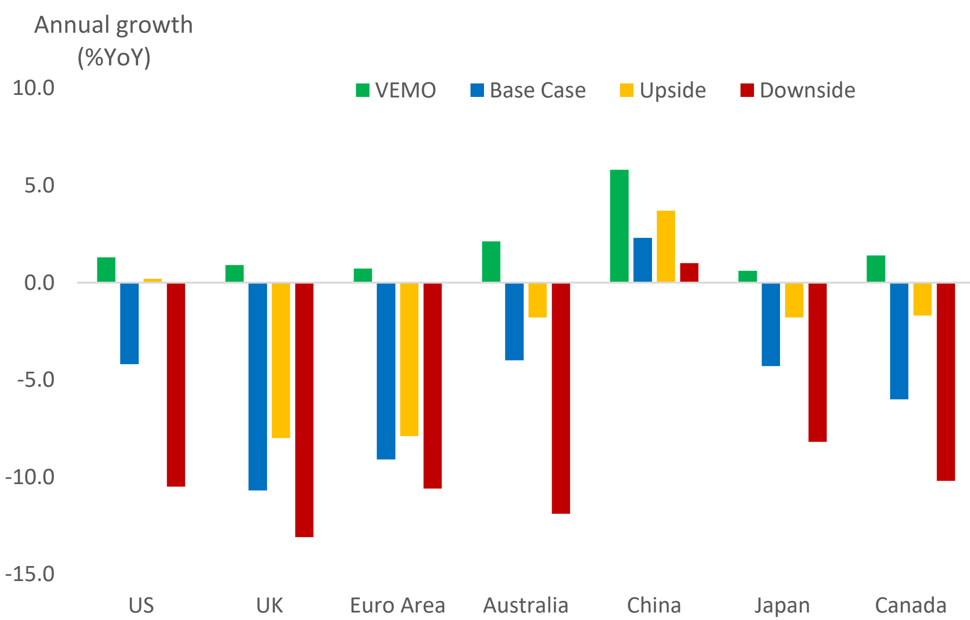
Investing globally can help benefit the long term

Asia-Pacific likely to outperform in 2020

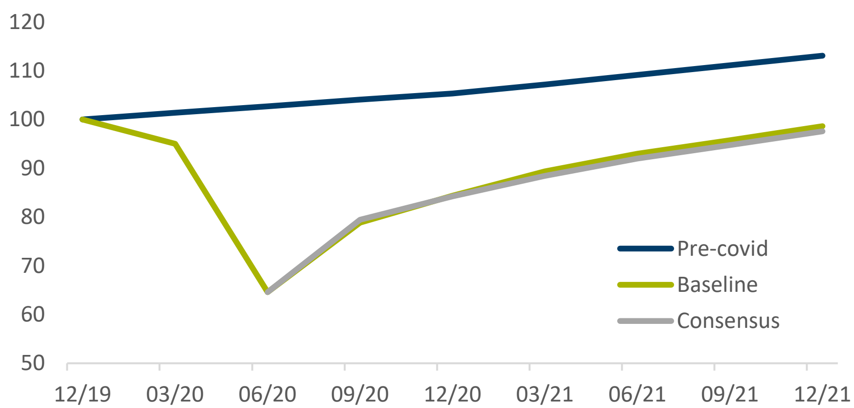


2020 Annual Growth Rate	VEMO	Base Case	Upside	Downside
US	1.3	-4.2	0.2	-10.5
UK	0.9	-10.7	-8.0	-13.1
Euro Area	0.7	-9.1	-7.9	-10.6
Australia	2.1	-4.0	-1.8	-11.9
China	5.8	2.3	3.7	1.0
Japan	0.6	-4.3	-1.8	-8.2
Canada	1.4	-6.0	-1.7	-10.2
World	1.3	-2.0	-0.2	-4.6

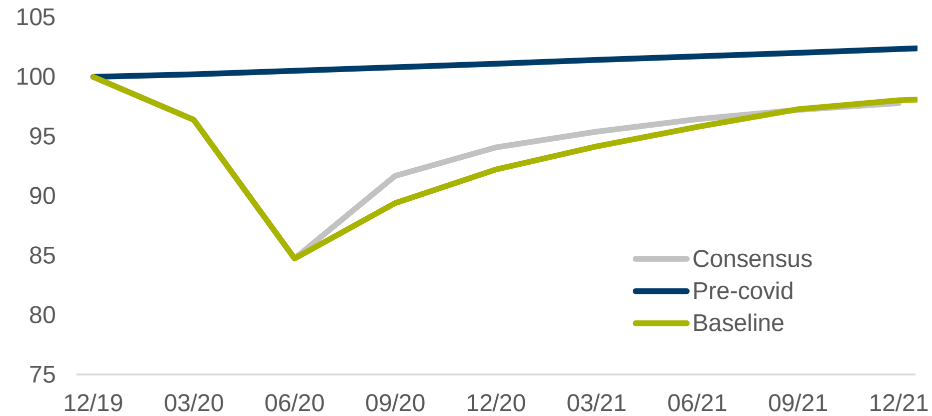
Source: Vanguard ISG. As at 8th September 2020.

A gradual economic recovery ahead

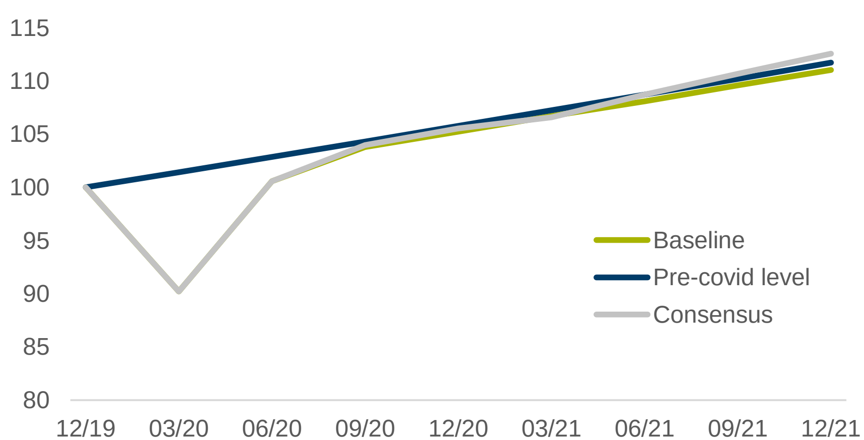
US (GDP level)



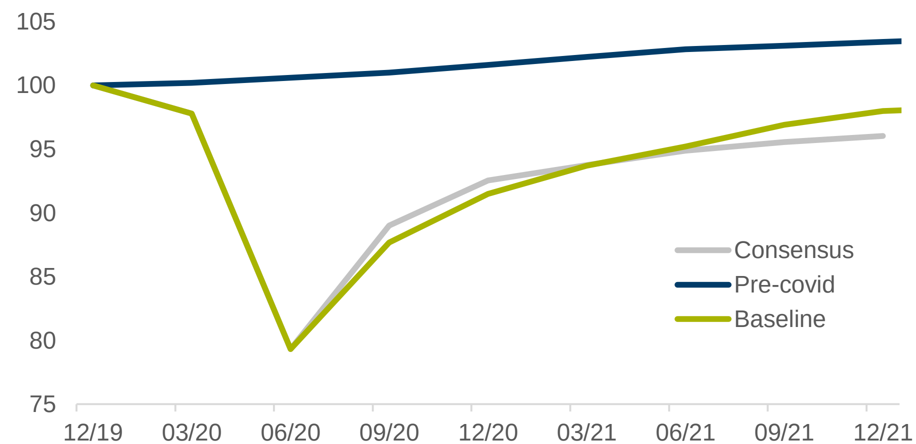
Euro area (GDP level)



China (GDP level)

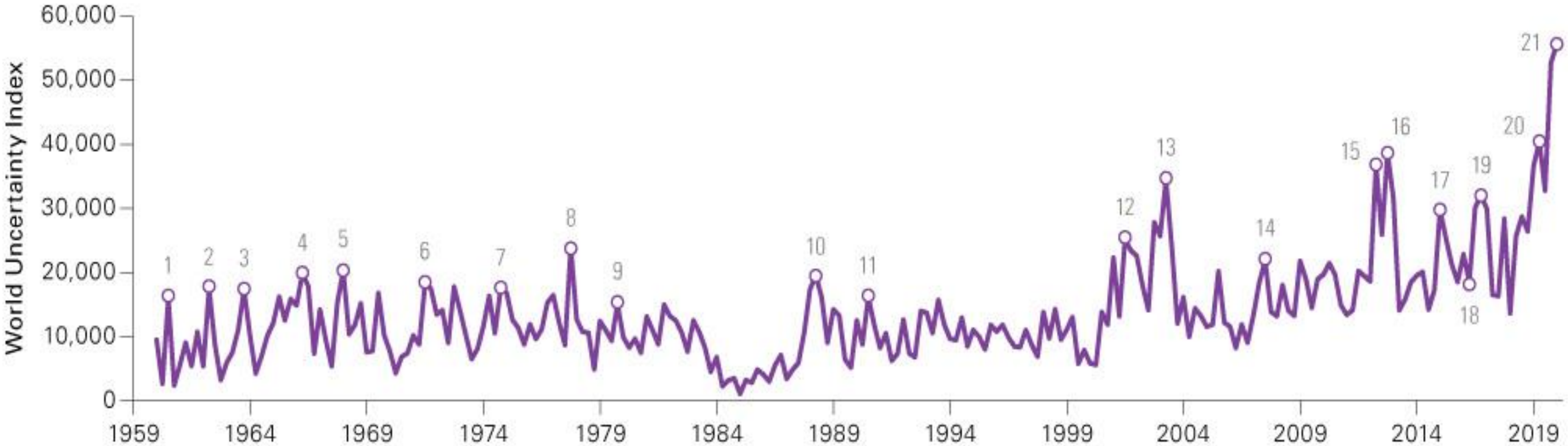


UK (GDP level)



Source: Vanguard ISG. As at 8th September 2020.

Index of general uncertainty



1 U.S. recession and upcoming U.S. election
2 Uncertainty related to the U.S. economy and the U.K. joining the EEC
3 Assassination of President John F. Kennedy
4 Vietnam War
5 Gold crisis
6 International monetary crisis
7 OPEC I
8 Weak prospects for the global economy and exports
9 OPEC II
10 Black Monday
11 Gulf War I
12 U.S. recession and 9/11
13 Iraq war and outbreak of SARS
14 Financial credit crunch
15 Sovereign debt crisis in Europe
16 U.S. fiscal cliff and sovereign debt crisis in Europe
17 U.S. Federal Reserve tightening and political risk in Greece and Ukraine
18 Brexit
19 U.S. presidential elections
20 U.S.-China trade tensions and Brexit
21 Coronavirus

Notes: The World Uncertainty Index tracks uncertainty across the globe by text mining the country reports of the Economist Intelligence Unit.
Source: World Uncertainty Index, available at https://worlduncertaintyindex.com/.

Global Macroeconomic Outlook
(Baseline Views: 1-year ahead)

Business cycle outlook

- The global economy experienced its sharpest contraction in output since the Great Depression. Both supply and demand have shrunk in H1, with annual GDP growth of -2.0% in 2020.
- In H2, we expect a moderate recovery as supply gradually comes back on line. Although some activities may be unable to return until there is a vaccine or the virus is well under control.
- There will be large sector variation, with industries that can operate with social distancing measures in place (e.g. parts of construction, manufacturing) resuming activity earlier than industries that are more reliant on face-to-face interactions and open borders (e.g. restaurants, tourism).
- But even after a large portion of supply has returned, the economy is still is expected to lag its pre-virus trend as a consequence of persistent demand shocks (both income and preferences/fear).

Inflation outlook

- In the near term, consumer price inflation will remain weak given the sharp fall in energy prices.
- Extraordinary and unprecedented monetary and fiscal stimulus, coupled with pent-up demand in some sectors, are valid reasons to expect a surge in inflation in coming months as the economy gradually returns to normalcy.
- However, we caution strongly against this view. Despite the factors above, our best judgement suggests that core inflation will remain very subdued and below target for the foreseeable future. Even after supply comes back in most industries, demand will remain very soft relative to pre-virus levels as incomes are lower and consumer reticence in engaging in key face-to-face activities persist.

Policy outlook

- Given our expectation for a slow recovery in demand, we expect monetary policy to remain loose throughout 2020 and well into 2021, with risks skewed towards further easing.
- We expect forward guidance by central banks to play an increased role during this prolonged recovery phase, and if more stimulus becomes warranted, we anticipate further asset purchases rather than negative interest rates.
- There is a substantive risk that fiscal support programs for firms and workers are extended through the end of the year in some countries, in order to prevent mass layoffs and company defaults. If not, demand may weaken as schemes roll off.

Risks to our view

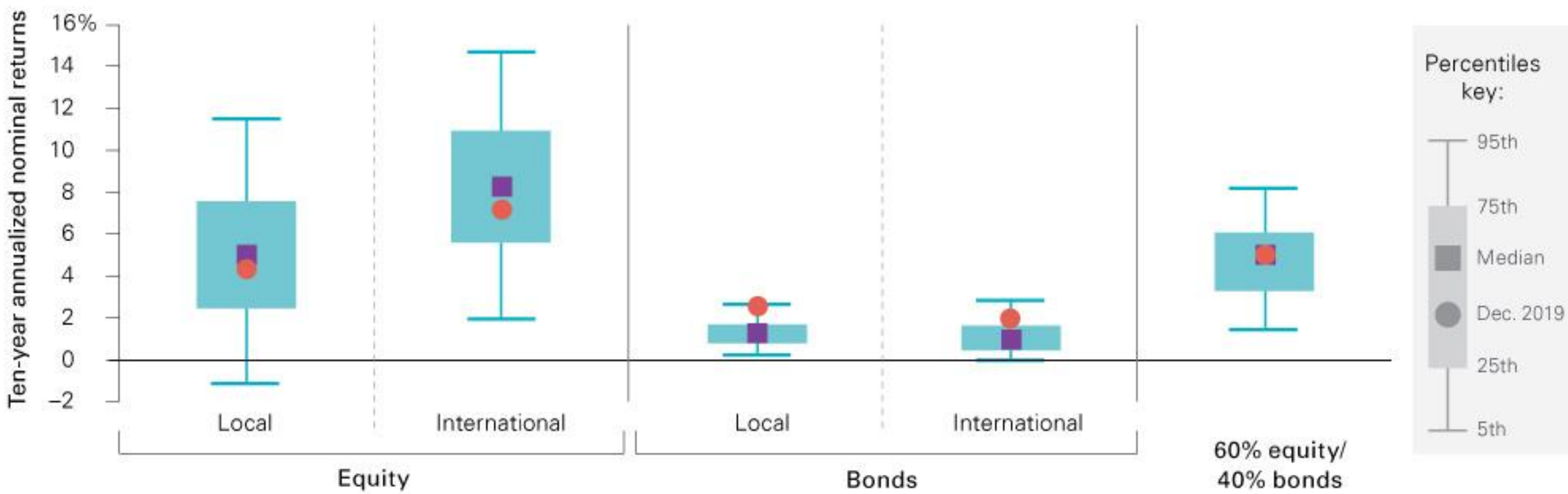
Upside risks:

- The development of therapeutic drugs and/or a vaccine in the next 12 months would imply that many social distancing measures can be eased, and people will feel confident to return to work and normal life. This would boost supply and demand, and mean a faster recovery in GDP.

Downside risks

- Lifting lockdown measures too early risks a second (or third) outbreak of the virus and a potential re-instalment of containment measures.
- Even with an appropriate easing of lockdown, there is a risk the virus returns in mini waves or a very large wave, resulting in more economic destruction and loss of life.

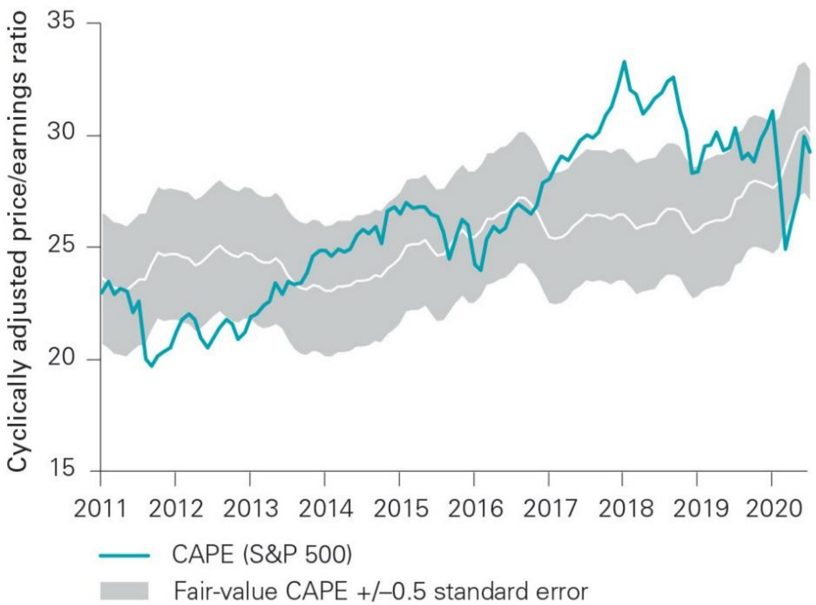
Equity markets’ prospects have improved since the market correction; fixed income expected returns remain subdued



Notes: Forecast corresponds to distribution of 10,000 VCMM simulations for ten-year annualized nominal returns as of June 30, 2020, in USD for asset classes shown. See the Appendix section titled “Index simulations” for further details on asset classes shown here. The 60/40 globally diversified portfolio includes home bias of 50% for the equity portion and 60% for the fixed income portion.
Source: Vanguard.
IMPORTANT: The projections and other information generated by the 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 the VCMM are derived from 10,000 simulations for each modeled asset class. Simulations are as of June 30, 2020. Results from the model may vary with each use and over time. For more information, see the Appendix section “About the Vanguard Capital Markets Model.”

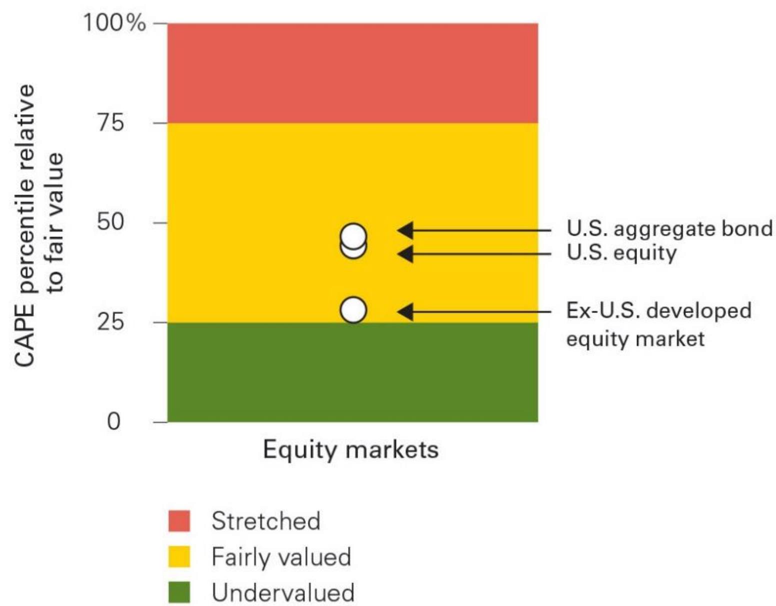
Valuations underpin better outlook for equity returns

a. U.S. equity market seems fairly valued according to our fair-value CAPE model



Notes: Fair-value CAPE is based on a statistical model that corrects cyclically adjusted price/earnings (CAPE) measures for the level of inflation expectations and for lower interest rates. The statistical model specification is a three-variable vector error correction (VEC), including equity-earnings yields, ten-year trailing inflation, and ten-year U.S. Treasury yields estimated over the period January 1940 to June 2020. For more details, see Davis, Aliaga-Díaz, Ahluwalia, and Tolani (2018).
Sources: Vanguard calculations, based on Robert Shiller's website at aida.wss. yale.edu/~shiller/data.htm, the U.S. Bureau of Labor Statistics, and the Federal Reserve Board.

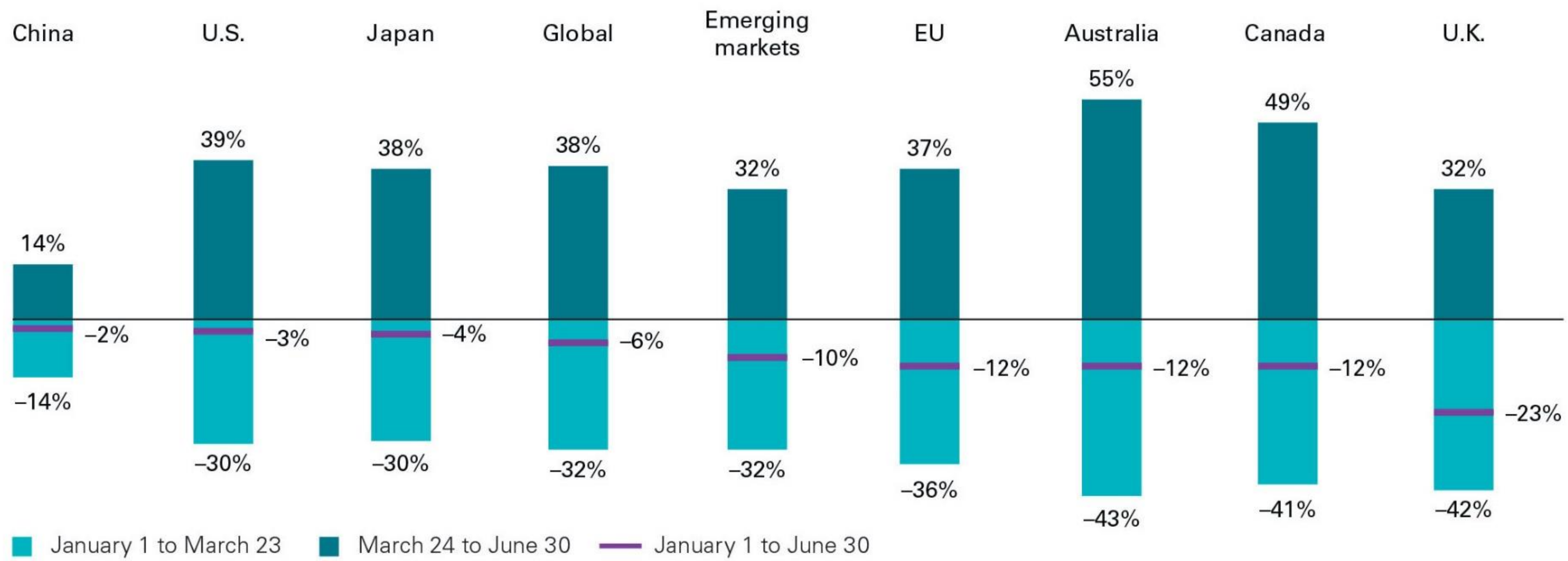
b. Valuations in the international equity market are more attractive than those in the U.S. market



Notes: For equity asset classes, the U.S. valuation measure is the current CAPE percentile relative to fair-value CAPE for the S&P 500 Index from January 1940 to June 2020. The developed markets valuation measure is the weighted average of each region's (Australia, the United Kingdom, the euro area, Japan, and Canada) current CAPE percentile relative to each region's own fair-value CAPE. For fixed income asset classes, valuation percentiles are relative to 30-year VCMM projections. Intermediate credit and U.S. aggregate bond valuations are current credit spreads relative to Year 30.
Sources: Vanguard calculations, based on Robert Shiller's website at aida.wss. yale.edu/~shiller/data.htm, the U.S. Bureau of Labor Statistics, the Federal Reserve Board, and Thomson Reuters Datastream.

The crisis has shown the value of global diversification

Equity performance in 2020



Notes: Country and regional stock performance is measured by the following indexes: Japan: Nikkei 225 Index; U.S.: S&P 500 Index; China: Shanghai Stock Exchange Composite Index; Global: MSCI All Country World Index; emerging markets: MSCI Emerging Markets Index; European Union: MSCI EMU Index; Australia: S&P ASX 200 Index; Canada: S&P/TSX Composite Index; U.K.: MSCI United Kingdom Index; and Global ex U.S.: MSCI World ex USA Index. Total returns are gross of dividends. Data are from January 1, 2020, through June 30, 2020, in USD.

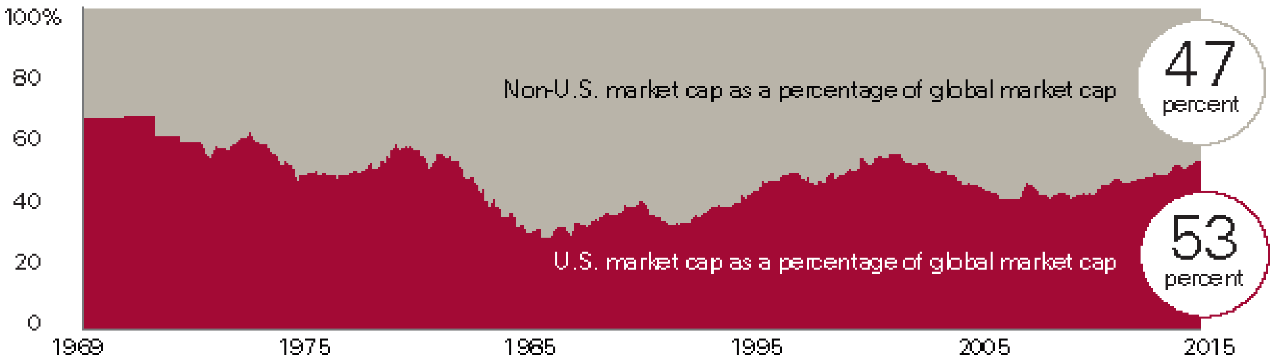
Source: Vanguard.

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.

Investing globally can benefit the long term

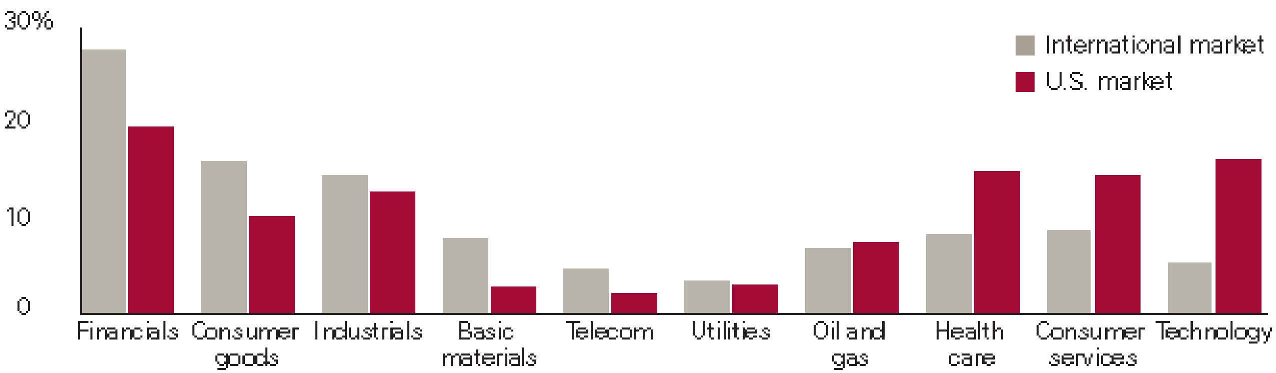
U.S. and international stock markets, globally and by sector mix

U.S. and international market value, as a percentage of global market value



Notes: U.S. market represented by MSCI USA Index; non-U.S. market represented by MSCI World ex USA from 1969 through 1987 and MSCI All Country World Index ex USA thereafter. Data as of December 31, 2015.
Sources: Vanguard, Thomson Reuters, MSCI.

U.S. and international stock markets: Sector mixes vary meaningfully



Notes: U.S. and international stock market sector mixes are represented by the CRSP US Total Market Index and the FTSE Global All Cap ex US index, respectively. Data as of June 30, 2015.

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.

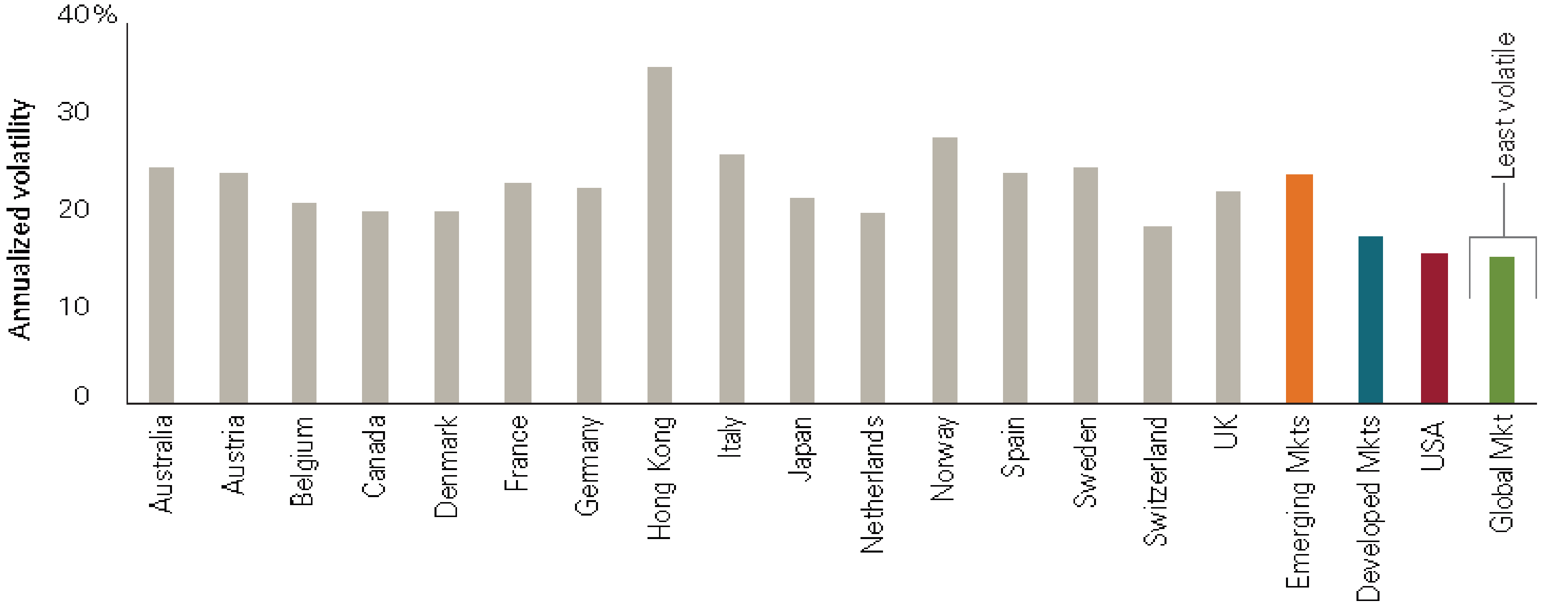
Investments in stocks issued by non-U.S. companies are subject to risks including country/regional risk and currency risk. Stocks of companies based in emerging markets are subject to national and regional political and economic risks and to the risk of currency fluctuations. These risks are especially high in emerging markets.

Currency hedging risk is the chance that currency hedging transactions may not perfectly offset the investment's foreign currency exposures and may eliminate any chance for the investment to benefit from favorable fluctuations in relevant currency exchange rates.

Tune out the headlines and stick with your long-term plan

A global approach to stocks is historically less volatile

Volatility of returns for country and regional indexes, 1970–2015



Notes: A statistical measure such as standard deviation is a common way of describing volatility. Standard deviation captures the dispersion of returns for a given security or market index. Country volatility levels reflect the performance of MSCI country indexes. Developed markets are represented by the MSCI World Index ex USA. The global market is represented by the MSCI World Index until 1987 and the MSCI All County World Index thereafter. Emerging markets data begins in 1988.

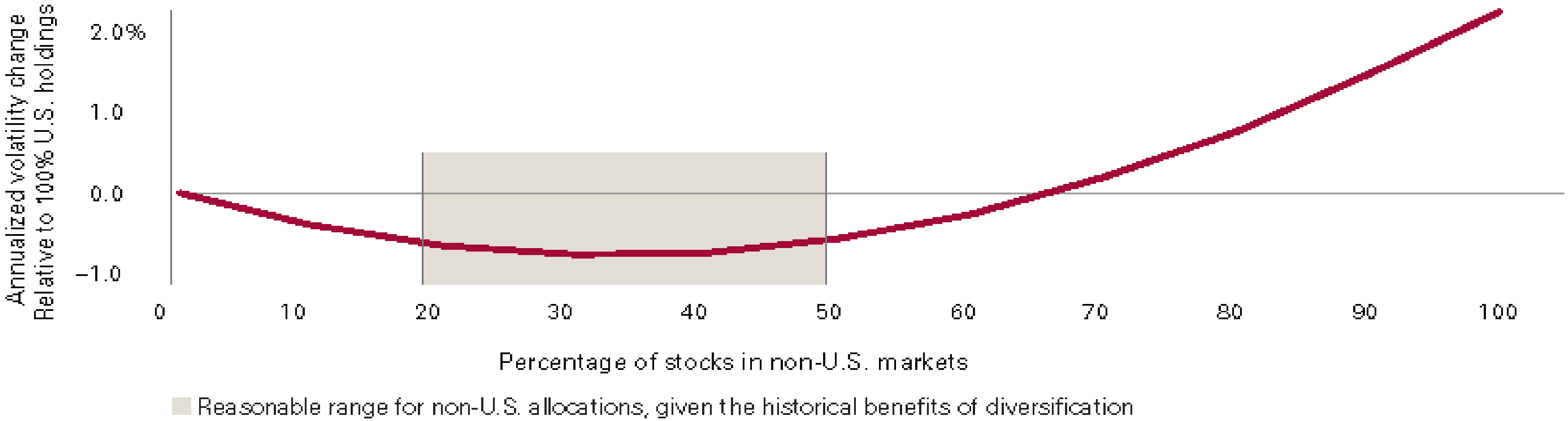
Past performance is no guarantee of future results. The performance of an index is not an exact representation of any particular investment, since you cannot invest directly in an index.

Source: Thomson Reuters Datastream.

Investing globally can help reduce portfolio risk

Investing part of a portfolio in international stocks has reduced volatility relative to a 100% U.S. stock portfolio.

Average annualized change in portfolio volatility when including non-U.S. stocks in a U.S. portfolio, 1970–2015



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. 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. Sources: Derived from data provided by MSCI, Barclays, and Thomson Datastream.

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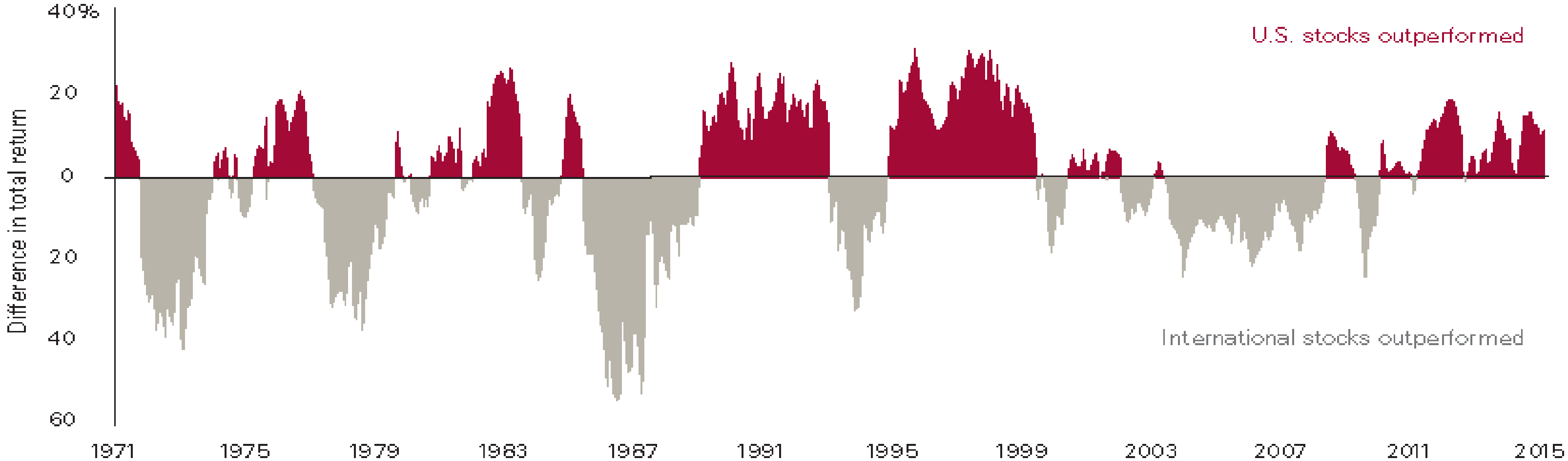
Diversification in action

Investing globally can help reduce portfolio risk

- U.S. and global stocks often swap positions as performance leaders.
- Global diversification gives you a chance to participate in whatever region is outperforming at a given time.

Trailing 12-month return differential, in percentage points



Notes: The chart reflects differences in the 12-month total returns of U.S. and international stocks, observed monthly between January 31, 1971, and June 30, 2015. For example, during the 12 months ended June 30, 2007, international stocks returned 9.5 percentage points more than U.S. stocks. (Their total returns were 30.1% and 20.6%, respectively.) U.S. stocks are represented by the MSCI USA Index. International stocks are represented by the MSCI World Index ex USA until 1987 and the MSCI All Country World Index ex USA thereafter.

All total returns on which the performance differentials are based are in U.S.-dollar terms.

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

Sources: Vanguard calculations, based on data from Thomson Reuters Datastream.

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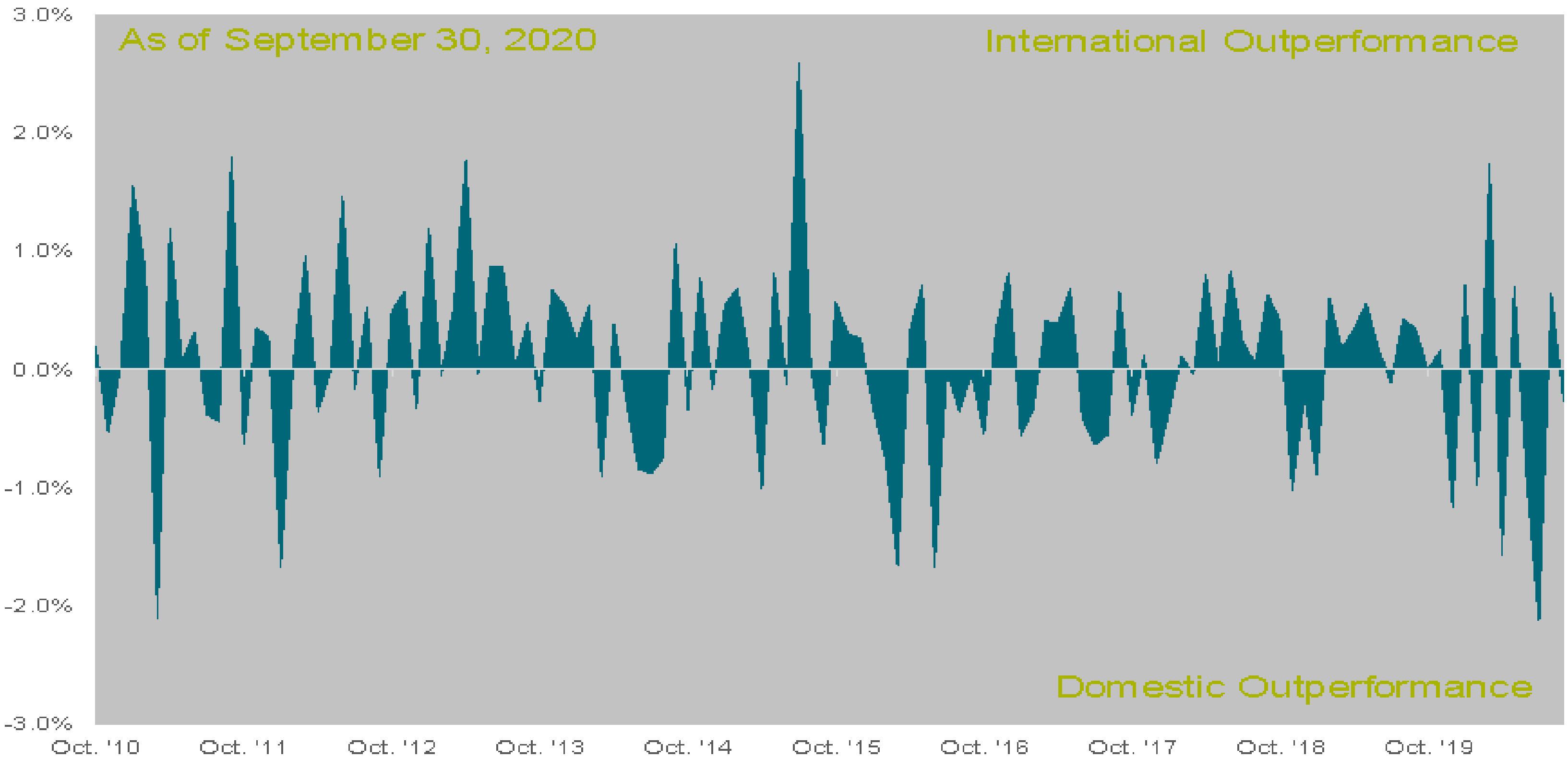
U.S. equity versus international equity performance

Spliced Total Stock Market Index vs. MSCI EAFE Index

Monthly performance differential over the past 10 years



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.
Spliced Total Stock Market Index – Dow Jones Wilshire 5000 Index through April 22, 2005; MSCI US Broad Market Index through June 2, 2013; and CRSP US Total Stock Market thereafter
Data provided by MorningStar

1

Important information

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

IMPORTANT: The projections or other information generated by the 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 VCMM 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 VCMM 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 Life-Cycle 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 sets 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.

Important information

All investing is subject to risk, including the possible loss of the money you invest. Diversification does not ensure a profit or protect against a loss. Investments in stocks or bonds issued by non-U.S. companies are subject to risks including country/regional risk and currency risk. Funds that concentrate on a relatively narrow market sector face the risk of higher share-price volatility. Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks. Investments in bonds are subject to interest rate, credit, and inflation risk. 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. 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. While U.S. Treasury or government agency securities provide substantial protection against credit risk, they do not protect investors against price changes due to changing interest rates. Unlike stocks and bonds, U.S. Treasury bills are guaranteed as to the timely payment of principal and interest.

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Advice services are provided by Vanguard Advisers, Inc., a registered investment advisor, or by Vanguard National Trust Company, a federally chartered, limited-purpose trust company.

Foreign investing involves additional risks including currency fluctuations and political uncertainty. Stocks of companies based in emerging markets are subject to national and regional political and economic risks and to the risk of currency fluctuations. These risks are especially high in emerging markets.

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.

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

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