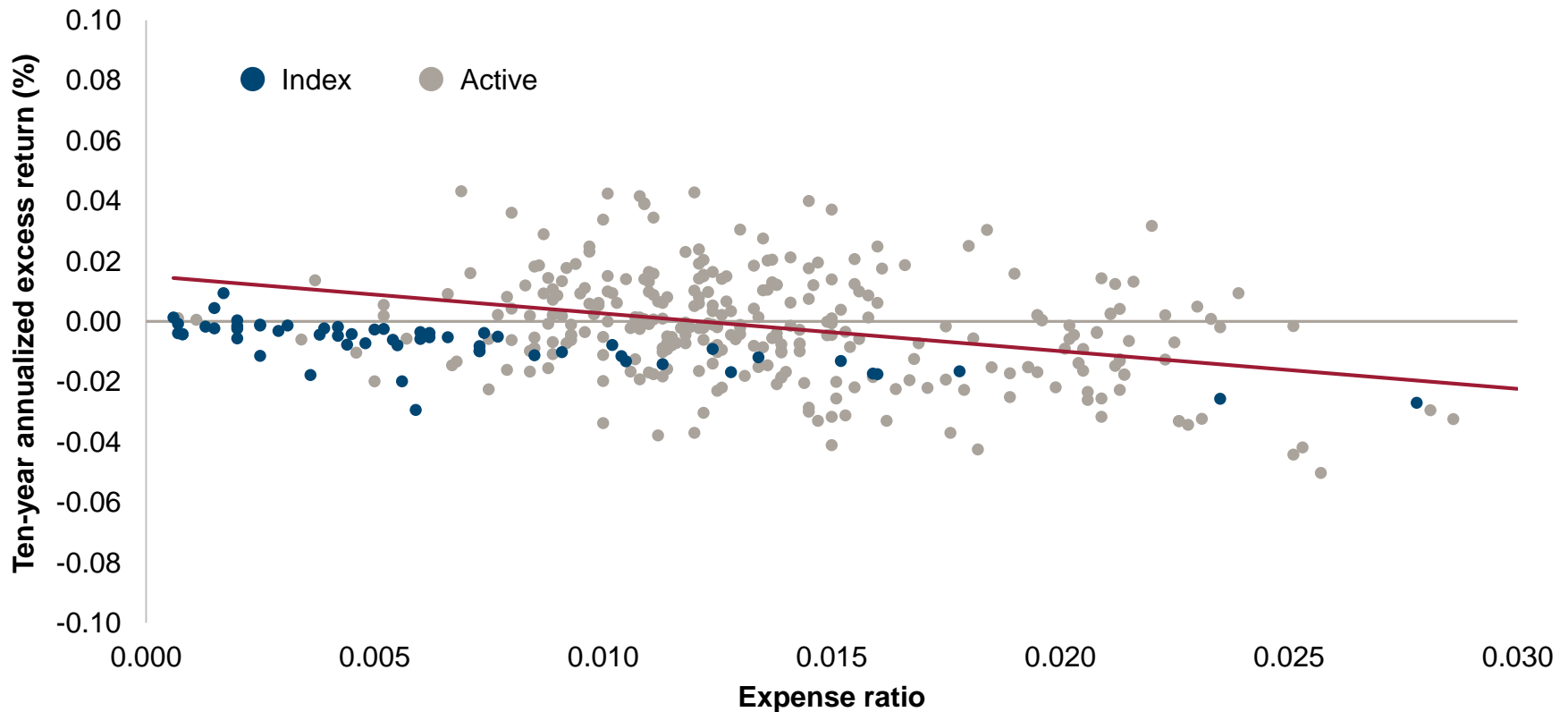
3

Passive investors can also be strong advocates for investment stewardship.

Appendix

Higher expense ratios are associated with lower excess returns

Small-cap blend funds' excess returns versus expense ratios

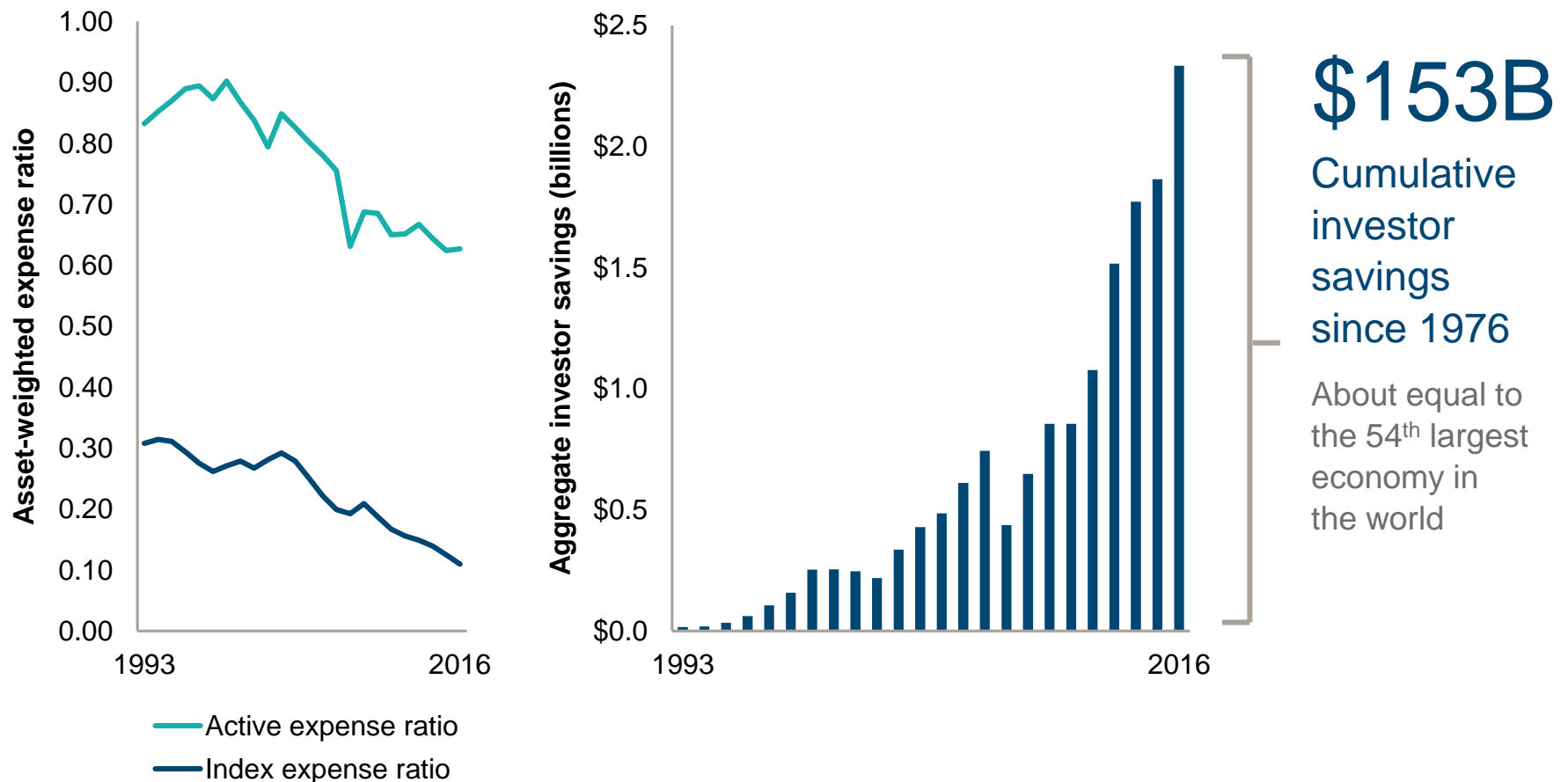


Notes: Each dot represents the relationship of the fund's expense ratio (x-axis) versus its ten-year annualized excess return relative to its stated benchmark (y-axis). The straight line represents the linear regression, or the best-fit trend line—that is, the general relationship of expenses to excess returns. Some funds' expense ratios and returns go beyond the scales and are not shown. All data are as of December 31, 2016.

Source: Vanguard calculations, using data from Morningstar, Inc.

Indexing has allowed investors to keep more of their money

In aggregate, indexing has helped to drive down the cost of investing



Notes: Data reflect the difference between the cumulative expense ratio fees paid by investors owning open-end funds versus what they hypothetically would have paid if index funds did not exist. Investor savings are calculated as: (asset-weighted expense ratio of actively managed funds x industry assets) – (industry asset-weighted expense ratio x industry assets).

Source: Vanguard calculations, based on data from Morningstar, Inc.

Indexing is a small part of the **global market**

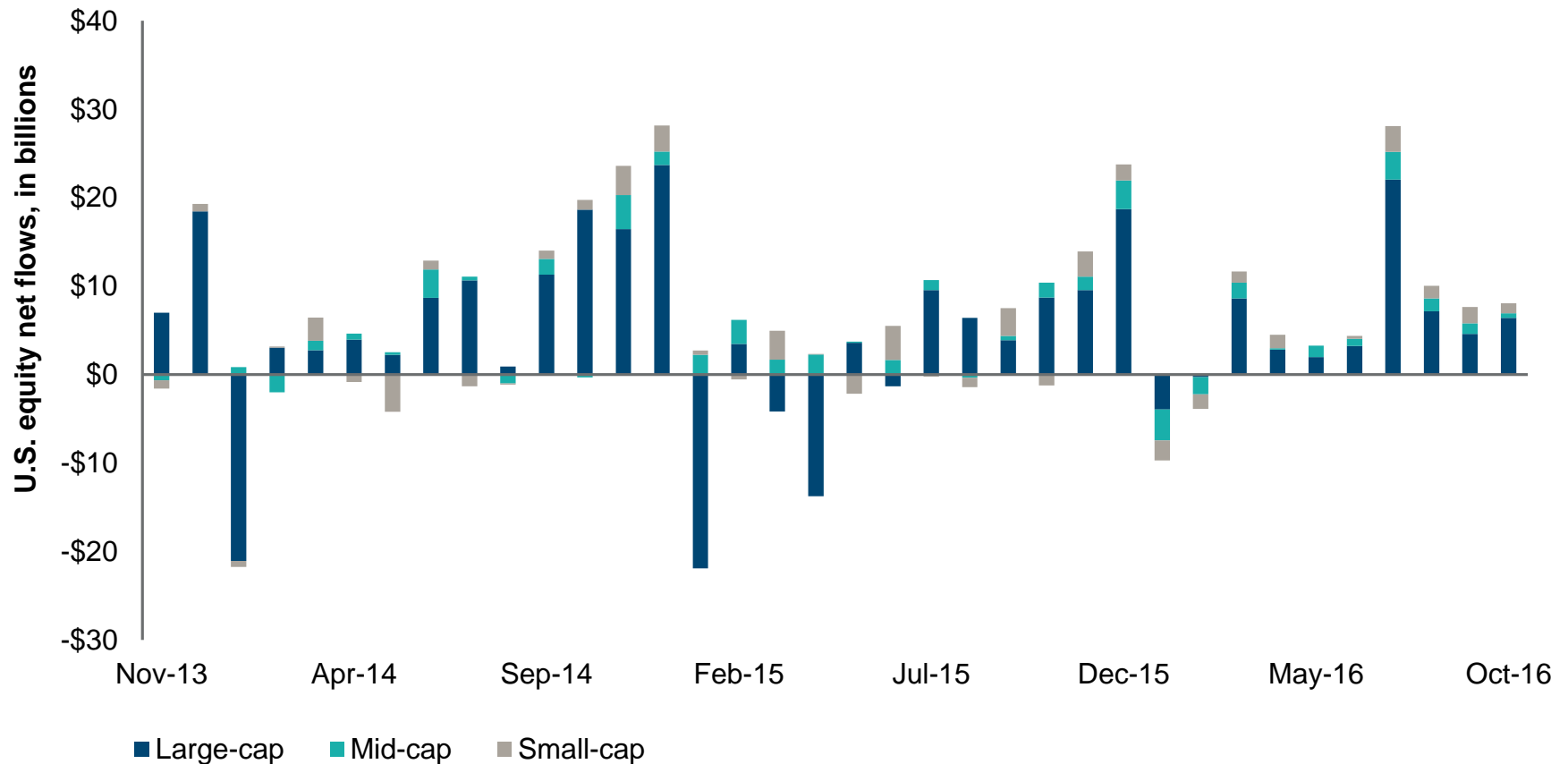


Notes: All data are as of September 30, 2017. Global registered fund assets are represented by Morningstar, excluding funds of funds, feeder funds, and money market funds. Global equity fund market share is represented by Morningstar global broad category group equity mutual funds and ETFs. Global equity market-cap is represented by the FTSE Global All Cap index. Global fixed income market-cap is represented by the Bloomberg Barclays Multiverse Index. Global fixed income fund market share is represented by Morningstar global broad category group fixed income mutual funds and ETFs. Ownership share of outstanding securities is best estimate based on available data.

Source: Vanguard calculations, based on data from Morningstar, Inc., and Factset.

Index ETF cash flows have not been market-cap-proportional

Investors make varying allocations across the capitalization spectrum

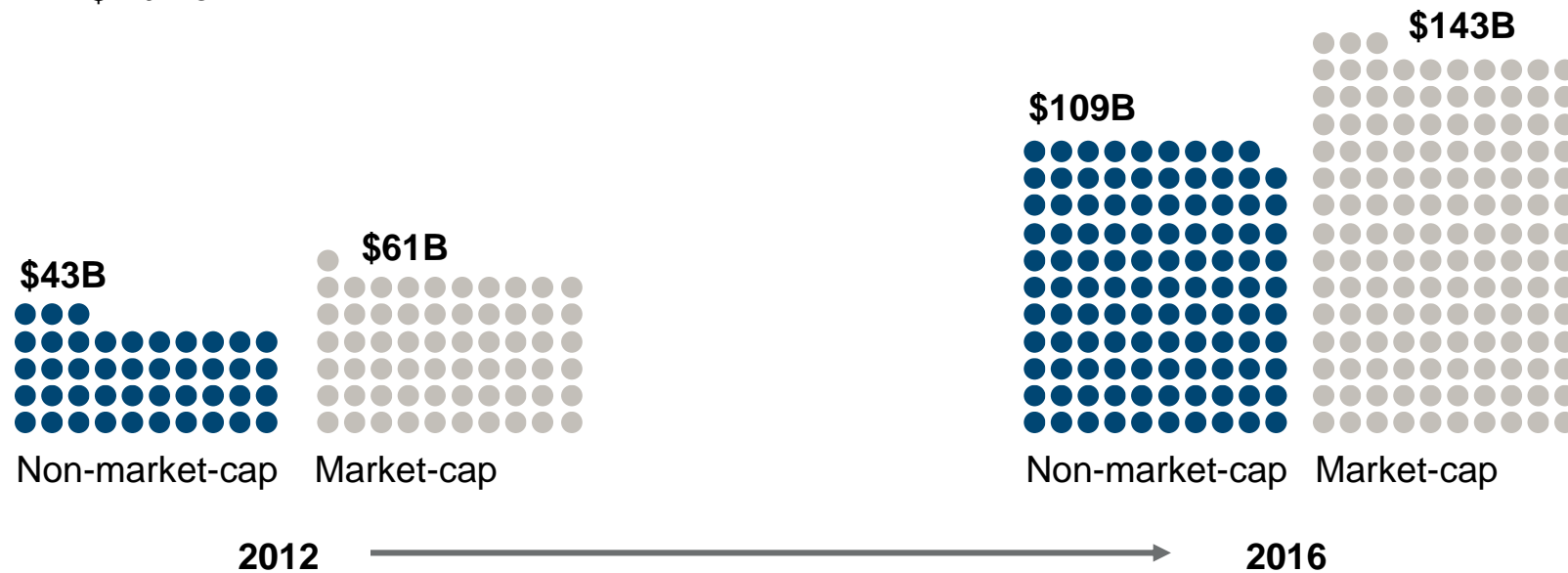


Note: Data represent U.S. ETFs in nine-box Morningstar categories.
Source: Vanguard calculations, based on data from Morningstar, Inc.

Some passive assets are in fact active

Strategic beta ETF assets

● = \$1 billion

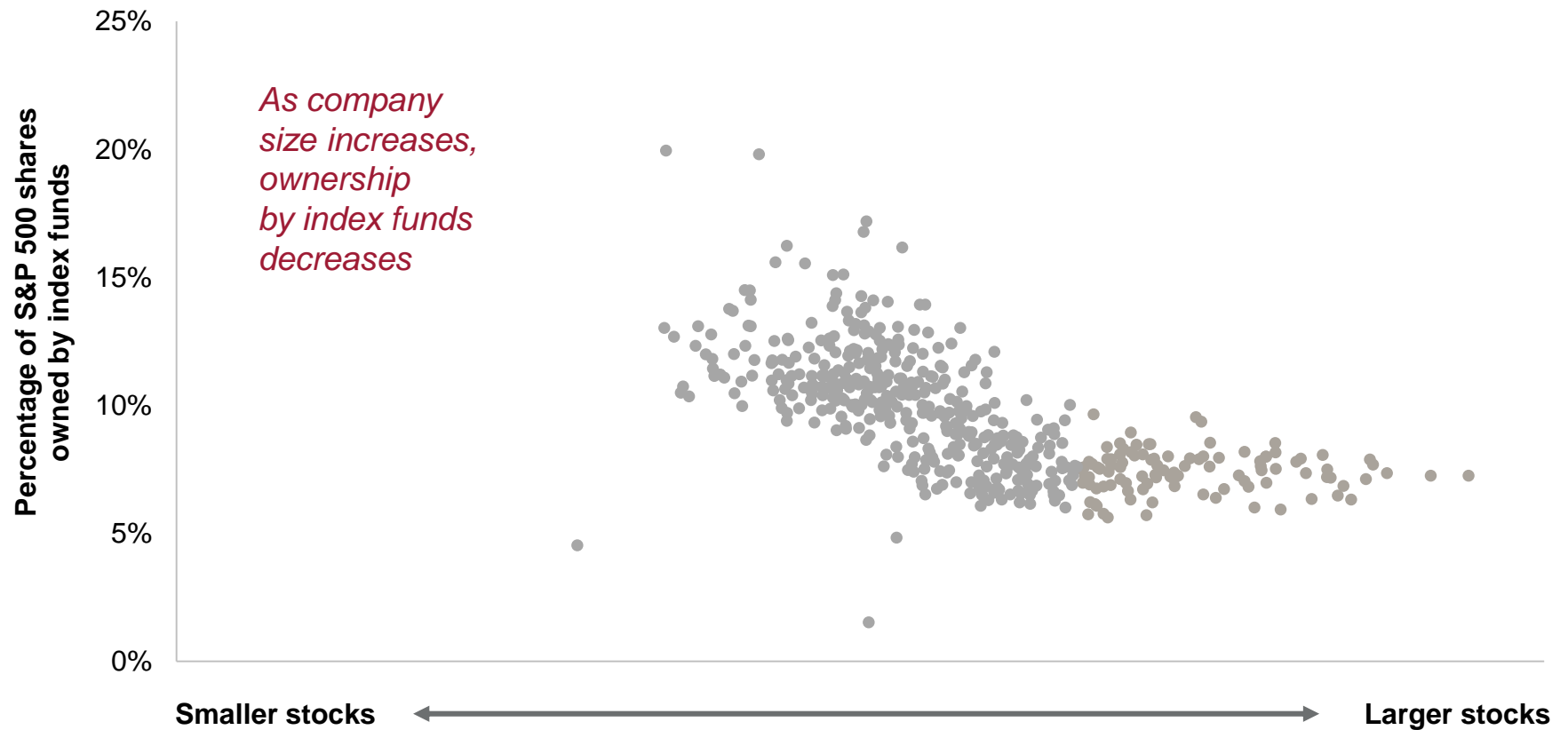


Strategic beta assets continue to grow rapidly, but about half of those assets are in funds that are not market-cap-weighted.

Note: Data represent U.S. ETFs in Morningstar strategic beta category. Data for 2016 are through October.
Source: Vanguard calculations, based on data from Morningstar, Inc.

Proportional ownership of individual stocks is misunderstood

Larger companies actually have lower index fund ownership

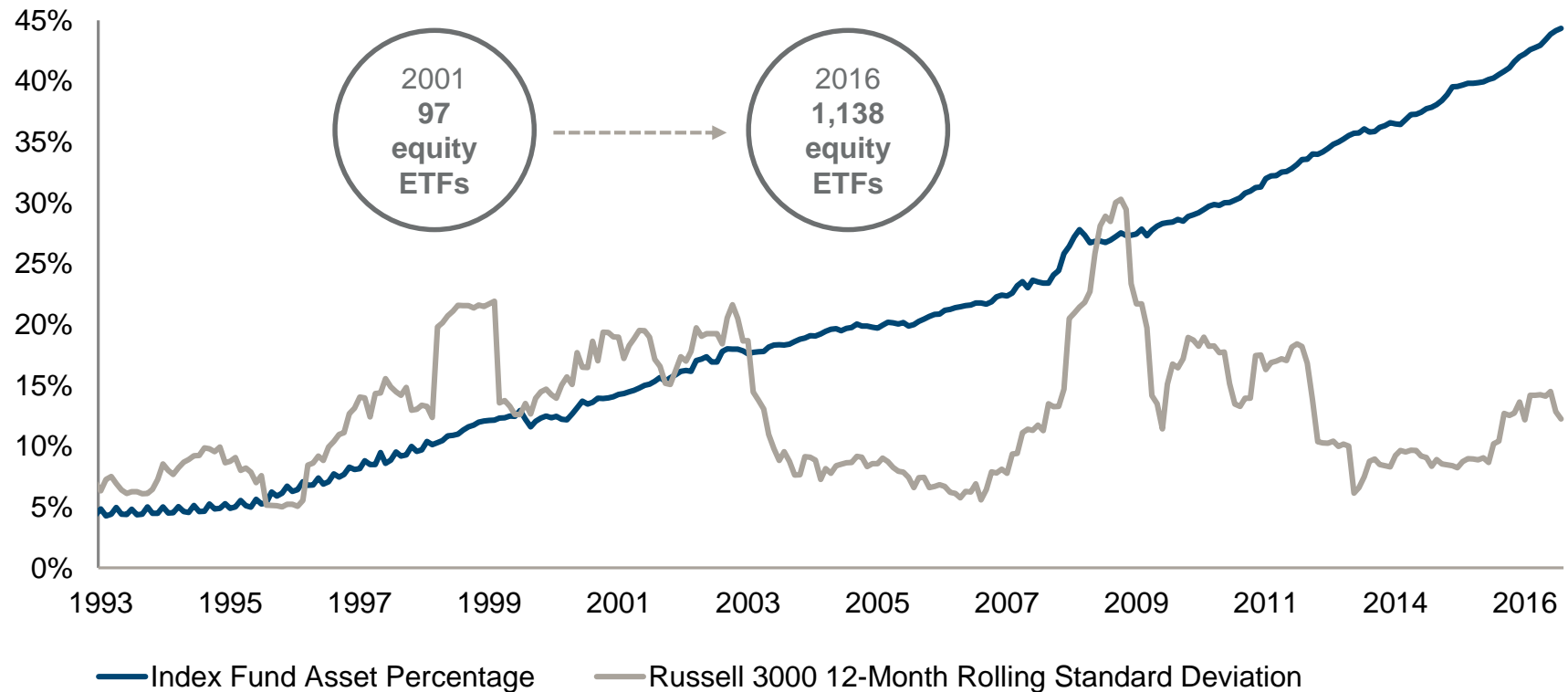


Notes: Stock size is measured by market capitalization in logarithmic scale. Data are as of December 31, 2015.

Source: Vanguard calculations, based on data from Morningstar, Inc., and FactSet.

Indexing's growth and market volatility: No connection found

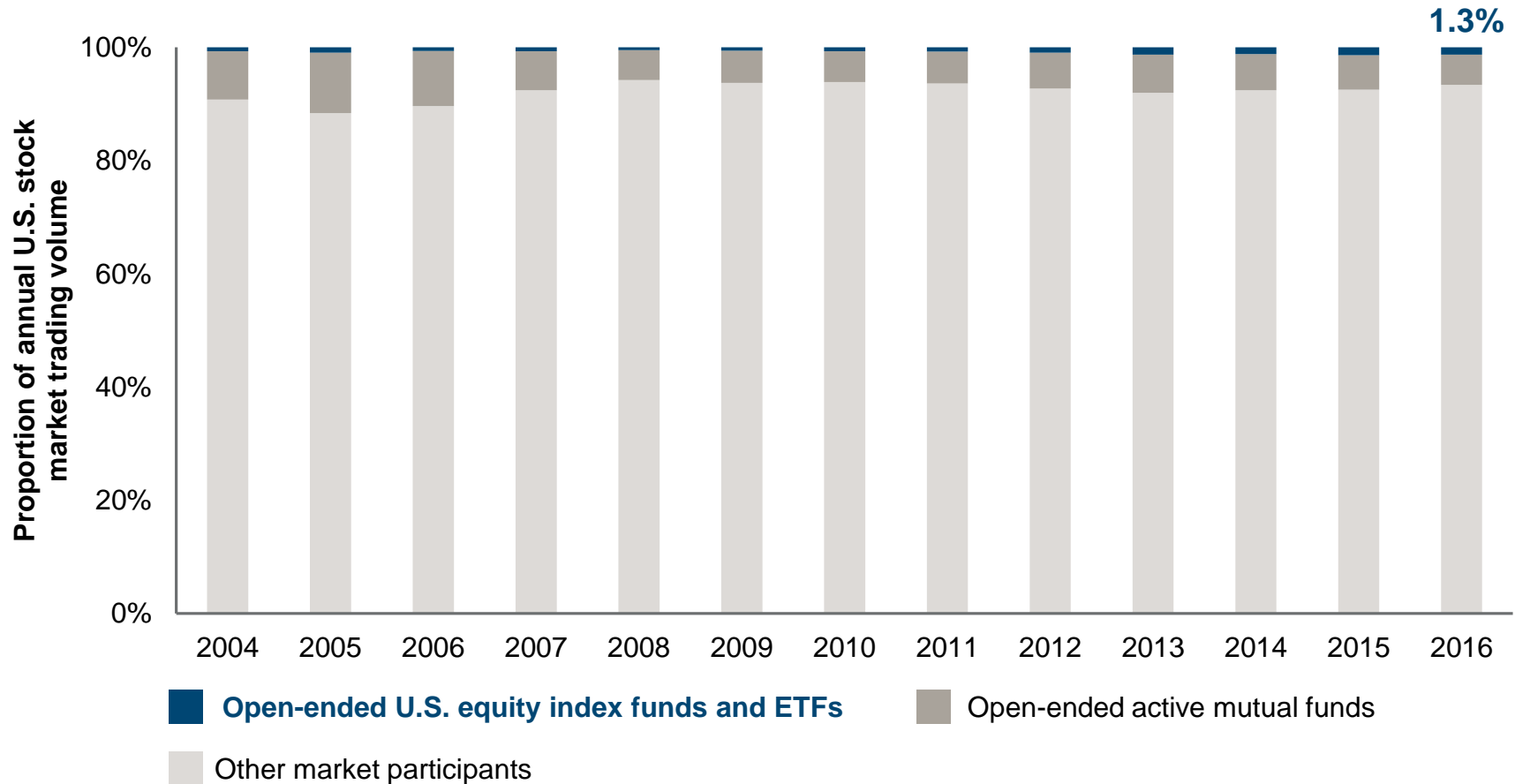
Passive asset percentage and market volatility



Notes: Passive market share is the percent of assets in U.S.-domiciled U.S. equity funds invested in index funds. Sector funds are included. Past performance is no guarantee of future results. The performance of an index is not representative of any particular investment, as you cannot invest directly in an index. Source: Vanguard calculations, using data from FactSet and Morningstar, Inc.

Trading by index funds accounts for a fraction of trading activity

Price discovery is driven by active participants

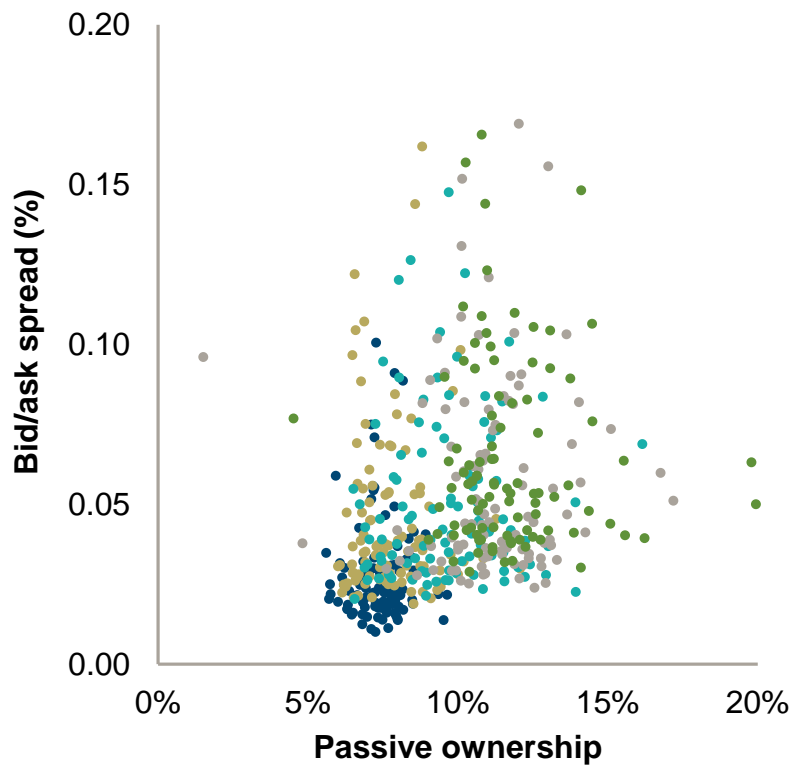


Notes: Data include domestic equity open-end funds and ETFs. A fund's trading activity is estimated by its cash-flow-adjusted turnover, defined as the sum of (i) portfolio turnover multiplied by average net assets and (ii) one-half the absolute value of annual net cash flow. Examples of other market participants include individual investors, hedge funds, pension funds, separately managed accounts, and high-frequency traders and could include index-based strategies that are not 1940 Act funds.

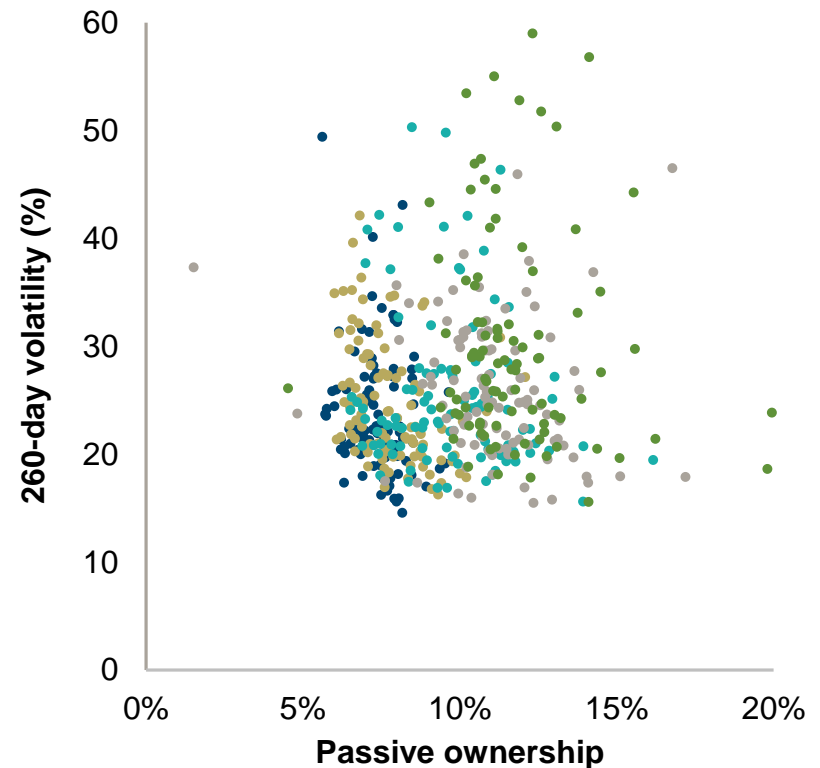
Source: Vanguard, based on data from Morningstar, Inc., and ArcaVision.

Higher ownership, liquidity and volatility: No connection found

Passive ownership percentage and **bid/ask spread** of S&P 500 constituents



Passive ownership percentage and **volatility** of S&P 500 constituents



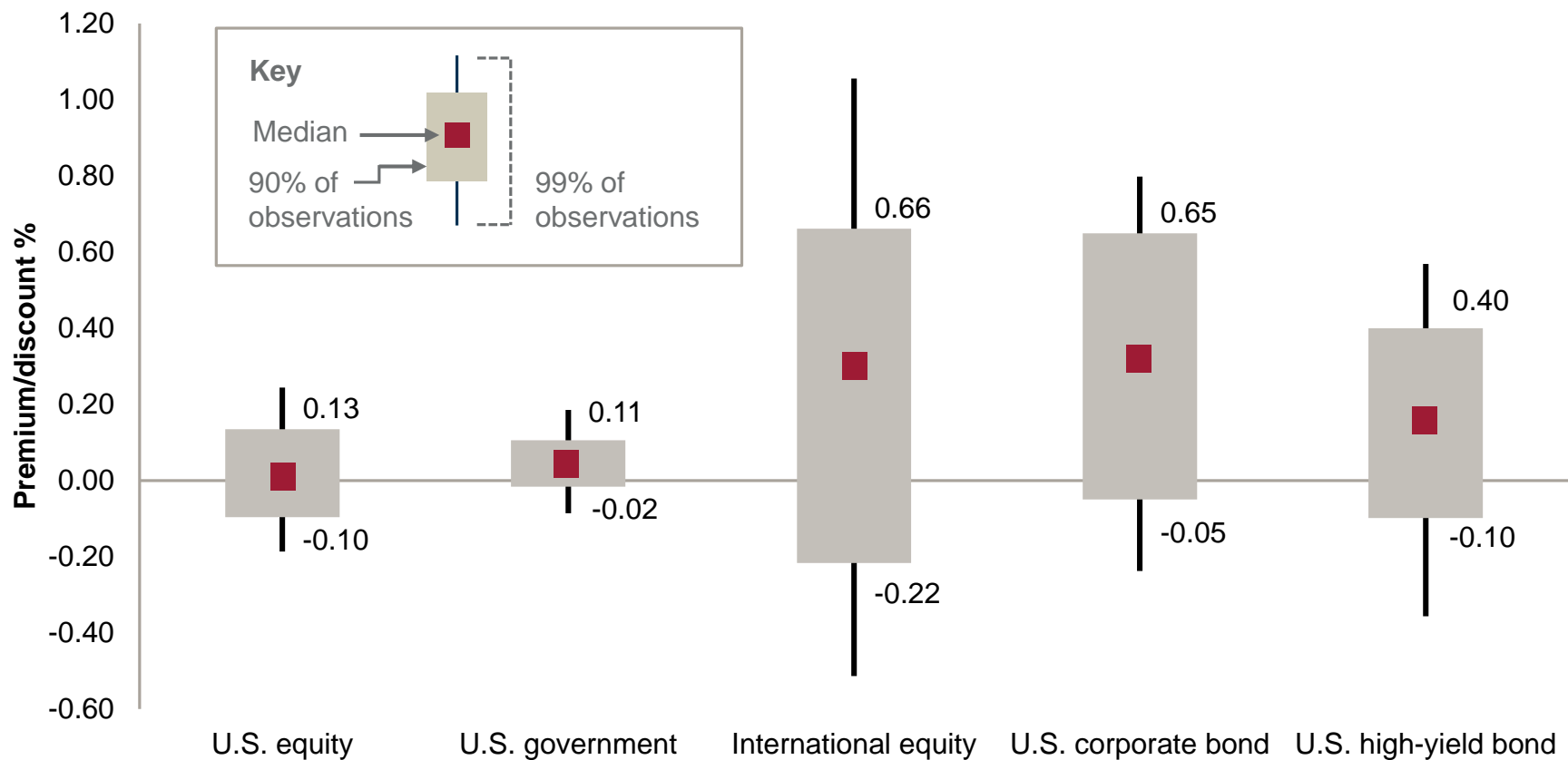
● Top quintile ● Second quintile ● Third quintile ● Fourth quintile ● Bottom quintile

Notes: Ownership data represent the proportional ownership of S&P 500 Index stocks by all passive industry mutual funds and ETFs tracking all U.S. style-box indexes. Data are as of December 31, 2015. Six outlier companies were omitted from the bid/ask chart and four from the volatility chart. The 260-day volatility is the annualized standard deviation of the price change for the 260 most recent trading days' closing price.

Sources: Bloomberg, FactSet and Morningstar, Inc.

ETFs reflect market conditions

Market prices reveal valuable information about market conditions



Notes: Data set includes all available ETFs from July 1, 2012, through June 30, 2015, in each category as defined by Morningstar. “U.S. equity” represents large, mid, and small, as well as growth, value, and blend, Morningstar categories; “U.S. government bonds” represents short, intermediate, and long U.S. government bond Morningstar categories; “International equity” represents foreign large, mid, and small, as well as growth, value, and blend, Morningstar categories; “U.S. corporate bonds” and “U.S. high-yield bonds” represent their respective Morningstar categories. Each tan box represents the 5th–95th percentiles; whiskers represent the 0.5%–99.5% of observations; and red squares represent the median value for each category, using daily data from Bloomberg.

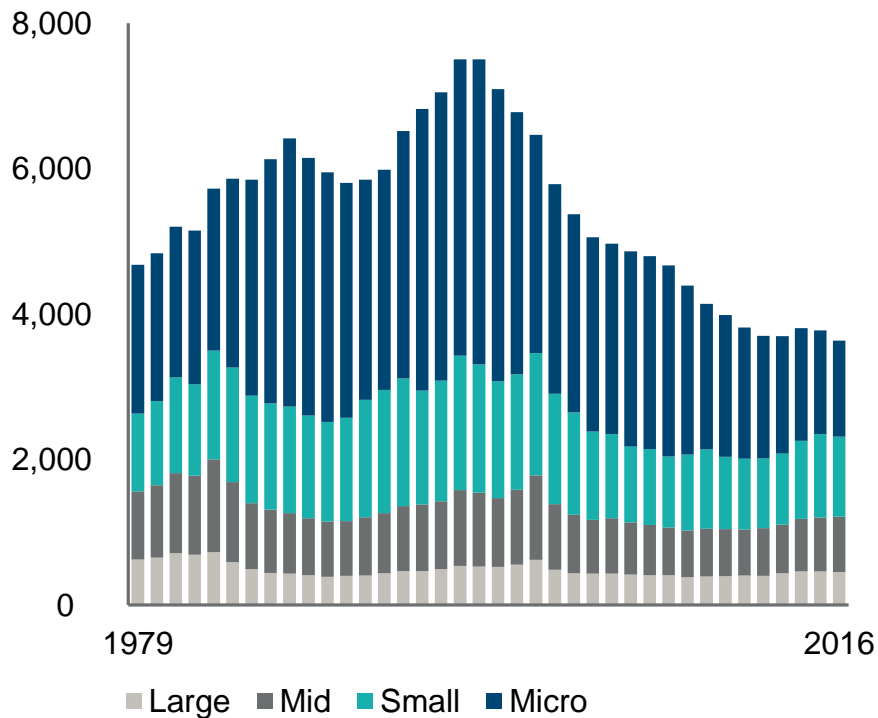
Source: Vanguard, based on data from Morningstar, Inc., and Bloomberg Inc.

Decrease in public companies hasn't altered investable market

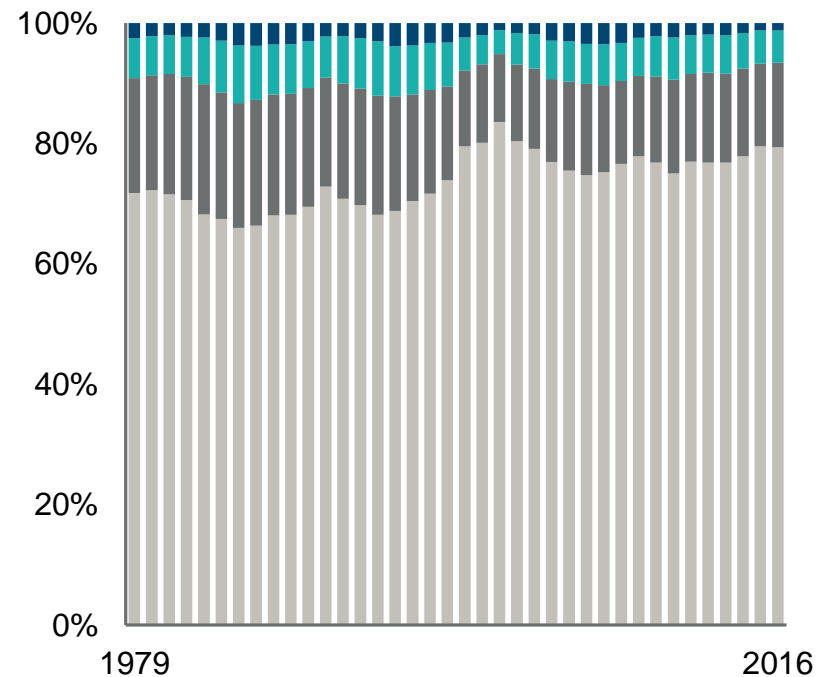
Micro-caps have accounted for most of the decline in public companies . . .

. . . and they remain a miniscule portion of the overall market.

Number of public companies



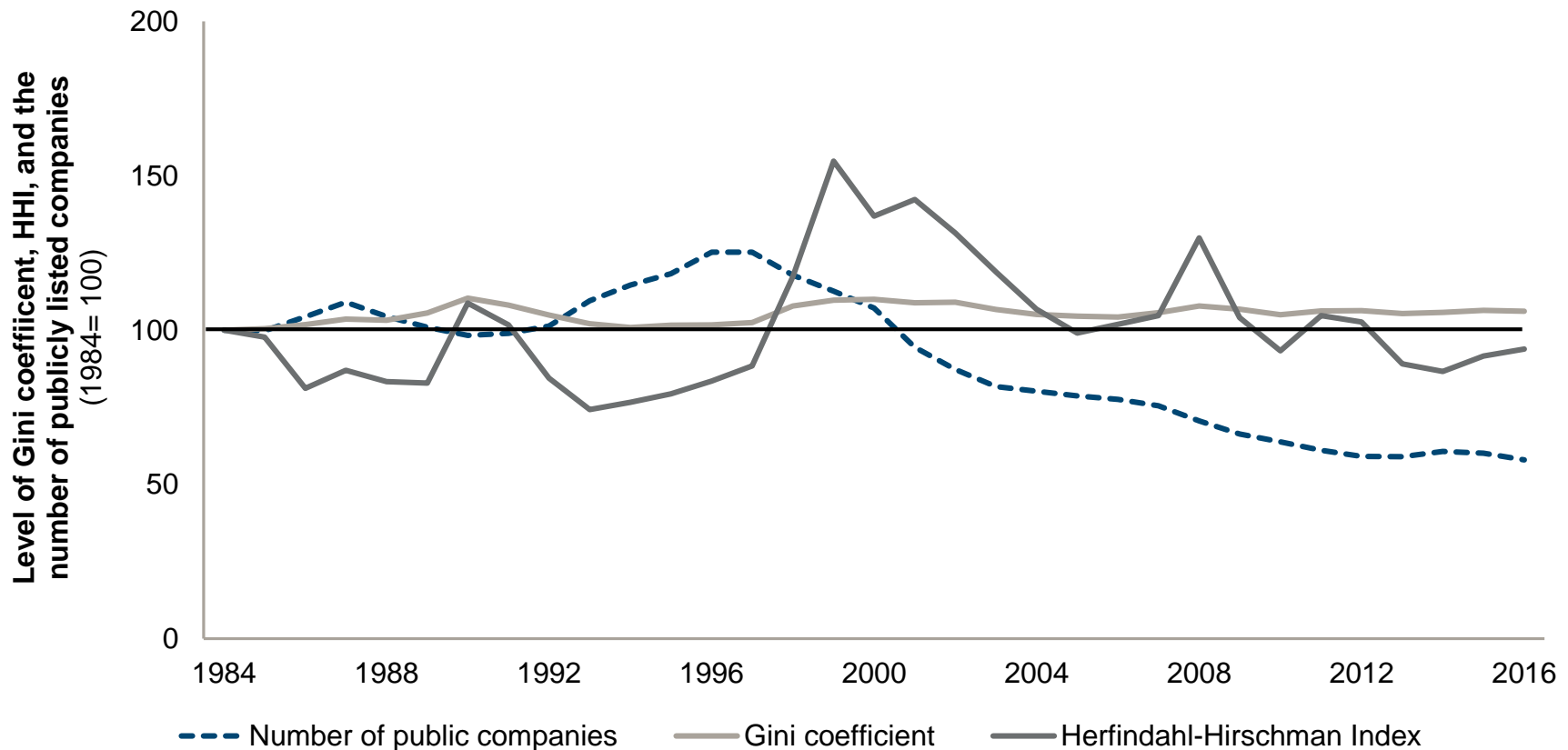
Market-cap proportion of public companies



Notes: Large, mid, small, and micro are defined by CRSP in deciles. The first and second deciles are defined as large-cap; the third, fourth, and fifth are defined as mid-cap; the sixth, seventh, and eighth are defined as low-cap; and the ninth and tenth are defined as micro-cap. Year-end values were used. Simplifying assumption includes only securities that had portfolio assignments at year-end. This reduced the universe, but not materially. Source: Vanguard calculations, based on data from CRSP.

Decrease in public companies hasn't altered concentration

Two measures of market concentration show no connection



Notes: FactSet started reporting the weight of individual companies in the Russell 3000 Index in 1984. The Herfindahl-Hirschman Index (HHI) is the sum of the square of the market share of each firm, expressed as a whole number, not a decimal; it is commonly used to measure market concentration. Gini coefficient is a statistical measure of the degree of variation or inequality represented in a set of values; it is widely used to represent the income or wealth distribution of a nation's residents. The chart shows the levels of Gini coefficient, HHI, and the number of publicly listed companies, all of which were assumed to be 100 in 1984. Source: Vanguard calculations, based on data from FactSet.

Vanguard conducts thorough research on critical issues

We act with our voice and our vote

Research and analyze

company performance, governance and stewardship practices, and ballot proposals



Engage

with companies and other stakeholders to inform our perspective on issues. Consult with fund managers, where appropriate, to understand additional context

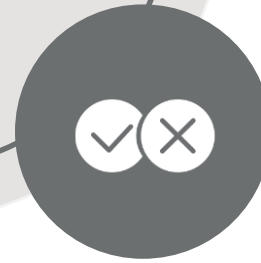


Ongoing monitoring

Communicate key activities (e.g., voting results and engagement activities) to clients, regulators, and other stakeholders

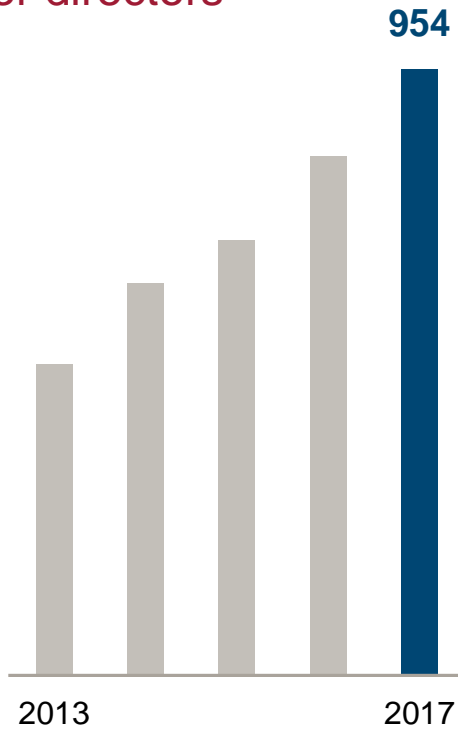


Vote on proposals at shareholder meetings in the best long-term interests of each fund or portfolio

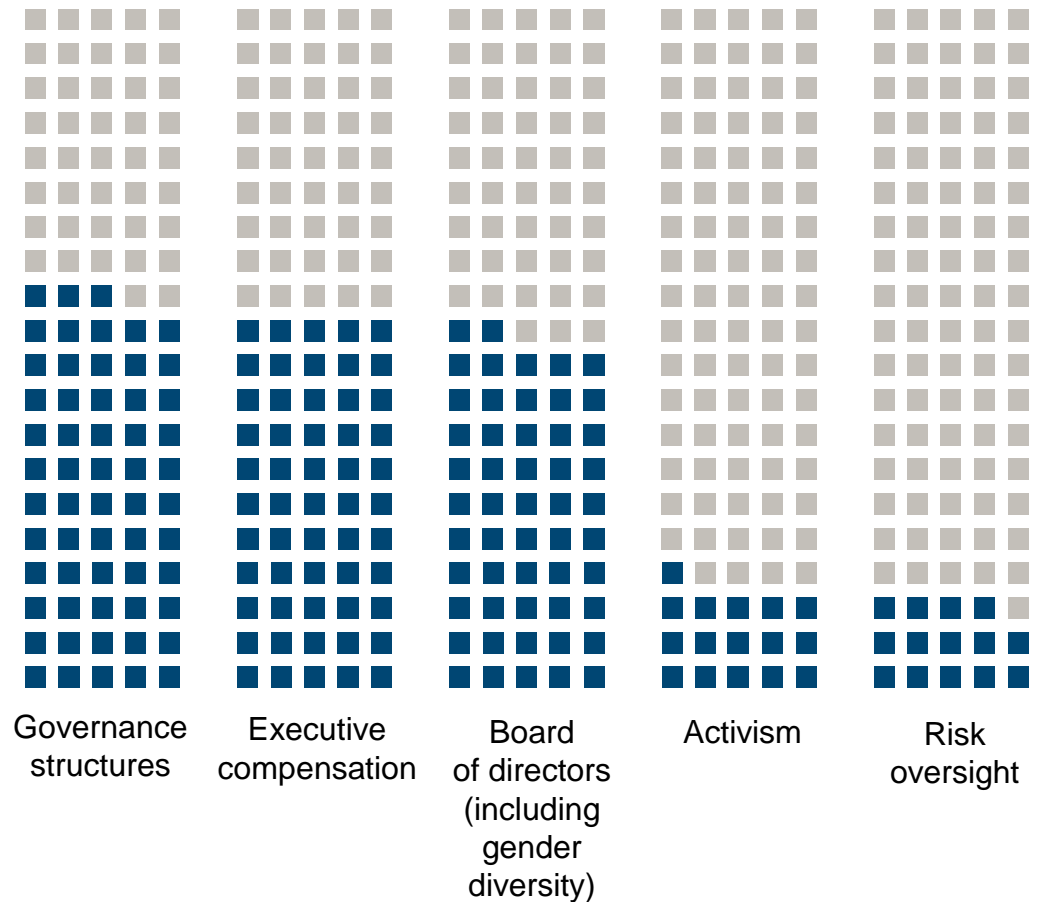


Vanguard actively engages with management and boards

Meetings with management or directors



Percentage of engagements where topic was discussed in proxy year 2017



Note: Data are from July 1, 2016, through June 30, 2017.
Source: The Vanguard Group, Inc.

Investment stewardship: Year in review

Vanguard was actively engaged on stewardship across several fronts

Proxy voting

>18,000

shareholder meetings
where votes were cast

>171,000

proposals
voted upon

67

countries
voted in

\$3.0T

in global
equity assets*

Engagement

>950

meetings with
companies

>25%

included independent
directors

>\$1.1T

AUM engaged in
2016 proxy season

~100

commitments to change
in response to input

Industry impact

>40

articles mentioning
Vanguard's investment
stewardship efforts

>50

events
participated in

>25

industry speaking
engagements

>10

press citations from
Vanguard leaders on
investment stewardship

Note: Data are as of June 30, 2017.

Source: Vanguard.

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Important information

All investing is subject to risk, including possible loss of principal.

Bond funds are subject to the risk that an issuer will fail to make payments on time, and that bond prices will decline because of rising interest rates or negative perceptions of an issuer's ability to make payments.

Diversification does not ensure a profit or protect against a loss.

High-yield bonds generally have medium- and lower-range credit quality ratings and are therefore subject to a higher level of credit risk than bonds with higher credit quality ratings.

U.S. government backing of Treasury or agency securities applies only to the underlying securities and does not prevent share-price fluctuations. Unlike stocks and bonds, U.S. Treasury bills are guaranteed as to the timely payment of principal and interest.

Investments in stocks or bonds issued by non-U.S. companies are subject to risks including country/regional risk and currency risk.

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