

Prepared for

Community Foundation for Muskegon County

February 11, 2019



Vanguard

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Agenda

- I. Market recap
 - II. Portfolio performance and fee analysis
 - III. International story
 - IV. Fixed income review
 - V. Economic and market outlook
 - VI. Endowment model review
 - VII. Vanguard active management
- Appendix

Presented by:

Arlene Pine, CFA
Senior Investment Consultant
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Senior Investment Consultant
Vanguard Institutional Advisory Services®

Biography



Matt D. Ruhl, CFA, is a senior investment consultant in Vanguard Institutional Advisory Services® (VIAS™), where he assists institutional clients with asset allocation, portfolio design, and investment policy consulting for defined benefit, endowment, and foundation portfolios.

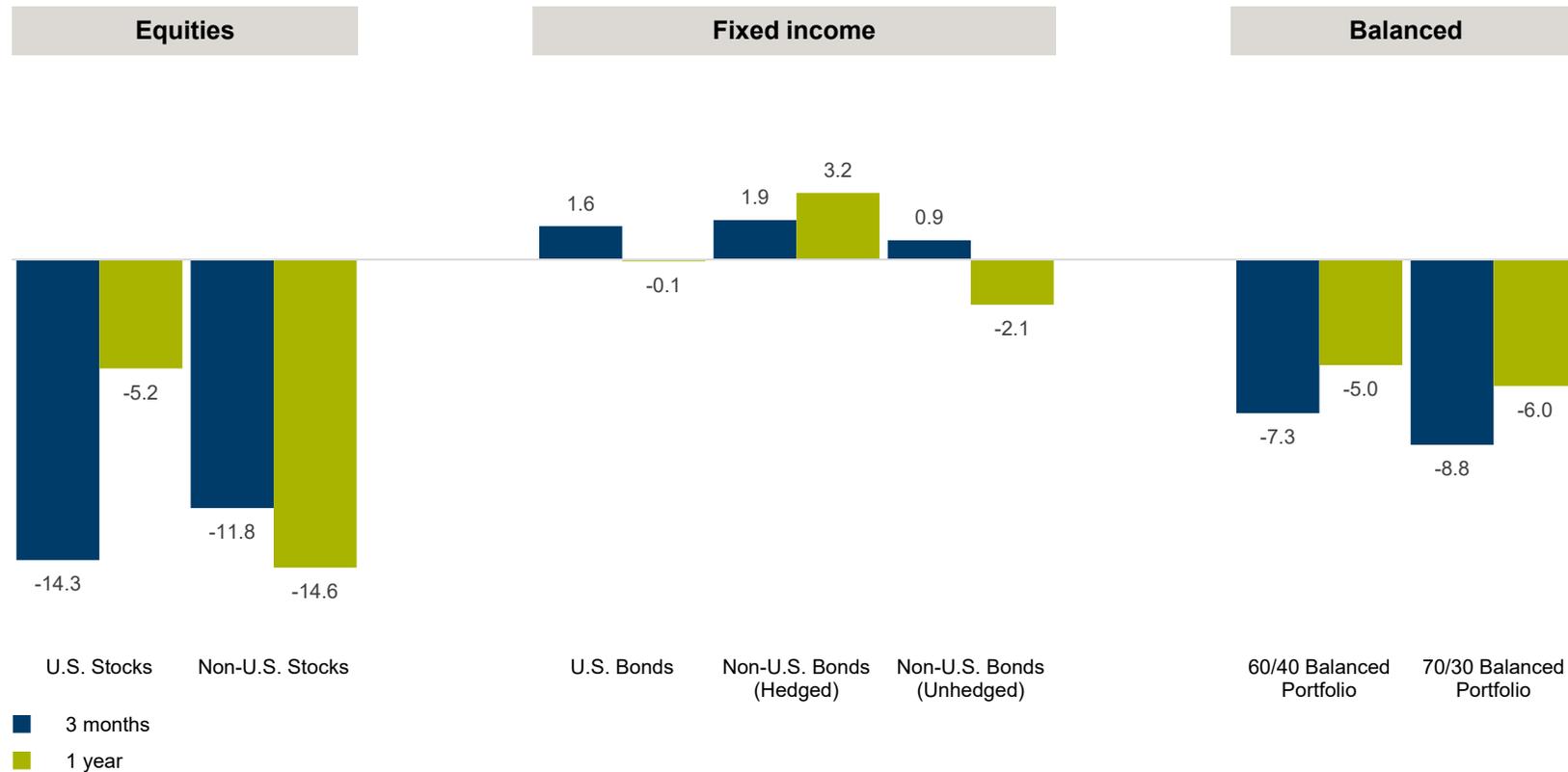
Mr. Ruhl joined Vanguard in 2004 and previously was an investment analyst in Vanguard Portfolio Review Department, which is responsible for overseeing, evaluating, and developing funds, as well as sharing Vanguard's views on its funds, the markets, and the economy. In that role, he focused on manager oversight and search, with an emphasis on Vanguard's active international, global, and domestic equity funds. In addition, he was responsible for conducting investment reviews for a range of institutional, intermediary, and ultra-high-net-worth clients.

He earned a bachelor's degree in commerce with a concentration in finance at the University of Virginia, and is a member of the CFA Institute and CFA Society of Philadelphia.

Market recap

Most balanced portfolios have shifted into negative territory, driven primarily by the fourth quarter equity volatility, while fixed income has been a diversifier

Global market returns as of December 31, 2018 (%)



Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Sources: Bloomberg Barclays, FTSE, MSCI, Russell, CRSP and Dow Jones.

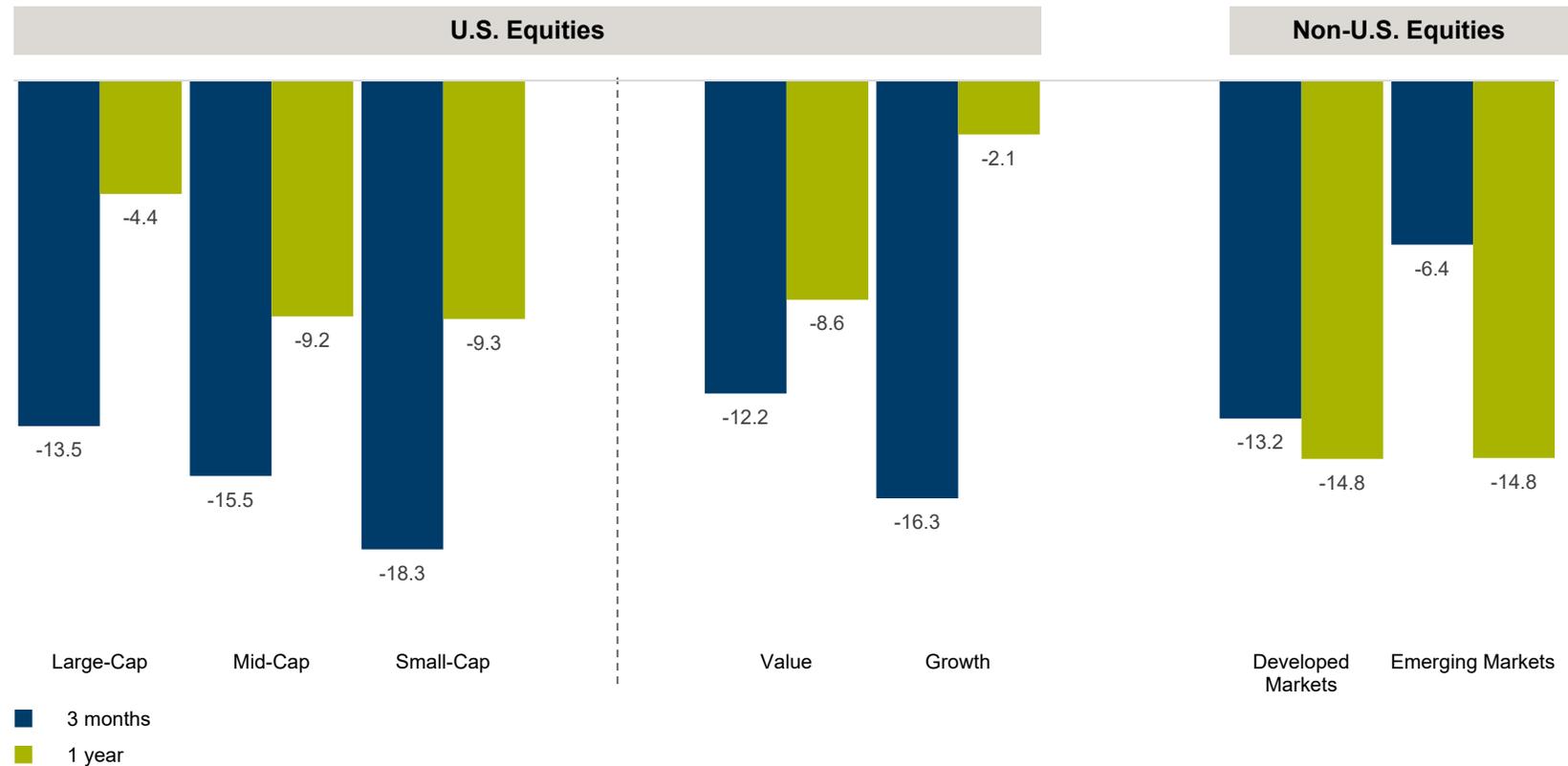
US Stocks (CRSP US Total Market Index), Non-US Stocks (FTSE Global All-Cap ex-US Index), US Bonds (Bloomberg Barclays US Aggregate Float Adjusted Index), Non-US Bonds hedged (Bloomberg Barclays Global Aggregate ex-USD Float Adjusted RIC Capped Index hedged), Non-US Bonds unhedged (Bloomberg Barclays Global Aggregate Index ex-USD).

* 60/40 balanced portfolio Static Composite (36% U.S. stocks, 24% International stocks, and 28% Investment-grade U.S. bonds, 12% Investment-grade international bonds).

** 70/30 balanced portfolio Static Composite (42% U.S. stocks, 28% International stocks, and 21% Investment-grade U.S. bonds, 9% Investment-grade international bonds).

All segments of equity markets have experienced losses the past 3 months and 1 year

Global equity market returns as of December 31, 2018 (%)



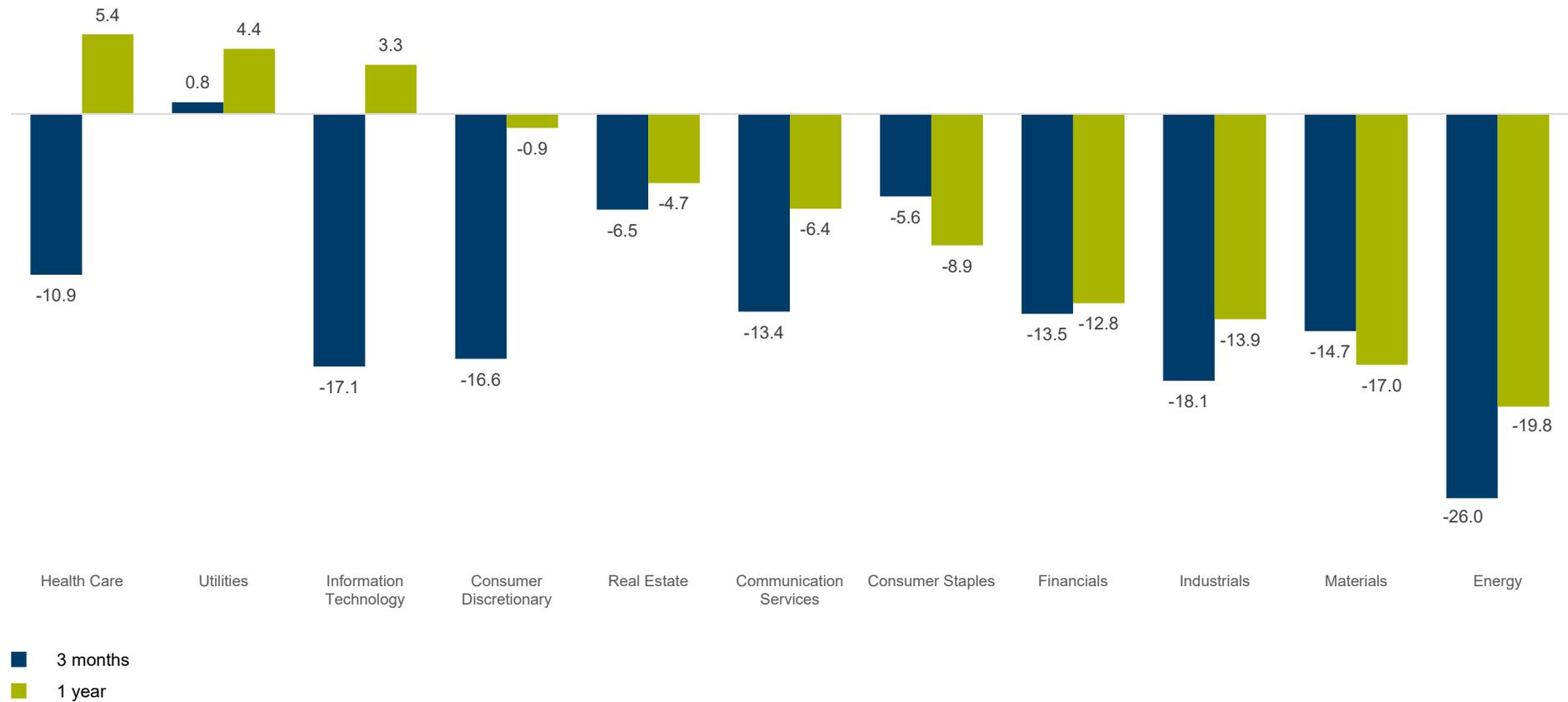
Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Sources: FTSE, MSCI, Russell, CRSP and Dow Jones.

Large-cap (CRSP US Large Cap Index), Mid-cap (CRSP US Mid Cap Index), Small-cap (CRSP US Small Cap Index); Value (Russell 3000 Value Index), Growth (Russell 3000 Growth Index); Developed markets (FTSE Developed All Cap ex-US Index), Emerging markets (FTSE Emerging Markets All Cap China A Inclusion Index)

Within the U.S. equity market, over the last 3 months defensive sectors such as utilities and consumer staples have held up best during the recent return of equity volatility

U.S. equity sector returns as of December 31, 2018 (%)

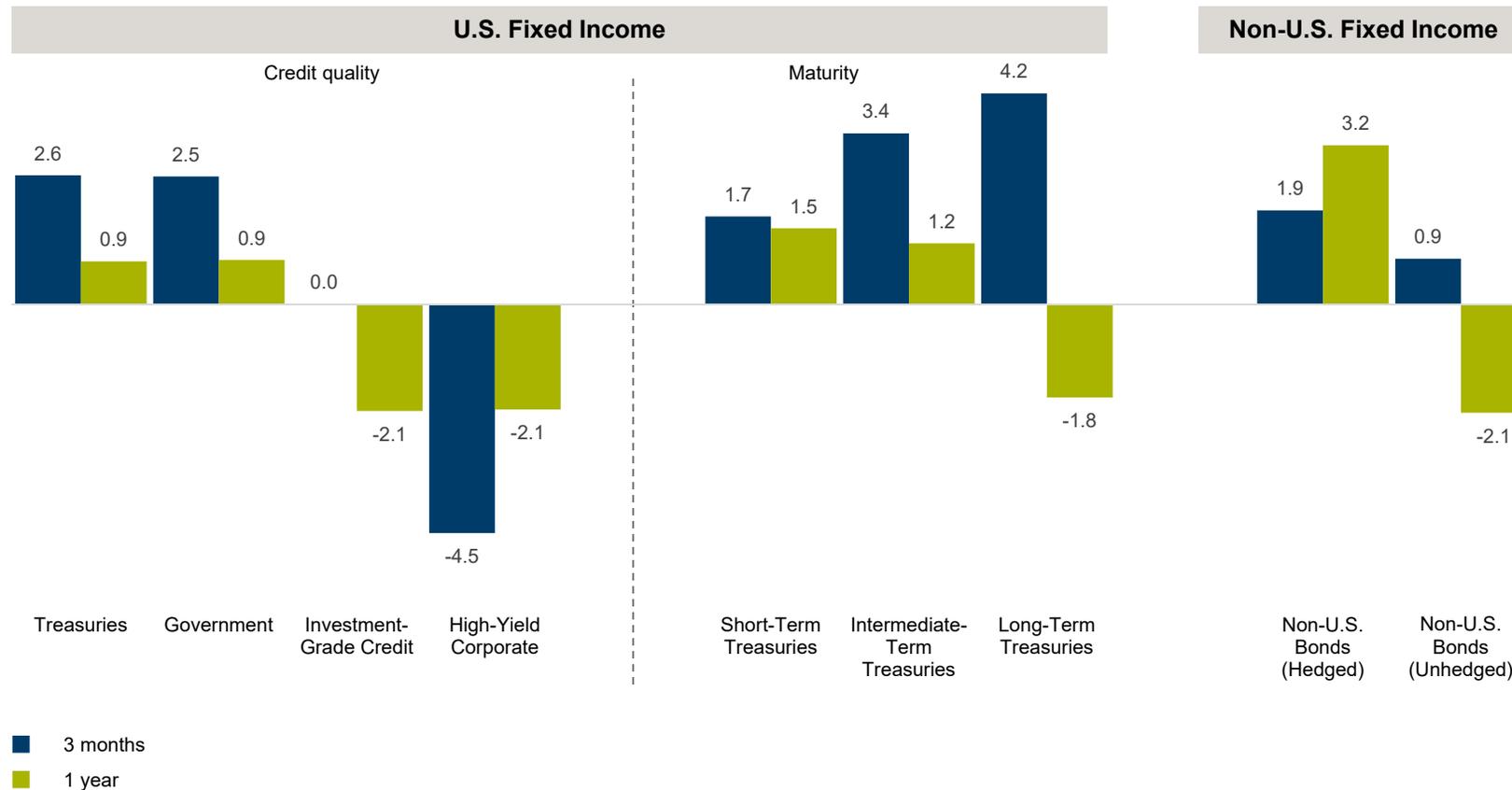


Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Sources: FactSet and Vanguard.
U.S. markets measured by CRSP US Total Market Index. Past performance is no guarantee of future returns.

High quality U.S and Non-U.S. Fixed Income markets had positive returns the past 3 months and served as a flight to quality asset, while lower quality fixed income experienced some losses

Global fixed income market returns as of December 31, 2018 (%)

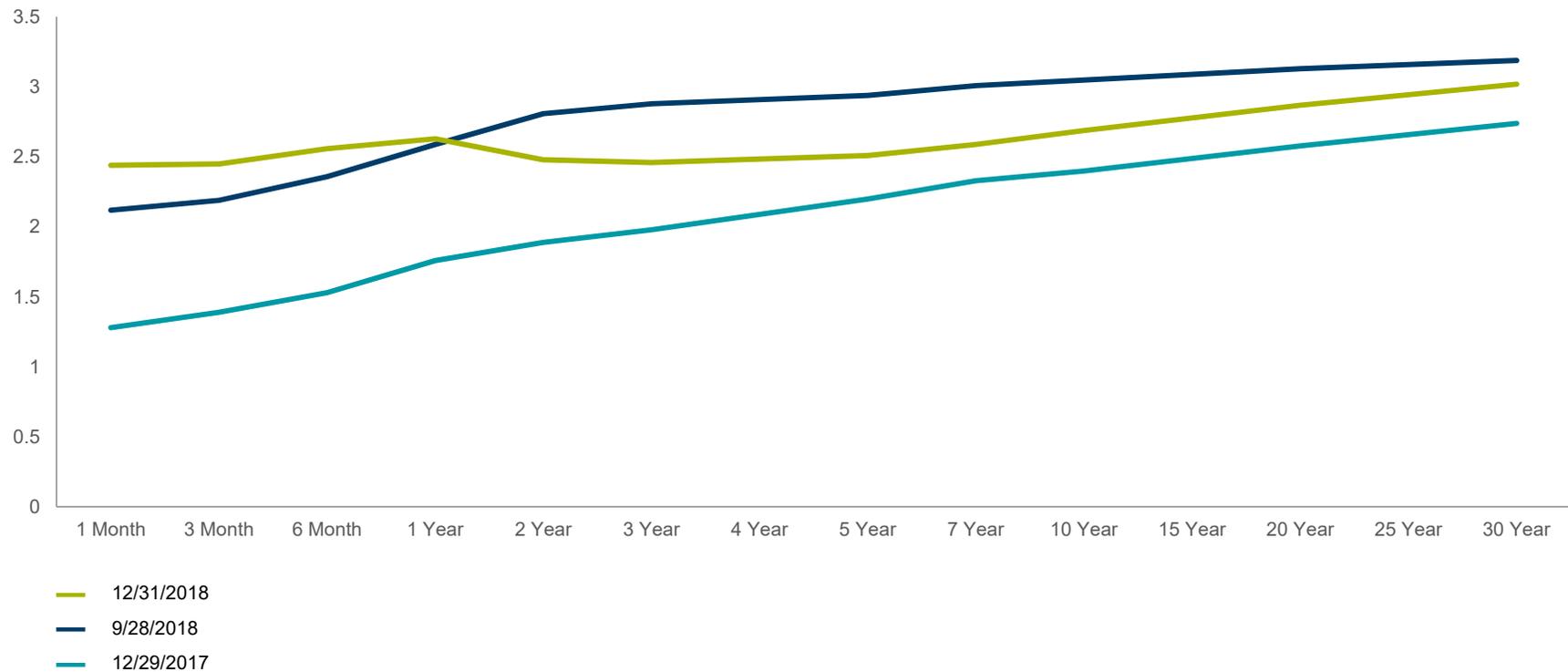


Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Sources: Bloomberg Barclays.
 Treasuries-Government-Investment Grade Corporates-High Yield (Bloomberg Barclays US Treasury/Government/Credit/Corporate High Yield Indices); Short-Inter-Long-term Treasuries (Bloomberg Barclays US 1-5/5-10/Long Year Treasury Indices)
 Non-US Bonds hedged (Bloomberg Barclays Global Aggregate ex-USD Float Adjusted RIC Capped Index hedged), Non-US Bonds unhedged (Bloomberg Barclays Global Aggregate Index ex-USD).

Over the past 3 months U.S. Treasury yields have fallen on the long end of the yield curve, however, over the past year they have risen across the yield curve

Yield (%) and change (bps)	1 month	3 month	6 month	1 year	2 year	3 year	5 year	7 year	10 year	20 year	30 year
— Current yield (%)	2.44	2.45	2.56	2.63	2.48	2.46	2.51	2.59	2.69	2.87	3.02
— 3 month change	32	26	20	4	-33	-42	-43	-42	-36	-26	-17
— 12 month change	116	106	103	87	59	48	31	26	29	29	28



Source: U.S. Treasury.

Portfolio performance and fee analysis

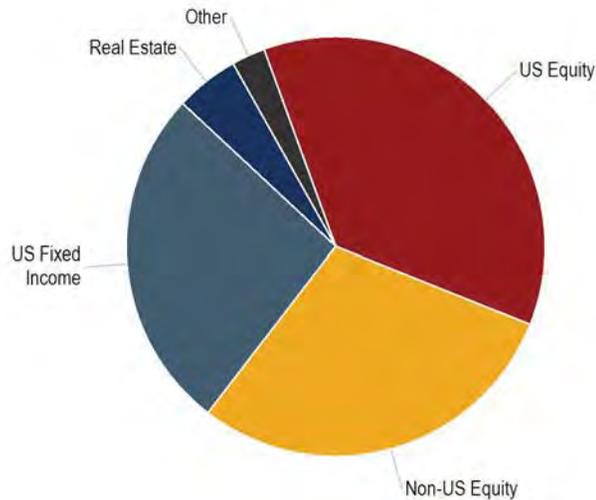
Total Portfolio Performance & Asset Allocation

Performance Summary ending December 31, 2018

	Market Value (\$)	1 Mo (%)	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
COMMUNITY FOUNDATION FOR MUSKEGON COUNTY	164,471,143	-4.93	-8.96	-6.67	5.43	--	--	4.39	Apr-14
COMMUNITY FOUNDATION FOR MUSKEGON COUNTY (Net)		-4.93	-8.97	-6.71	5.38	--	--	4.35	
Composite Benchmark		-4.99	-9.21	-6.87	5.13	--	--	4.24	Apr-14

- Composite Benchmark = 39% Spliced Total Stock Market Index / 31% Spliced Total International Stock Index / 25% Spliced Bloomberg Barclays US Aggregate Float Adjusted Index / 5% Real Estate Spliced Index

Current Allocation as of December 31, 2018



	Current \$	Current %	Policy	Difference*
US Equity	\$60,164,744	36.6%	39.0%	-2.4%
Non-US Equity	\$48,366,769	29.4%	31.0%	-1.6%
US Fixed Income	\$43,573,137	26.5%	22.6%	3.9%
Real Estate	\$8,066,493	4.9%	5.0%	-0.1%
Other**	\$4,300,000	2.6%	2.4%	0.2%
Total	\$164,471,143	100.0%	100.0%	

*Difference between Policy and Current Allocation

** "Other" represents the foundation's private loans, which are not being managed by Vanguard.

Gross of Advisory Fee returns reflect the deduction of fund expense ratios and any purchase or redemption fees.

Net of Fee returns reflect the deduction of fund expense ratios, any purchase or redemption fees, and VIAS advisory fee applied to the client portfolio.

Returns greater than one year represent annualized returns. Returns less than one year represent cumulative returns.

Performance Summary (Gross of Advisory Fees) ending December 31, 2018

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
COMMUNITY FOUNDATION FOR MUSKEGON COUNTY	164,471,143	100.00	-4.93	-8.96	-6.67	5.43	--	--	4.39	Apr-14
COMMUNITY FOUNDATION FOR MUSKEGON COUNTY (Net)			-4.93	-8.97	-6.71	5.38	--	--	4.35	
Composite Benchmark			-4.99	-9.21	-6.87	5.13	--	--	4.24	Apr-14
MUSKEGON COUNTY SPLICED TOTAL			-3.42	-7.27	-6.00	5.17	--	--	2.76	Apr-14
Total Equity	108,531,513	65.99	-7.36	-13.12	-9.16	7.14	--	--	5.00	Apr-14
Equity Domestic	60,164,744	36.58	-9.29	-14.26	-5.16	9.00	--	--	8.03	Apr-14
Spliced Total Stock Market Index			-9.29	-14.26	-5.17	9.00	7.92	13.26	8.02	Apr-14
Equity International	48,366,769	29.41	-4.84	-11.66	-14.39	4.57	--	--	0.59	Apr-14
Spliced Total International Stock Index			-4.61	-11.79	-14.61	4.44	1.05	6.64	0.68	Apr-14
Total Fixed Income	43,573,137	26.49	1.81	1.62	-0.01	2.04	--	--	2.04	Apr-14
Fixed Income Domestic	43,573,137	26.49	1.81	1.62	-0.01	2.04	--	--	2.04	Apr-14
Spliced Bloomberg Barclays US Aggregate Float Adjusted Index			1.82	1.58	-0.08	2.09	2.50	3.49	2.10	Apr-14
Total Real Estate	8,066,493	4.90	-7.97	-6.46	-5.93	2.32	--	--	5.03	Apr-14
Real Estate Domestic	8,066,493	4.90	-7.97	-6.46	-5.93	2.32	--	--	5.03	Apr-14
Real Estate Spliced Index			-7.96	-6.44	-5.88	2.41	7.50	12.07	5.13	Apr-14
Private Loans	4,300,000	2.61	0.27	0.81	--	--	--	--	2.46	Mar-18

Gross of Advisory Fee returns reflect the deduction of fund expense ratios and any purchase or redemption fees.

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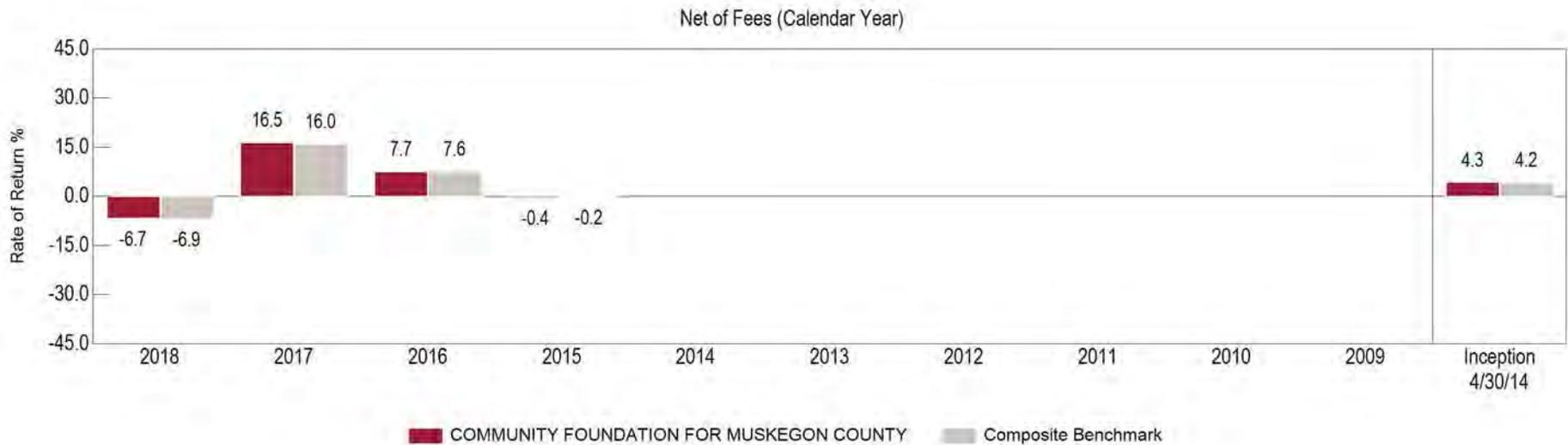
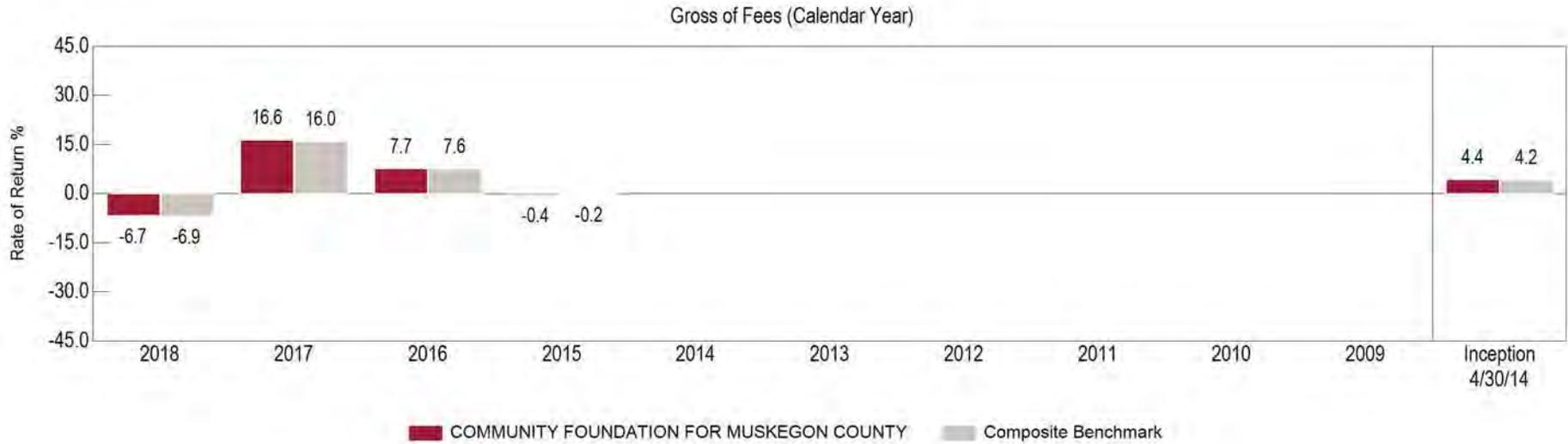
Performance Summary (Gross of Advisory Fees) ending December 31, 2018

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
COMMUNITY FOUNDATION FOR MUSKEGON COUNTY	164,471,143	100.00	-4.93	-8.96	-6.67	5.43	--	--	4.39	Apr-14
Composite Benchmark			-4.99	-9.21	-6.87	5.13	--	--	4.24	Apr-14
MUSKEGON COUNTY SPLICED TOTAL			-3.42	-7.27	-6.00	5.17	--	--	2.76	Apr-14
Total Equity	108,531,513	65.99	-7.36	-13.12	-9.16	7.14	--	--	5.00	Apr-14
Equity Domestic	60,164,744	36.58	-9.29	-14.26	-5.16	9.00	--	--	8.03	Apr-14
Spliced Total Stock Market Index			-9.29	-14.26	-5.17	9.00	7.92	13.26	8.02	Apr-14
Vanguard® Total Stock Market Index Fund Institutional Shares	60,164,744	36.58	-9.29	-14.26	-5.16	8.99	7.91	13.26	8.02	Apr-14
Spliced Total Stock Market Index			-9.29	-14.26	-5.17	9.00	7.92	13.26	8.02	Apr-14
Multi-Cap Core Funds Average			-9.27	-14.42	-7.96	6.51	5.29	11.20	5.34	Apr-14
Equity International	48,366,769	29.41	-4.84	-11.66	-14.39	4.57	--	--	0.59	Apr-14
Spliced Total International Stock Index			-4.61	-11.79	-14.61	4.44	1.05	6.64	0.68	Apr-14
Vanguard® Total International Stock Index Fund Inst Shares	48,366,769	29.41	-4.84	-11.66	-14.39	4.56	0.97	6.38	0.58	Apr-14
Spliced Total International Stock Index			-4.61	-11.79	-14.61	4.44	1.05	6.64	0.68	Apr-14
International Funds Average			-5.38	-13.47	-15.58	2.46	0.15	6.08	-0.08	Apr-14
Total Fixed Income	43,573,137	26.49	1.81	1.62	-0.01	2.04	--	--	2.04	Apr-14
Fixed Income Domestic	43,573,137	26.49	1.81	1.62	-0.01	2.04	--	--	2.04	Apr-14
Spliced Bloomberg Barclays US Aggregate Float Adjusted Index			1.82	1.58	-0.08	2.09	2.50	3.49	2.10	Apr-14
Vanguard® Total Bond Market Index Fund Institutional Shares	43,573,137	26.49	1.81	1.62	-0.01	2.04	2.47	3.45	2.06	Apr-14
Spliced Bloomberg Barclays US Aggregate Float Adjusted Index			1.82	1.58	-0.08	2.09	2.50	3.49	2.10	Apr-14
Spliced Intermediate-Term Investment-Grade Debt Funds Average			1.38	0.90	-0.69	1.95	2.19	4.16	1.74	Apr-14
Total Real Estate	8,066,493	4.90	-7.97	-6.46	-5.93	2.32	--	--	5.03	Apr-14
Real Estate Domestic	8,066,493	4.90	-7.97	-6.46	-5.93	2.32	--	--	5.03	Apr-14
Real Estate Spliced Index			-7.96	-6.44	-5.88	2.41	7.50	12.07	5.13	Apr-14
Vanguard® Real Estate Index Fund Institutional Shares	8,066,493	4.90	-7.97	-6.46	-5.93	2.31	7.41	12.07	5.04	Apr-14
Real Estate Spliced Index			-7.96	-6.44	-5.88	2.41	7.50	12.07	5.13	Apr-14
Real Estate Funds Average			-7.70	-7.07	-6.32	1.97	6.70	11.49	4.58	Apr-14

Performance Summary (Gross of Advisory Fees) ending December 31, 2018

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Private Loans	4,300,000	2.61	0.27	0.81	--	--	--	--	2.46	Mar-18
Private Loan 1	2,300,000	1.40	0.27	0.81	--	--	--	--	2.46	Mar-18
Private Loan 2	2,000,000	1.22	0.27	0.81	--	--	--	--	2.46	Mar-18

Total Portfolio Performance



Gross of Advisory Fee returns reflect the deduction of fund expense ratios and any purchase or redemption fees.

Net of Fee returns reflect the deduction of fund expense ratios, any purchase or redemption fees, and VIAS advisory fee applied to the client portfolio.

Returns greater than one year represent annualized returns. Returns less than one year represent cumulative returns.

Cash Flow Summary

	Last Month	Last Three Months	Year-To-Date	One Year
Beginning Market Value	\$173,489,149	\$181,131,871	\$177,075,436	\$177,075,436
Net Cash Flow	-\$488,354	-\$459,376	-\$1,054,993	-\$1,054,993
Net Investment Change	-\$8,529,651	-\$16,201,352	-\$11,549,299	-\$11,549,299
Ending Market Value	\$164,471,143	\$164,471,143	\$164,471,143	\$164,471,143

Month Ending December 31, 2018

	Beginning Market Value	Net Cash Flow	Net Investment Change	Ending Market Value
Private Loan 1	\$2,300,000	-\$6,229	\$6,229	\$2,300,000
Private Loan 2	\$2,000,000	-\$5,417	\$5,417	\$2,000,000
Vanguard® Real Estate Index Fund Institutional Shares	\$8,764,804	\$0	-\$698,312	\$8,066,493
Vanguard® Total Bond Market Index Fund Institutional Shares	\$43,298,216	-\$500,000	\$774,921	\$43,573,137
Vanguard® Total International Stock Index Fund Inst Shares	\$50,817,391	\$7,014	-\$2,457,636	\$48,366,769
Vanguard® Total Stock Market Index Fund Institutional Shares	\$66,308,737	\$16,278	-\$6,160,270	\$60,164,744
Total	\$173,489,149	-\$488,354	-\$8,529,651	\$164,471,143

Net Investment Change is inclusive of income.

Benchmark History as of December 31, 2018

COMMUNITY FOUNDATION FOR MUSKEGON COUNTY

8/1/2018	Present	39% Spliced Total Stock Market Index / 31% Spliced Total International Stock Index / 25% Spliced Bloomberg Barclays US Aggregate Float Adjusted Index / 5% Real Estate Spliced Index
7/1/2018	7/31/2018	39% Spliced Total Stock Market Index / 30% Spliced Total International Stock Index / 25% Spliced Bloomberg Barclays US Aggregate Float Adjusted Index / 6% Real Estate Spliced Index
6/1/2018	6/30/2018	39% Spliced Total Stock Market Index / 29% Spliced Total International Stock Index / 25% Spliced Bloomberg Barclays US Aggregate Float Adjusted Index / 7% Real Estate Spliced Index
4/1/2018	5/31/2018	39% Spliced Total Stock Market Index / 28% Spliced Total International Stock Index / 25% Spliced Bloomberg Barclays US Aggregate Float Adjusted Index / 8% Real Estate Spliced Index
3/1/2018	3/31/2018	39% Spliced Total Stock Market Index / 27% Spliced Total International Stock Index / 25% Spliced Bloomberg Barclays US Aggregate Float Adjusted Index / 9% Real Estate Spliced Index
9/1/2017	2/28/2018	39% Spliced Total Stock Market Index / 26% Spliced Total International Stock Index / 25% Spliced Bloomberg Barclays US Aggregate Float Adjusted Index / 10% REIT Spliced Index
8/1/2017	8/31/2017	38% Spliced Total Stock Market Index / 25.33% Spliced Total International Stock Index / 26.67% Spliced Bloomberg Barclays US Aggregate Float Adjusted Index / 10% REIT Spliced Index
7/1/2017	7/31/2017	37.5% Spliced Total Stock Market Index / 25% Spliced Total International Stock Index / 27.5% Spliced Bloomberg Barclays US Aggregate Float Adjusted Index / 10% REIT Spliced Index
5/1/2014	6/30/2017	10% REIT Spliced Index / 30% Spliced Bloomberg Barclays US Aggregate Float Adjusted Index / 24% Spliced Total International Stock Index / 36% Spliced Total Stock Market Index

Total Equity

N/A

Equity Domestic

4/30/2014 Present 100% CRSP US Total Market TR USD

Vanguard® Total Stock Market Index Fund Institutional Shares

4/30/2014 Present 100% CRSP US Total Market TR USD

Equity International

4/30/2014 Present 100% FTSE Global All-Cap ex-US Index

Vanguard® Total International Stock Index Fund Inst Shares

4/30/2014 Present 100% FTSE Global All-Cap ex-US Index

Benchmark History as of December 31, 2018

Total Fixed Income

N/A

Fixed Income Domestic

4/30/2014 Present 100% BBgBarc US Aggregate Float Adjusted TR

Vanguard® Total Bond Market Index Fund Institutional Shares

4/30/2014 Present 100% BBgBarc US Aggregate Float Adjusted TR

Total Real Estate

N/A

Real Estate Domestic

7/25/2018 Present 100% MSCI US IM Real Estate 25/50 Index

1/26/2018 7/24/2018 100% MSCI US IM Real Estate 25/50 Tran Index

4/30/2014 1/25/2018 100% MSCI US REIT Gross

Vanguard® Real Estate Index Fund Institutional Shares

7/25/2018 Present 100% MSCI US IM Real Estate 25/50 Index

1/26/2018 7/24/2018 100% MSCI US IM Real Estate 25/50 Tran Index

4/30/2014 1/25/2018 100% MSCI US REIT Gross

Private Loans

N/A

Private Loan 1

N/A

Private Loan 2

N/A

Legal

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Total Portfolio returns represent client-specific time-weighted returns (TWR) are presented gross of any applicable service fees with the exception of mutual fund expense ratios and other security-level expenses.

Client performance inception date is generally the first month-end after initial funding. Mutual funds and all investments are subject to risk, including the possible loss of the money you invest. Diversification does not ensure a profit or protect against a loss.

Performance figures assume the reinvestment of dividends and capital gains distributions. The fund performance percentages are based on fund total return data, adjusted for expenses, obtained from Lipper, a Thomson Reuters Company. The total return data was not adjusted for fees and loads.

Benchmark comparative indexes represent unmanaged or average returns on various financial assets, which can be compared with funds' total returns for the purpose of measuring relative performance.

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Quarterly summary of combined historical performance As of December 31, 2018

	Annualized returns						Calendar return							
	QTR	YTD	1 year	3 year	5 year	10 year	2017	2016	2015	2014	2013	2012	2011	2010
CFMC Composite Portfolio	-8.97	-6.66	-6.66	5.40	4.27	8.18	-6.66	16.51	7.67	-0.42	5.68	12.35	12.21	-3.47
CFMC Composite Benchmark *	-9.21	-6.87	-6.87	5.12	4.42	8.91	-6.87	15.94	7.59	-0.20	7.08	19.26	12.92	0.70

Notes:

Composite performance data consists of previous providers' portfolio and benchmark returns through April 2014; VIAS returns thereafter. Data prior to May 2014 is based upon information taken from the previous providers' quarterly performance reports and is provided as an estimate only. Composite does not include segregated accounts or pledge holdings.

Return calculations are derived from Morningstar Direct.

* Composite Benchmark allocations over time:

50% S&P 500 / 10% Russell 2000 / 10% MSCI EAFE / 30% LB AGG from March 2004 to March 2005;

45% S&P 500 / 12.5% Russell 2000 / 12.5% MSCI EAFE / 30% LB AGG from March 2005 to December 2007;

55% Russell 3000 / 15% MSCI AC World Index ex-US / 30% LB AGG from December 2007 to December 2008;

55% Russell 3000 / 15% MSCI AC World Index ex-US / 30% Barclays AGG from December 2008 to April 2014;

36% Spliced Total Stock Market Index (CRSP US Total Market Index) / 30% Spliced Barclays US Agg Float-Adj Ix (Barclays U.S. Aggregate Float Adjusted Index)/24% Spliced Total Int'l Stock Index (FTSE Global All Cap ex US Index) / 10% REIT Spliced Index (MSCI US REIT Index) from May 2014 to June 2017.

39% Spliced Total Stock Market Index (CRSP US Total Market Index) / 25% Spliced Barclays US Agg Float-Adj Ix (Barclays U.S. Aggregate Float Adjusted Index)/26% Spliced Total Int'l Stock Index (FTSE Global All Cap ex US Index) / 10% REIT Spliced Index (MSCI US REIT Index) from July 2017 to February 2018.

39% Spliced Total Stock Market Index (CRSP US Total Market Index) / 25% Spliced Barclays US Agg Float-Adj Ix (Barclays U.S. Aggregate Float Adjusted Index)/31% Spliced Total Int'l Stock Index (FTSE Global All Cap ex US Index) / 5% REIT Spliced Index (MSCI US REIT Index) from March 2018 to the present.

Community Foundation for Muskegon County Combined fee analysis as of December 31, 2018

Advisory fee	Assets in tier	Advisory fee (%)	Advisory fee (\$)
First \$10 million	\$10,000,000	0.15%	\$15,000
Next \$10 million	\$10,000,000	0.12%	\$12,000
Next \$30 million	\$30,000,000	0.08%	\$24,000
Next \$50 million	\$50,000,000	0.03%	\$15,000
Over \$100 million	\$60,437,272	0.02%	\$12,087
Total	\$160,437,272	0.05%	\$78,087

Fund expenses	Market value	% of portfolio	Fund expense (%)	Fund expense (\$)
Equity				
Total Stock Market Index Institutional	\$60,164,744	37.50%	0.035%	\$21,058
Total International Stock Index Institutional	\$48,366,769	30.15%	0.090%	\$43,530
Fixed Income				
Total Bond Market Index Institutional	\$43,706,112	27.24%	0.040%	\$17,482
Intermediate-Term Bond Index Admiral™	\$133,154	0.08%	0.070%	\$93
Real Estate				
Real Estate Index Institutional	\$8,066,493	5.03%	0.100%	\$8,066
Total	\$160,437,272	100%	0.056%	\$90,230

Total fees and expenses	(%)	(\$)
Advisory fee	0.05%	\$78,087
Fund expenses	0.06%	\$90,230
Estimated annual fees and expenses	0.10%	\$168,317

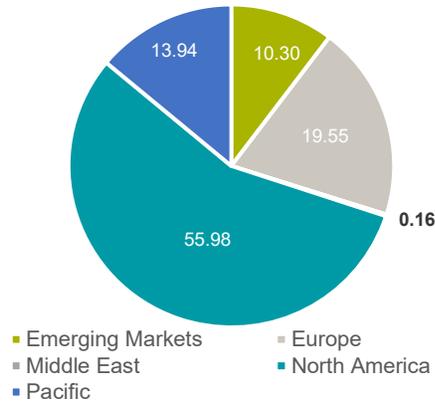
Note: Fund expenses are netted from mutual fund performance daily. Investment management fees are paid for out of pocket and are invoiced or swept quarterly.

International story

Why international stocks?

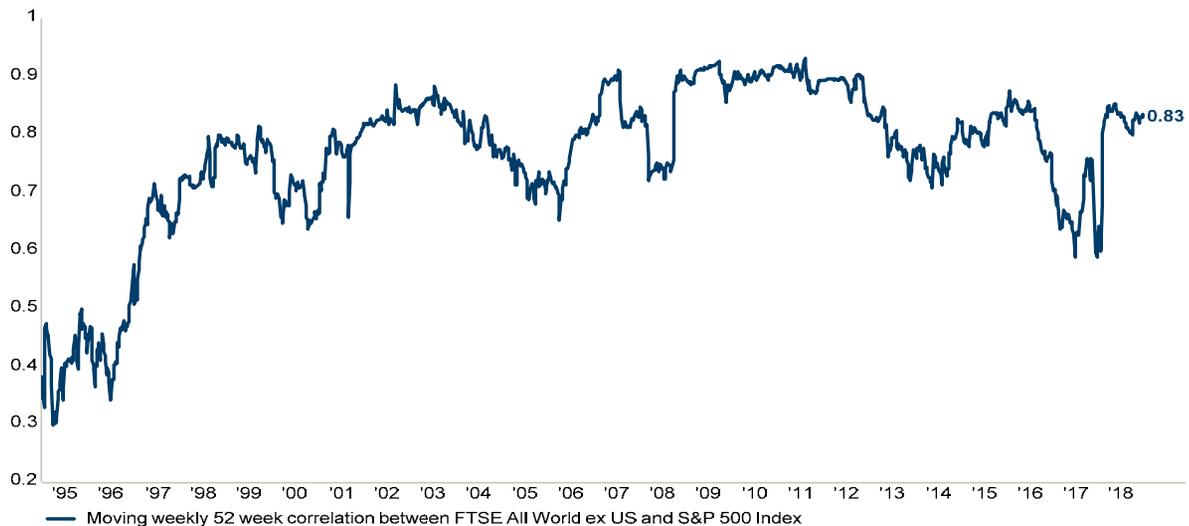
FTSE All-world index USD

% global market capitalization, float adjusted



- They are a valuable diversifier to a balanced portfolio and can serve to dampen volatility over the long-term
- International stocks, including emerging markets, account for nearly half of the global equity market
- Offer exposure to global industries and a wider array of economic and market forces

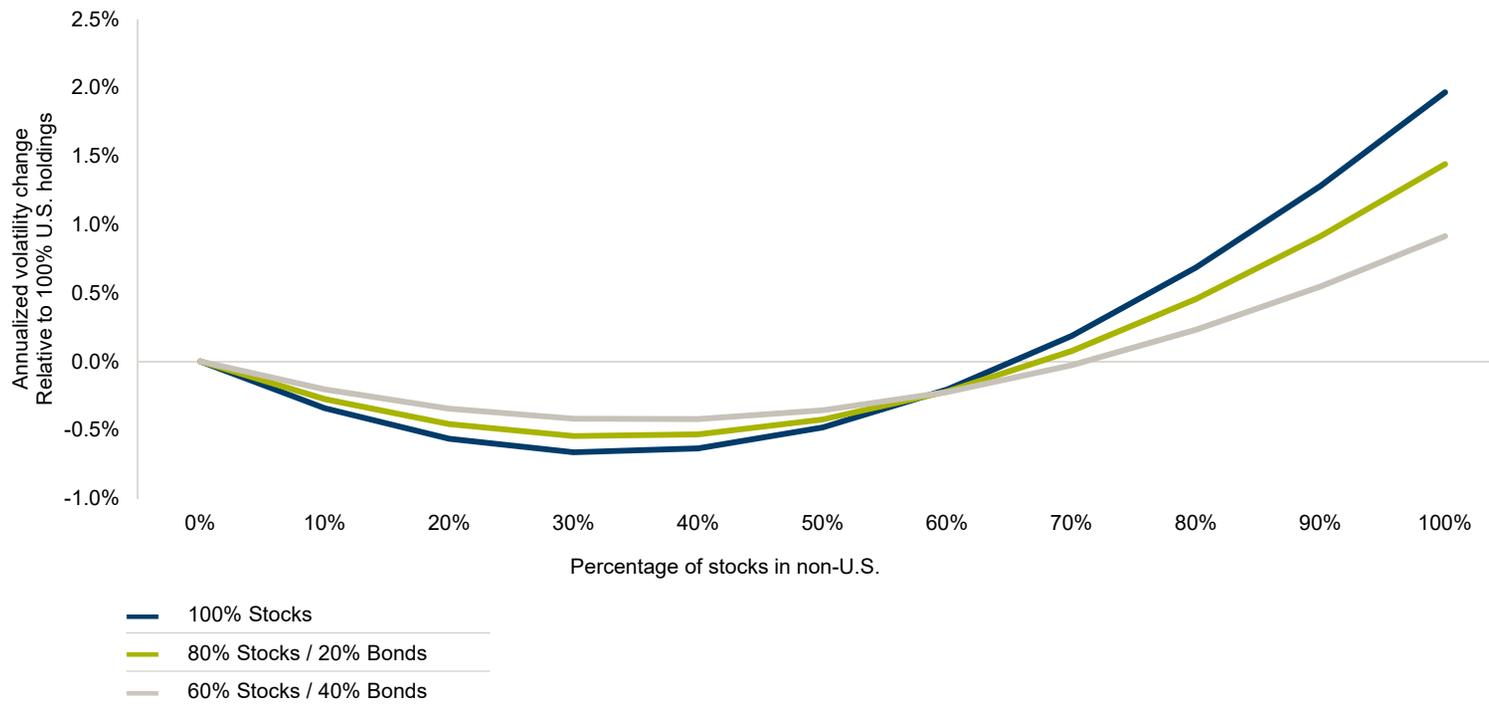
Global equity market correlations



Source: FactSet, as of 12/31/2018. FTSE Indexes used unless otherwise noted * where MSCI Indexes used.

Diversification benefits of international stocks

Average annualized change in portfolio volatility when including non-U.S. stocks in a U.S. portfolio, 1970–2017



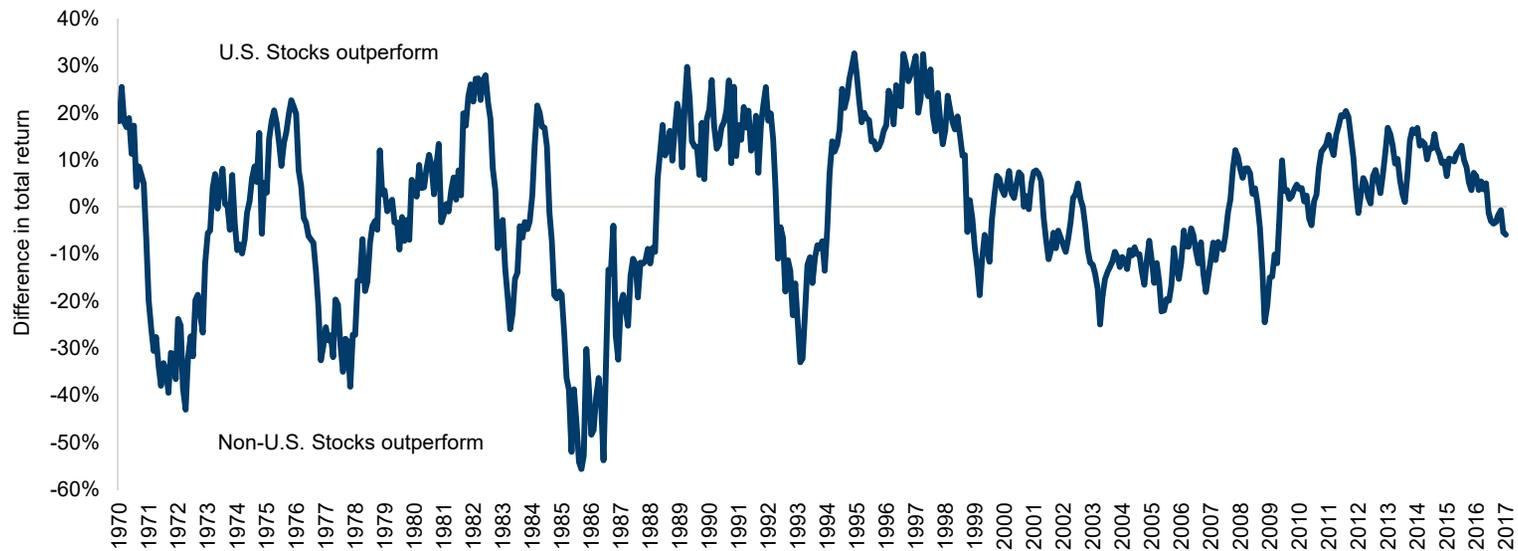
- When allocating 20-50% of a global portfolio's equity exposure to international stocks, the correlation and volatility differences, in addition to other factors has historically reduced the total portfolio volatility

Past performance is no guarantee of future results. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Non-U.S. equities represented by MSCI World Index ex USA from 1970 through 1987 and MSCI All Country World Index ex USA thereafter. U.S. stocks are represented by the MSCI USA Index. U.S. bonds are represented by Citigroup High Grade Index (1970–1972), the Barclays Long AA Corporate Index (1973–1975), and the Barclays U.S. Aggregate Bond Index thereafter. Sources: Derived from data provided by MSCI, Barclays, and Thomson Datastream.

Historical returns illustrate benefits of global exposure during various market cycles

Trailing 12-month return differential between U.S. and non-U.S. stocks

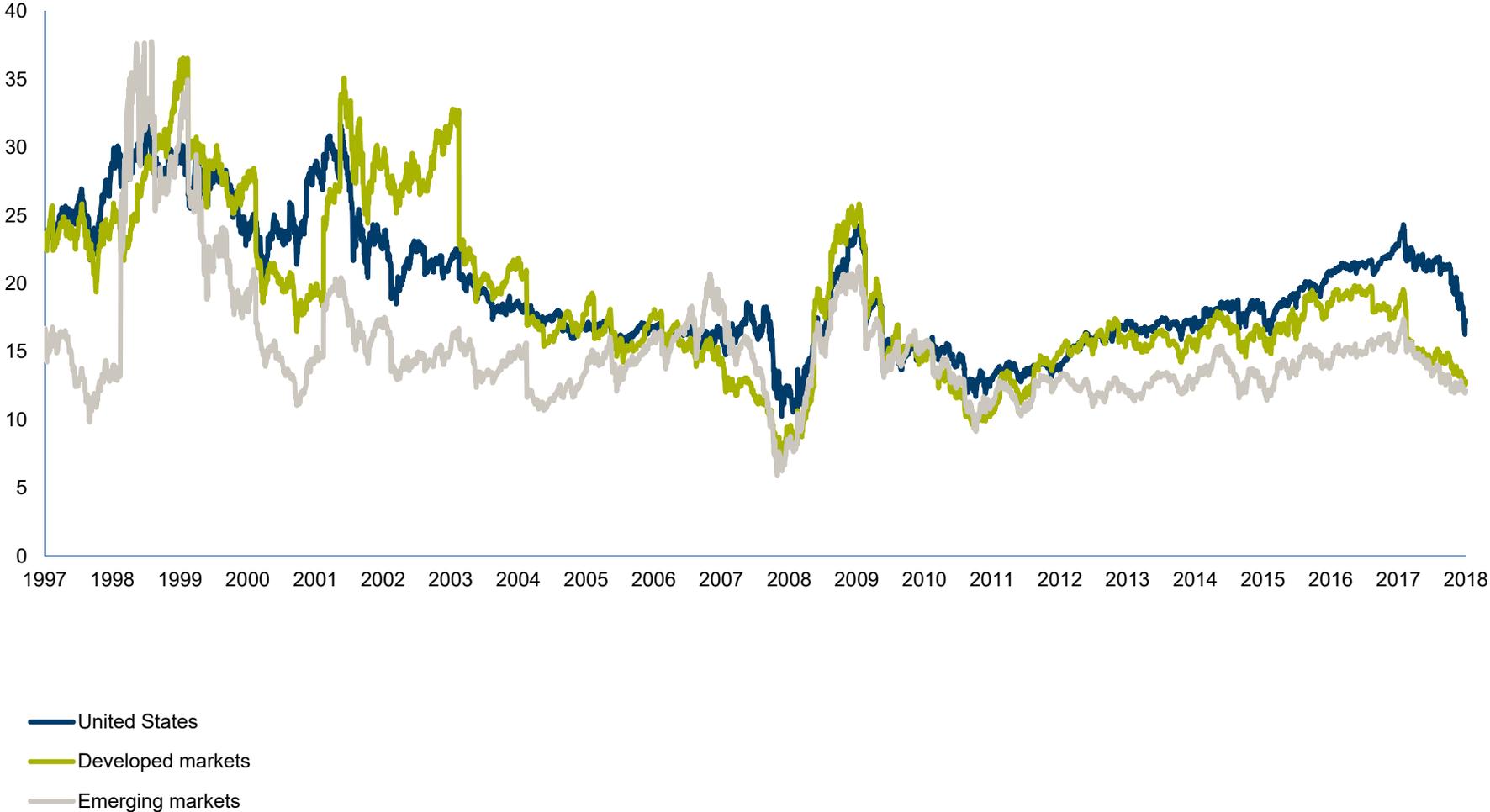


- Idiosyncrasies between the U.S. and non-U.S. markets lead to correlation differences and returns over different time periods

Notes: U.S. equities represented by MSCI USA Index; international equities represented by MSCI World Index ex USA from 1970 through 1987 and MSCI All Country World Index ex USA thereafter. Data as of December 31, 2017.
Sources: Vanguard, Thomson Reuters Datastream, and MSCI.

Valuations across regions

12 month trailing PE ratio



Source: Factset
Notes: The price-to-earnings ratio defined by the most recent price divided by 12-month trailing earnings. United States is represented by the S&P 500 Index, Developed ex US is represented by the MSCI EAFE Index, and Emerging Markets is represented by the MSCI Emerging Markets Index. All three indices are denominated in U.S. dollars and represent an unhedged position with data as of December 31, 2018.

VCMM model summary statistics 10 year horizon as of September 30, 2018

10-year time horizon Asset class	Return percentiles					Volatility
	5th	25th	50 th	75 th	95 th	
U.S. Equities	(2.4%)	1.3%	3.8%	6.4%	10.3%	16.3%
International Equities	0.8%	4.4%	7.1%	9.8%	13.8%	18.2%
U.S. Aggregate Bonds	2.0%	2.9%	3.5%	4.2%	5.3%	5.3%
International Bonds (hedged)	1.0%	2.1%	2.9%	3.9%	5.3%	3.7%
Intermediate-Term Credit Bonds	2.3%	3.2%	3.9%	4.6%	5.7%	5.2%
Short-Term Credit Bonds	2.1%	3.0%	3.7%	4.5%	5.7%	2.8%
Short-Term Treasury Bonds	1.3%	2.2%	3.0%	3.8%	5.0%	3.6%
REITS	(3.5%)	1.1%	4.5%	7.7%	12.6%	18.4%
Inflation	(0.4%)	0.9%	1.8%	2.7%	4.1%	2.4%
U.S. Treasury Index	0.9%	2.0%	2.8%	3.6%	4.7%	8.0%

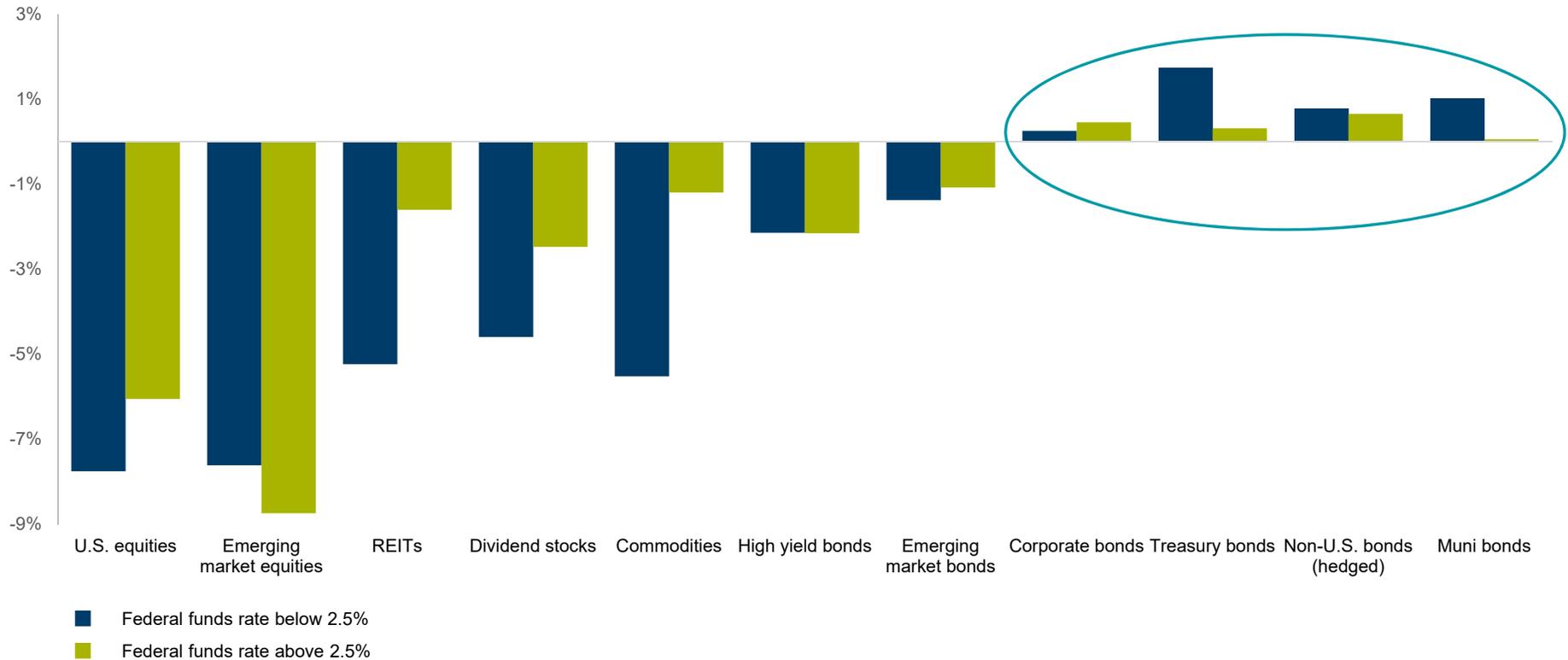
IMPORTANT: The projections or other information generated by the Vanguard Capital Markets Model®(VCMM) regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from VCMM derived from 10,000 simulations for U.S. equity returns and fixed income returns. Simulations as of September 30, 2018. Results from the model may vary with each use and over time. For more information on VCMM, see the Important Information slide.

Source: Vanguard

Fixed income review

Bonds provide ballast during equity bear markets regardless of interest rate environment

Median return of various asset classes during the worst decile of monthly equity returns 1988-2018



Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Sources: Vanguard calculations based on data from Thomson Reuters Datastream, Bloomberg Barclays, HFRI, MSCI, FTSE, CRSP, S&P, and Dow Jones.

Notes: U.S. stocks represented by Dow Jones U.S. Total Stock Market Index through April 2005, MSCI US Broad Market Index through June 2013 and CRSP US Total Market Index thereafter; emerging markets stocks are represented by MSCI Emerging Markets Index; REITs by FTSE NAREIT Equity REIT Index; dividend stocks by Dow Jones U.S. Select Dividend Index; commodities by S&P GSCI Commodity Index; high yield bonds by Bloomberg Barclays U.S. Corporate High Yield Bond Index; emerging markets bonds by Bloomberg Barclays EM USD Aggregate Index; investment-grade corporate bonds by Bloomberg Barclays U.S. Corporate Index; U.S. Treasury bonds by Bloomberg Barclays U.S. Treasury Bond Index; U.S. Municipal Bonds by Bloomberg Barclays Municipal Bond Index; Hedge fund index by HFRI fund-weighted total return Index and international bonds by Bloomberg Barclays Global Aggregate ex-USD Bond Index. The Dow Jones U.S. Select Dividend Index starts in January 1992; Bloomberg Barclays EM USD Aggregate Index starts in January 1993; hedge fund data start in 1994 and Bloomberg Barclays Global Aggregate ex USD Bond Index starts in January 1990. All data provided through December 31, 2018.

Vanguard Total Bond Market Index Fund (VBTIX)

Fixed income characteristics

	VBTIX	Benchmark
Number of bonds	8,582	10,248
Average duration	5.9 years	5.9 years
Average effective maturity	8.3 years	8.2 years
Turnover (fiscal year end)	60.0%	—
Short-term reserves	0.0%	N/A

Distribution by issuer type

	% of total net assets
Treasury/Agency	43.3%
Government Mortgage-Backed	22.1%
Industrial	16.0%
Finance	8.7%
Foreign	5.2%
Commercial Mortgage-Backed	1.9%
Utilities	1.9%
Other	0.5%
Asset-Backed	0.4%

Hedged non-U.S. dollar-denominated bonds are included in the sector of issuer, not as part of the foreign category.

Risk and volatility

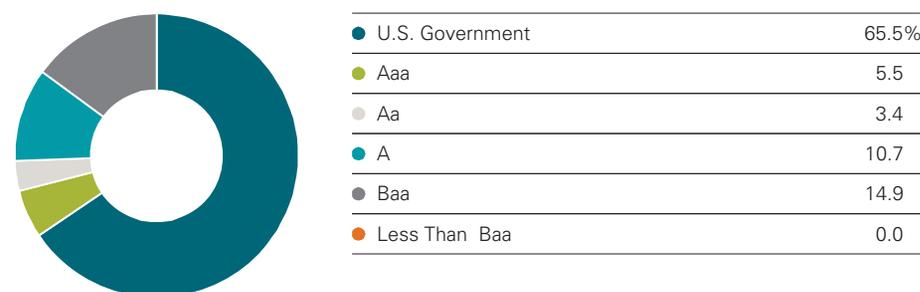
	R-squared	Beta	Alpha	Standard deviation	Sharpe ratio
VBTIX	N/A	N/A	-0.00	2.97	0.36
Primary benchmark	0.99	1.01	N/A	2.93	0.38
Broad-based benchmark	0.99	1.01	N/A	2.93	0.38

R-squared and beta are calculated from trailing 36-month fund returns relative to the associated benchmark. Broad-based benchmark: Spliced Bloomberg Barclays U.S. Aggregate Float Adjusted Index.

Distribution by effective maturity as a % of funds



Distribution by credit quality as a % of funds



Credit-quality ratings are measured on a scale that generally ranges from AAA (highest) to D (lowest). "NR" is used to classify securities for which a rating is not available. NR securities may include a fund's investment in Vanguard Market Liquidity Fund or Vanguard Municipal Cash Management Fund, each of which invests in high-quality money market instruments and may serve as a cash management vehicle for the Vanguard funds, trusts, and accounts. U.S. Treasury, U.S. Agency, and U.S. Agency mortgage-backed securities appear under "U.S. Government." Credit-quality ratings for each issue are obtained from Barclays using ratings derived from Moody's Investors Service (Moody's), Fitch Ratings (Fitch), and Standard & Poor's (S&P). When ratings from all three agencies are available, the median rating is used. When ratings are available from two of the agencies, the lower rating is used. When one rating is available, that rating is used.

Vanguard Intermediate-Term Investment-Grade Fund (VFIDX)

Fixed income characteristics

	VFIDX	Benchmark
Number of bonds	1,861	1,876
Average duration	5.4 years	6.2 years
Average effective maturity	5.6 years	7.3 years
Turnover (fiscal year end)	63.0%	—
Short-term reserves	1.1%	N/A

Distribution by issuer type

	% of total net assets
Finance	30.8%
Industrial	27.8%
Asset-Backed	12.3%
Treasury/Agency	8.3%
Commercial Mortgage-Backed	8.1%
Foreign	7.3%
Utilities	3.5%
Short-Term Reserves	1.1%
Government Mortgage-Backed	0.7%
Other	0.1%

Hedged non-U.S. dollar-denominated bonds are included in the sector of issuer, not as part of the foreign category.

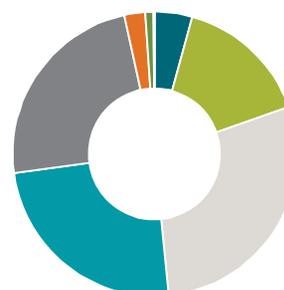
Risk and volatility

	R-squared	Beta	Alpha	Standard deviation	Sharpe ratio
VFIDX	N/A	N/A	-0.01	2.98	0.53
Primary benchmark	0.97	0.84	N/A	3.49	0.59
Broad-based benchmark	0.91	0.99	N/A	2.88	0.37

R-squared and beta are calculated from trailing 36-month fund returns relative to the associated benchmark.

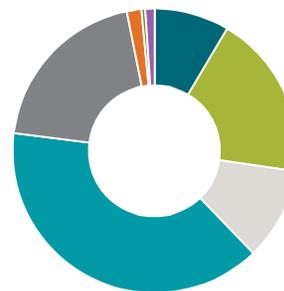
Broad-based benchmark: Bloomberg Barclays U.S. Aggregate Bond Index.

Distribution by effective maturity as a % of funds



Under 1 Year	4.3%
1 - 3 Years	15.3
3 - 5 Years	28.8
5 - 7 Years	24.4
7 - 10 Years	23.7
10 - 20 Years	2.4
20 - 30 Years	0.9
Over 30 Years	0.2

Distribution by credit quality as a % of funds



U.S. Government	8.5%
Aaa	18.8
Aa	10.5
A	39.2
Baa	19.8
Ba	1.7
B	0.4
Caa	0.0
Ca	0.0
C	0.0
Not Rated	1.1

Credit-quality ratings are measured on a scale that generally ranges from AAA (highest) to D (lowest). "NR" is used to classify securities for which a rating is not available. NR securities may include a fund's investment in Vanguard Market Liquidity Fund or Vanguard Municipal Cash Management Fund, each of which invests in high-quality money market instruments and may serve as a cash management vehicle for the Vanguard funds, trusts, and accounts. U.S. Treasury, U.S. Agency, and U.S. Agency mortgage-backed securities appear under "U.S. Government." Credit-quality ratings for each issue are obtained from Barclays using ratings derived from Moody's Investors Service (Moody's), Fitch Ratings (Fitch), and Standard & Poor's (S&P). When ratings from all three agencies are available, the median rating is used. When ratings are available from two of the agencies, the lower rating is used. When one rating is available, that rating is used.

Economic and market outlook

Global outlook summary

Global economy: *Down but not out*

- Although several factors will raise the risk of recession in 2019, a **slowdown in growth** – led by the US and China – is the most likely outcome.
- **US economic growth** should drop back toward a more **sustainable 2%** as the benefits of expansionary fiscal and monetary policy abate.
- In emerging markets, **China's growth** will remain **near 6%**, with increasing policy stimulus applied to help maintain that trajectory.
- Unresolved US-China trade tensions remain one of the largest risk factors to our view, in addition to stronger-than-expected tightening by the Federal Reserve should the US unemployment rate approach 3%.

Global inflation: *Unlikely to shoot past 2%*

- In the **US**, we expect **core inflation** to remain near or below **2%** throughout 2019; an escalation in tariffs would only temporarily affect US core inflation.
- In **Europe and Japan**, price pressures will increase gradually as labor market slack erodes, though **core inflation is likely to stay below 2%**.
- Higher wages are likely, yes, but higher inflation is not.

Monetary policy: *Convergence commences, with the Fed stopping near 3%*

- As inflation moves toward target, financial-stability risks rise, and unemployment rates approach full employment, global central banks will stay on their gradual normalization paths.
- In the US, we expect **one more rate hike from the Fed in 2019**.
- We expect the **first increase from the European Central Bank in late 2019**, followed by a very gradual hiking path thereafter.
- **Japan** is late to the party and we **do not expect any rate increases in 2019**, though some fine-tuning of its policy framework is likely to ease growing financial-stability risk.

Investment outlook: *No pain, no gain*

- With slowing growth, disparate rates of inflation, and continued policy normalization, volatility in financial markets is likely to accelerate. Long term, our ten-year outlook for investment returns remains guarded, given the backdrop of high valuations and depressed risk-free rates across major asset classes.
- **US fixed income returns** are most likely to be in the **2.5%-4.5% range** versus last year's outlook of 1.5%-3.5%.
- **Returns in global equity markets** are likely to be about **2.5%-6.5%** for US-dollar-based investors.
- We do foresee improving return prospects in non-US developed markets, building on slightly more attractive valuations (a key driver of the equity risk premiums) combined with higher expected risk-free rates.

Region by region

United States

Going for a soft landing

- Trend GDP growth of about 2%
- Trend growth of labor force of 80,000-100,000 jobs per month
- Neutral Fed Funds rate of 2.5%-3%
- Inflation will remain around the Fed's 2% target

Euro area

Stable growth as policy normalizes

- Trend GDP growth of about 1.5%
- Chance of an Italian exit is only 5%
- Unemployment rate, now close to 8%, likely to approach 7.5%
- ECB to raise rates for first time in late 2019

United Kingdom

Brexit is still the wild card

- The UK is set to leave the EU on March 29, 2019
- Compromise Brexit (base case), Crash Brexit, or No Deal Brexit
- Trend GDP growth of about 1.6%
- Bank of England to raise rates twice if base case plays out

China

Reprioritizing policy goals amid rising risks

- Trend GDP growth range of 6-6.3%
- Direct impact of current tariffs on China's GDP is modest at -0.15% but could accelerate to -0.60% with a 25% tariff on all imports from China
- Government will strive to avoid both under- and over-easing the economy in 2019

Japan

No exit, but more flexibility

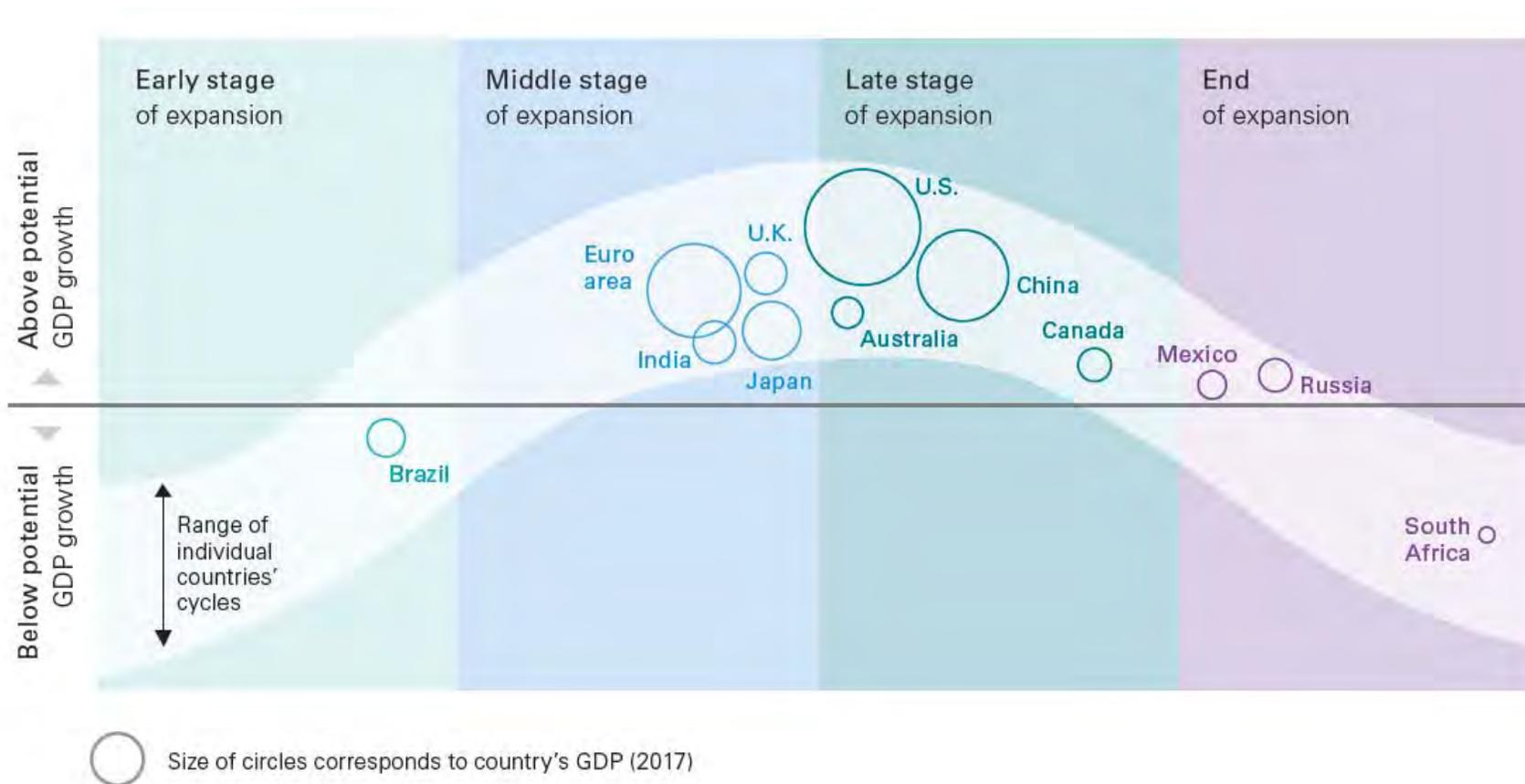
- Trend GDP growth of about 0.8%
- Impediments to growth will intensify given scheduled consumption tax hike and potential escalation of US protectionism, notably auto tariffs
- Core inflation to gradually rise to 1%
- Yield curve control target likely anchored at 0% with negative rate policy in place

Emerging markets

A mixed bag

- Aggregate trend GDP growth of about 4.6%
- Asia region expected to register slower growth as China slows but remains fastest growing region
- Latin American region growth projection is 2.8%
- US monetary policy normalization has led to tighter financial conditions

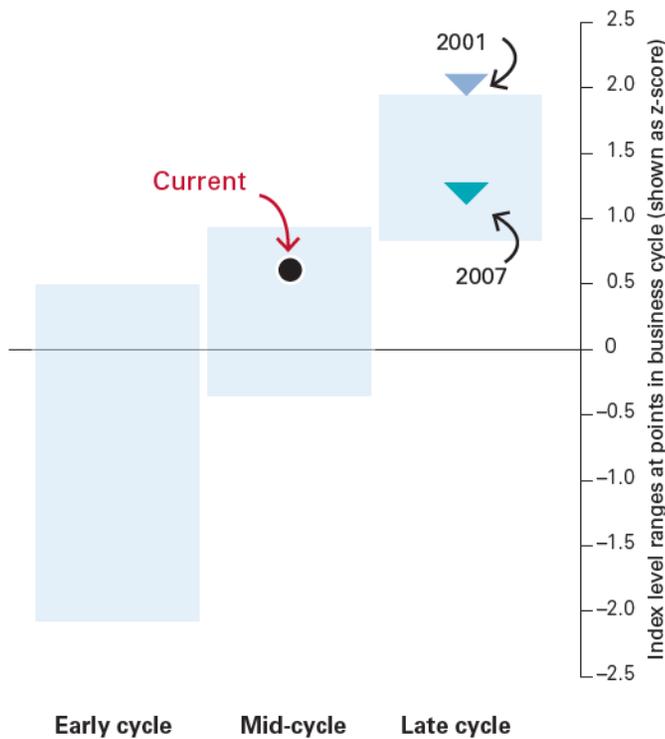
Where are countries in their economic cycles?



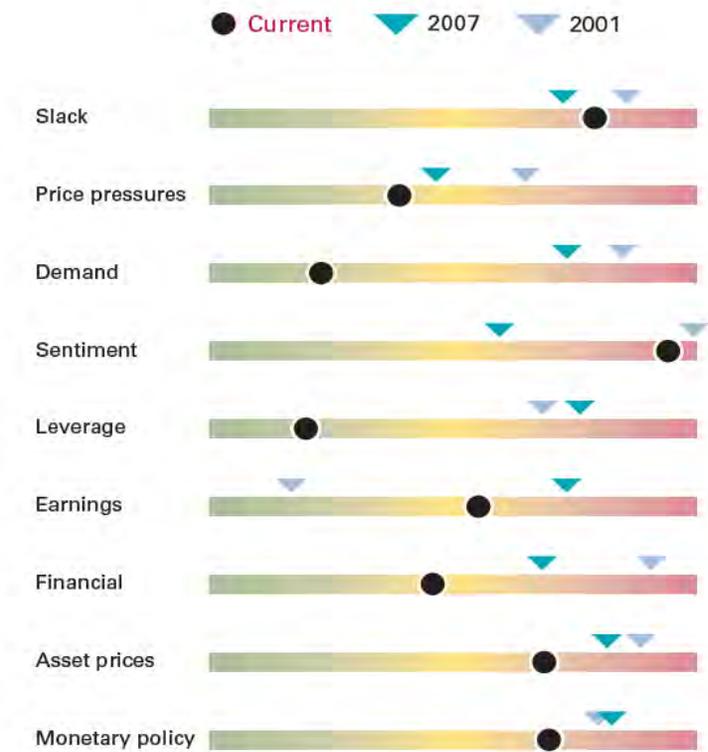
Notes: The vertical axis represents GDP growth rate relative to each country's potential growth rate, represented by the horizontal line. There is no inherent time limit on the length of each stage; different economies progress through the stages at varying speeds. The end of an expansion represents below-trend growth, which may or may not match the common definition of recession of two consecutive quarters of negative real GDP growth. Sources: Vanguard and the International Monetary Fund (IMF).

Still too early to call recession in the U.S.

Cyclical index just now moving toward later cycle levels



Lack of extremes broadly present across a range of indicators



Notes: Figure I-2a displays the historical ranges of a cyclical index at various points in the business cycle. Index is shown as a z-score and weighted by first principal components of 25 economic indicators (below). The business cycle is determined by historical observations of the output gap. Figure I-2b displays the underlying components of the cyclical index in Figure I-2a, presenting the current level relative to historical observations. The 2007 and 2001 data points indicate the index and component position 12 months prior to the onset of recession. Underlying indicators: slack = output gap, U3 and U6 unemployment rate gap relative to NAIRU. Price pressures = personal consumption expenditures (PCE), core PCE, average hourly earnings, unit labor costs. Demand = housing starts, residential investment, non-residential investment, durable goods consumption. Sentiment = business optimism, consumer sentiment, consumer confidence. Leverage = household financial obligations ratio, nonfinancial corporate debt, FRB Senior Loan Officer Opinion Survey for consumer and commercial and industrial credit terms. Earnings = corporate profits. Financial = Vanguard financial conditions index, yield curve (measured as the 10 year-3 month Treasury yield) Asset prices = Vanguard's fair-value CAPE, corporate OAS spread, high-yield OAS spread. Monetary policy = federal funds rate versus neutral rate estimated by the Laubach-Williams (2003) model. Data range is 1980 Q1-present. Sources: Vanguard, Moody's Analytics Data Buffet, Federal Reserve Bank of St. Louis, Laubach-Williams (2003).

Global risks to the outlook

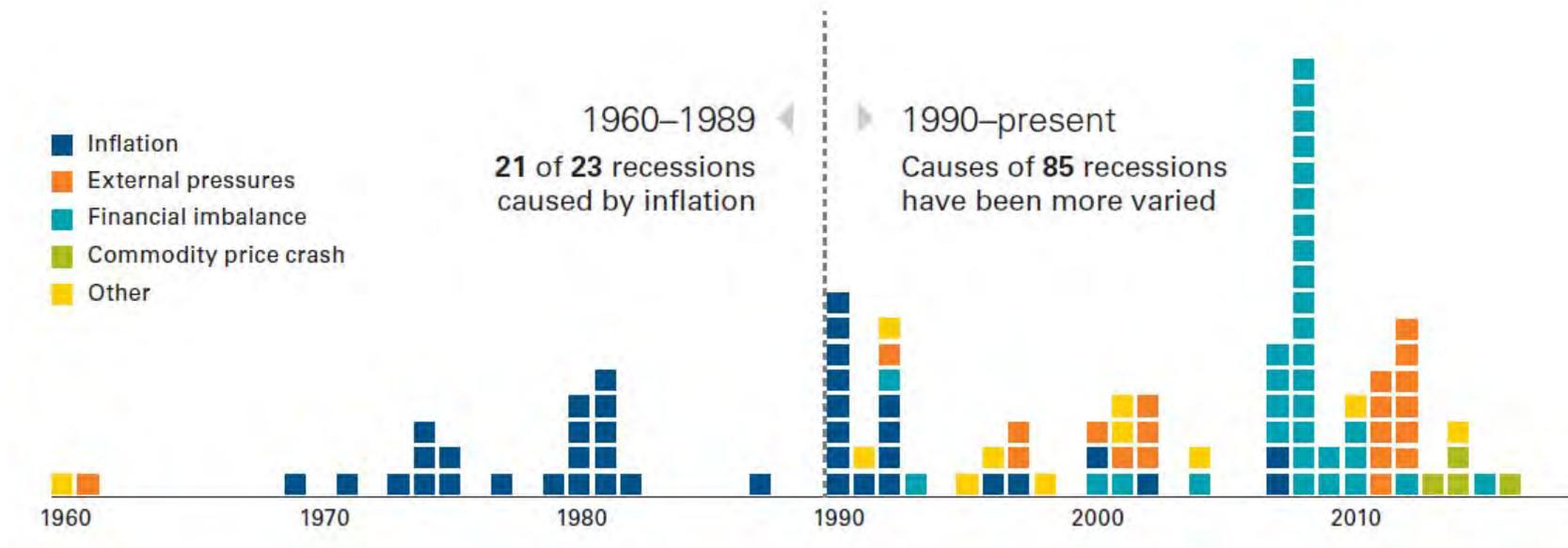
Vanguard assessment of risks

Risk	Description	Negative scenario	Base case	Positive scenario
Global monetary policy normalization	Extreme nature of existing policy stimulus, uncharted territory of quantitative tightening, and uncertainty about the neutral setting for policy (r^*).	25% Policy mistake in the U.S.: Fed continues tightening beyond r^* and the yield curve inverts. ECB/BOE hold off on normalization plans.	60% Soft landing in the U.S. at 2.75%–3%. Gradual ECB/BOE normalization commences. Global growth slowing back to trend.	15% Soft landing in the U.S. at 3% or higher. Global trend growth increases without global inflation.
Trade war and protectionism	Bilateral U.S.-China trade war continues to escalate. Tariffs can be increased further and non-tariff barriers implemented.	20% Trade war extends beyond tariffs with major retaliations from China. GDP growth impact could be more than 100 basis points.	55% Trade war escalates in intensity. Impact on the global economy of 30–50 basis points.	25% The U.S. and China reach a bilateral agreement. Tariffs are rolled back.
Instability of Chinese economy	Fears are rising about a hard landing in China, given the collateral damage of deleveraging and status of China-U.S. relations.	30% Chinese policymakers fail to provide enough stimulus. Headline growth falls below 6%.	55% Further policy easing will support domestic demand. Growth likely moderates to 6.0%–6.3% for 2019.	15% U.S.-China striking a trade deal and/or policy over-easing represent upside risks to growth.
Euro breakup risk	An escalation in tensions relating to Italy.	10% The Italian government maintains a loose fiscal policy resulting in eventual departure from the euro. This results in a wider crisis in the euro area.	70% The Italian government revises fiscal policy and tensions subside. Euro breakup concerns are lessened.	20% The Italian government backs down completely and submits a fiscal austerity plan and euro breakup concerns to subside.
Emerging-market debt crises	Key drivers of emerging-market cycles are global monetary policy divergence, the effect of the U.S. dollar on dollar denominated debt, and global/China demand for commodities.	20% Trade wars, a slowdown of the Chinese economy, or a strong U.S. dollar due to continued divergence of monetary policy lead to spillovers and broader EM crises.	60% Emerging-market debt crises remain contained to a few idiosyncratic cases.	20% U.S. dollar level normalizes as developed-market central banks commence normalization. Risk-on environment helps emerging markets undergo V-shape bounce-back.

Note: Odds for each scenario are based on median responses to a poll of Vanguard's Global Economics and Capital Markets Outlook Team.
Source: Vanguard.

Drivers of recessions vary

Drivers of 108 country-specific recessions since 1960

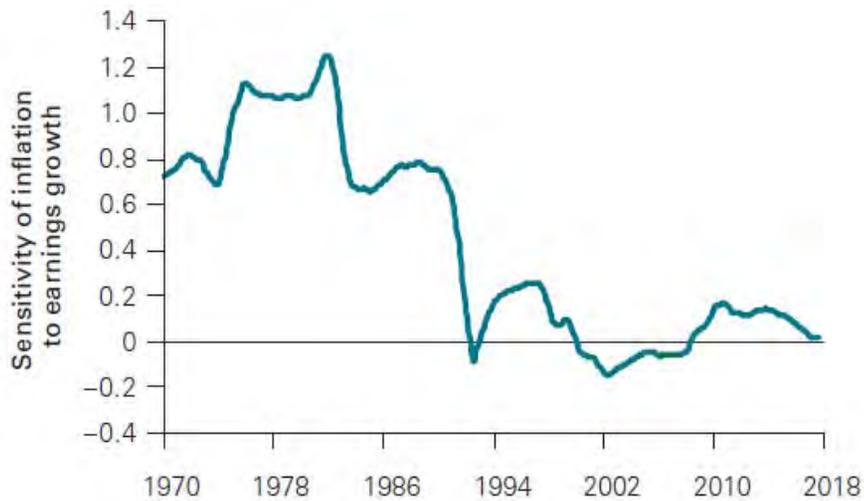


Notes: Recessions are defined as two consecutive quarters of negative real GDP growth. We examined 23 developed economies starting in 1960, or with the earliest available quarterly data. Recessions were categorized using a variety of macroeconomic indicators and historical analysis. Inflation recessions are those where regional inflation averaged greater than 4% in the 12 months preceding the recession's start. External pressures signify recessions caused by export-demand weakness. Financial imbalance broadly represents a misallocation of capital, either through unsustainable equity, housing, or credit valuations resulting in elevated financial sector stress. Commodity price crashes are most likely to affect commodity export-driven economies. Examples of idiosyncratic factors (other) include weather events, tax increases, and political developments.

Source: Vanguard calculations, based on data from Thomson Reuters, Moody's Analytics Data Buffet, and the Associated Press.

Runaway inflation remains unlikely

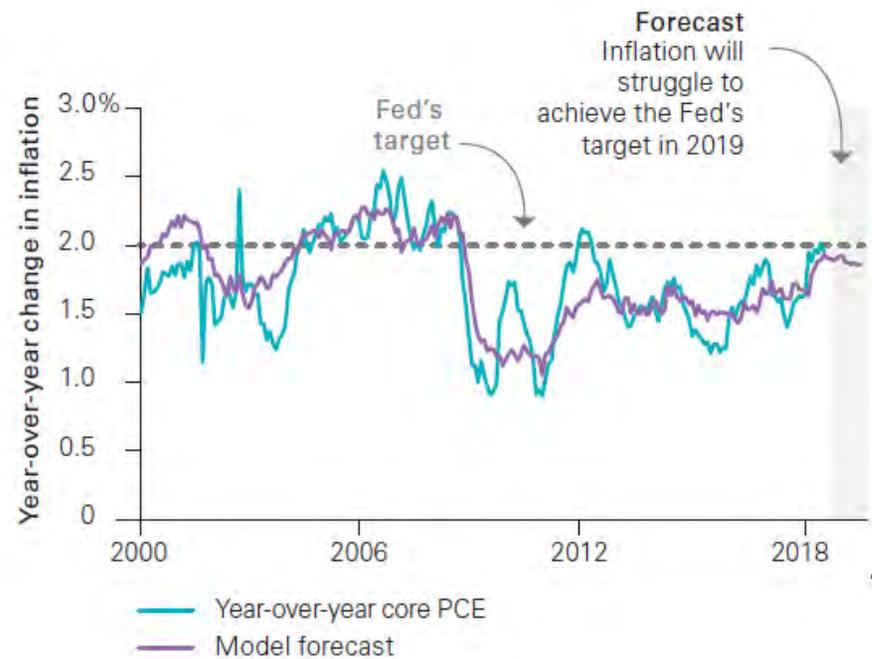
Pass-through of earnings to inflation has waned with anchored inflation expectations



Notes: Figure indicates the sensitivity of core PCE inflation to year-over-year growth in average hourly earnings using rolling ten-year regression coefficients. Data cover January 1960–September 2018.

Sources: Vanguard calculations, Moody's Analytics Data Buffet.

An “augmented” Phillips curve model



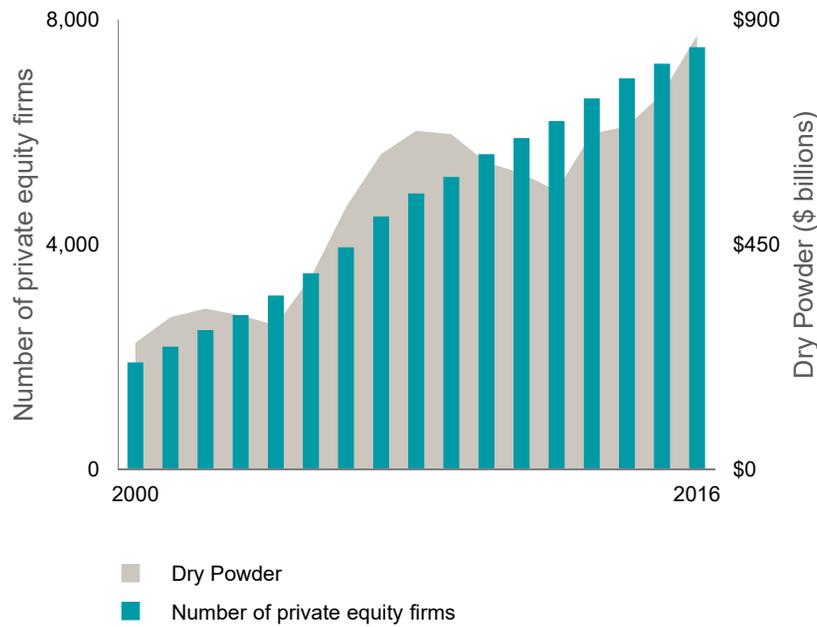
Notes: Core PCE model is a root mean square error (RMSE)-weighted average of two models: a bottom-up model where we model the deviation of augmented Phillips curve fitted values to each major component in the core PCE and a top-down macro model. The RMSE is 0.35 for the bottom-up model and 0.24 for the top-down model. This leads to a 40% weight for the bottom-up model and a 60% weight for the top-down model in the weighted model.

Source: Vanguard calculations, based on Thomson Reuters Datastream, Bureau of Economic Analysis, Bureau of Labor Statistics, Philadelphia Federal Reserve Bank Survey of Professional Forecasters, Congressional Budget Office, and Bloomberg Commodity Index.

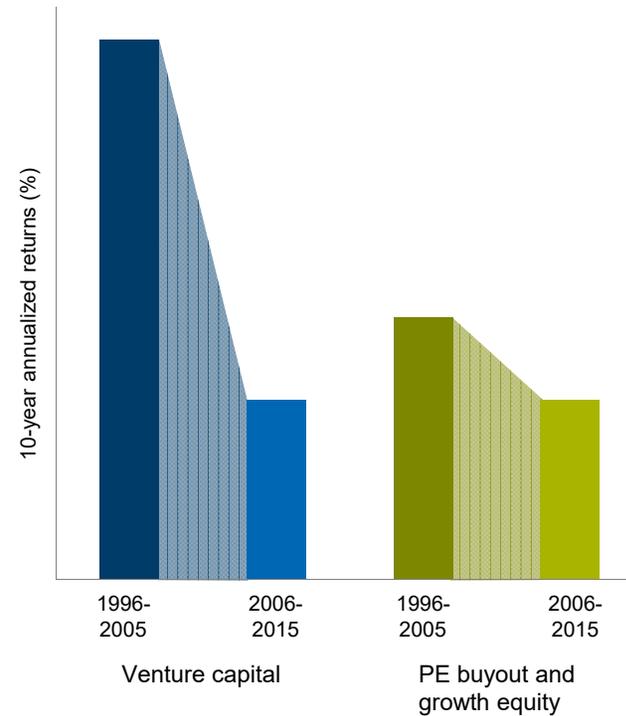
Endowment model review

More investors searching for more returns has resulted in lower returns

Dry powder versus the number of private equity firms



10-year annualized returns



Source: Preqin as of 12/31/2016.

Source: Vanguard calculations using data from HFR, Cambridge Associates, and Thompson Reuters Datastream.
 Note: Values for venture capital and private equity are internal rate of returns (IRR) while hedge fund and balance portfolio returns are total returns. Private equity includes both buyout and growth equity funds.

Debunking the endowment model

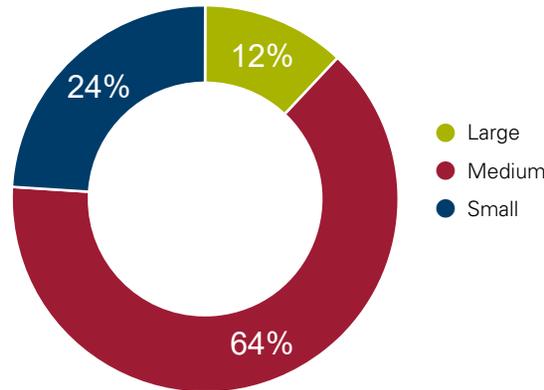
“Such strategies [low-cost indexing] make sense for organizations lacking the resources and capabilities to pursue successful active management programs, a group that arguably includes a substantial majority of endowments and foundations.”

- Yale Endowment, 2016 Report.

The endowment reality

To many, large endowments represent investment success. However, large sized institutions like Harvard or Yale comprise only a tiny fraction of the endowment population.

Small (assets under \$100million),
 Medium (assets from \$101million to \$1billion),
 Large (assets greater than \$1billion).
 Data is from the 2017 NACUBO-Commonfund Study of Endowments.



Large endowments have an edge

Pricing advantage

The ability to invest directly in alternative strategies (vs. more expensive fund-of-funds) and fee negotiation power

Resources

An average of 11 investment professionals on staff

Access

Direct relationships with top investment managers

Smaller endowments can have an edge too

Focus on what you can control*

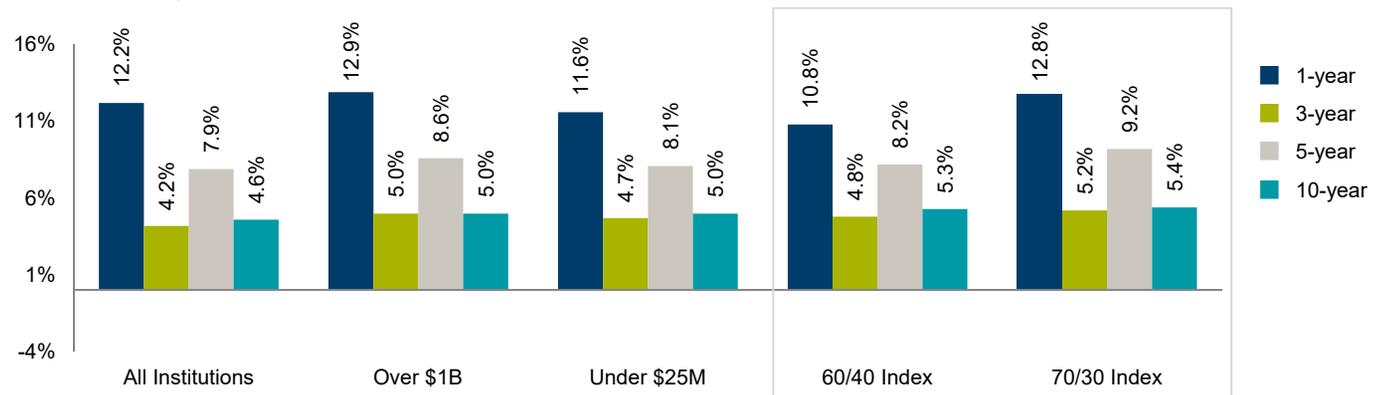
Goals: create clear, appropriate investment goals

Balance: develop a suitable asset allocation using broadly diversified funds

Cost: minimize cost

Discipline: maintain perspective and long-term discipline

VIAS model portfolios vs. NACUBO returns**



Past performance is no guarantee of future results.

All returns are reported net of fees. The volatility of the VIAS portfolios is materially different from that of the NACUBO institutions' portfolios. NACUBO institutions' may have had during the time periods noted above, and may currently have, investment objectives that are not consistent with the VIAS portfolios.

VIAS portfolios are reviewed quarterly to determine the deviation from target weightings and rebalanced according to written investment guidelines. VIAS advisory fees are subject to change dependent on portfolio size and as described in the VIAS advisory brochure. VIAS portfolios are subject to fluctuations in value and investment losses. Please see important information slide for additional details.

* Vanguard's Principles for Investing Success, May 3, 2017.

** Vanguard calculations using data from Morningstar and the NACUBO-Commonfund Study of Endowments 2017. All data is for the fiscal year ending June 30, 2017.

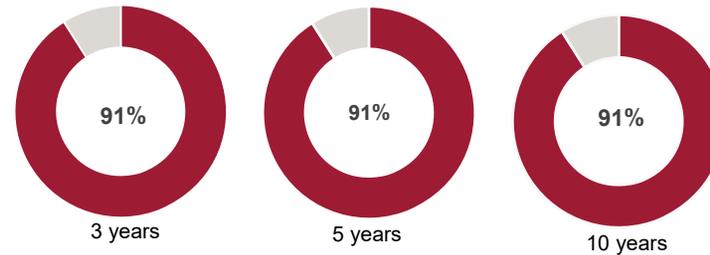
Vanguard active management

Vanguard believes in active management

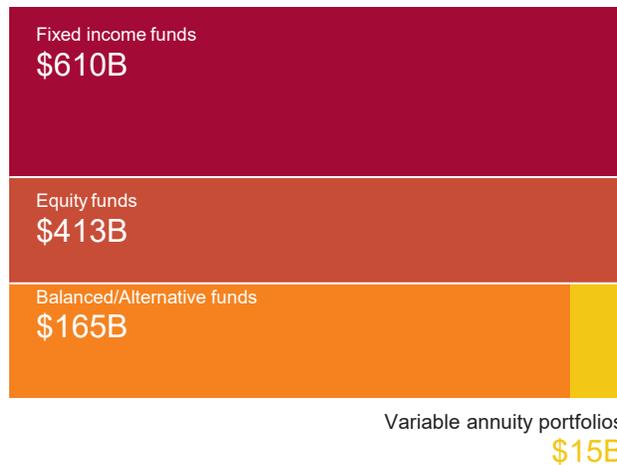
Vanguard has offered actively managed funds since it began operations in 1975

Performance

Percentage of Vanguard active funds whose returns beat their peer-group averages, periods ended June 30, 2018.*



Active assets account for roughly 30% of all Vanguard assets



Invested in active funds

More than **\$1 trillion** in assets under management are invested in **81 active funds** across a wide range of categories.**

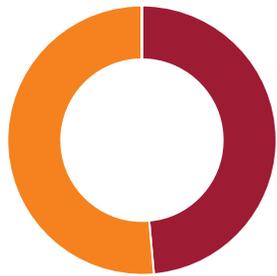


* For the three-year period, 9 of 9 Vanguard money market funds, 43 of 48 bond funds, 31 of 32 balanced funds, and 38 of 44 stock funds, or 121 of 133 Vanguard funds outperformed their peer group averages. For the five-year period, 9 of 9 Vanguard money market funds, 41 of 44 bond funds, 19 of 21 balanced funds, and 37 of 42 stock funds, or 106 of 116 Vanguard funds outperformed their peer group averages. For the ten-year period, 9 of 9 Vanguard money market funds, 40 of 44 bond funds, 17 of 19 balanced funds, and 36 of 40 stock funds, or 102 of 112 Vanguard funds outperformed their peer group averages. Results will vary for other time periods. Only funds with a minimum, three-, five-, or ten-year history, respectively, were included in the comparison. (Source: Lipper, a Thomson Reuters Company.) Note that the competitive performance data shown represent past performance, which is not a guarantee of future results, and that all investments are subject to risks. For the most recent performance, visit our website at vanguard.com/performance.

** Sources: Vanguard and Morningstar, based on data as of December 31, 2017.

↑ Talent

Vanguard's culture, scale, and long-term pay structure have allowed for adept hiring of external advisors. The Wellington™ Fund originated in 1929.



Active assets

(including money market funds):

\$584B

internally managed

\$618B

externally managed

27
external
advisors

We look for these drivers of performance

- Firm
- People
- Philosophy
- Process

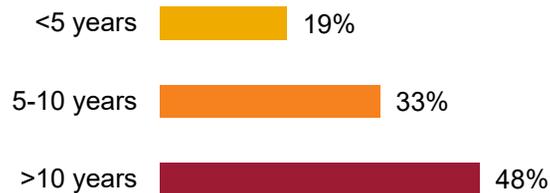
→ Patience

Patience is necessary: Even the most successful funds can experience frequent or extended periods of underperformance

99% of successful funds experienced at least four years underperformance*

Just as investors need to be patient with their investments, Vanguard is patient with our external managers.

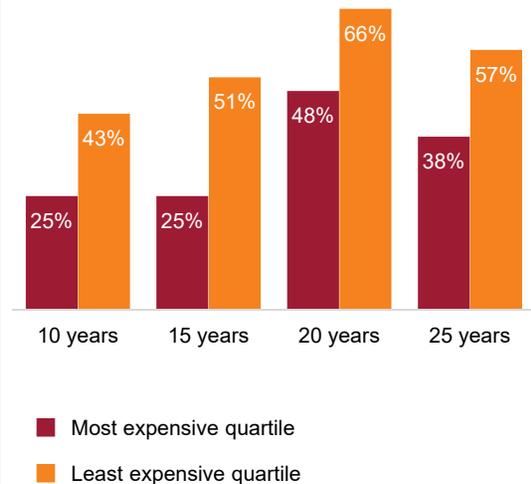
Tenure of external managers**



↓ Cost

Some argue higher costs indicate more skilled management. Our results suggest otherwise. We find no relationship between cost and gross alpha, but there is a clear negative relationship between cost and net alpha because alpha consistently decreases as the expense ratio increases.***

Percentage of actively managed equity funds that outperformed their benchmarks, periods ended June 30, 2018.†



* Successful funds are those that survived for the 15 years and also outperformed their prospectus benchmarks. Data are as of December 31, 2017. Our analysis was based on expenses and fund returns for active equity funds available to U.S. investors at the start of the period. The oldest and lowest-cost share class was used to represent a fund when multiple share classes existed. Each fund's performance was compared with that of its prospectus benchmark. Funds that were merged or liquidated were considered underperformers for the purpose of this analysis. The following fund categories were included: small-cap value, small-cap growth, small-cap blend, mid-cap value, mid-cap growth, mid-cap blend, large-cap value, large-cap growth, and large-cap blend. Sources: Vanguard calculations, based on data from Morningstar, Inc.

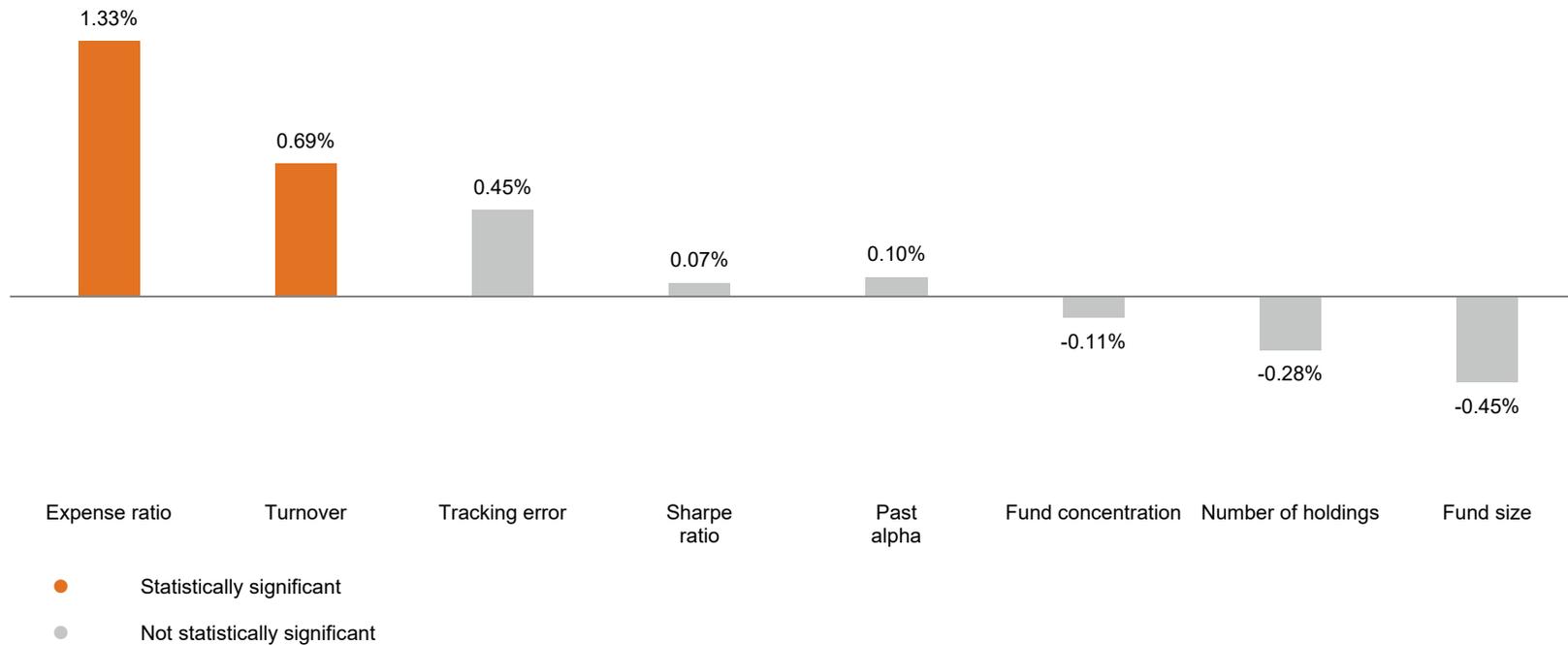
** Vanguard, as of August 1, 2018.

*** Rowley Jr., James J., Garrett L. Harbron, and Matthew C. Tufano, 2017. *In pursuit of alpha: Evaluating active and passive strategies*. Valley Forge, Pa.: The Vanguard Group

† Because of expenses, most index funds also underperform their benchmarks. Our analysis was based on expenses and fund returns for active equity funds available to U.S. investors at the start of each period. Each fund's performance was compared with that of its prospectus benchmark. Data includes funds from all share classes. Sources: Vanguard calculations, based on data from Lipper, a Thomson Reuters Company, as of June 30, 2018.

Are there any strong indicators that can improve the odds?

- Cost is a powerful indicator of future alpha
- Relative difference in median alpha



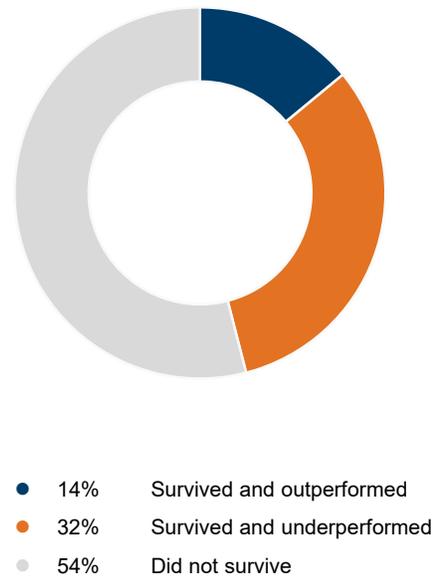
Source: Vanguard calculations, based on data from Morningstar, Inc.

Notes: The bars represent the difference in the median annual alpha from January 1, 2006, through December 31, 2015, of mutual funds in the lowest and highest quartiles based on the above metric measurements from January 1, 2001, through December 31, 2005. Fund concentration is measured as the percentage of assets in the top ten holdings. Expense ratio and turnover were the only variables significant at the 99% confidence level. For more about the analysis, see *Shopping for alpha: You get what you don't pay for*, Daniel W. Wallick, Brian R. Wimmer, and James J. Balsamo, 2015. Valley Forge, Pa.: The Vanguard Group.

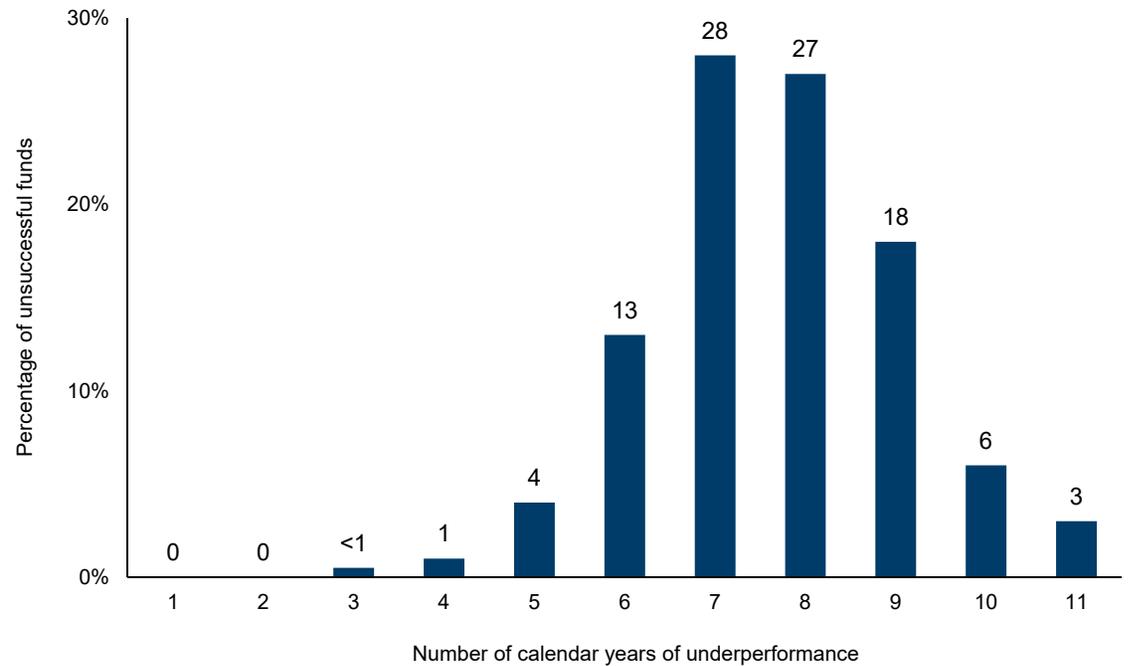
The odds of a consistent winner are, on average, modest

Distribution of active equity funds by total calendar years of underperformance

Out of 2,224 initial funds . . .



. . . of those that survived and outperformed, almost 100% underperformed in at least four years



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

Notes: Successful funds are those that survived for the 15 years and also outperformed their prospectus benchmarks for the period ended December 31, 2016.

Our analysis used expenses and fund returns for active equity funds available to U.S. investors and that were alive at the start of each analysis period. The initial number of funds at the start of the analysis was 2,224 funds. Of these initial 2,224 funds, 1,020 (46%) survived and 319 (14%) outperformed over the 15-year period. The oldest and lowest-cost single share class was used to represent a given fund where multiple share classes existed. Their performance was compared with their prospectus benchmarks. Funds that were merged or liquidated are considered underperformers for the purposes of this analysis. The following fund categories were included: small value, small growth, small blend, mid-cap value, mid-cap growth, mid-cap blend, large value, large growth, and large blend.

Past performance is no guarantee of future results.

Manager patience: Average tenure is 14 years

Partner	Number of mandates	Start date	Duration (years)	Vanguard assets (\$B)
Wellington Management Co.	21	1975	43	371.3
Schroder Investment Management North America	3	1981	36	17.4
PRIMECAP Management Co.	4	1984	33	90.8
Barrow, Hanley, Mewhinney, & Strauss	3	1985	33	31.4
Marathon Asset Management	1	1995	23	1.8
Oaktree Capital Management	3	1996	21	1.4
Baillie Gifford Overseas	5	2003	15	24.5
Hotchkis and Wiley Capital Management	1	2003	14	7.8
William Blair Investment Management	3	2004	14	3.3
Acadian Asset Management	1	2004	13	1.8
Pzena Investment Management	3	2005	13	8.6
Donald Smith & Co.	1	2005	13	1.9
Lazard Asset Management	2	2006	12	14.1
Jennison Associates	2	2007	11	3.6
Edinburgh Partners	1	2008	10	3.5
Frontier Capital Management	2	2008	9	2.3
Sanders Capital	1	2010	8	7.7
Jackson Square Partners	2	2010	7	3.2
Cardinal Capital Management	1	2010	8	0.3
D. E. Shaw Investment Management	1	2011	6	3.4
Los Angeles Capital	1	2011	6	3.4
ARGA Investment Management	1	2012	6	2.5
Stephens Investment Management Group	1	2013	5	1.9
ArrowMark Partners	2	2014	4	3.0
RS Investments	1	2016	1	2.1
ClearBridge Investments	1	2017	1	2.1
TimesSquare Capital Management	1	2017	1	0.4

95%
of total assets
>10 years tenure

4%
of total assets
5–10 years tenure

1%
of total assets
< 5 years tenure

Source: Vanguard, as of December 31, 2017.

Patience has paid off

Annualized excess returns of Vanguard active equity funds over the returns of their stated benchmarks, net of fees

Periods ended December 31, 2017

	Past 10 years	Past 20 years	Past 30 years
Equal-weighted (median)			
Vanguard funds	0.00%	0.64%	0.37%
Non-Vanguard funds	-0.85%	-0.42%	-0.54%
Asset-weighted			
Vanguard funds	0.93%	1.38%	0.75%
Non-Vanguard funds	-0.34%	0.44%	0.13%

Source: Vanguard.

Notes: The performance of each Vanguard and non-Vanguard fund was compared with that of its stated benchmark using monthly return data ended December 31, 2017. The returns for all non U.S., global, and domestic large-, mid-, small-cap, and sector Vanguard active equity funds, including those that were merged or liquidated during the period, were included in the performance calculations. The active equity portions of our balanced funds were excluded. In our calculations, the portfolios of Vanguard and non-Vanguard active equity funds were assumed to be rebalanced monthly to their target weights (as determined by the equal-weighting or asset-weighting) across all the Vanguard or non-Vanguard active equity funds alive in a given month. All fund performance data are net of fees. See Appendix for a full list of Vanguard funds.

Appendix

Quarterly investment performance summary of segregated accounts For the period ending December 31, 2018

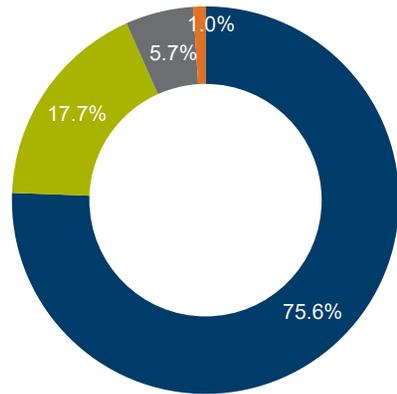
Performance net of investment manager fees

Account Name	Inv. manager	Q4 2018 return	YTD 2018	Market value as of 12/31/2018
Freedom - Willard Bosma	RJ	-11.03%	-7.85%	\$424,142
J Hanna/M Murphy	UBS	-10.87%	-7.01%	\$1,133,157
Ernest E Settle	UBS	-10.33%	-7.17%	\$1,058,231
Cutler	Schwab	-9.95%	-10.41%	\$191,177
The 2012 Fund	Schwab	+0.07%	+0.19%	\$593,706
MI Heritage Trails (MICHHT)	UBS	-10.33%	-7.55%	\$1,184,785
Donahue	NW	+0.08%	-1.17%	\$162,362
G & B Hilt Fund	UBS	-9.84%	-6.82%	\$6,354,785
Collins	RJ	-11.42%	-5.13%	\$634,775
Campbell Scholarship	ML	-7.77%	-7.81%	\$32,997
Shelby Rotary	LPL	-9.19%	-5.78%	\$332,847

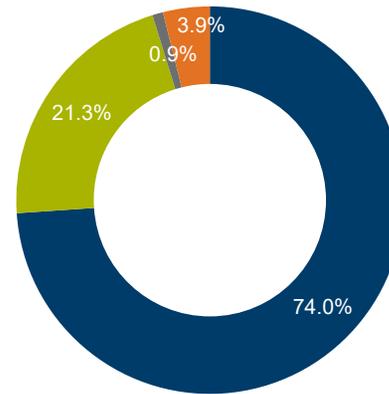
Note: Vanguard cannot independently validate the accuracy of the returns shown above. All returns are calculated using data as reported by CFMC staff. Return calculation reflects beginning period and ending period market values adjusted for investment provider or CFMC cash flows, and investment provider fees.

Quarterly asset allocation summary of segregated accounts As of December 31, 2018

RJ - Freedom - Willard Bosma (\$424,124)



UBS - J Hanna/M Murphy (\$1,133,157)

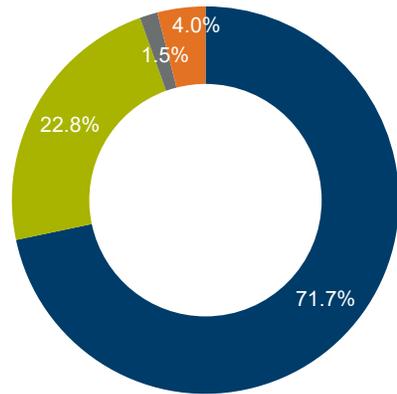


- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

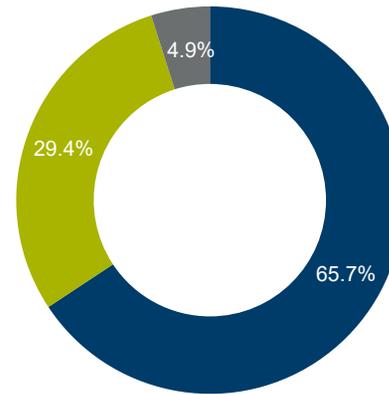
- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

Quarterly asset allocation summary of segregated accounts As of December 31, 2018

UBS - Ernest E Settle (\$1,058,231)



Schwab - Cutler (\$195,813)

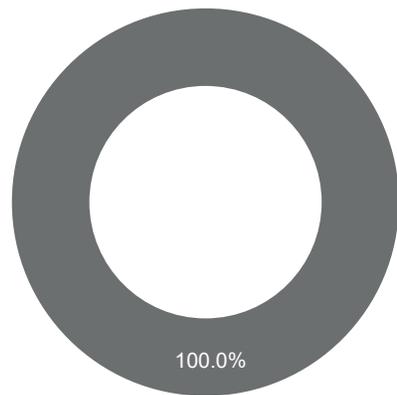


- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

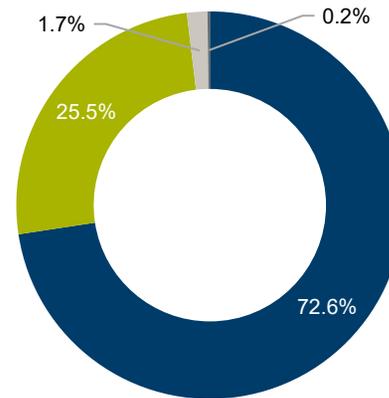
Quarterly asset allocation summary of segregated accounts As of September 30, 2018

Schwab - The 2012 Fund (\$593,706)



- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

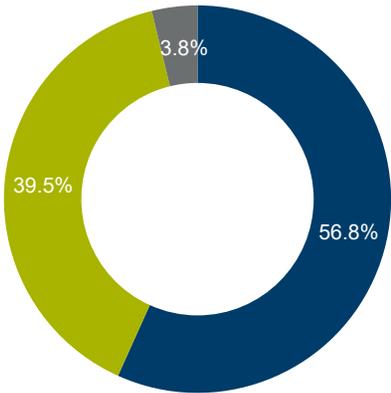
UBS - MI Heritage Trails (MICHHT) (\$1,184,785)



- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

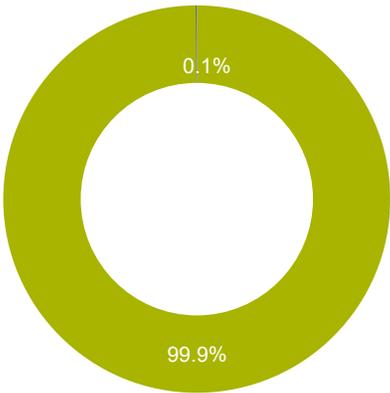
Quarterly asset allocation summary of segregated accounts As of September 30, 2018

ML - Campbell Scholarship (\$32,997)



- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

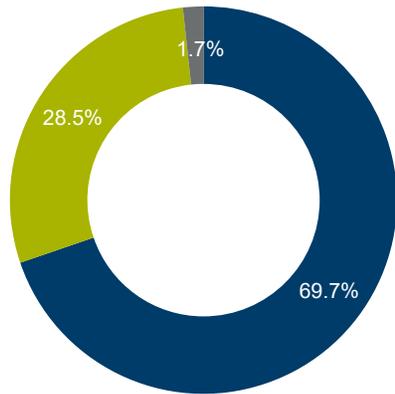
NW - Donahue (\$162,362)



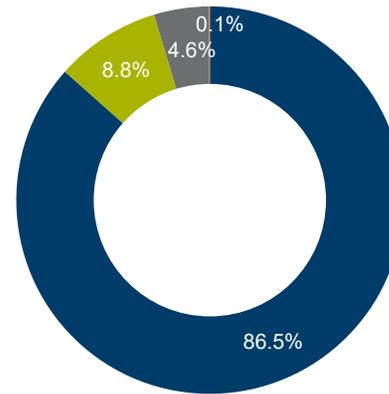
- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

Quarterly asset allocation summary of segregated accounts As of September 30, 2018

UBS - G & B Hilt Fund (hilt05) (\$6,354,785)



RJ - Collins (\$634,775)

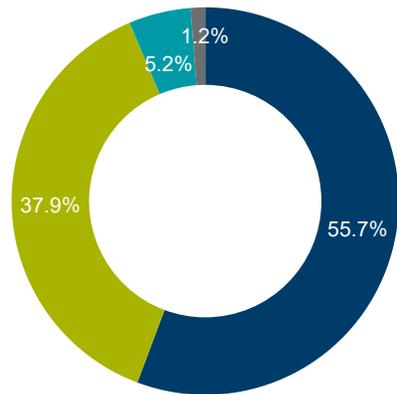


- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

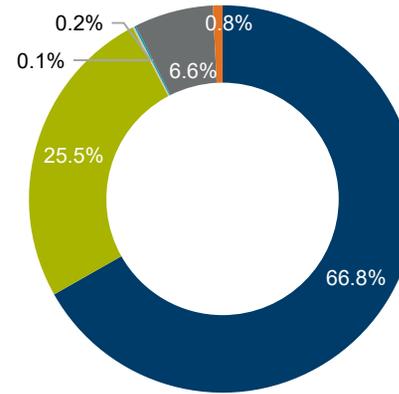
- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

Quarterly asset allocation summary of segregated accounts As of September 30, 2018

LPL - Shelby Rotary (\$332,847)



Combined segregated accounts (\$12,102,964)



- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

- Equity
- Fixed Income
- Alternative Investments
- Real Estate
- Cash / Cash Alternatives
- Non-classified

Vanguard Intermediate-Term Bond Index Fund (VBIIX)

Investment approach

- Seeks to track the performance of the Bloomberg Barclays U.S. 5–10 Year Government/Credit Float Adjusted Index.
- Diversified exposure to the intermediate-term, investment-grade U.S. bond market.
- Passively managed using index sampling.
- Provides moderate current income with high credit quality.

Key facts

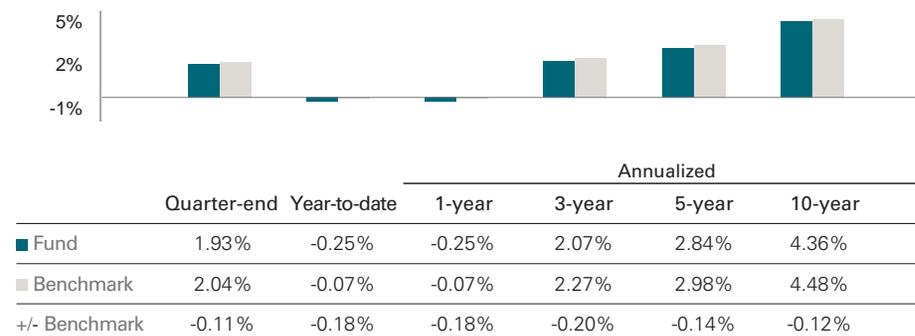
Expense ratio as of 04/26/2018	
15 bps As reported in the most recent prospectus.	
Designation	Treasury/agency/blend intermediate-term
Fund inception date	03/01/1994
Investor Shares inception date	03/01/1994
Total net assets as of 12/31/2018 (\$M)	\$31,344
Net fund assets for VBIIX as of 12/31/2018 (\$M)	\$1,037
Holdings	1,842
Indexed to	Bloomberg Barclays U.S. 5–10 Year Government/Credit Float Adjusted Index (BFA0TRUU)
Turnover rate (fiscal year-end 12/31/2018)	58.2%
CUSIP	921937306
Investment manager	Vanguard Fixed Income Group

Risk and volatility

	R ²	Beta
Primary benchmark	0.99	1.01
Broad-based benchmark	0.96	1.23

R-squared and beta are calculated from trailing 36-month fund returns relative to the associated benchmark.
Broad-based benchmark: Spliced Bloomberg Barclays U.S. Aggregate Float Adjusted Index.

Performance



Spliced Bloomberg Barclays U.S. 5–10 Year Government/Credit Float Adjusted Index: Bloomberg Barclays U.S. 5–10 Year Government/Credit Bond Index through December 31, 2009; Bloomberg Barclays U.S. 5–10 Year Government/Credit Float Adjusted Index thereafter.

Performance versus competitors

Percentage of Core Bond Funds outperformed by VBIIX



Source: Lipper, a Thomson Reuters Company. Based on total returns as of December 31, 2018. Number of funds in category: 1-year, 488; 3-year, 434; 5-year, 372; 10-year, 285. Results will vary for other time periods.

The performance data shown represent past performance, which is not a guarantee of future results. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For performance data current to the most recent month-end, visit our website at vanguard.com/performance.

Figures for periods of less than one year are cumulative returns. All other figures represent average annual returns. Performance figures include the reinvestment of all dividends and any capital gains distributions. All returns are net of expenses.

The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Vanguard Total Bond Market Index Fund (VBMFX)

Investment approach

- Seeks to track the performance of the Bloomberg Barclays U.S. Aggregate Float Adjusted Index.
- Broadly diversified exposure to investment-grade U.S. bond market.
- Passively managed using index sampling.
- Intermediate-duration portfolio.
- Provides moderate current income with high credit quality.

Share of U.S. bond market (%)



- 100% Bloomberg Barclays U.S. Aggregate Float Adjusted Index

As measured by the Bloomberg Barclays U.S. Aggregate Bond Index.

Key facts

Expense ratio as of 04/26/2018	15 bps
As reported in the most recent prospectus.	
Designation	Treasury/agency/blend intermediate-term
Fund inception date	12/11/1986
Investor Shares inception date	12/11/1986
Total net assets as of 12/31/2018 (\$M)	\$204,007
Net fund assets for VBMFX as of 12/31/2018 (\$M)	\$4,250
Holdings	8,582
Indexed to	Bloomberg Barclays U.S. Aggregate Float Adjusted Index (LBUFRUU)
Turnover rate (fiscal year-end 12/31/2018)	60.0%
CUSIP	921937108
Investment manager	Vanguard Fixed Income Group

Risk and volatility

	R ²	Beta
Primary benchmark	0.99	1.01
Broad-based benchmark	0.99	1.01

R-squared and beta are calculated from trailing 36-month fund returns relative to the associated benchmark.
Broad-based benchmark: Spliced Bloomberg Barclays U.S. Aggregate Float Adjusted Index.

Performance



	Annualized					
	Quarter-end	Year-to-date	1-year	3-year	5-year	10-year
Fund	1.59%	-0.13%	-0.13%	1.93%	2.35%	3.31%
Benchmark	1.58%	-0.08%	-0.08%	2.09%	2.50%	3.49%
+/- Benchmark	0.01%	-0.05%	-0.05%	-0.16%	-0.15%	-0.18%

Spliced Bloomberg Barclays U.S. Aggregate Float Adjusted Index: Bloomberg Barclays U.S. Aggregate Bond Index through December 31, 2009; Bloomberg Barclays U.S. Aggregate Float Adjusted Index thereafter.

Performance versus competitors

Percentage of Core Bond Funds outperformed by VBMFX



Source: Lipper, a Thomson Reuters Company. Based on total returns as of December 31, 2018. Number of funds in category: 1-year, 488; 3-year, 434; 5-year, 372; 10-year, 285. Results will vary for other time periods.

The performance data shown represent past performance, which is not a guarantee of future results. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For performance data current to the most recent month-end, visit our website at vanguard.com/performance. Figures for periods of less than one year are cumulative returns. All other figures represent average annual returns. Performance figures include the reinvestment of all dividends and any capital gains distributions. All returns are net of expenses.

The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Important Information

For more information about Vanguard funds or ETF Shares, visit vanguard.com or contact your financial advisor to obtain a prospectus or, if available, a summary prospectus. Investment objectives, risks, charges, expenses, and other important information are contained in the prospectus; read and consider it carefully before investing.

Vanguard ETF Shares are not redeemable with the issuing Fund other than in very large aggregations worth millions of dollars. Instead, investors must buy and sell Vanguard ETF Shares in the secondary market and hold those shares in a brokerage account. In doing so, the investor may incur brokerage commissions and may pay more than net asset value when buying and receive less than net asset value when selling.

Mutual funds and all investments are subject to risk, which may result in loss of principal. Prices of mid-and small-cap stocks often fluctuate more than those of large-company stocks. Investments in stocks or bonds issued by non-U.S. companies are subject to risks including country/regional risk and currency risk. These risks are especially high in emerging markets. Funds that concentrate on a relatively narrow market sector face the risk of higher share-price volatility. It is possible that tax-managed funds will not meet their objective of being tax-efficient. Because company stock funds concentrate on a single stock they are considered riskier than diversified stock funds.

Investments in 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. 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. Although the income from a municipal bond fund is exempt from federal tax, you may owe taxes on any capital gains realized through the fund's trading or through your own redemption of shares. For some investors, a portion of the fund's income may be subject to state and local taxes, as well as to the federal Alternative Minimum Tax. Diversification does not ensure a profit or protect against a loss.

Investments in Target Retirement Funds or Trusts are subject to the risks of their underlying funds. The year in the Fund or Trust name refers to the approximate year (the target date) when an investor in the Fund or Trust would retire and leave the workforce. The Fund or Trust will gradually shift its emphasis from more aggressive investments to more conservative ones based on its target date. An investment in the Target Retirement Fund or Trust is not guaranteed at any time, including on or after the target date.

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NACUBO stands for the National Association of College and University Business Officers. The 2017 NACUBO-CommonfundStudy of Endowments®(NCSE) shows data gathered from 809 U.S. Colleges and universities.

The NACUBO institutions' portfolios performance was reported to NACUBO voluntarily by NACUBO member institutions and the performance reported may have been affected by changes in conditions, objectives, or investment strategies during the time period of performance displayed. Seventy-nine percent of study participants reported rebalancing at least once in 2017.

NACUBO portfolios performance is net of fees. The fees deducted from NACUBO portfolios include: (i) management fees paid to direct asset managers for investment and management services excluding performance fees which can vary widely and may not be indicative of expected rates for a given period; (ii) fund-of-fund fees, which represent aggregate blended management fee rates paid directly to fund-of-fund providers; (iii) advisory fees, which may include consulting fees in addition to fees for investment advisor services; (iv) fund operating expenses; and (v) custody fees. The NACUBO Report notes that individual institutions may pay more or less in fees than is represented by the performance figures set forth above and that NACUBO's fee deduction method is intended to provide a representation of average fee levels rather than what any individual institution pays.

Benchmark descriptions

Spliced Total Stock Market Index: Dow Jones Wilshire 5000 Index (BM ID 19) through April 22, 2005; MSCI US Broad Market Index (BM ID 11598) through June 2, 2013; CRSP US Total Market Index thereafter.

Spliced Total International Stock Idx: Total International Composite Index through August 31, 2006; MSCI EAFE + Emerging Markets Index through December 15, 2010; MSCI ACWI ex USA IMI Index through June 2, 2013, FTSE Global All Cap ex US Index thereafter.

Spliced BloomBarc USAgg Float Adj Ix: BloomBarc U.S. Aggregate Bond Index through December 31, 2009; BloomBarc U.S. Aggregate Float Adjusted Index thereafter.

Important information

IMPORTANT: The projections or other information generated by the Vanguard Capital Markets Model® (VCMM) regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM results will vary with each use and over time.

The VCMM projections are based on a statistical analysis of historical data. Future returns may behave differently from the historical patterns captured in the VCMM. More importantly, the VCMM may be underestimating extreme negative scenarios unobserved in the historical period on which the model estimation is based.

The Vanguard Capital Markets Model® is a proprietary financial simulation tool developed and maintained by Vanguard's primary investment research and advice teams. The model forecasts distributions of future returns for a wide array of broad asset classes. Those asset classes include U.S. and international equity markets, several maturities of the U.S. Treasury and corporate fixed income markets, international fixed income markets, U.S. money markets, commodities, and certain alternative investment strategies. The theoretical and empirical foundation for the Vanguard Capital Markets Model is that the returns of various asset classes reflect the compensation investors require for bearing different types of systematic risk (beta). At the core of the model are estimates of the dynamic statistical relationship between risk factors and asset returns, obtained from statistical analysis based on available monthly financial and economic data from as early as 1960. Using a system of estimated equations, the model then applies a Monte Carlo simulation method to project the estimated interrelationships among risk factors and asset classes as well as uncertainty and randomness over time. The model generates a large set of simulated outcomes for each asset class over several time horizons. Forecasts are obtained by computing measures of central tendency in these simulations. Results produced by the tool will vary with each use and over time.

The Vanguard Lifecycle Model (VLCM) is designed to identify the product design that represents the best investment solution for a theoretical, representative investor who uses the target-date funds to accumulate wealth for retirement. The VLCM generates an optimal custom glide path for a participant population by assessing the trade-offs between the expected (median) wealth accumulation and the uncertainty about that wealth outcome, for thousands of potential glide paths. The VLCM does this by combining two set of inputs: the asset class return projections from the VCMM and the average characteristics of the participant population. Along with the optimal custom glide path, the VLCM generates a wide range of portfolio metrics such as a distribution of potential wealth accumulation outcomes, risk and return distributions for the asset allocation, and probability of ruin, such as the odds of participants depleting their wealth by age 95.

The VLCM inherits the distributional forecasting framework of the VCMM and applies to it the calculation of wealth outcomes from any given portfolio.

The most impactful drivers of glide path changes within the VLCM tend to be risk aversion, the presence of a defined benefit plan, retirement age, savings rate and starting compensation. The VLCM chooses among glide paths by scoring them according to the utility function described and choosing the one with the highest score. The VLCM does not optimize the levels of spending and contribution rates. Rather, the VLCM optimizes the glide path for a given customizable level of spending, growth rate of contributions and other plan sponsor characteristics.

A full dynamic stochastic life-cycle model, including optimization of a savings strategy and dynamic spending in retirement is beyond the scope of this framework.

All investing is subject to risk, including the possible loss of money you invest. Diversification does not ensure a profit or protect against a loss. Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks. Investments in stocks or bonds issued by non-U.S. companies are subject to risks including country/regional risk and currency risk. These risks are especially high in emerging markets. Investments in bonds 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.

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Mutual funds and all investments are subject to risk, including the possible loss of the money you invest. Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks. Investments in stocks or bonds issued by non-U.S. companies are subject to risks including country/regional risk and currency risk. These risks are especially high in emerging markets. Funds that concentrate on a relatively narrow sector face the risk of higher share-price volatility. It is possible that tax-managed funds will not meet their objective of being tax-efficient. Because company stock funds concentrate on a single stock they are considered riskier than diversified stock funds.

Investments in 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. 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. Although the income from a municipal bond fund is exempt from federal tax, you may owe taxes on any capital gains realized through the fund's trading or through your own redemption of shares. For some investors, a portion of the fund's income may be subject to state and local taxes, as well as to the federal Alternative Minimum Tax. Diversification does not ensure a profit or protect against a loss.

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