
FPA of Central Ohio

2022 Recap and Lessons Learned

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January 10, 2023

Stories of 2022

Recession Fears

Value Delivers

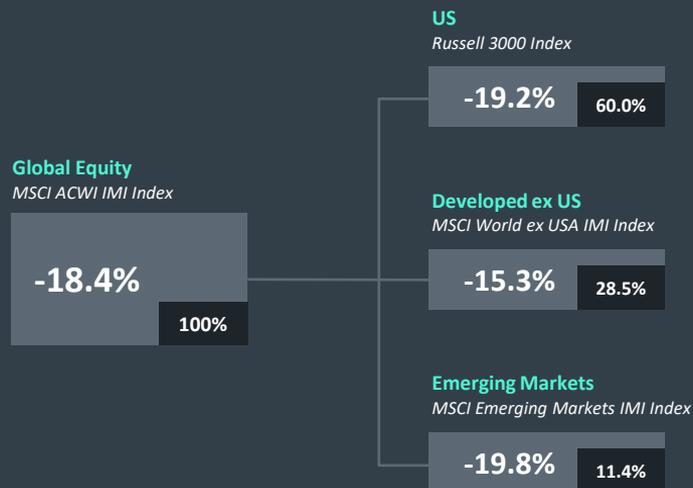
Yields Rise

High Inflation

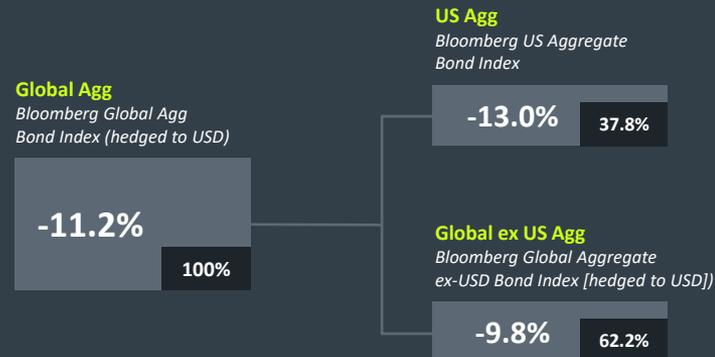
Stocks and Bonds Decline Sharply YTD

Global Markets Returns (USD), Year to Date as of December 31, 2022

Global Equity Markets



Global Fixed Income Markets



Return (%)

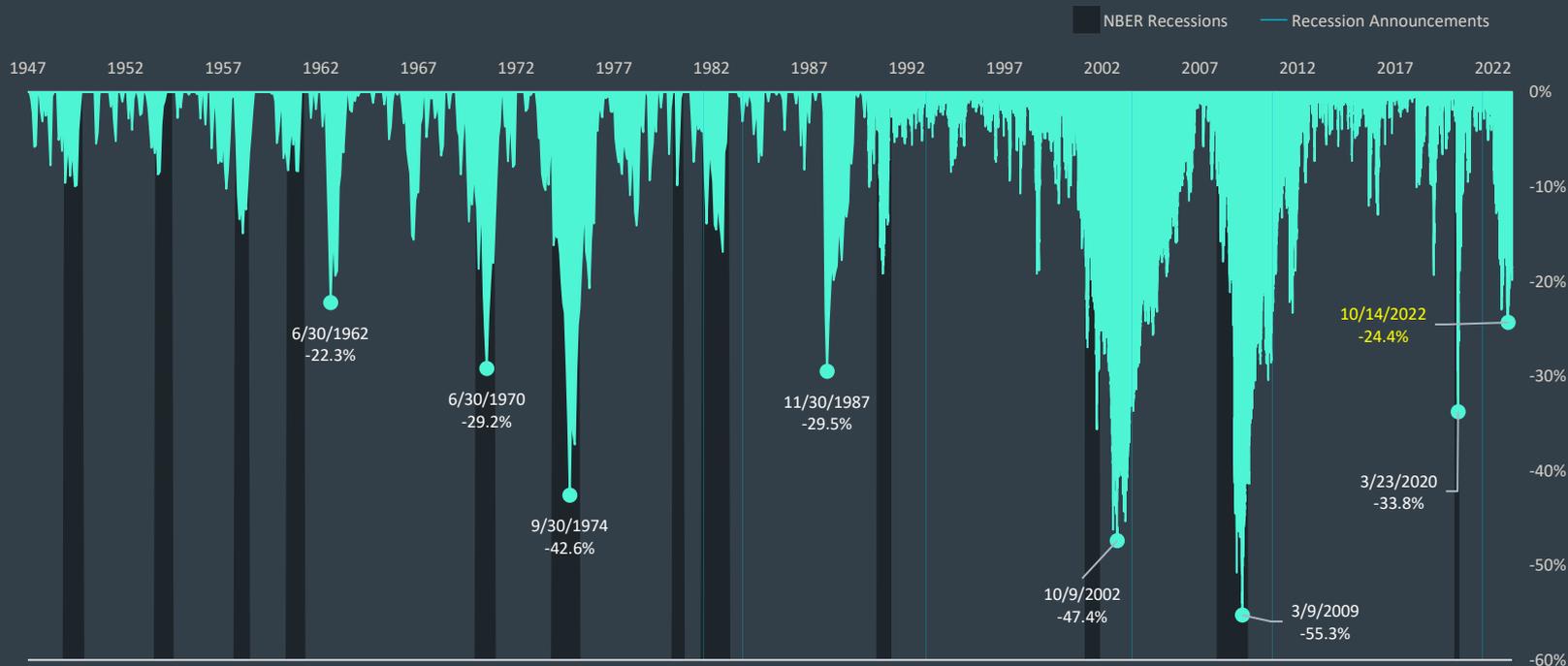
Weight

Past performance is no guarantee of future results.

Market returns are derived from the stated index. Market weights are based on beginning of period weights from the MSCI All Country World IMI Index and Bloomberg Global Aggregate Bond Index (hedged to USD) and Dimensional classification of securities based on region and currency of issuance. Frank Russell Company is the source and owner of the trademarks, service marks, and copyrights related to the Russell Indexes. MSCI data © MSCI 2023, all rights reserved. Bloomberg data provided by Bloomberg. Indices are not available for direct investment. Index performance does not reflect the expenses associated with the management of an actual portfolio.

US Drawdowns, Recessions, and Recoveries

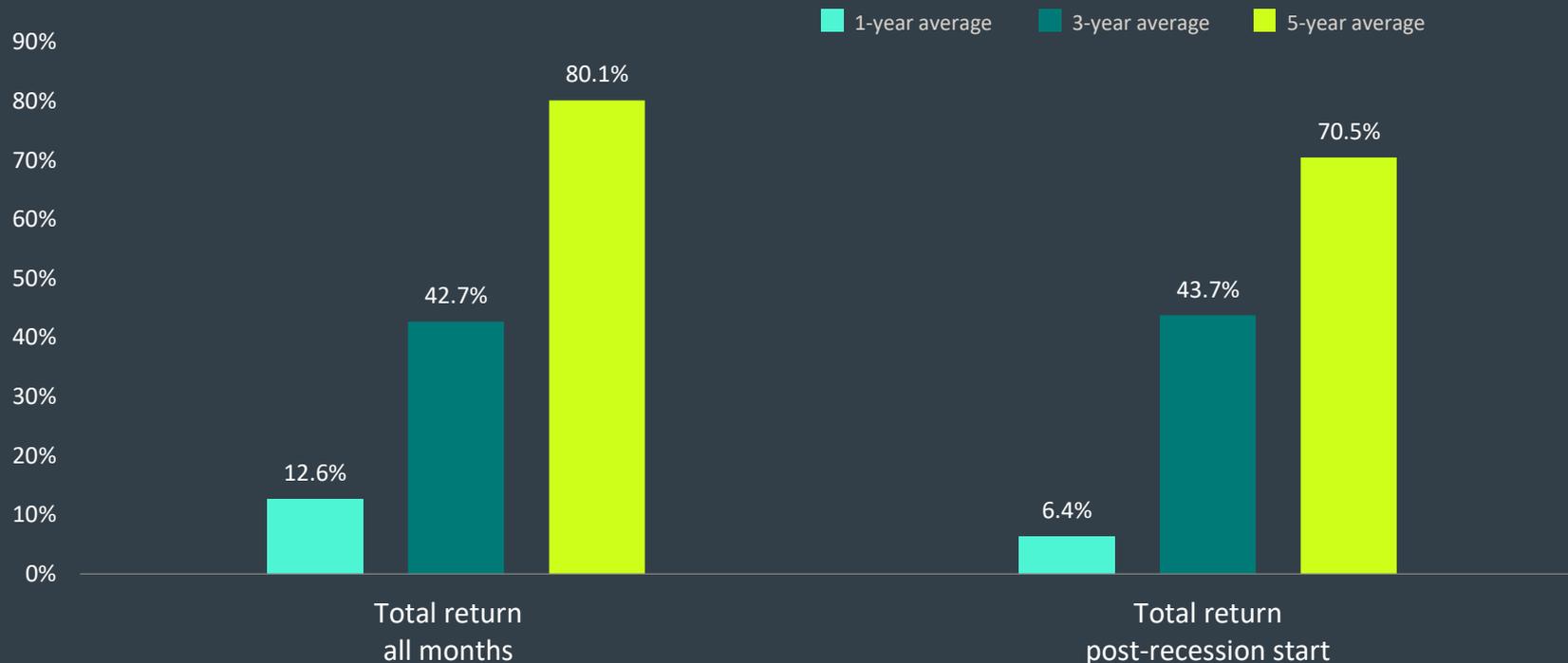
S&P 500 Index total returns in USD, January 1947–December 2022



Past performance is no guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. Chart end date is 12/31/2022, the last peak to trough return of -25% represents the return through October 2022. Due to availability of data, monthly returns are used January 1947 through December 1989; daily returns are used January 1990 through present. Drawdowns shown are the cumulative negative returns from the prior Peak. Peak is defined as the highest index level prior to a given month. The sample start date is based on quarterly US gross domestic product data, a key measure used to identify changes in economic activity across the business cycles, that first becomes available starting in 1947. Business cycle peak, trough, and announcement dates sourced from the National Bureau of Economic Research (NBER). Prior to 1979, the NBER did not formally announce recessions. S&P data © 2023 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved.

Average Returns Post-Recession Start Have Been Positive

S&P 500 Index total returns, January 1947–December 2022



Past performance is no guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. Returns data based on monthly S&P 500 Index returns from January 1947 to December 2022. Returns are calculated for the 1-, 3-, and 5-year look-ahead periods for all months and post-recession start months. The sample start date is based on quarterly US gross domestic product data, a key measure used to identify changes in economic activity across the business cycle, that is first available starting in 1947. Business cycle recession dates sourced from the National Bureau of Economic Research (NBER). S&P data © 2023 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved.

Bears of All Shapes and Sizes



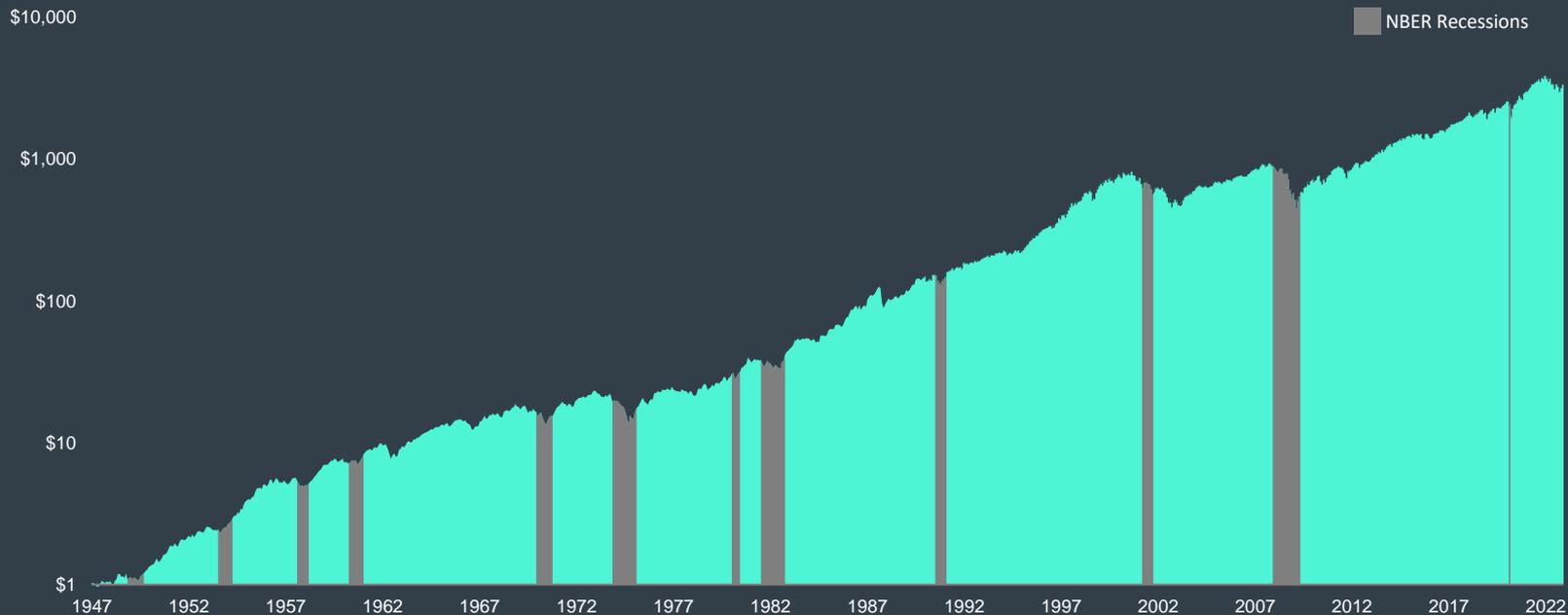
Previous US stock market declines of at least 20%

Start of Decline	Max Decline	Number of Months to Max Decline	Number of Months from -20% to Max Decline	Number of Months from Max Decline to Recovery
January 1962	-22.3%	6	0	10
December 1968	-29.2%	19	2	9
January 1973	-42.6%	21	5	21
September 1987	-29.5%	3	1	18
September 2000	-47.4%	25	19	48
October 2007	-55.3%	17	8	37
February 2020	-33.8%	1	0	5
January 2022	-24.5%	9	4	—

Past performance is no guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. Includes any decline of 20% or more beginning the day after a new all-time high for the market. Recovery is defined as the first day when the cumulative return since the previous market high is no longer negative. US stock market represented by the S&P 500 Index. Due to availability of data, monthly returns are used January 1947 through December 1989; daily returns are used January 1990 through present. The sample start date is based on quarterly US gross domestic product data, a key measure used to identify changes in economic activity across the business cycles, that first becomes available starting in 1947. S&P data © 2023 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved.

Growth of a Dollar

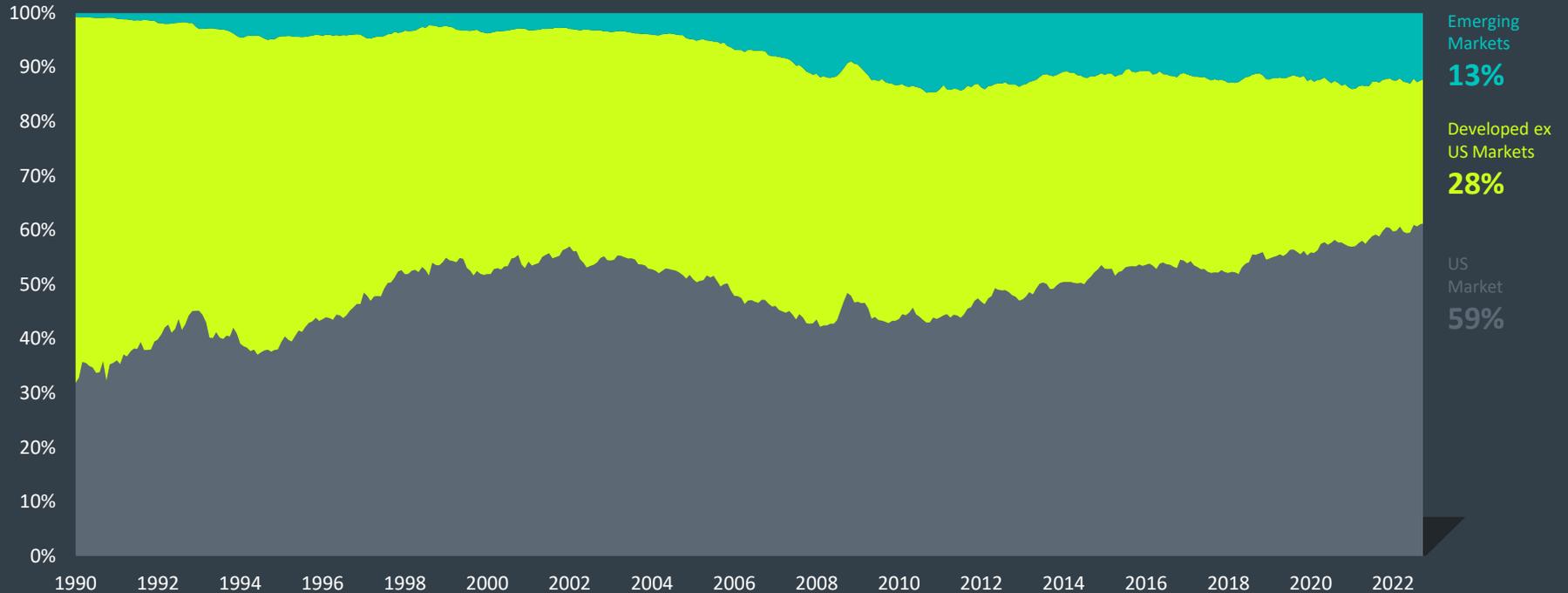
S&P 500 Index, 1947–2022



Past performance is no guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. Chart end date is 12/31/2022. Due to availability of data, monthly returns are used January 1947 through December 1989; daily returns are used January 1990 through present. The sample start date is based on quarterly US gross domestic product data, a key measure used to identify changes in economic activity across the business cycles, that first becomes available starting in 1947. Business cycle peak and trough dates sourced from the National Bureau of Economic Research (NBER). S&P data © 2023 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved.

International Market Significance

January 1990–December 2022

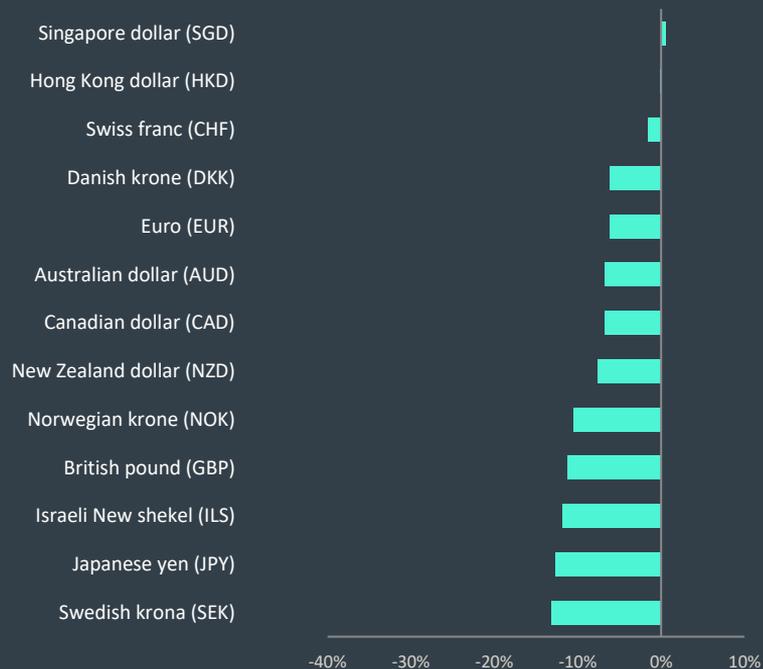


In US dollars.
Market cap data is free-float adjusted and meets minimum liquidity and listing requirements. Data provided by Bloomberg. Numbers may not total 100% due to rounding.

Strong US Dollar Impacted International Performance

Major Currency Returns Relative to US Dollar, 1 Year as December 31, 2022

DEVELOPED MARKETS



EMERGING MARKETS



A Bad Decade Can Happen Anywhere

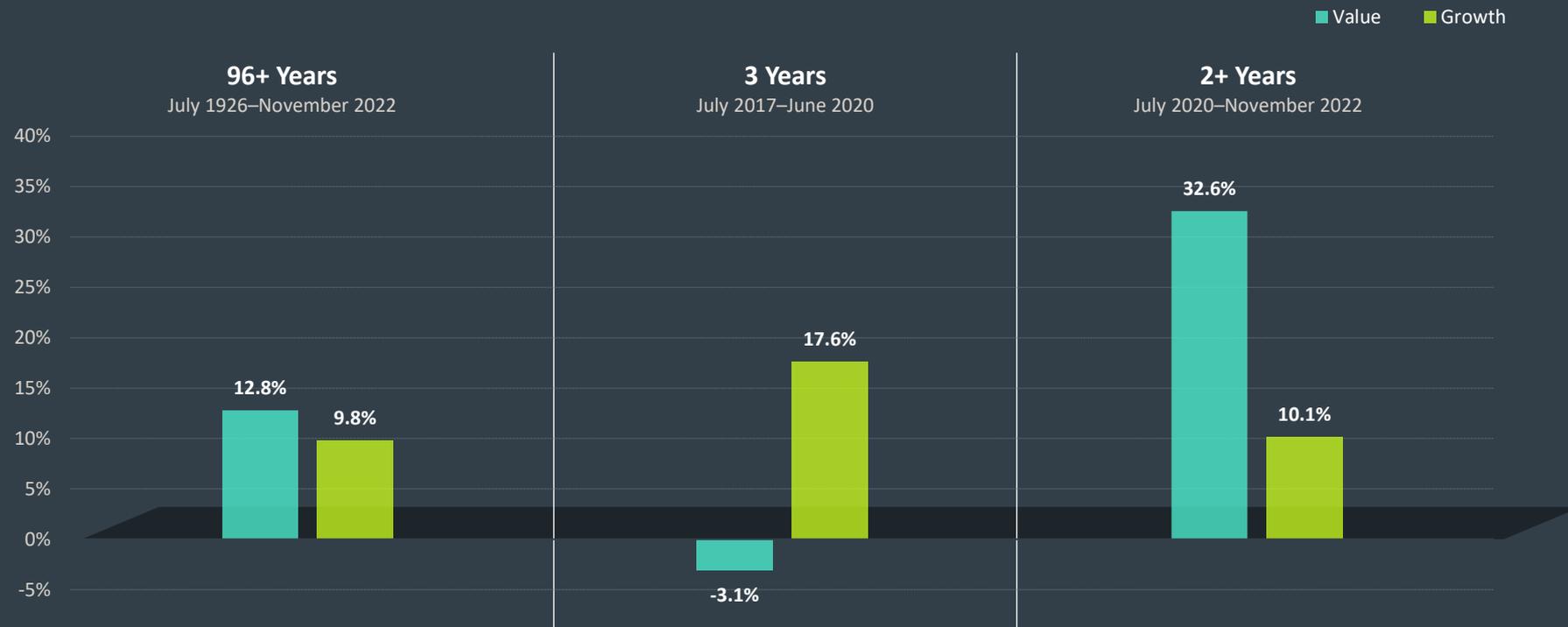
The worst 10-year rolling returns across MSCI Country Indices as of December 31, 2022



Past performance is no guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. In USD. Data provided by MSCI. The worst 10-year performance is defined as the lowest rolling 10-year return based on monthly return data for the respective MSCI Country Index. Developed countries include (from 1979 unless stated differently): Australia, Austria, Belgium, Canada, Denmark, Finland (from 1997), France, Germany, Hong Kong, Ireland (from 1997), Israel (from 2002), Italy, Japan, Netherlands, New Zealand (from 1997), Norway, Portugal (from 1997), Singapore, Spain, Sweden, Switzerland, UK, US. Emerging market countries include (from 2002 unless stated differently): Brazil, Chile, China, Colombia, Czech Republic (from 2004), Egypt (from 2004), Greece (from 1997), Hungary (from 2004), India, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Russia (from 2004), South Africa, South Korea, Taiwan (from 1997), Thailand, Turkey. Developed and emerging market countries MSCI index returns are gross dividend. MSCI data © MSCI 2023, all rights reserved. Countries with less than 10 years of performance are excluded.

Recent Value Performance in Context

July 1926–November 2022



Performance data shown represents past performance and is no guarantee of future results.

Value and growth stocks represented by the Fama/French US Value Research Index and the Fama/French US Growth Research Index, respectively. Returns provided by Ken French, available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to Dimensional Fund Advisors LP.

Historical Valuations: US Market

Price-to-book ratio, June 1989–September 2022



In USD. Past performance is no guarantee of future results. Actual returns may be lower. The Fama/French Indices represent academic concepts that may be used in portfolio construction and are not available for direct investment or for use as a benchmark. Index returns are not representative of actual portfolios and do not reflect costs and fees associated with an actual investment. Source: CRSP and Compustat data calculated by Dimensional. Fama/French data provided by Fama/French. Value stocks represented by the Fama/French US Value Research Index. Growth stocks represented by the Fama/French US Growth Research Index. Monthly aggregate price-to-book ratios are computed as the inverse of the weighted average book-to-market value as of month-end, where book equity used from July of year t through June of year $t+1$ is the book equity for the last fiscal year end in $t-1$, and market equity is as of month-end for each month. Firms with negative book value are excluded. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to, Dimensional Fund Advisors LP. See "Index Descriptions" in the appendix for descriptions of Fama/French index data.

Interest Rates Over Time

January 2000–June 2022



Past performance is no guarantee of future results.

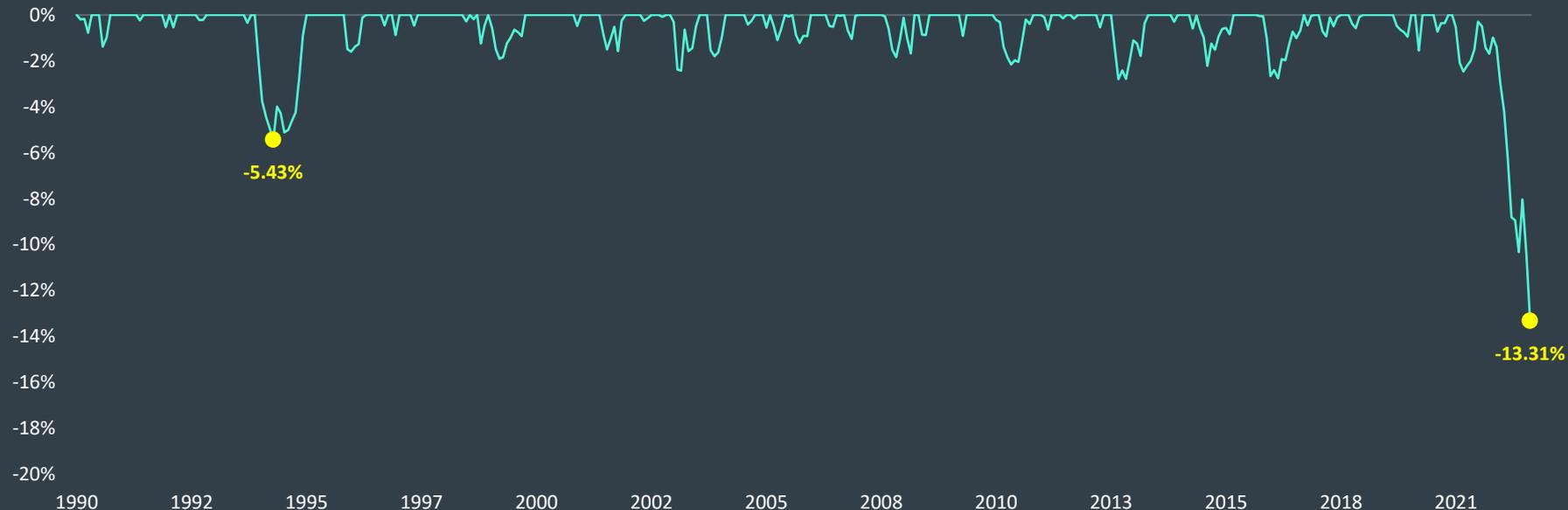
Bloomberg Global Aggregate Bond Index data starts in 08/2000. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.

Source: US Treasury data provided by FRED, Federal Reserve Bank of St. Louis. Bloomberg Data provided by Bloomberg. All rights reserved.

Bloomberg Global Aggregate Bond Index Drawdowns (%)



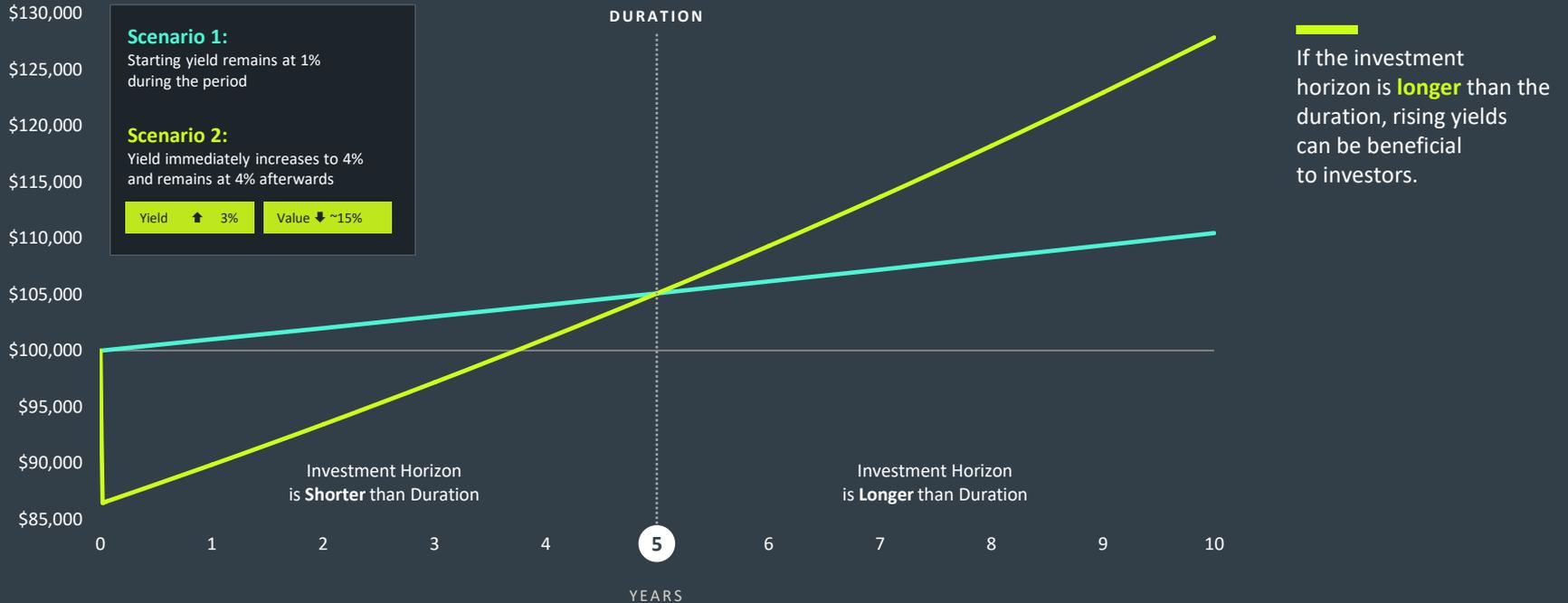
January 1, 1990–September 30, 2022



Past performance is no guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. Bloomberg Global Aggregate Bond Index Drawdowns shown are the cumulative negative returns from the prior Peak from January 1, 1990 to September 30, 2022. Peak is the highest point prior to the drawdown, trough is the lowest point after the peak, and recovery is the date, if any, that the index reached or surpassed the peak. Business cycle peak & trough dates for the recessions sourced from the National Bureau of Economic Research. Bloomberg data provided by Bloomberg. All rights reserved.

Rising Yields: Growth of Wealth

Growth of a \$100,000 fixed income allocation with a five-year duration



If the investment horizon is **longer** than the duration, rising yields can be beneficial to investors.

For illustrative purposes only.

Data presented are based on mathematical principles, are not representative of indices, actual investments or actual strategies managed by Dimensional, and do not reflect costs and fees associated with an actual investment. Growth of wealth assumes a constant duration and flat yield curve for simplicity.

For Scenario 2, the approximate 15% drop in value seen in year 0 is based on a hypothetical yield increase from 1% to 4%, resulting in an immediate decline in value. The drop in value can be approximated by multiplying the assumed five-year duration by the yield increase.

Fixed income securities are subject to increased loss of principal during periods of rising interest rates.

Source: Dimensional.

Disappointing, but Not Unprecedented



Historical 60/40 returns: January 1926–September 2022

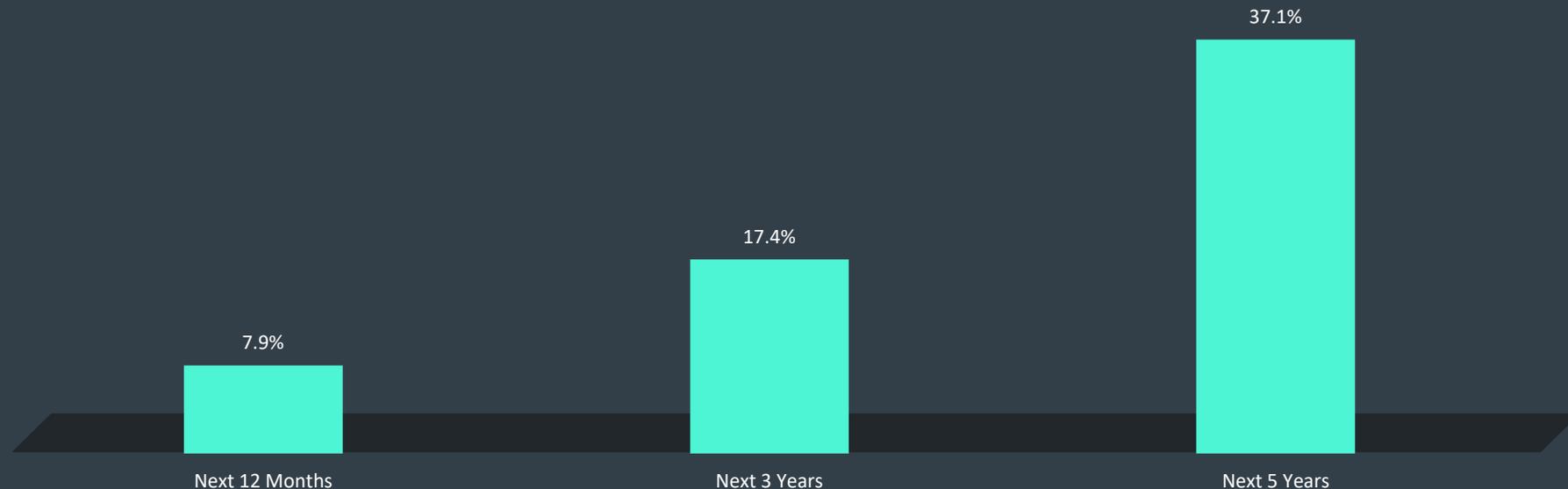
	Sep 1929 – May 1932	Mar 1937 – Mar 1938	Nov 2007 – Feb 2009	Jan 1973 – Sep 1974	Sep 2000 – Sep 2002	Jan 2022 – Sep 2022	Dec 1968 – Jun 1970	Sep 1987 – Nov 1987	Jun 1946 – Nov 1946	Jan 1962 – Jun 1962	Feb 2020 – Mar 2020	
Peak-to-Trough Drawdown	-62.1%	-32.0%	-29.9%	-26.4%	-21.7%	-18.6%	-17.6%	-17.3%	-13.4%	-13.0%	-10.1%	
Recovery Date	Feb 1936	Jan 1943	Dec 2010	Jan 1976	Oct 2004	—	Dec 1970	Jan 1989	Oct 1948	Jan 1963	Jun 2020	Average
Months Until Recovery	46	59	22	16	25	—	6	14	23	7	3	22

Past performance is no guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. The 60/40 Portfolio is comprised of the S&P 500 Index (60%) and Five-Year US Treasury Notes (40%). Rebalanced monthly. The maximum drawdown shows the largest decline in the value of the investment or index since the first full month of the investment or, in the case of an index, since the first full month of the oldest investment in the comparison. Peak is the highest point prior to the drawdown, trough is the lowest point after the peak, and recovery is the date, if any, that the investment or index reached or surpassed the peak. Five-Year US Treasury Notes data provided by Morningstar. S&P data © 2022 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved.

A Case for Optimism



Forward looking returns for the 60/40 portfolio post 10% declines: January 1926–September 2022



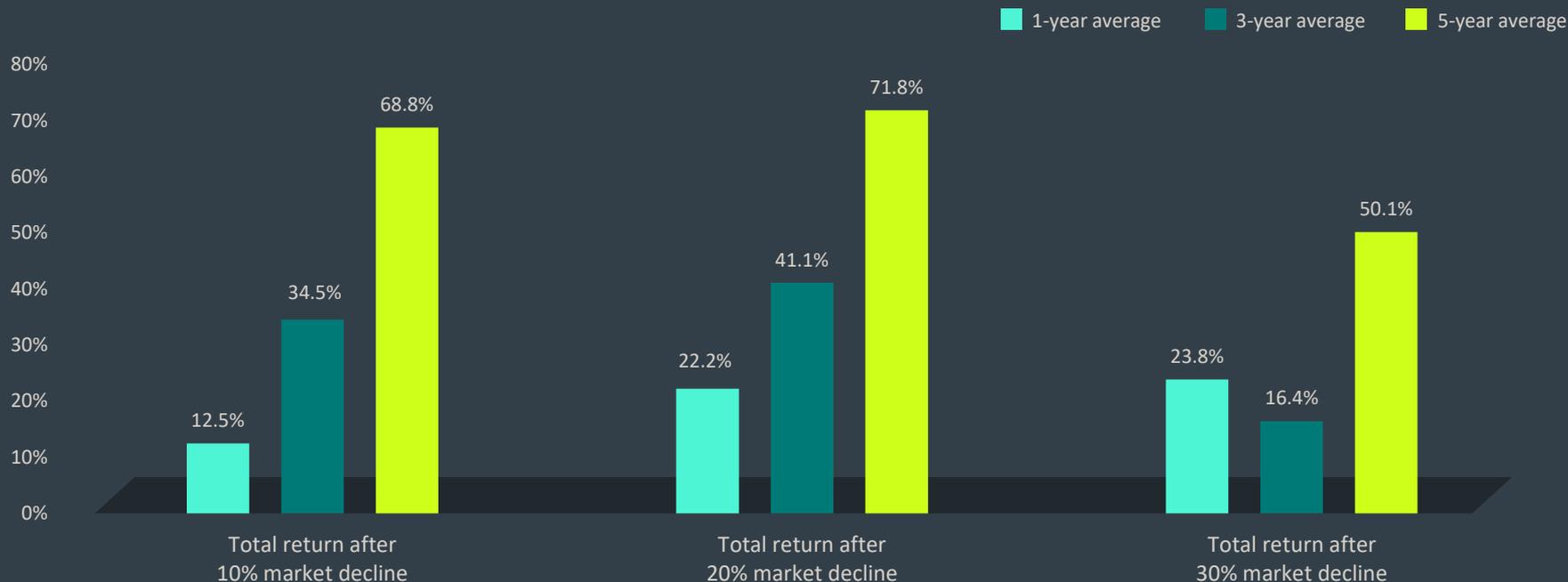
Past performance, including hypothetical performance, is not a guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.

In USD. The 60/40 Portfolio is comprised of the S&P 500 Index (60%) and Five-Year US Treasury Notes (40%). Rebalanced monthly. 60/40 Portfolio declines are defined as periods in which the cumulative return from the prior peak is -10% or lower for the 60/40 Portfolio. Returns are calculated for the 1-, 3-, and 5-year look-ahead periods beginning the month after the respective downturn thresholds are exceeded. The bar chart shows the average cumulative returns for the 1-, 3-, and 5-year periods post decline. There are 10, 9, and 9 observations for the 1-, 3-, and 5-year look-ahead periods, respectively. Five-Year US Treasury Notes data provided by Morningstar. S&P data © 2022 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved.

Q&A

Average Returns After Downturns Have Been Positive

Fama/French Total US Market Research Index returns, July 1, 1926–December 31, 2021



Past performance is no guarantee of future results. Short-term performance results should be considered in connection with longer term performance results. The Fama/French Indices represent academic concepts that may be used in portfolio construction and are not available for direct investment or for use as a benchmark. Their performance does not reflect the expenses associated with the management of an actual portfolio. In USD. Total returns are calculated for the 1-, 3-, and 5-year periods beginning the day after a downturn of 10%, 20%, or 30% from a new all-time high for the market. The bar chart shows the average total returns for the 1-, 3-, and 5-year periods following the 10%, 20% and 30% thresholds. For the 10% threshold, there are 29, 28, and 27 observations for the 1-, 3-, and 5-year periods, respectively. For the 20% threshold, there are 15, 14, and 13 observations for the 1-, 3-, and 5-year periods, respectively. For the 30% threshold, there are 7, 6, and 6 observations for 1-, 3-, and 5-year periods, respectively. Data provided by Fama/French and available at mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to, Dimensional Fund Advisors LP. See "Index Descriptions" in the appendix for descriptions of Dimensional and Fama/French index data.

Fret Lag

Markets may be on the road to recovery when a recession is called

Peak Month	Announcement Month	Market Low Month	Months Between Announcement and Market Low
Jan-80	Jun-80	Mar-80	-3
Jul-81	Jan-82	Jul-82	6
Jul-90	Apr-91	Oct-90	-6
Mar-01	Nov-01	Sep-01	-2
Dec-07	Dec-08	Feb-09	2
Feb-20	Jun-20	Mar-20	-3

Business cycle peak and recession announcement dates sourced from the National Bureau of Economic Research. US market represented by the Fama/French Total US Market Index. The Fama/French Indices represent academic concepts that may be used in portfolio construction and are not available for use as a benchmark. Index returns are not representative of actual portfolios and do not reflect costs and fees associated with an actual investment. Low indicates the minimum cumulative return during the recession.

Performance of Premiums: Average Cumulative Return Differences Following Market Declines

US stocks, July 1963–December 2021

	Small Minus Large			Value Minus Growth			High Profitability Minus Low Profitability		
	1YR	3YR	5YR	1YR	3YR	5YR	1YR	3YR	5YR
10% Decline (N=20)	1.00%	16.55%	31.09%	0.48%	16.48%	39.16%	4.54%	11.31%	24.83%
20% Decline (N=11)	13.47%	21.73%	40.96%	3.71%	15.85%	42.26%	1.41%	18.79%	29.86%
30% Decline (N=6)	18.81%	13.32%	52.19%	4.91%	6.34%	27.91%	-4.58%	12.31%	13.57%

Past performance is no guarantee of future results.

In USD. Returns are calculated for the 1-, 3-, and 5-year periods beginning the day after a downturn of 10%, 20%, and 30%, respectively, from a new all-time high for the market. There are 20, 11, and 6 observations of downturns that compose each average return for the 10%, 20%, and 30% thresholds, respectively. Market represented by the Fama/French Total US Market Research Index. Small cap and large cap stocks represented by the Dimensional US Small Cap Index and Dimensional US Large Cap Index, respectively. Value and growth stocks represented by the Fama/French US Value Research Index and the Fama/French US Growth Research Index, respectively. High profitability and low profitability stocks represented by the Fama/French US High Profitability Index and the Fama/French US Low Profitability Index, respectively. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to, Dimensional Fund Advisors LP. The Dimensional and Fama/French Indices represent academic concepts that may be used in portfolio construction and are not available for direct investment or for use as a benchmark. Their performance does not reflect the expenses associated with the management of an actual portfolio. See "Index Descriptions" in the appendix for descriptions of Dimensional and Fama/French index data.

Premiums Have Been Positive Following Market Declines



US stock market premiums following declines, July 1963–December 2021



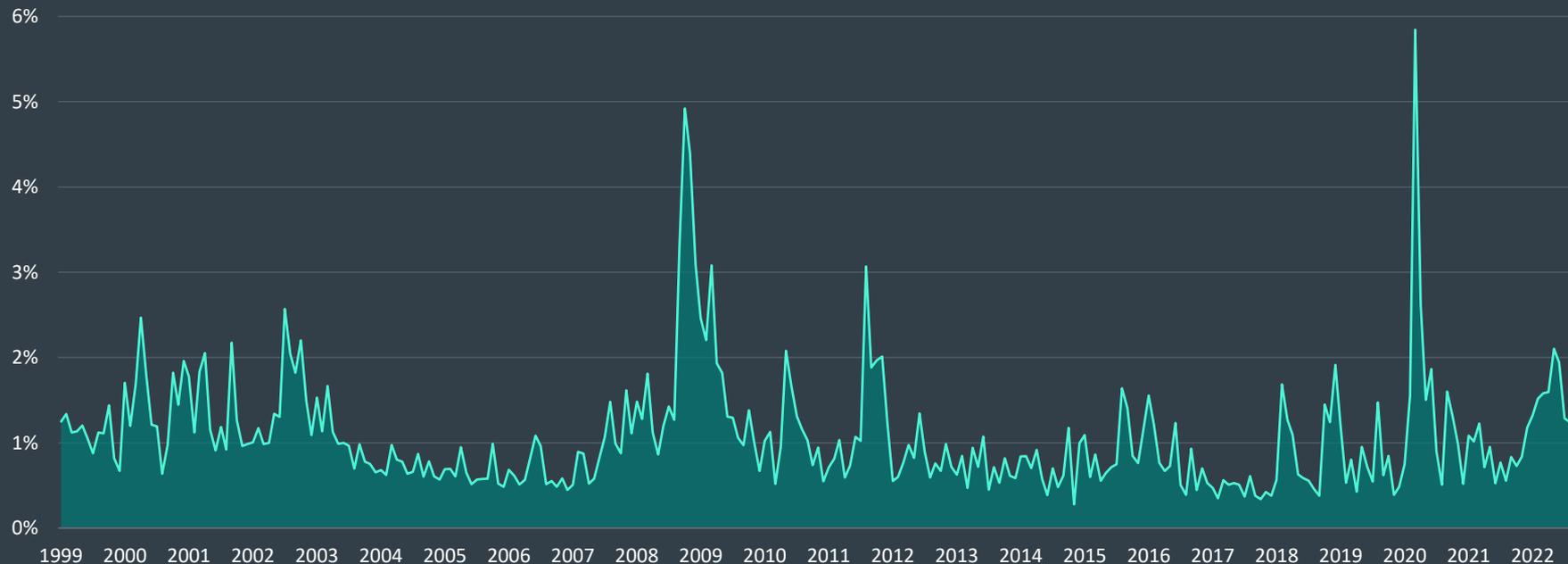
Past performance, including hypothetical performance, is not a guarantee of future results. The Dimensional and Fama/French Indices represent academic concepts that may be used in portfolio construction and are not available for direct investment or for use as a benchmark. In USD. Returns are calculated for the 1-, 3-, and 5-year periods beginning the day after a downturn of 10% and 20% respectively, from a new all-time high for the market. For the 1-year average, there are 20 and 11 observations of downturns that compose each average return for the 10% and 20% thresholds, respectively. For the 3-year average, there are 19 and 10 observations of downturns that compose each average return for the 10% and 20% thresholds, respectively. For the 5-year average, there are 18 and 9 observations of downturns that compose each average return for the 10% and 20% thresholds, respectively. Market represented by the Fama/French Total US Market Research Index. Small cap and large cap stocks represented by the Dimensional US Small Cap Index and Dimensional US Large Cap Index, respectively. Value and growth stocks represented by the Fama/French US Value Research Index and the Fama/French US Growth Research Index, respectively. High profitability and low profitability stocks represented by the Fama/French US High Profitability Index and the Fama/French US Low Profitability Index, respectively. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to, Dimensional Fund Advisors LP. Indices are not available for direct investment. Their performance does not reflect the expenses associated with the management of an actual portfolio. See "Index Descriptions" in the appendix for descriptions of Dimensional and Fama/French index data.

Appendix

Market Volatility



Standard deviation of daily US stock market returns by month, January 1999–September 2022

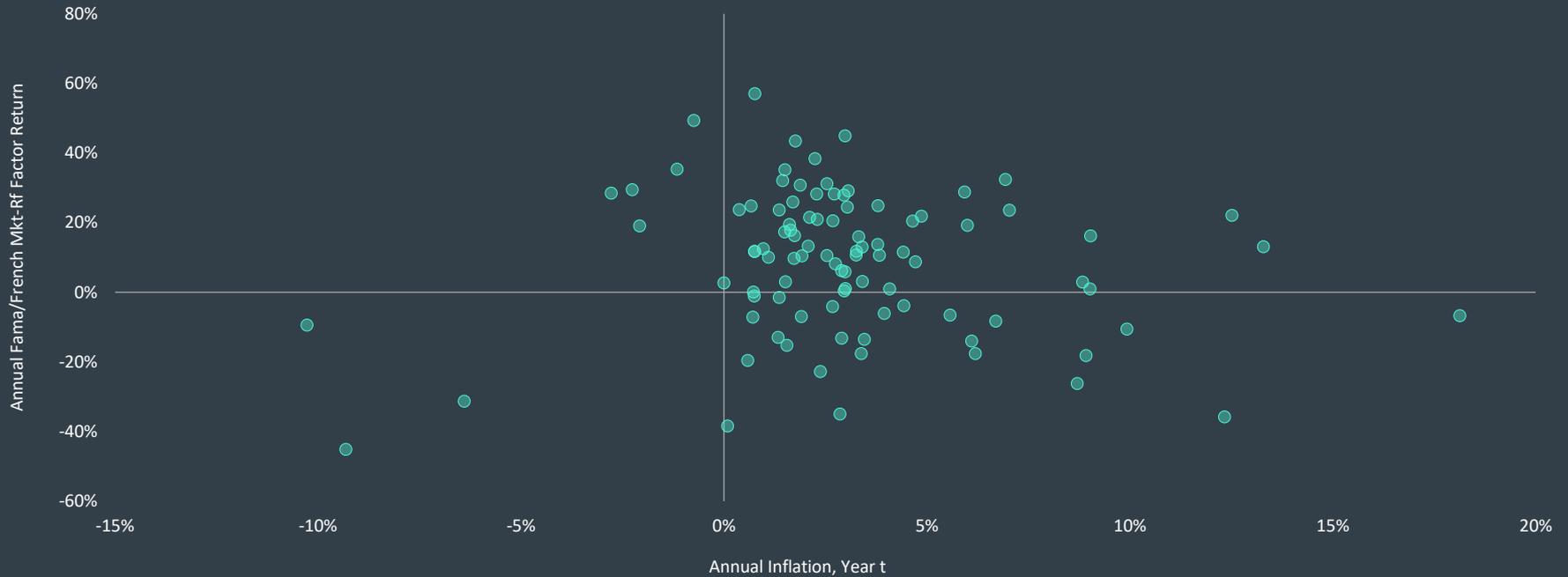


Past performance is not a guarantee of future results.

The Fama/French Indices represent academic concepts that may be used in portfolio construction and are not available for direct investment or for use as a benchmark. Index returns are not representative of actual portfolios and do not reflect costs and fees associated with an actual investment. US stock market represented by the Fama/French Total US Market Research Index, available from the data library of Ken French. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to, Dimensional Fund Advisors LP. See "Index Descriptions" in the appendix for descriptions of Fama/French index data.

Inflation and the Equity Premium

US inflation against contemporaneous Fama/French US Mkt-Rf Factor, 1927–2021



Past performance is not a guarantee of future results.

In USD. Inflation is measured by the annual percentage change in the US Consumer Price Index. Fama/French Factors shown are provided by Ken French. Factors are not available for direct investment; their performance does not reflect the expenses associated with the management of an actual portfolio. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to, Dimensional Fund Advisors LP. See “Data Appendix—Fama/French Factors” for more information regarding the factors shown.

Stock Prices Are Forward Looking

Scatter plots of annual GDP growth against lagged and contemporaneous stock returns, 1930–2020



Past performance is no guarantee of future results.

Indices are not available for direct investment. Their performance does not reflect the expenses associated with the management of an actual portfolio.

In USD. Annual GDP growth rates obtained from the US Bureau of Economic Analysis. GDP growth numbers are adjusted to 2012 USD terms to remove the effects of inflation. The contemporaneous stock returns represented by the Fama/French US Mkt-Rf Factor. Data provided by Fama/French. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to, Dimensional Fund Advisors LP. The Fama/French Indices represent academic concepts that may be used in portfolio construction and are not available for direct investment or for use as a benchmark. Index returns are not representative of actual portfolios and do not reflect costs and fees associated with an actual investment. Please see "Appendix: Index Descriptions" for a description of the Fama/French index data.

Equity Returns and Economic Growth in High and Low Growth Countries



		Developed Markets: 1975–2018		Emerging Markets: 1995–2018	
		Average Annual Return	Annual Standard Deviation	Average Annual Return	Annual Standard Deviation
Prior Year GDP Growth	High GDP Growth Countries	11.39%	18.87%	11.97%	35.70%
	Low GDP Growth Countries	12.63%	20.95%	10.76%	33.95%
	Difference	-1.23%		1.21%	
	t-stat	-0.54		0.42	
Same Year GDP Growth	High GDP Growth Countries	10.46%	18.78%	13.42%	36.49%
	Low GDP Growth Countries	12.21%	21.64%	10.86%	34.38%
	Difference	-1.75%		2.56%	
	t-stat	-0.70		0.89	

Past performance, including hypothetical performance, is no guarantee of future results.

In USD. Each year, countries are classified as either high or low growth depending on whether their GDP growth was above or below that year's median GDP growth, defined separately for developed and emerging markets. The return for each group of countries is the average stock market return of all countries in the group weighted by countries' market capitalization weights, over the subsequent and contemporaneous year, respectively. Annual percentage growth rate of GDP at market prices based on constant local currency. Shorter time periods shown for some countries due to data availability. If a country does not have data extending for the full sample period, we use the longest data series available. Filters were applied to data retroactively and with the benefit of hindsight. Groups of stocks and their returns are hypothetical and are not representative of indices or actual strategies and do not reflect costs and fees associated with an actual investment. Actual returns may be lower. Please see "Data Appendix—Economic Growth and Equity Returns" for more information.

Bears of All Shapes and Sizes



Previous US Stock Market Declines of at least 20%

Start of Decline	Max Decline	# Days to Max Decline	# Days from -20% to Max Decline	# Days from Max Decline to Recovery
September 3, 1929	-83.9%	845	799	3,725
May 29, 1946	-28.2%	273	203	712
July 15, 1957	-20.6%	70	1	191
December 12, 1961	-27.7%	135	20	234
February 9, 1966	-20.6%	167	0	104
November 29, 1968	-36.8%	369	80	233
January 11, 1973	-48.4%	436	216	567
August 11, 1981	-20.1%	254	0	39
August 25, 1987	-33.2%	71	33	364
July 16, 1990	-20.8%	62	0	84
July 17, 1998	-21.9%	58	27	53
March 24, 2000	-49.6%	637	449	1,017
October 9, 2007	-54.7%	355	163	760
September 20, 2018	-20.5%	65	0	81
February 19, 2020	-34.3%	23	7	94

Includes any decline of 20% or more beginning the day after a new all-time high for the market. Recovery is defined as the first day when the cumulative return since the previous market high is no longer negative. US stock market represented by the Fama/French Total US Market Index. The Fama/French Indices represent academic concepts that may be used in portfolio construction and are not available for direct investment or for use as a benchmark. Index returns are not representative of actual portfolios and do not reflect costs and fees associated with an actual investment. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to, Dimensional Fund Advisors LP. See "Index Descriptions" in the appendix for descriptions of Fama/French index data.

Markets Have Often Been Up in Recessions: Appendix



Growth of wealth shows the growth of a hypothetical investment of \$10,000 in the securities in the Fama/French Total US Market Research Index over the 24 months starting the month after the relevant Recession Start Date.

Index data presented in the growth of wealth chart is hypothetical and assumes reinvestment of income and no transaction costs or taxes. Sample includes 16 US recessions as identified by the National Bureau of Economic Research (NBER) from October 1926 to December 2021. NBER defines recessions as starting at the peak of a business cycle. A business cycle is a description of the various stages of economic output.

Fama/French Total US Market Research Index: July 1926–present: Fama/French Total US Market Research Factor + One-Month US Treasury Bills. Source: Ken French Website.

Data Appendix—Economic Growth and Equity Returns



For the Equity Returns and Economic Growth in High and Low Growth Countries slide, developed markets since 1975 (unless stated differently): MSCI Australia Index (net div.), MSCI Austria Index (net div.), MSCI Belgium Index (net div.), MSCI Canada Index (net div.), MSCI Denmark Index (net div.), MSCI Finland Index (net div.) (1988), MSCI France Index (net div.), MSCI Germany Index (net div.), MSCI Hong Kong Index (net div.), MSCI Ireland Index (net div.) (1988), MSCI Israel Index (net div.) (1999), MSCI Italy Index (net div.), MSCI Japan Index (net div.), MSCI Netherlands Index (net div.), MSCI New Zealand (net div.) (1988), MSCI Norway Index (net div.), MSCI Portugal Index (net div.) (1988), MSCI Singapore Index (net div.), MSCI Spain Index (net div.), MSCI Sweden Index (net div.), MSCI Switzerland Index (net div.), MSCI United Kingdom Index (net div.), and the MSCI USA Index (net div.).

For the Equity Returns and Economic Growth in High and Low Growth Countries slide, emerging markets since 1995 (unless stated differently): MSCI Brazil Index (gross div.), MSCI Chile Index (gross div.), MSCI China Index (gross div.), MSCI Colombia Index (gross div.), MSCI Egypt Index (gross div.), MSCI Greece Index (gross div.), MSCI Hungary Index (gross div.), MSCI India Index (gross div.), MSCI Indonesia Index (gross div.), MSCI Korea Index (gross div.), MSCI Malaysia Index (gross div.), MSCI Peru Index (gross div.), MSCI Philippines Index (gross div.), MSCI Poland Index (gross div.), MSCI Russia Index (gross div.), MSCI Thailand Index (gross div.), MSCI Turkey Index (gross div.), MSCI Mexico Index (gross div.), MSCI South Africa (gross div.). Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars, as provided by the World Bank.

Data Appendix—Fama/French Factors



Fama/French Mkt-Rf: The excess return on the market, value-weight return of all CRSP firms incorporated in the US and listed on the NYSE, AMEX, or NASDAQ that have a CRSP share code of 10 or 11 at the beginning of month t , good shares and price data at the beginning of t , and good return data for t minus the one-month Treasury bill rate (from Ibbotson Associates).

Fama/French US SMB Research Factor: Constructed from six size/book-to-market research portfolios, six size/profitability research portfolios, and six size/investment research portfolios. SMB (Small minus Big) for July of year t to June $t + 1$ includes all NYSE, AMEX, and NASDAQ stocks for which we have market equity for December $t - 1$ and June of t , (positive) book-to-market equity data for fiscal year ending in $t - 1$, non-missing revenues and at least one of the following: cost of goods sold, selling, general and administrative expenses, or interest expense for $t - 1$, and total assets data for $t - 2$ and $t - 1$. Exclusions: ADRs, investment companies, tracking stocks, non-US incorporated companies, closed end funds, certificates, shares of beneficial interests, and negative book values.

Fama/French US HML Research Factor: Constructed from four size/book-to-market research portfolios. HML for July of year t to June $t + 1$ includes all NYSE, AMEX, and NASDAQ stocks for

which we have market equity for December $t - 1$ and June of t , and (positive) book-to-market equity data for fiscal year ending in $t - 1$. HML (High minus Low) is the average return on two value research portfolios minus the average return on two growth research portfolios: $1/2$ (Small Value + Big Value) – $1/2$ (Small Growth + Big Growth). Exclusions: ADRs, investment companies, tracking stocks, non-US incorporated companies, closed-end funds, certificates, shares of beneficial interests, and negative book values.

Fama/French US RMW Research Factor: Constructed from four size/profitability research portfolios. RMW for July of year t to June $t + 1$ includes all NYSE, AMEX, and NASDAQ stocks for which we have market equity data for June of t , (positive) book equity data for $t - 1$, non-missing revenues data for $t - 1$, and non-missing data for at least one of the following: cost of goods sold, selling, general and administrative expenses, or interest expense for $t - 1$. RMW (Robust minus Weak) is the average return on the two robust operating profitability portfolios minus the average return on the two weak operating profitability portfolios: $1/2$ (Small Robust + Big Robust) – $1/2$ (Small Weak + Big Weak). Exclusions: ADRs, investment companies, tracking stocks, non-US incorporated companies, closed-end funds, certificates, and shares of beneficial interests.

Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to, Dimensional Fund Advisors LP.

Index Descriptions



Fama/French Total US Market Research Index: July 1926–present: Fama/French Total US Market Research Factor + One-Month US Treasury Bills. Source: Ken French Website.

Fama/French US Small Cap Research Index: July 1926–present: Fama/French US Small Cap Research Index. Courtesy of Fama/French from CRSP and Compustat securities data. Includes NYSE securities (plus AMEX equivalents since July 1962 and NASDAQ equivalents since 1973) in the lower 50% market equity range of NYSE firms; rebalanced annually in June.

Fama/French US Large Cap Research Index: July 1926–present: Fama/French US Large Cap Research Index. Courtesy of Fama/French from CRSP and Compustat securities data. Includes NYSE securities (plus AMEX equivalents since July 1962 and NASDAQ equivalents since 1973) in the upper 50% market equity range of NYSE firms; rebalanced annually in June.

Fama/French US Value Research Index: Provided by Fama/French from CRSP securities data. Includes the lower 30% in price-to-book of NYSE securities (plus NYSE Amex equivalents since July 1962 and Nasdaq equivalents since 1973).

Fama/French US Growth Research Index: Provided by Fama/French from CRSP securities data. Includes the higher 30% in price-to-book of NYSE securities (plus NYSE Amex equivalents since July 1962 and Nasdaq equivalents since 1973).

Fama/French US Small Value Research Index: Provided by Fama/French from CRSP securities data. Includes the lower 30% in price-to-book of NYSE securities (plus NYSE Amex equivalents since July 1962 and Nasdaq equivalents since 1973) that have smaller market capitalization than the median NYSE company.

Fama/French US Small Growth Research Index: Provided by Fama/French from CRSP securities data. Includes the higher 30% in price-to-book of NYSE securities (plus NYSE Amex equivalents since July 1962 and Nasdaq equivalents since 1973) that have smaller market capitalization than the median NYSE company.

Fama/French US Large Value Research Index: Provided by Fama/French from CRSP securities data.

Includes the lower 30% in price-to-book of NYSE securities (plus NYSE Amex equivalents since July 1962 and Nasdaq equivalents since 1973) that have larger market capitalization than the median NYSE company.

Fama/French US Large Growth Research Index: Provided by Fama/French from CRSP securities data. Includes the higher 30% in price-to-book of NYSE securities (plus NYSE Amex equivalents since July 1962 and Nasdaq equivalents since 1973) that have larger market capitalization than the median NYSE company.

Fama/French US High Profitability Index: July 1963–present: Fama/French US High Profitability Index. Courtesy of Fama/French from CRSP and Compustat securities data. Includes all stocks in the upper 30% operating profitability range of NYSE eligible firms; rebalanced annually in June. OP for June of year t is annual revenues minus cost of goods sold, interest expense, and selling, general, and administrative expenses divided by book equity for the last fiscal year end in $t-1$. Fama/French and multifactor data provided by Fama/French.

Fama/French US Low Profitability Index: July 1963–present: Fama/French US Low Profitability Index. Courtesy of Fama/French from CRSP and Compustat securities data. Includes all stocks in the lower 30% operating profitability range of NYSE eligible firms; rebalanced annually in June. OP for June of year t is annual revenues minus cost of goods sold, interest expense, and selling, general, and administrative expenses divided by book equity for the last fiscal year end in $t-1$. Fama/French and multifactor data provided by Fama/French.

Results shown during periods prior to each index's index inception date do not represent actual returns of the respective index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Backtested performance results assume the reinvestment of dividends and capital gains. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to, Dimensional Fund Advisors LP.

Index Descriptions



Dimensional US Small Cap Index was created by Dimensional in March 2007 and is compiled by Dimensional. It represents a market-capitalization-weighted index of securities of the smallest US companies whose market capitalization falls in the lowest 8% of the total market capitalization of the eligible market. The eligible market is composed of securities of US companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: non-US companies, REITs, UITs, and investment companies. From January 1975 to the present, the index excludes companies with the lowest profitability and highest relative price within the small cap universe. The index also excludes those companies with the highest asset growth within the small cap universe. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Asset growth is defined as change in total assets from the prior fiscal year to current fiscal year. Source: CRSP and Compustat. The index monthly returns are computed as the simple average of the monthly returns of 12 subindices, each one reconstituted once a year at the end of a different month of the year. The calculation methodology for the Dimensional US Small Cap Index was amended on January 1, 2014, to include profitability as a factor in selecting securities for inclusion in the index.

Dimensional International Small Cap Index was created by Dimensional in April 2008 and is compiled by Dimensional. July 1981–December 1993: It includes non-US developed securities in the bottom 10% of market capitalization in each eligible country. All securities are market capitalization weighted. Each country is capped at 50%. Rebalanced semiannually. January 1994–present: Market-capitalization-weighted index of small company securities in the eligible markets, excluding those with the lowest profitability and highest relative price within their country's small cap universe. The index also excludes those companies with the highest asset growth within their country's small cap universe. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Asset growth is defined as change in total assets from the prior fiscal year to current fiscal year. The index monthly returns are computed as the simple average of the monthly returns of four subindices, each one reconstituted once a year at the end of a different quarter of the year. Prior to July 1981, the index is 50% UK and 50% Japan. The calculation methodology for the Dimensional International Small Cap Index was amended on January 1, 2014, to include profitability as

a factor in selecting securities for inclusion in the index.

Dimensional Emerging Markets Small Index was created by Dimensional in April 2008 and is compiled by Dimensional. January 1989–December 1993: Fama/French Emerging Markets Small Cap Index. January 1994–present: Dimensional Emerging Markets Small Cap Index composition: Market-capitalization-weighted index of small company securities in the eligible markets, excluding those with the lowest profitability and highest relative price within their country's small cap universe. The index also excludes those companies with the highest asset growth within their country's small cap universe. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Asset growth is defined as change in total assets from the prior fiscal year to current fiscal year. The index monthly returns are computed as the simple average of the monthly returns of four subindices, each one reconstituted once a year at the end of a different quarter of the year. Source: Bloomberg. The calculation methodology for the Dimensional Emerging Markets Small Cap Index was amended on January 1, 2014, to include profitability as a factor in selecting securities for inclusion in the index.

Index Descriptions



Fama/French International Market Index: January 1975–present: Fama/French International Market Index. Source: Ken French website. Simulated from MSCI and Bloomberg data.

Fama/French International Value Index: January 1975–present: Fama/French International Value Index. Simulated strategy of international developed countries with securities in the lower 30% price-to-book range. Source: Ken French website. Simulated from MSCI and Bloomberg data.

Fama/French International Growth Index: January 1975–present: Fama/French International Growth Index. Simulated strategy of international developed countries with securities in the higher 30% price-to-book range. Source: Ken French website. Simulated from MSCI and Bloomberg data.

Fama/French International High Profitability Index: July 1990–present: Fama/French International High Profitability Index. Courtesy of Fama/French from Bloomberg securities data. Includes stocks in the upper 30% operating profitability range in each region; companies weighted by float-adjusted market cap; rebalanced annually in June. OP for June of year t is annual revenues minus cost of goods sold, interest expense, and selling, general, and administrative expenses divided by book equity for the last fiscal year end in $t-1$. Fama/French and multifactor data provided by Fama/French.

Fama/French International Low Profitability Index: July 1990–present: Courtesy of Fama/French from Bloomberg securities data. Includes stocks in the lower 30% operating profitability range in each region; companies weighted by float-adjusted market cap; rebalanced annually in June. OP for June of year t is annual revenues minus cost of goods sold, interest expense, and selling, general, and administrative expenses divided by book equity for the last fiscal year end in $t-1$. Fama/French and multifactor data provided by Fama/French.

Fama/French Emerging Markets Index: July 1989–present: Fama/French Emerging Markets Index. Courtesy of Fama/French from Bloomberg and IFC securities data. Companies weighted by float-adjusted market cap; rebalanced annually in June. Fama/French and multifactor data provided by Fama/French.

Fama/French Emerging Markets Value Index: July 1989–present: Fama/French Emerging Markets Value Index. Courtesy of Fama/French from Bloomberg and IFC securities data. Includes stocks in the upper 30% book-to-market range in each country; companies weighted by float-adjusted market cap; rebalanced annually in June. Fama/French and multifactor data provided by Fama/French.

Fama/French Emerging Markets Growth Index: July 1989–present: Fama/French Emerging Markets Growth Index. Courtesy of Fama/French from Bloomberg and IFC securities data. Includes stocks in the bottom 30% book-to-market range in each country; companies weighted by float-adjusted market cap; rebalanced annually in June. Fama/French and multifactor data provided by Fama/French.

Fama/French Emerging Markets High Profitability Index: July 1991–present: Fama/French Emerging Markets High Profitability Index. Courtesy of Fama/French from Bloomberg and IFC securities data. Includes stocks in the upper 30% operating profitability range in each country; companies weighted by float-adjusted market cap; rebalanced annually in June. OP for June of year t is annual revenues minus cost of goods sold, interest expense, and selling, general, and administrative expenses divided by book equity for the last fiscal year end in $t-1$. Fama/French and multifactor data provided by Fama/French.

Fama/French Emerging Markets Low Profitability Index: July 1991–present: Fama/French Emerging Markets Low Profitability Index. Courtesy of Fama/French from Bloomberg and IFC securities data. Includes stocks in the lower 30% operating profitability range in each country; companies weighted by float-adjusted market cap; rebalanced annually in June. OP for June of year t is annual revenues minus cost of goods sold, interest expense, and selling, general, and administrative expenses divided by book equity for the last fiscal year end in $t-1$. Fama/French and multifactor data provided by Fama/French.

Results shown during periods prior to each index's index inception date do not represent actual returns of the respective index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Backtested performance results assume the reinvestment of dividends and capital gains. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Eugene Fama and Ken French are members of the Board of Directors of the general partner of, and provide consulting services to, Dimensional Fund Advisors LP.