



WEALTH  
MANAGEMENT

# Q3

Quarterly Market Review

Third Quarter 2022

## **The Hope of a Fed Pivot?**

The markets seem to be betting on a perfect pivot, and thinks that the Fed has very good timing. Unfortunately, history does not show this to be true. This is where the expression “every recession has the FOMC’s palm prints on its back” comes from.

Many economists have recently voiced their fears that the Federal Reserve’s inflation fight may create an unnecessarily deep downturn. The problem is that the Federal Reserve created the foundations of a crisis by unnecessarily lowering real rates to negative territory and aggressively increasing it’s balance sheet. It is the malinvestment and excessive risk-taking fueled by cheap money that leads to a recession, not rate hikes alone. Normally, to cut inflation the following three steps need to happen, and not only one of them: (1) hike rates, (2) reduce the balance sheet of central banks meaningfully, and (3) stop deficit spending. Given the political environment, this is unlikely to happen.

This was also echoed by Thomas Hoenig, now retired. In 2010, Hoenig was the president of the Federal Reserve regional bank in Kansas City. As part of his job, Hoenig also had a seat on the Fed’s most powerful polity committee, and that’s where he lodged one of the longest-running string of “no” votes in the bank’s history. He strongly felt that the amount of money the Fed was creating/”printing” would not only create inflation, but that the Fed was also taking a risky path that would deepen income inequality, stoke dangerous asset bubbles and enrich the wealthiest and biggest banks over everyone else. He also warned that it would suck the Fed into a money-printing quagmire that the central bank would not be able to escape without destabilizing the entire financial system. Volcker, in his memoir also stated that “the real danger comes from (the Fed) encouraging or inadvertently tolerating rising inflation and its close cousin of extreme speculation and risk taking, in effect standing by while bubbles and excesses threaten financial markets”.

So will the Fed pivot and should they? As Daniel Lacalle (Spanish economist) stated recently, “The Fed pivot isn’t an investment thesis”. He has also pointed out the following:

*“Now many market participants want the Fed to pivot and stop hiking rates. Why? Because many want the easy multiple expansion carry trade back. The fact that investors see a Fed pivot as the main reason to buy tells you what an immensely perverse incentive monetary policy is and how poor the macro and earnings’ outlook are....Few of us seem to realize the Fed pivot is a bad idea, and, in any case, it will not be enough to drive markets to a bull run again because inflationary pressures are stickier than what consensus would want. I find it an exercise in wishful thinking to read so many predictions of a rapid return to 2% inflation, even less, when history shows that once inflation rises about 5% in developed economies, it takes at least a decade to bring it down to 2%, according to Deutsche Bank. Even the OECD expects persistent inflation in 2023 against a backdrop of weakening growth.”*

Ray Dalio may be right in stating that stagflation is where we are headed. That seems to be the risk ahead, and a Fed pivot would do nothing to bring markets higher in that scenario. A Fed pivot is also not likely as they risk **credibility**, and Powell knows that he can’t let the market’s challenge his credibility further. That’s why his Jackson Hole speech seemed to be so clear: the Fed will be as tight as needed until the job is done to bring inflation back at 2%. And this week core inflation was the highest since 1982 and the Fed has never stopped tightening when core inflation was above the Fed rate. Not once.

The issue is, with the Fed continuing to raise rates and also tapering (e.g. QT), is there a risk that it will overshoot and cause global equity and bond market dislocation, resulting in the risk of a long global recession?

At times like these, it’s important to understand our emotions. Anger and fear can be helpful emotions in certain situations. But these emotions can be harmful when it’s exaggerated and because of this abandon our longer term investment objectives. That’s why clients need good financial and other advisors to put emotions in check and help clients to not make bad decisions that will negatively impact their longer term objectives. Let us help you.

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# Quarterly Market Review

Third Quarter 2022

This report features world capital market performance and a timeline of events for the past quarter. It begins with a global overview, then features the returns of stock and bond asset classes in the US and international markets.

The report also illustrates the impact of globally diversified portfolios and features a quarterly topic.

## Overview:

Market Summary

World Stock Market Performance

US Stocks

International Developed Stocks

Emerging Markets Stocks

Country Returns

Real Estate Investment Trusts (REITs)

Commodities

Fixed Income

Global Fixed Income

Impact of Diversification

Quarterly Topic: What Drives Investment Returns? Start with Ingenuity.

Appendix

# Quarterly Market Summary

## Index Returns

|                          | US Stock Market  | International Developed Stocks   | Emerging Markets Stocks  | Global Real Estate  | US Bond Market   | Global Bond Market ex US   |
|--------------------------|--|--|--|---|--|--|
| <b>Q3 2022</b>           | <b>STOCKS</b>  |  |  |   | <b>BONDS</b>   |  |
|                          | <b>-4.46%</b>  | <b>-9.20%</b>  | <b>-11.57%</b>   | <b>-11.12%</b>  | <b>-4.75%</b>  | <b>-2.21%</b>  |
|                          |  |  |  |  |  |  |
| <b>Since Jan. 2001</b>   |  |  |  |   |  |  |
| Average Quarterly Return | 2.1%   | 1.3%   | 2.4%   | 2.2%  | 0.9%   | 0.9%   |
| Best Quarter             | 22.0%<br>2020 Q2   | 25.9%<br>2009 Q2   | 34.7%<br>2009 Q2   | 32.3%<br>2009 Q3  | 4.6%<br>2001 Q3  | 4.6%<br>2008 Q4  |
| Worst Quarter            | -22.8%<br>2008 Q4  | -23.3%<br>2020 Q1  | -27.6%<br>2008 Q4  | -36.1%<br>2008 Q4   | -5.9%<br>2022 Q1   | -4.1%<br>2022 Q1   |

Past performance is not a guarantee of future results. Indices are not available for direct investment. Index performance does not reflect the expenses associated with the management of an actual portfolio. Market segment (index representation) as follows: US Stock Market (Russell 3000 Index), International Developed Stocks (MSCI World ex USA Index [net dividends]), Emerging Markets (MSCI Emerging Markets Index [net dividends]), Global Real Estate (S&P Global REIT Index [net dividends]), US Bond Market (Bloomberg US Aggregate Bond Index), and Global Bond Market ex US (Bloomberg Global Aggregate ex-USD Bond Index [hedged to USD]). S&P data © 2022 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved. Frank Russell Company is the source and owner of the trademarks, service marks, and copyrights related to the Russell Indexes. MSCI data © MSCI 2022, all rights reserved. Bloomberg data provided by Bloomberg.

# Long-Term Market Summary

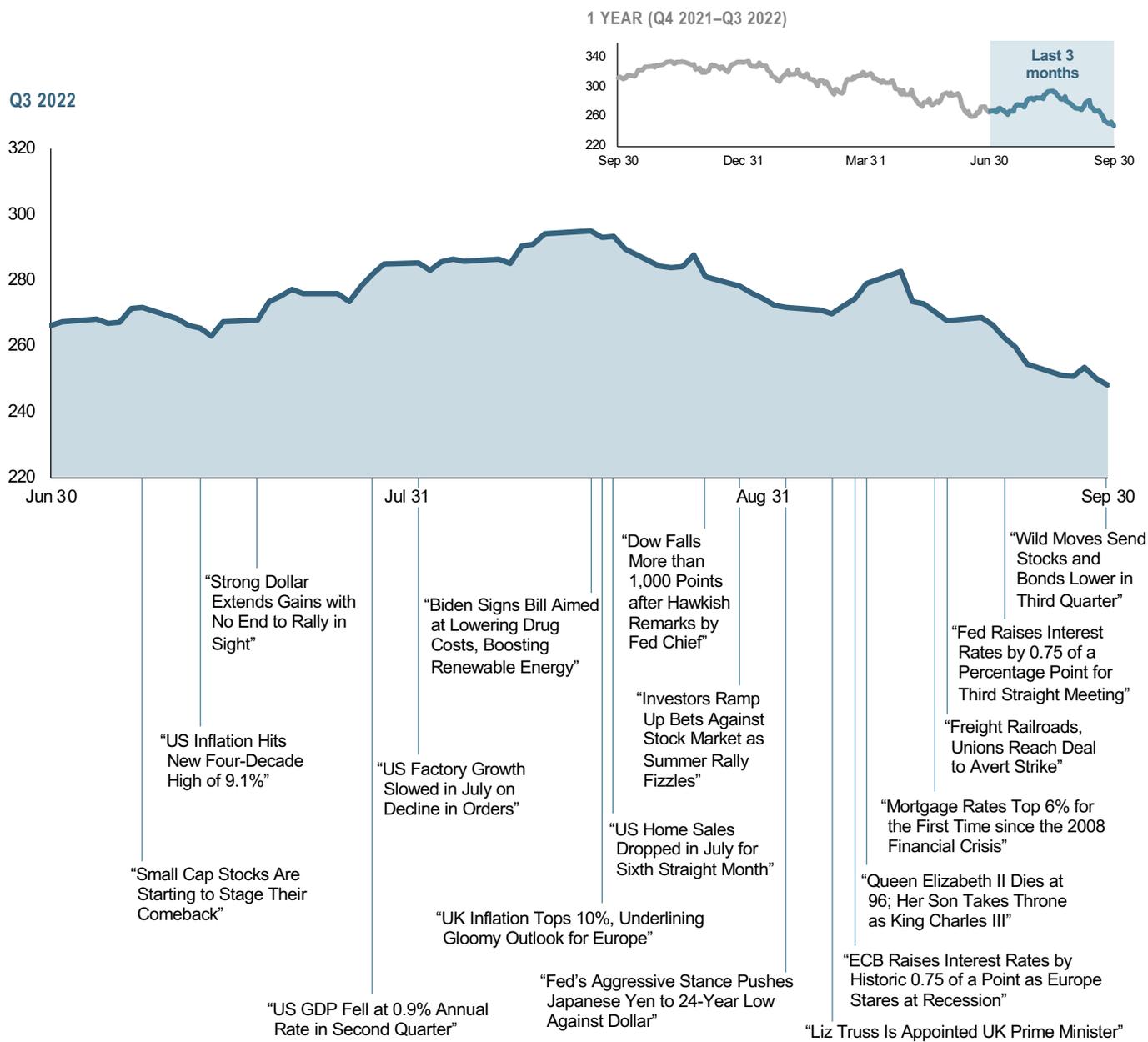
Index Returns as of September 30, 2022

|                 | US Stock Market   | International Developed Stocks  | Emerging Markets Stocks   | Global Real Estate   | US Bond Market  | Global Bond Market ex US  |
|-----------------|---|---|---|--|---|---|
| <b>1 Year</b>   | <b>STOCKS</b>   |   |   |  | <b>BONDS</b>  |   |
|                 | -17.63%   | -23.91%   | -28.11%   | -20.49%  | -14.60%   | -9.86%  |
|                 |    |    |    |    |    |    |
| <b>5 Years</b>  |   |   |   |  |   |   |
|                 | 8.62%   | -0.39%  | -1.81%  | 0.17%  | -0.27%  | 0.71%   |
|                 |  |  |  |  |  |  |
| <b>10 Years</b> |   |   |   |  |   |   |
|                 | 11.39%  | 3.62%   | 1.05%   | 3.58%  | 0.89%   | 2.21%   |
|                 |  |  |  |  |  |  |

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# World Stock Market Performance

MSCI All Country World Index with selected headlines from Q3 2022

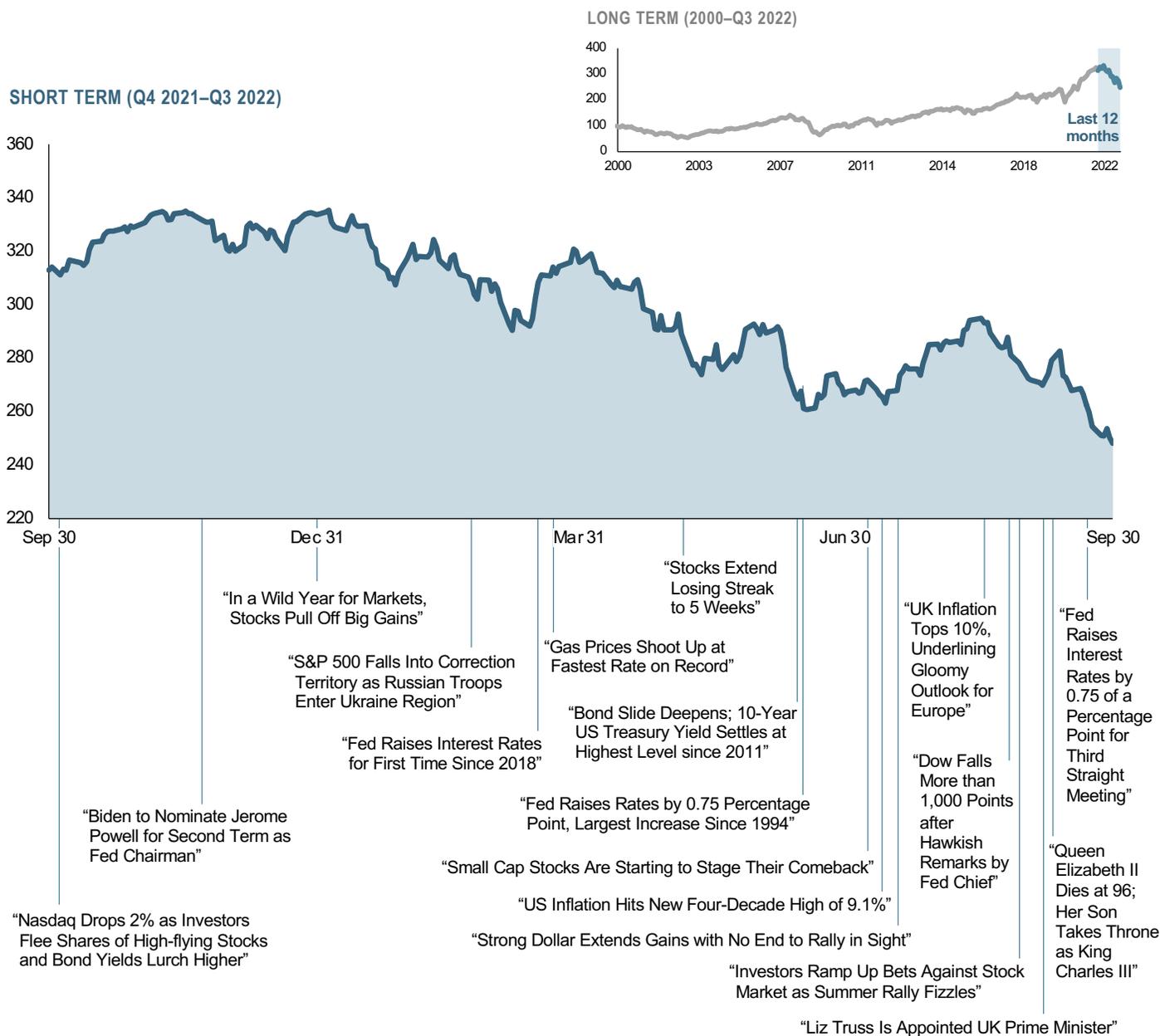


*These headlines are not offered to explain market returns. Instead, they serve as a reminder that investors should view daily events from a long-term perspective and avoid making investment decisions based solely on the news.*

Graph Source: MSCI ACWI Index (net dividends). MSCI data © MSCI 2022, all rights reserved.  
 It is not possible to invest directly in an index. Performance does not reflect the expenses associated with management of an actual portfolio.  
 Past performance is not a guarantee of future results.

# World Stock Market Performance

MSCI All Country World Index with selected headlines from past 12 months



*These headlines are not offered to explain market returns. Instead, they serve as a reminder that investors should view daily events from a long-term perspective and avoid making investment decisions based solely on the news.*

Graph Source: MSCI ACWI Index (net dividends). MSCI data © MSCI 2022, all rights reserved.  
 It is not possible to invest directly in an index. Performance does not reflect the expenses associated with management of an actual portfolio.  
 Past performance is not a guarantee of future results.

# US Stocks

## Third quarter 2022 index returns

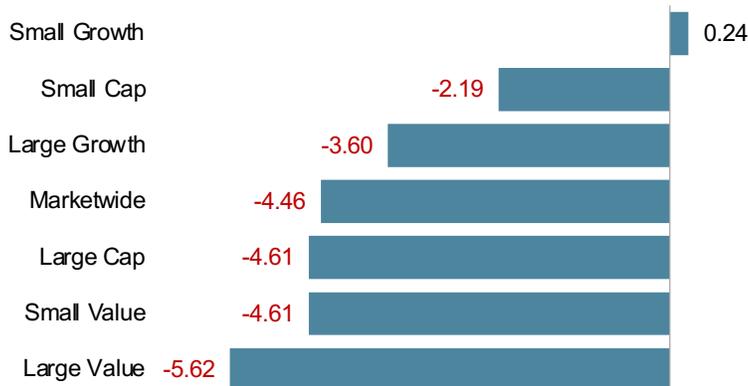
The US equity market posted negative returns for the quarter and outperformed both non-US developed and emerging markets.

Value underperformed growth.

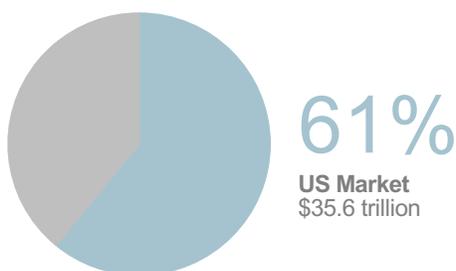
Small caps outperformed large caps.

REIT indices underperformed equity market indices.

### Ranked Returns (%)



### World Market Capitalization—US



### Period Returns (%)

| Asset Class  | * Annualized |        |        |          |          |           |
|--------------|--------------|--------|--------|----------|----------|-----------|
|              | QTR          | YTD    | 1 Year | 3 Years* | 5 Years* | 10 Years* |
| Small Growth | 0.24         | -29.28 | -29.27 | 2.94     | 3.60     | 8.81      |
| Small Cap    | -2.19        | -25.10 | -23.50 | 4.29     | 3.55     | 8.55      |
| Large Growth | -3.60        | -30.66 | -22.59 | 10.67    | 12.17    | 13.70     |
| Marketwide   | -4.46        | -24.62 | -17.63 | 7.70     | 8.62     | 11.39     |
| Large Cap    | -4.61        | -24.59 | -17.22 | 7.95     | 9.00     | 11.60     |
| Small Value  | -4.61        | -21.12 | -17.69 | 4.72     | 2.87     | 7.94      |
| Large Value  | -5.62        | -17.75 | -11.36 | 4.36     | 5.29     | 9.17      |

Past performance is not a guarantee of future results. Indices are not available for direct investment. Index performance does not reflect the expenses associated with the management of an actual portfolio. Market segment (index representation) as follows: Marketwide (Russell 3000 Index), Large Cap (Russell 1000 Index), Large Value (Russell 1000 Value Index), Large Growth (Russell 1000 Growth Index), Small Cap (Russell 2000 Index), Small Value (Russell 2000 Value Index), and Small Growth (Russell 2000 Growth Index). World Market Cap represented by Russell 3000 Index, MSCI World ex USA IMI Index, and MSCI Emerging Markets IMI Index. Russell 3000 Index is used as the proxy for the US market. Dow Jones US Select REIT Index used as proxy for the US REIT market. Frank Russell Company is the source and owner of the trademarks, service marks, and copyrights related to the Russell Indexes. MSCI data © MSCI 2022, all rights reserved.

# International Developed Stocks

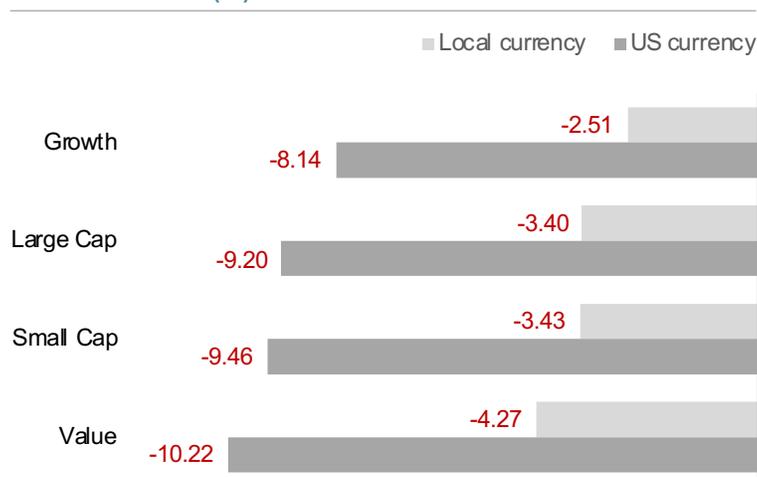
Third quarter 2022 index returns

Developed markets outside of the US posted negative returns for the quarter and underperformed the US market, but outperformed emerging markets.

Value underperformed growth.

Small caps underperformed large caps.

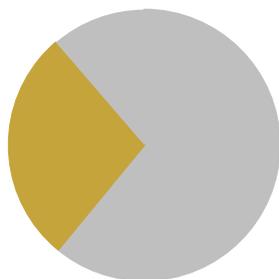
## Ranked Returns (%)



## World Market Capitalization— International Developed

28%

International  
Developed Market  
\$16.2 trillion



## Period Returns (%)

\* Annualized

| Asset Class | QTR    | YTD    | 1 Year | 3 Years* | 5 Years* | 10 Years* |
|-------------|--------|--------|--------|----------|----------|-----------|
| Growth      | -8.14  | -32.33 | -29.44 | -1.14    | 0.85     | 4.46      |
| Large Cap   | -9.20  | -26.23 | -23.91 | -1.21    | -0.39    | 3.62      |
| Small Cap   | -9.46  | -31.07 | -30.80 | -1.27    | -1.24    | 4.78      |
| Value       | -10.22 | -20.10 | -18.58 | -1.97    | -2.08    | 2.53      |

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# Emerging Markets Stocks

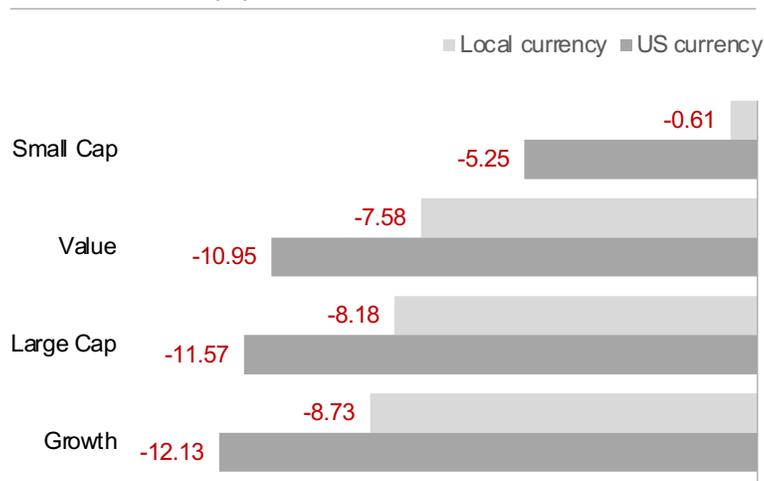
Third quarter 2022 index returns

Emerging markets posted negative returns for the quarter and underperformed both US and non-US developed markets.

Value outperformed growth.

Small caps outperformed large caps.

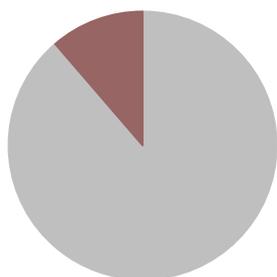
## Ranked Returns (%)



## World Market Capitalization— Emerging Markets

11%

Emerging Markets  
\$6.6 trillion



## Period Returns (%)

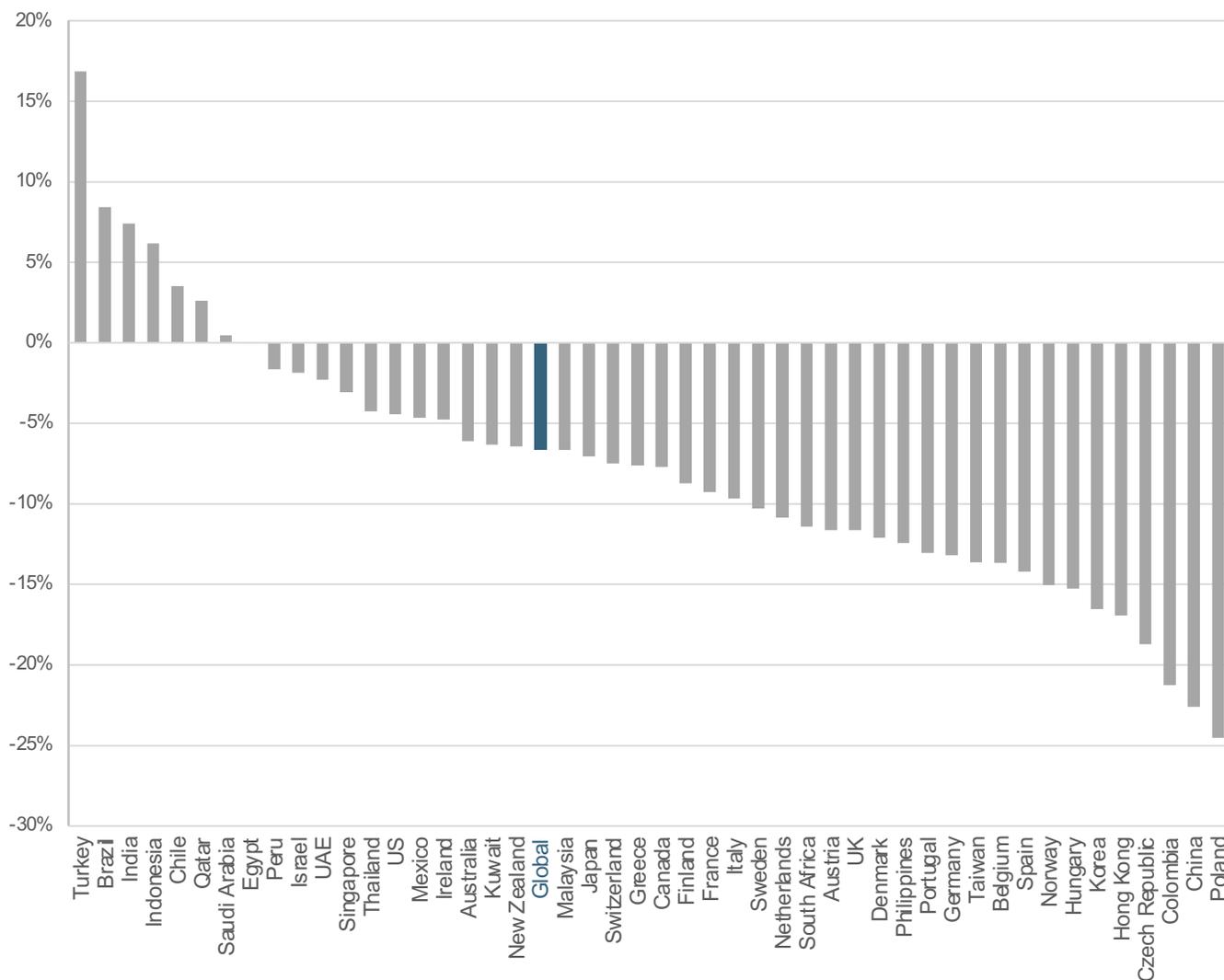
\* Annualized

| Asset Class | QTR    | YTD    | 1 Year | 3 Years* | 5 Years* | 10 Years* |
|-------------|--------|--------|--------|----------|----------|-----------|
| Small Cap   | -5.25  | -24.23 | -23.23 | 5.54     | 1.25     | 2.91      |
| Value       | -10.95 | -23.32 | -23.63 | -2.57    | -2.13    | -0.41     |
| Large Cap   | -11.57 | -27.16 | -28.11 | -2.07    | -1.81    | 1.05      |
| Growth      | -12.13 | -30.65 | -32.09 | -1.75    | -1.64    | 2.38      |

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# Country Returns

Third quarter 2022 index returns



**Past performance is no guarantee of future results.**

Country returns are the country component indices of the MSCI All Country World IMI Index for all countries except the United States, where the Russell 3000 Index is used instead. Global is the return of the MSCI All Country World IMI Index. MSCI index returns are net dividend. Indices are not available for direct investment. Their performance does not reflect the expenses associated with the management of an actual portfolio. Frank Russell Company is the source and owner of the trademarks, service marks and copyrights related to the Russell Indexes. MSCI data © MSCI 2022, all rights reserved.

# Real Estate Investment Trusts (REITs)

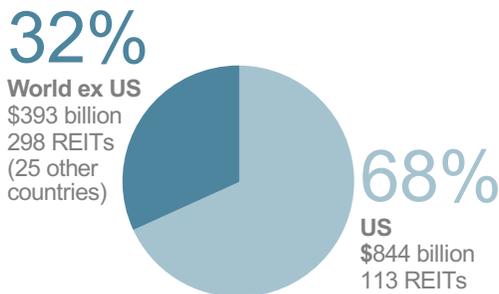
Third quarter 2022 index returns

US real estate investment trusts outperformed non-US REITs during the quarter.

## Ranked Returns (%)



## Total Value of REIT Stocks



## Period Returns (%)

| Asset Class        | * Annualized |        |        |          |          |           |
|--------------------|--------------|--------|--------|----------|----------|-----------|
|                    | QTR          | YTD    | 1 Year | 3 Years* | 5 Years* | 10 Years* |
| US REITS           | -10.37       | -29.32 | -17.15 | -3.29    | 1.95     | 5.49      |
| Global ex US REITS | -13.18       | -30.48 | -27.32 | -9.72    | -3.01    | 1.12      |

Past performance is not a guarantee of future results. Indices are not available for direct investment. Index performance does not reflect the expenses associated with the management of an actual portfolio. Number of REIT stocks and total value based on the two indices. All index returns are net of withholding tax on dividends. Total value of REIT stocks represented by Dow Jones US Select REIT Index and the S&P Global ex US REIT Index. Dow Jones US Select REIT Index used as proxy for the US market, and S&P Global ex US REIT Index used as proxy for the World ex US market. Dow Jones and S&P data © 2022 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved.

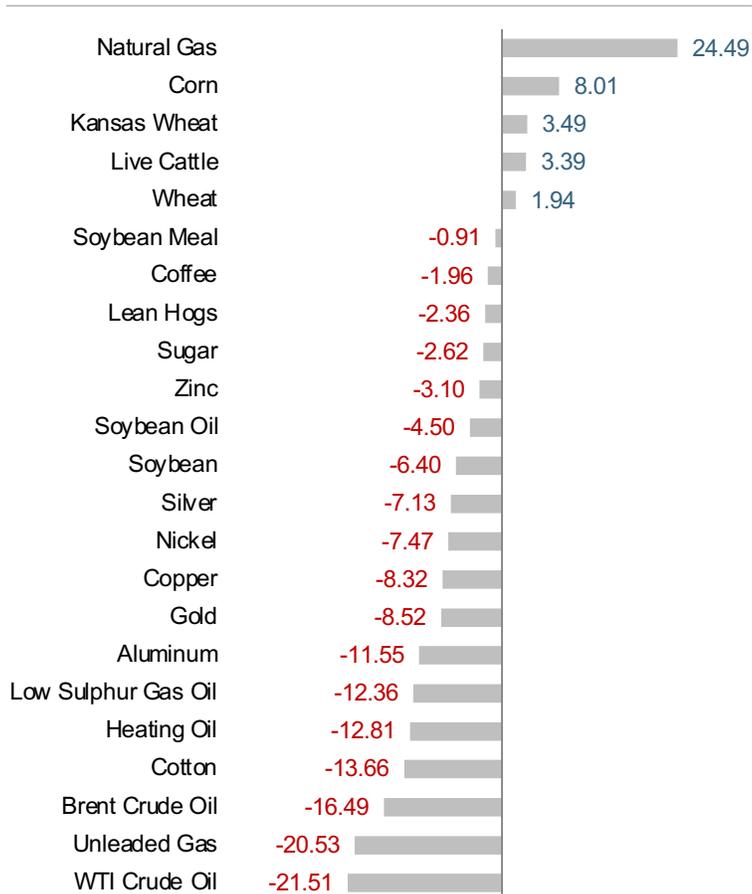
# Commodities

## Third quarter 2022 index returns

The Bloomberg Commodity Total Return Index returned -4.11% for the third quarter of 2022.

WTI Crude Oil and Unleaded Gas were the worst performers, returning -21.51% and -20.53% during the quarter, respectively. Natural Gas and Corn were the best performers, returning +24.49% and +8.01% during the quarter, respectively.

### Ranked Returns (%)



### Period Returns (%)

\* Annualized

| Asset Class | QTR   | YTD   | 1 Year | 3 Years* | 5 Years* | 10 Years* |
|-------------|-------|-------|--------|----------|----------|-----------|
| Commodities | -4.11 | 13.57 | 11.80  | 13.45    | 6.96     | -2.14     |

Past performance is not a guarantee of future results. Index is not available for direct investment. Index performance does not reflect the expenses associated with the management of an actual portfolio. Commodities returns represent the return of the Bloomberg Commodity Total Return Index. Individual commodities are sub-index values of the Bloomberg Commodity Total Return Index. Data provided by Bloomberg.

# Fixed Income

## Third quarter 2022 index returns

Interest rates increased across all bond maturities in the US Treasury market for the quarter.

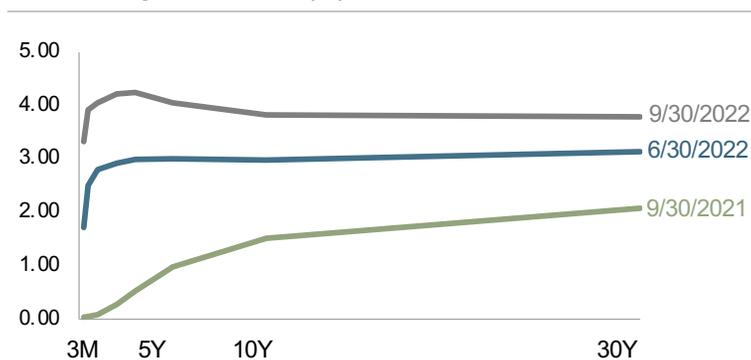
The yield on the 5-Year US Treasury Note increased 105 basis points (bps) to 4.06%. The yield on the 10-Year US Treasury Note increased 85 bps to 3.83%. The yield on the 30-Year US Treasury Bond increased 65 bps to 3.79%.

On the short end of the yield curve, the 1-Month US Treasury Bill yield increased 151 bps to 2.79%, while the 1-Year US Treasury Bill yield increased 125 bps to 4.05%. The yield on the 2-Year US Treasury Note increased 130 bps to 4.22%.

In terms of total returns, short-term corporate bonds returned -1.94% and intermediate-term corporate bonds returned -3.11%.<sup>1</sup>

The total return for short-term municipal bonds was -1.88% and -2.65% for intermediate-term municipal bonds. Within the municipal fixed income market, general obligation bonds outperformed revenue bonds, returning -3.30% vs -3.62%, respectively.<sup>2</sup>

US Treasury Yield Curve (%)



Bond Yields Across Issuers (%)



### Period Returns (%)

| Asset Class  | *Annualized |        |        |          |          |           |
|--|-------------|--------|--------|----------|----------|-----------|
|  | QTR         | YTD    | 1 Year | 3 Years* | 5 Years* | 10 Years* |
| ICE BofA US 3-Month Treasury Bill Index                    | 0.46        | 0.61   | 0.62   | 0.59     | 1.15     | 0.68      |
| ICE BofA 1-Year US Treasury Note Index                     | -0.50       | -1.77  | -1.95  | 0.18     | 0.94     | 0.67      |
| Bloomberg U.S. High Yield Corporate Bond Index             | -0.65       | -14.74 | -14.14 | -0.45    | 1.57     | 3.94      |
| FTSE World Government Bond Index 1-5 Years (hedged to USD) | -1.79       | -5.03  | -5.53  | -0.87    | 0.63     | 0.96      |
| Bloomberg Municipal Bond Index                             | -3.46       | -12.13 | -11.50 | -1.85    | 0.59     | 1.79      |
| Bloomberg U.S. Aggregate Bond Index                        | -4.75       | -14.61 | -14.60 | -3.26    | -0.27    | 0.89      |
| FTSE World Government Bond Index 1-5 Years                 | -4.77       | -12.10 | -13.34 | -3.33    | -1.83    | -1.74     |
| Bloomberg U.S. TIPS Index                                  | -5.14       | -13.61 | -11.57 | 0.79     | 1.95     | 0.98      |
| Bloomberg U.S. Government Bond Index Long                  | -9.60       | -28.77 | -26.60 | -8.48    | -1.62    | 0.60      |

1. Bloomberg US Corporate Bond Index.

2. Bloomberg Municipal Bond Index.

One basis point (bps) equals 0.01%. Past performance is not a guarantee of future results. Indices are not available for direct investment. Index performance does not reflect the expenses associated with the management of an actual portfolio. Yield curve data from Federal Reserve. State and local bonds, and the Yield to Worst are from the S&P National AMT-Free Municipal Bond Index. AAA-AA Corporates represent the ICE BofA US Corporates, AA-AAA rated. A-BBB Corporates represent the ICE BofA Corporates, BBB-A rated. Bloomberg data provided by Bloomberg. US long-term bonds, bills, inflation, and fixed income factor data © Stocks, Bonds, Bills, and Inflation (S&BI) Yearbook™, Ibbotson Associates, Chicago (annually updated work by Roger G. Ibbotson and Rex A. Sinquefeld). FTSE fixed income indices © 2022 FTSE Fixed Income LLC, all rights reserved. ICE BofA index data © 2022 ICE Data Indices, LLC. S&P data © 2022 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved. Bloomberg data provided by Bloomberg.

# Global Fixed Income

## Third quarter 2022 yield curves

Interest rates generally increased within global developed markets for the quarter.

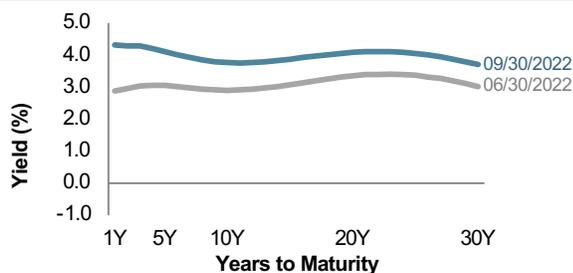
Realized term premiums were negative in global developed markets.

In Japan, short-term nominal interest rates remained negative. In Canada, the short-term segment of the yield curve inverted.

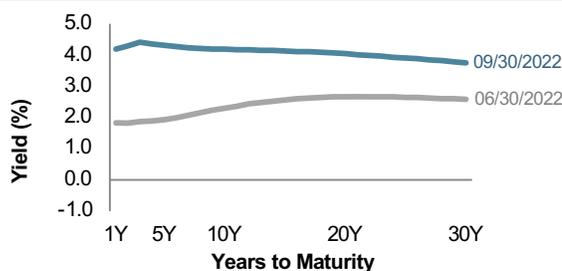
### Changes in Yields (bps) since 6/30/2022

|           | 1Y    | 5Y    | 10Y   | 20Y   | 30Y   |
|-----------|-------|-------|-------|-------|-------|
| US        | 143.7 | 106.4 | 86.3  | 72.8  | 68.6  |
| UK        | 235.1 | 238.0 | 188.6 | 137.8 | 117.5 |
| Germany   | 128.0 | 88.7  | 73.9  | 53.5  | 50.9  |
| Japan     | -1.1  | 4.4   | 2.6   | 12.1  | 15.7  |
| Canada    | 90.6  | 18.6  | -4.1  | -0.6  | -3.5  |
| Australia | 81.1  | 34.8  | 23.4  | 27.6  | 22.6  |

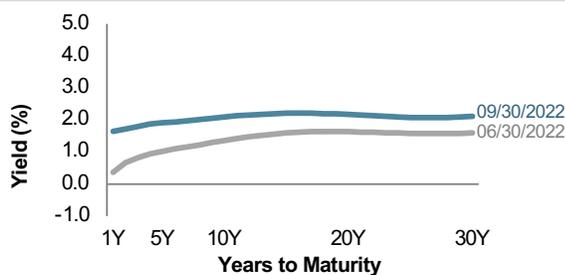
### US



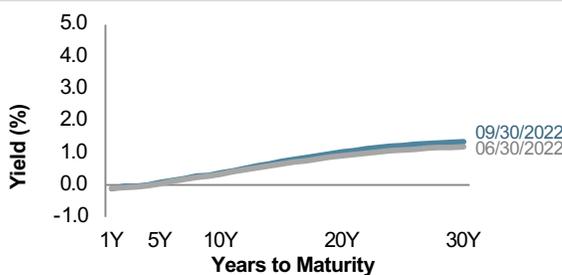
### UK



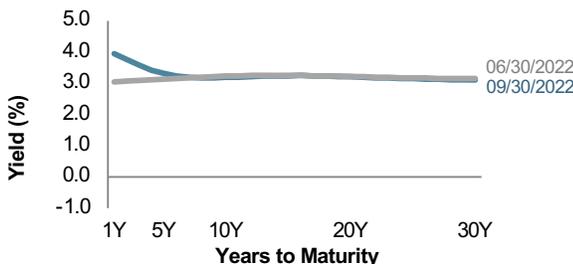
### Germany



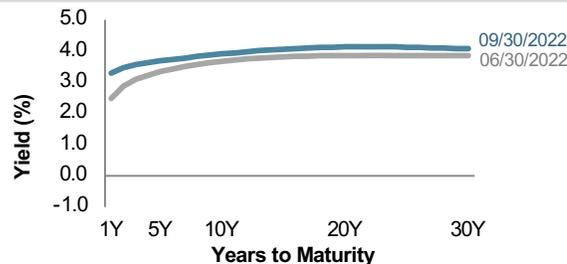
### Japan



### Canada



### Australia



One basis point (bps) equals 0.01%. Source: ICE BofA government yield. ICE BofA index data © 2022 ICE Data Indices, LLC.

# Impact of Diversification

As of December 31, 2021

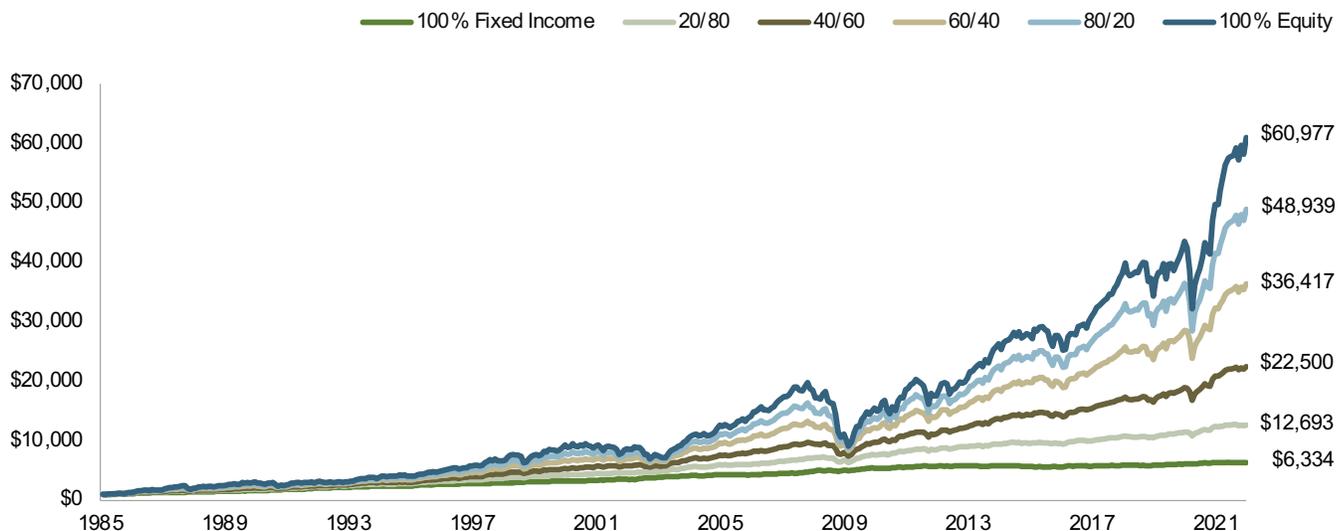
These portfolios illustrate the performance of different global stock/bond mixes and highlight the benefits of diversification. Mixes with larger allocations to stocks are considered riskier but have higher expected returns over time.

## Period Returns (%)

\* Annualized

| Dimensional Core Plus Wealth Index Model | 3 Months | 1 Year | 3 Years* | 5 Years* | 10 Years* | 10-Year STDEV <sup>1</sup> |
|--|----------|--------|----------|----------|-----------|----------------------------|
| 100% Equity                              | 6.61     | 22.63  | 21.12    | 14.57    | 13.24     | 14.11                      |
| 80/20                                    | 5.30     | 17.70  | 18.49    | 12.90    | 11.94     | 11.76                      |
| 60/40                                    | 3.86     | 12.63  | 15.37    | 10.82    | 9.99      | 9.07                       |
| 40/60                                    | 2.22     | 7.79   | 10.82    | 7.75     | 7.28      | 6.13                       |
| 20/80                                    | 0.55     | 2.10   | 6.40     | 4.89     | 4.05      | 3.71                       |
| 100% Fixed Income                        | -0.51    | -0.93  | 2.20     | 1.98     | 0.97      | 1.73                       |

## Growth of Wealth: The Relationship Between Risk and Return



1. STDEV (standard deviation) is a measure of the variation or dispersion of a set of data points. Standard deviations are often used to quantify the historical return volatility of a security or portfolio.

**Diversification does not eliminate the risk of market loss. For illustrative purposes only. Past performance is no guarantee of future results.** The performance reflects the growth of a hypothetical \$10,000. Assumes all models have been rebalanced monthly. See appendix for allocation information. All performance results are based on performance of indexes with model/back-tested asset allocations; the performance was achieved with the benefit of hindsight; it does not represent actual investment strategies. The index models are unmanaged and the model's performance does not reflect advisory fees or other expenses associated with the management of an actual portfolio. In particular, Model performance may not reflect the impact that economic and market factors may have had on the advisor's decision making if the advisor were actually managing client money. The models are not recommendations for an actual allocation. Indices are not available for direct investment. Backtested performance results assume the reinvestment of dividends and capital gains. Sources: Dimensional Fund Advisors LP for Dimensional Indices. Copyright 2022 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved.

# What Drives Investment Returns? Start with Ingenuity.

Third quarter 2022

Weston Wellington, Vice President, Dimensional Fund Advisors

A recent news item reported that Frederick Smith intended to step down as Chairman and Chief Executive Officer of FedEx Corp., the largest air freight firm in the world.

As a Yale undergraduate in 1965, Smith wrote a term paper for his economics course outlining an overnight air delivery service for urgently needed items such as medicines or computer parts. His professor was not much impressed with the paper, but after a stint in the Air Force, Smith sought to put his classroom idea into practice. He founded Federal Express (now FedEx) in 1971, and one evening in April 1973, 14 Dassault Falcon jets took off from Memphis airport with 186 packages destined for 25 cities.

In retrospect, it was not an auspicious time to launch a new venture requiring expensive aircraft consuming large quantities of jet fuel. Oil prices rose sharply later that year following the Arab states' oil embargo, and the US economy fell into a deep recession. Most airlines struggled during the 1970s, and Federal Express was no exception.

But Smith's idea found favor with customers, and 49 years after its initial deliveries, the firm is a global colossus with over 650 aircraft, including 42 Boeing 777s—each of which can fly more cargo than 100 Falcons. Although it took over two years to turn its first profit, FedEx became the first start-up in American history to generate over \$1 billion in revenue in less than 10 years without relying on

mergers or acquisitions. The journey has proved rewarding for investors as well—100 shares purchased at the initial offering price of \$24 in 1978 has mushroomed to 3,200 shares worth over \$718,000 as of May 31, 2022.<sup>1</sup>

Fred Smith's idea is just one example of ingenuity that humans have exhibited for centuries. Sticks and stones led to hammers and spears, the wheel and axle, the steam engine, and eventually semiconductors and jet aircraft. The invention of writing made it possible to store and hand down information from one generation to the next, enabling ingenuity to compound into an ever-increasing body of knowledge. Although we often associate innovation with clever new technology, some remarkable developments have required little more than astute powers of observation. The curse of smallpox, for example, has afflicted humans with death or disfigurement for thousands of years. English doctor Edward Jenner noticed that milkmaids who had previously experienced cowpox did not catch smallpox, and in 1796, he took material from a milkmaid's cowpox sore and inoculated James Phipps, the nine-year-old son of his gardener. Later exposed to the virus, Phipps never developed smallpox, and Jenner published a treatise on vaccination in 1801. Smallpox vaccines gradually eliminated the disease in countries around the world, and the last known case was reported in Somalia in 1977.

1. Stock split information sourced from FedEx investor relations website. Stock price information provided by Bloomberg. This is not taking into account cash dividends or any reinvestment.

# What Drives Investment Returns? Start with Ingenuity.

(continued from page 16)

One innovation often paves the way for others:

- Charles Lindbergh took off from Long Island for his historic transatlantic flight to Paris on May 20, 1927. That same day, J. Willard Marriott opened a nine-stool lunch counter serving cold A&W root beer in Washington, D.C. Ten years later he began to supply box lunches to airlines flying from nearby Hoover airport and 20 years later opened the world's first motor hotel in Arlington, Virginia. Today, Marriott is the world's leading travel firm, with over 8,000 hotel properties in 139 countries.
- The now-ubiquitous microwave oven can trace its roots to a happy accident. While working on radar equipment in 1945 for Massachusetts-based Raytheon, electronics engineer Percy Spencer noticed that the chocolate bar in his pocket had suddenly melted. His curiosity led to the introduction of commercial-grade water-cooled microwave ovens in 1947 costing thousands and ultimately to countertop units available today for \$99.
- Frustrated by lengthy delays associated with loading and unloading cargo ships, trucking firm owner Malcolm McLean launched a shipping service in 1956 using standardized steel containers of his own design. Met with great skepticism when first introduced, his idea for theftproof stackable cargo boxes eventually transformed the global shipping industry—and world trade—by slashing dockside loading costs over 90%.
- On June 26, 1974, cashier Sharon Buchanan inaugurated the era of barcode inventory tracking when she scanned a pack of Juicy Fruit gum bearing a Universal Product Code at Marsh Supermarket in Troy, Ohio. Barcode scanners eliminated the drudgery and inevitable mistakes associated with manual entry by checkout clerks and provided store managers with powerful tools to track sales trends. As retailers such as Home Depot, Ross Stores, and Walmart expanded throughout the country in recent decades, barcode technology played a key role in matching inventory with local preferences at each location.
- In March 2022, a 20-year-old woman born with a small and misshapen right ear received a 3D-printed ear implant made from her own cells and shaped to precisely match her other ear. Although experimental, the procedure represented a significant advance in tissue engineering and could eventually lead to artificial organs such as lungs or kidneys.

The benefits of innovation are widely dispersed throughout the economy, often in unpredictable ways. Apple Inc. became one of the world's most valuable companies based on its clever marriage of the computer and the telephone; both iPhone users and Apple shareholders reaped substantial rewards.

On the other hand, suppose your fairy godmother had told you in 1935, at the dawn of commercial air travel, that this tiny sector of the

# What Drives Investment Returns? Start with Ingenuity.

(continued from page 17)

economy would eventually become a gigantic industry with millions of passengers flying every year—including some flying from breakfast in New York to Los Angeles for dinner. What would your prediction be for industry pioneers such as TWA or Pan American? Most likely, bountiful prosperity and rewarding stock market performance. The millions of passengers materialized. The profits did not. Both firms went bankrupt. So innovation itself does not ensure prosperity in every case.

That's why it makes sense to diversify. Investors are often tempted to focus their attention on firms that appear poised to benefit from innovation. But it's difficult to predict which ideas will prove successful, and even if we could, it's unclear which firms will benefit and to what extent. Software giant Microsoft has been a big winner for investors, with the share value soaring more than 100-fold over the 30-year

period ending May 31, 2022. Discount retailer Ross Stores proved even more rewarding, as the stock price multiplied over 189 times during the same period. One firm developed powerful computer technology and the other applied it.

Civilization is a history of innovation—curious minds seeking to improve upon existing ways of meeting mankind's wants and needs. Public securities markets are just one example of such creativity, and they have a history of rewarding investors for the capital they supply to fund such innovation. But a significant fraction of the wealth created in public equity markets typically comes from only a small number of firms; therefore, we believe owning a broad universe of stocks is the most effective way to participate in the rewards of ingenuity and innovation, wherever and whenever it takes place.

**Investments involve risks. The investment return and principal value of an investment may fluctuate so that an investor's shares, when redeemed, may be worth more or less than their original value. Past performance is not a guarantee of future results. There is no guarantee strategies will be successful.**

Named securities may be held in accounts managed by Dimensional. This information should not be considered a recommendation to buy or sell a particular security. The information in this material is intended for the recipient's background information and use only. It is provided in good faith and without any warranty or representation as to accuracy or completeness. Information and opinions presented in this material have been obtained or derived from sources believed by Dimensional to be reliable, and Dimensional has reasonable grounds to believe that all factual information herein is true as at the date of this material. It does not constitute investment advice, a recommendation, or an offer of any services or products for sale and is not intended to provide a sufficient basis on which to make an investment decision. Before acting on any information in this document, you should consider whether it is appropriate for your particular circumstances and, if appropriate, seek professional advice. It is the responsibility of any persons wishing to make a purchase to inform themselves of and observe all applicable laws and regulations. Unauthorized reproduction or transmission of this material is strictly prohibited. Dimensional accepts no responsibility for loss arising from the use of the information contained herein. This material is not directed at any person in any jurisdiction where the availability of this material is prohibited or would subject Dimensional or its products or services to any registration, licensing, or other such legal requirements within the jurisdiction. "Dimensional" refers to the Dimensional separate but affiliated entities generally, rather than to one particular entity. These entities are Dimensional Fund Advisors LP, Dimensional Fund Advisors Ltd., Dimensional Ireland Limited, DFA Australia Limited, Dimensional Fund Advisors Canada ULC, Dimensional Fund Advisors Pte. Ltd., Dimensional Japan Ltd. and Dimensional Hong Kong Limited. Dimensional Hong Kong Limited is licensed by the Securities and Futures Commission to conduct Type 1 (dealing in securities) regulated activities only and does not provide asset management services. Dimensional Fund Advisors LP is an investment advisor registered with the Securities and Exchange Commission. Investment products: • Not FDIC Insured • Not Bank Guaranteed • May Lose Value Dimensional Fund Advisors does not have any bank affiliates.

# Appendix

# Dimensional Core Plus Wealth Index Models

Weights (%)



| <b>Equity Total</b>  | <b>0%</b>   | <b>20%</b> | <b>40%</b> | <b>60%</b> | <b>80%</b> | <b>100%</b> |
|--|-------------|------------|------------|------------|------------|-------------|
| Dimensional US Adjusted Market 2 Index   | 0           | 9          | 18         | 27         | 36         | 45          |
| Dimensional US Large Cap High Profitability Index                                | 0           | 2          | 5          | 7          | 9          | 11          |
| Dimensional US Adjusted Market Value Index                                       | 0           | 2          | 5          | 7          | 9          | 11          |
| Dimensional International Adjusted Market Index                                  | 0           | 3          | 5          | 8          | 10         | 13          |
| Dimensional International Large Cap High Profitability Index                     | 0           | 1          | 2          | 3          | 3          | 4           |
| Dimensional International Vector Index   | 0           | 1          | 2          | 3          | 3          | 4           |
| Dimensional Emerging Markets Adjusted Market Index                               | 0           | 1          | 2          | 3          | 4          | 5           |
| Dimensional Emerging Markets Value Index   | 0           | 1          | 2          | 3          | 4          | 5           |
| S&P Global REIT Index  | 0           | 0          | 1          | 1          | 2          | 2           |
| <b>Fixed Income Total</b>  | <b>100%</b> | <b>80%</b> | <b>60%</b> | <b>40%</b> | <b>20%</b> | <b>0%</b>   |
| Dimensional Short-Duration Real Return Index                                     | 20          | 0          | 0          | 0          | 0          | 0           |
| Dimensional US Adjusted Investment Grade Index                                   | 0           | 20         | 20         | 20         | 0          | 0           |
| Dimensional Global Short-Term Government Index (Hedged to USD)                   | 20          | 0          | 0          | 0          | 0          | 0           |
| Dimensional Global Short-Term Government Variable Maturity Index (Hedged to USD) | 20          | 20         | 20         | 0          | 0          | 0           |
| Dimensional Global Government/Credit 1-3 Year Unhedged Index                     | 40          | 30         | 0          | 0          | 0          | 0           |
| Dimensional Global Adjusted Fixed Income Market Index (Hedged to USD)            | 0           | 0          | 0          | 20         | 20         | 0           |
| Dimensional Targeted Credit Index (Hedged to USD)                                | 0           | 10         | 20         | 0          | 0          | 0           |

Weights may not equal 100 due to rounding. Weights as of December 31, 2021. Rebalanced monthly. For illustrative purposes only. The index models are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Indices are not available for direct investment. Please see "Sources and Descriptions of Data" in the appendix for descriptions of the Dimensional index data.

# Dimensional Core Plus Wealth Index Models

Period Returns as of December 31, 2021 (%)

|  | 1 Year | 3 Years | 5 Years | 10 Years |
|--|--------|---------|---------|----------|
| <b>Equity</b>  |        |         |         |          |
| Dimensional US Adjusted Market 2 Index   | 26.86  | 24.55   | 16.64   | 15.93    |
| Dimensional US Large Cap High Profitability Index                                | 26.17  | 30.94   | 22.18   | 18.03    |
| Dimensional US Adjusted Market Value Index                                       | 29.62  | 20.90   | 12.42   | 14.23    |
| Dimensional International Adjusted Market Index                                  | 14.05  | 14.97   | 10.39   | 9.22     |
| Dimensional International Large Cap High Profitability Index                     | 13.71  | 17.05   | 11.99   | 9.00     |
| Dimensional International Vector Index   | 14.74  | 14.55   | 9.93    | 9.43     |
| Dimensional Emerging Markets Adjusted Market Index                               | 5.36   | 12.07   | 10.52   | 6.82     |
| Dimensional Emerging Markets Value Index   | 12.84  | 8.42    | 8.77    | 5.38     |
| S&P Global REIT Index (gross dividends)  | 32.50  | 14.87   | 9.41    | 10.17    |
| <b>Fixed Income</b>  |        |         |         |          |
| Dimensional Short-Duration Real Return Index                                     | 6.26   | 5.75    | 3.75    | 2.53     |
| Dimensional US Adjusted Investment Grade Index                                   | -1.92  | 5.06    | 3.71    | 3.24     |
| Dimensional Global Short-Term Government Index (Hedged to USD)                   | -0.07  | 1.57    | 1.57    | 1.21     |
| Dimensional Global Short-Term Government Variable Maturity Index (Hedged to USD) | -1.94  | 1.36    | 1.30    | 1.63     |
| Dimensional Global Government/Credit 1-3 Year Unhedged Index                     | -4.29  | 1.17    | 1.61    | -0.28    |
| Dimensional Global Adjusted Fixed Income Market Index (Hedged to USD)            | -0.67  | 7.38    | 5.59    | 6.17     |
| Dimensional Targeted Credit Index (Hedged to USD)                                | -0.19  | 4.69    | 3.66    | 4.35     |

Past performance is no guarantee of future results. Actual returns may be lower.

The Dimensional 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. Index returns are not representative of actual portfolios and do not reflect costs and fees associated with an actual investment. See "Sources and Descriptions of Data" in the appendix for descriptions of Dimensional index data.

# Sources and Descriptions of Data

## **DIMENSIONAL CORE PLUS 100/0 WEALTH INDEX MODEL**

Dimensional Wealth Index Model data compiled by Dimensional. The Dimensional Core Plus 100/0 Wealth Index Model combines the following indices: Dimensional US Adjusted Market 2 Index, Dimensional US Adjusted Market Value Index, Dimensional US Large Cap High Profitability Index, Dimensional International Adjusted Market Index, Dimensional International Vector Index, Dimensional International Large Cap High Profitability Index, Dimensional Emerging Markets Adjusted Market Index, Dimensional Emerging Markets Value Index, and the S&P Global REIT Index (gross dividends). The weight of the REIT index is based on the market capitalization weight of equity REITs within the global universe of eligible stocks and equity REITs, rounded to the nearest 1%. Within the remaining non-REIT allocation, US equities are overweight relative to their market capitalization weight. The weights of the US, developed ex US, and emerging markets equities are then rescaled to sum to the total non-REIT weight of the Wealth Index Model and are all rounded to the nearest 1%. Regional weights are rebalanced quarterly. Within the US equity allocation, each month the weights of the Dimensional US Adjusted Market 2 Index, Dimensional US Adjusted Market Value Index, and Dimensional US Large Cap High Profitability Index are 66.67%, 16.67%, and 16.67%, respectively. Within the developed ex US equity allocation, each month the weights of the Dimensional International Adjusted Market Index, Dimensional International Vector Index, and Dimensional International Large Cap High Profitability Index are 60%, 20%, and 20%, respectively. Within the emerging market equity allocation, each month the weights of the Dimensional Emerging Markets Adjusted Market Index and Dimensional Emerging Markets Value Index are equal. The Wealth Index Model returns are calculated monthly as a weighted average of the returns of the underlying indices. The Dimensional Core Plus 100/0 Wealth Index Model has been retrospectively calculated by Dimensional and did not exist prior to March 2020.

## **DIMENSIONAL CORE PLUS 80/20 WEALTH INDEX MODEL**

Dimensional Wealth Index Model data compiled by Dimensional. 80% of the weight is allocated to the Dimensional Core Plus 100/0 Wealth Index Model, and 20% of the weight is allocated to the Dimensional Global Adjusted Fixed Income Market Index (hedged to USD). The Wealth Index Model returns are calculated monthly as a weighted average of the returns of the underlying indices. The Dimensional Global Adjusted Fixed Income Market Index (hedged to USD) is represented by the Bloomberg US Aggregate Bond Index from January 1985 to December 1989 and the Bloomberg Global Aggregate Bond Index (hedged to USD) from January 1990 to January 1999. The Dimensional Core Plus 80/20 Wealth Index Model has been retrospectively calculated by Dimensional and did not exist prior to March 2020.

## **DIMENSIONAL CORE PLUS 60/40 WEALTH INDEX MODEL**

Dimensional Wealth Index Model data compiled by Dimensional. 60% of the weight is allocated to the Dimensional Core Plus 100/0 Wealth Index Model, and 40% of the weight is allocated to the following fixed income indices: Dimensional Global Adjusted Fixed Income Market Index (hedged to USD) (20%) and Dimensional US Adjusted Investment Grade Index (20%). The Wealth Index Model returns are calculated monthly as a weighted average of the returns of the underlying indices. The Dimensional Global Adjusted Fixed Income Market Index (hedged to USD) is represented by the Bloomberg US Aggregate Bond Index from January 1985 to December 1989 and the Bloomberg Global Aggregate Bond Index (hedged to USD) from January 1990 to January 1999. The Dimensional Core Plus 60/40 Wealth Index Model has been retrospectively calculated by Dimensional and did not exist prior to March 2020.

## **DIMENSIONAL CORE PLUS 40/60 WEALTH INDEX MODEL**

Dimensional Wealth Index Model data compiled by Dimensional. 40% of the weight is allocated to the Dimensional Core Plus 100/0 Wealth Index Model, and 60% of the weight is allocated to the following fixed income indices: Dimensional Targeted Credit Index (hedged to USD) (20%), Dimensional Global Short-Term Government Variable Maturity Index (hedged to USD) (20%), and Dimensional US Adjusted Investment Grade Index (20%). The Wealth Index Model returns are calculated monthly as a weighted average of the returns of the underlying indices. The Dimensional Targeted Credit Index is represented by the Bloomberg US Credit 1–3 Year Bond Index from January 1985 to January 1999. The Dimensional US Adjusted Investment Grade Index is represented by the Bloomberg US Aggregate Bond Index from January 1985 to January 1989. The Dimensional Core Plus 40/60 Wealth Index Model has been retrospectively calculated by Dimensional and did not exist prior to March 2020.

## **DIMENSIONAL CORE PLUS 20/80 WEALTH INDEX MODEL**

Dimensional Wealth Index Model data compiled by Dimensional. 20% of the weight is allocated to the Dimensional Core Plus 100/0 Wealth Index Model, and 80% of the weight is allocated to the following fixed income indices: Dimensional Global Government/Credit 1–3 Year Unhedged Index (30%), Dimensional Targeted Credit Index (hedged to USD) (10%), Dimensional Global Short-Term Government Variable Maturity Index (hedged to USD) (20%), and Dimensional US Adjusted Investment Grade Index (20%). The Wealth Index Model returns are calculated monthly as a weighted average of the returns of the underlying indices. The Dimensional Global Government/Credit 1–3 Year Unhedged Index is represented by the Bloomberg US Government/Credit 1–3 Year Bond Index from January 1985 to January 1999. The Dimensional Targeted Credit Index is represented by the Bloomberg US Credit 1–3 Year Bond Index from January 1985 to January 1999. The Dimensional US Adjusted Investment Grade Index is represented by the Bloomberg US Aggregate Bond Index from January 1985 to January 1989. The Dimensional Core Plus 20/80 Wealth Index Model has been retrospectively calculated by Dimensional and did not exist prior to March 2020.

## **DIMENSIONAL CORE PLUS 0/100 WEALTH INDEX MODEL**

Dimensional Wealth Index Model data compiled by Dimensional. The Dimensional Core Plus 0/100 Wealth Index Model combines the following indices: Dimensional Global Short-Term Government Index (hedged to USD) (20%), Dimensional Global Government/Credit 1–3 Year Unhedged Index (40%), Dimensional Short-Duration Real Return Index (20%), and Dimensional Global Short-Term Government Variable Maturity Index (hedged to USD) (20%). The Wealth Index Model returns are calculated monthly as a weighted average of the returns of the underlying indices. The Dimensional Global Short-Term Government Index (hedged to USD) is represented by the Bloomberg US Government 1–3 Year Bond Index at 75% weight and the ICE BofA US 3-Month Treasury Bill Index at 25% weight from January 1985 to October 1992 and the Bloomberg US Government 1–2 Year Bond Index from November 1992 to January 1999. The Dimensional Global Government/Credit 1–3 Year Unhedged Index is represented by the Bloomberg US Government/Credit 1–3 Year Bond Index from January 1985 to January 1999. The Dimensional Short-Duration Real Return Index is not available back to 1985. The Dimensional Short-Duration Real Return Index is represented by the Bloomberg US TIPS Index 1–5 Years from August 1997 to October 2006. Prior to August 1997, its weight is redistributed pro rata to the other fixed income indices. The Dimensional Core Plus 0/100 Wealth Index Model has been retrospectively calculated by Dimensional and did not exist prior to March 2020.

Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. The returns of indices presented herein reflect hypothetical performance and do not represent returns that any investor actually attained. Changes in the assumptions upon which such performance is based may have a material impact on the hypothetical returns presented. Hypothetical backtested returns have many inherent limitations. Unlike actual performance, it does not represent actual trading. Since trades have not actually been executed, results may have under- or overcompensated for the impact, if any, of certain market factors, such as lack of liquidity, and may not reflect the impact that certain economic or market factors may have had on the decision-making process. Hypothetical backtested performance also is developed with the benefit of hindsight. Other periods selected may have different results, including losses. There can be no assurance that Dimensional Fund Advisors will achieve profits or avoid incurring substantial losses.

# Sources and Descriptions of Data

## **DIMENSIONAL US ADJUSTED MARKET 2 INDEX**

January 1975–present: Compiled by Dimensional from CRSP and Compustat data. Targets all the securities in the eligible market with an emphasis on companies with smaller capitalization, lower relative price, and higher profitability, excluding those 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 defined as operating income before depreciation and amortization minus interest expense divided by book equity. Asset growth is defined as change in total assets from the prior fiscal year to current fiscal year. 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. The index has been retrospectively calculated by Dimensional and did not exist prior to March 2007. Accordingly, the results shown during the periods prior to March 2007 do not represent actual returns of the index. Other periods selected may have different results, including losses. The calculation methodology for the index was amended in January 2014 to include profitability as a factor in selecting securities for inclusion in the index. The calculation methodology for the index was amended in December 2019 to include asset growth as a factor in selecting securities for inclusion in the index. Prior to January 1975: Compiled by Dimensional from CRSP and Compustat data. Targets all the securities in the eligible market with an emphasis on companies with smaller capitalization and lower relative price. 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.

## **DIMENSIONAL US LARGE CAP HIGH PROFITABILITY INDEX**

Compiled by Dimensional from CRSP and Compustat data. Consists of companies with market capitalizations above the 1,000th largest company whose profitability is in the top 35% of all large cap companies after the exclusion of utilities, companies lacking financial data, and companies with negative relative price. The index emphasizes companies with lower relative price, higher profitability, and lower market capitalization. Profitability is defined as operating income before depreciation and amortization minus interest expense divided by book equity. 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. The index has been retroactively calculated by Dimensional and did not exist prior to December 2016. Accordingly, the results shown during the periods prior to December 2016 do not represent actual returns of the index. Other periods selected may have different results, including losses.

## **DIMENSIONAL US ADJUSTED MARKET VALUE INDEX**

January 1975–present: Compiled by Dimensional from CRSP and Compustat data. Targets all the securities in the eligible market, excluding securities of companies with the largest market capitalizations and highest relative price. The index emphasizes companies with smaller capitalization, lower relative price, and higher profitability,

excluding those 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 defined as operating income before depreciation and amortization minus interest expense divided by book equity. Asset growth is defined as change in total assets from the prior fiscal year to current fiscal year. 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. The index has been retrospectively calculated by Dimensional and did not exist prior to March 2007. Accordingly, the results shown during the periods prior to March 2007 do not represent actual returns of the index. Other periods selected may have different results, including losses. The calculation methodology for the index was amended in January 2014 to include profitability as a factor in selecting securities for inclusion in the index. The calculation methodology for the index was amended in December 2019 to include asset growth as a factor in selecting securities for inclusion in the index. Prior to January 1975: Compiled by Dimensional from CRSP and Compustat data. Targets all the securities in the eligible market with an emphasis on securities with smaller capitalization and lower relative price, excluding securities with the largest market capitalizations and highest relative price. 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.

## **DIMENSIONAL INTERNATIONAL ADJUSTED MARKET INDEX**

Compiled by Dimensional from Bloomberg securities data. Targets all of the securities in the eligible markets with an emphasis on companies with smaller capitalization, lower relative price, and higher profitability, 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 defined as operating income before depreciation and amortization minus interest expense divided by book equity. 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 each quarter of the year. Maximum index weight of any one company is capped at 5%. Countries currently included are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and the UK. Exclusions: REITs and investment companies. The index has been retrospectively calculated by Dimensional and did not exist prior to April 2008. Accordingly, the results shown during the periods prior to April 2008 do not represent actual returns of the index. The calculation methodology for the index was amended in January 2014 to include profitability as a factor in selecting securities for inclusion in the index. The calculation methodology for the index was amended in November 2019 to include asset growth as a factor in selecting securities for inclusion in the index.

Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. The returns of indices presented herein reflect hypothetical performance and do not represent returns that any investor actually attained. Changes in the assumptions upon which such performance is based may have a material impact on the hypothetical returns presented. Hypothetical backtested returns have many inherent limitations. Unlike actual performance, it does not represent actual trading. Since trades have not actually been executed, results may have under- or overcompensated for the impact, if any, of certain market factors, such as lack of liquidity, and may not reflect the impact that certain economic or market factors may have had on the decision-making process. Hypothetical backtested performance also is developed with the benefit of hindsight. Other periods selected may have different results, including losses. There can be no assurance that Dimensional Fund Advisors will achieve profits or avoid incurring substantial losses.

# Sources and Descriptions of Data

## **DIMENSIONAL INTERNATIONAL VECTOR INDEX**

Compiled by Dimensional from Bloomberg securities data. Targets all the securities in the eligible markets with an emphasis on companies with smaller capitalization, lower relative price, and higher profitability, 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 defined as operating income before depreciation and amortization minus interest expense divided by book equity. 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 sub-indices, each one reconstituted once a year at the end of each quarter of the year. Maximum index weight of any one company is capped at 5%. Countries currently included are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and the UK. Exclusions: REITs and investment companies. The index has been retrospectively calculated by Dimensional and did not exist prior to April 2008. Accordingly, the results shown during the periods prior to April 2008 do not represent actual returns of the index. The calculation methodology for the index was amended in January 2014 to include profitability as a factor in selecting securities for inclusion in the index. The calculation methodology for the index was amended in November 2019 to include asset growth as a factor in selecting securities for inclusion in the index.

## **DIMENSIONAL INTERNATIONAL LARGE CAP HIGH PROFITABILITY INDEX**

Compiled by Dimensional from Bloomberg securities data. Consists of large cap companies with high relative price in eligible markets whose profitability is in the top 35% of their country's large cap universe, after the exclusion of utilities and companies with either negative or missing relative price data. The index emphasizes companies with lower relative price, higher profitability, and lower market capitalization. Profitability is defined as operating income before depreciation and amortization minus interest expense divided by book equity. The index monthly returns are computed as the simple average of the monthly returns of four sub-indices, each one reconstituted once a year at the end of each quarter of the year. Maximum index weight of any one company is capped at 5%. Countries currently included are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Japan, Italy, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and the UK. Exclusions: REITs and investment companies. The index has been retrospectively calculated by Dimensional and did not exist prior to December 2016. Accordingly, the results shown during the periods prior to December 2016 do not represent actual returns of the index.

## **DIMENSIONAL EMERGING MARKETS ADJUSTED MARKET INDEX**

Compiled by Dimensional from Bloomberg securities data. Targets all the securities in the eligible markets with an emphasis on companies with smaller capitalization, lower relative price, and higher profitability,

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 defined as operating income before depreciation and amortization minus interest expense divided by book equity. 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 sub-indices, each one reconstituted once a year at the end of each quarter of the year. Maximum index weight of any one company is capped at 5%. Countries currently included are Brazil, Chile, China, Colombia, the Czech Republic, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, South Africa, Taiwan, Thailand, and Turkey. Exclusions: REITs and investment companies. The index has been retrospectively calculated by Dimensional and did not exist prior to April 2008. Accordingly, the results shown during the periods prior to April 2008 do not represent actual returns of the index. The calculation methodology for the index was amended in January 2014 to include profitability as a factor in selecting securities for inclusion in the index. The calculation methodology for the index was amended in November 2019 to include asset growth as a factor in selecting securities for inclusion in the index.

## **DIMENSIONAL EMERGING MARKETS VALUE INDEX**

Compiled by Dimensional from Bloomberg securities data. Consists of companies whose relative price is in the bottom 33% of their country's respective constituents, after the exclusion of utilities and companies with either negative or missing relative price data. The index emphasizes companies with smaller capitalization, lower relative price, and higher profitability, excluding those with the lowest profitability 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 defined as operating income before depreciation and amortization minus interest expense divided by book equity. 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 sub-indices, each one reconstituted once a year at the end of each quarter of the year. Maximum index weight of any one company is capped at 5%. Countries currently included are Brazil, Chile, China, Colombia, the Czech Republic, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, South Africa, Taiwan, Thailand, and Turkey. Exclusions: REITs and investment companies. The index has been retrospectively calculated by Dimensional and did not exist prior to April 2008. Accordingly, the results shown during the periods prior to April 2008 do not represent actual returns of the index. The calculation methodology for the index was amended in January 2014 to include profitability as a factor in selecting securities for inclusion in the index. The calculation methodology for the index was amended in November 2019 to include asset growth as a factor in selecting securities for inclusion in the index.

Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. The returns of indices presented herein reflect hypothetical performance and do not represent returns that any investor actually attained. Changes in the assumptions upon which such performance is based may have a material impact on the hypothetical returns presented. Hypothetical backtested returns have many inherent limitations. Unlike actual performance, it does not represent actual trading. Since trades have not actually been executed, results may have under- or overcompensated for the impact, if any, of certain market factors, such as lack of liquidity, and may not reflect the impact that certain economic or market factors may have had on the decision-making process. Hypothetical backtested performance also is developed with the benefit of hindsight. Other periods selected may have different results, including losses. There can be no assurance that Dimensional Fund Advisors will achieve profits or avoid incurring substantial losses.

# Sources and Descriptions of Data

## S&P GLOBAL REIT INDEX

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## DIMENSIONAL SHORT-DURATION REAL RETURN INDEX

Compiled by Dimensional using data provided by Bloomberg. Includes securities in Bloomberg US 3–5 Year Government, Credit Aaa, Aa, A, Baa indices; Bloomberg US 1–3 Year Government, Credit Aaa, Aa, A, Baa indices; Bloomberg Inflation Swap USD 2YR Zero Coupon Index (Excess Return); and Bloomberg Inflation Swap USD 5YR Zero Coupon Index (Excess Return). For the fixed income component of the index, we do the following: (1) Securities can be over- or underweighted based on government/credit spreads. When the difference in yields between credit and government bonds is narrow, government bonds may be overweighted. When the difference in yields between credit and government bonds is wide, government bonds may be underweighted. (2) Securities can be over- or underweighted with respect to their market cap weight based on credit spreads. When the difference in yields between AAA+AA and A+BBB is narrow, AAA+AA bonds may be held above market cap weight. When the difference in yields between AAA+AA and A+BBB is wide, AAA+AA bonds may be held below market cap weight. When the difference in yields between AAA+AA and BBB is narrow, BBB bonds may be held below market cap weight. When the difference in yields between AAA+AA and BBB is wide, BBB bonds may be held above market cap weight. (3) The duration of the index is based on the term spread (of real yields) between the real yields of the 3–5 year and 1–3 year credit bonds. Real yield is defined as nominal yield minus inflation swap rate. When the term spread is wide, the duration of the index can be longer than the duration of Bloomberg US Credit 1–5 Year Index. When the term spread is narrow, the duration of the index can be shorter than the duration of Bloomberg US Credit 1–5 Year Index. (4) The duration of the government component is based on the term spread (of real yields) between 3–5 year government bonds and 1–3 year government bonds. When the term spread is wide, the duration of the government component can be longer than the duration of Bloomberg US Government 1–5 Year Index. When the term spread is narrow, the duration of the index can be shorter than the duration of Bloomberg US Government 1–5 Year Index. We use the 2-year and 5-year inflation swap indices to construct an index to match the duration of the fixed income component. The Dimensional index return is the sum of the fixed income component and the inflation swap index return component. Rebalanced monthly. The index has been retrospectively calculated by Dimensional and did not exist prior to January 2020. Accordingly, results shown during the periods prior to January 2020 do not represent actual returns of the index. Other periods selected may have different results, including losses.

## DIMENSIONAL US ADJUSTED INVESTMENT GRADE INDEX

Compiled by Dimensional using data provided by Bloomberg. Includes securities in Bloomberg US 3–10 Year Government, Credit Aaa, Aa, A, Baa indices; and Bloomberg US 1–3 Year Government, Credit Aaa, Aa, A, Baa indices. Securities can be over- or underweighted based on government/credit spreads. When the difference in yields between credit and government bonds is narrow, government bonds may be held above 50%. When the difference in yields between credit and

government bonds is wide, government bonds may be held below 50%. Securities can be over- or underweighted with respect to their market cap weight based on credit spreads. When the difference in yields between AAA+AA and A+BBB is narrow, AAA+AA bonds may be held above market cap weight. When the difference in yields between AAA+AA and A+BBB is wide, AAA+AA bonds may be held below market cap weight. When the difference in yields between AAA+AA and BBB is narrow, BBB bonds may be held below market cap weight. When the difference in yields between AAA+AA and BBB is wide, BBB bonds may be held above market cap weight. The duration of the index is based on the term spread between 5–10 year government/credit bonds and 1–3 year government/credit bonds. When the term spread is wide, the duration of the index can be longer than the duration of Bloomberg US Aggregate Index. When the term spread is narrow, the duration of the index can be shorter than the duration of Bloomberg US Aggregate Index. The duration of the government component is based on the term spread between 5–10 year government bonds and 1–3 year government bonds. When the term spread is wide, the duration of the government component can be longer than the duration of Bloomberg US Government Index. When the term spread is narrow, the duration of the index can be shorter than the duration of Bloomberg US Government Index. Rebalanced monthly. The index has been retrospectively calculated by Dimensional and did not exist prior to November 2016. Accordingly, results shown during the periods prior to November 2016 do not represent actual returns of the index. Other periods selected may have different results, including losses.

## DIMENSIONAL GLOBAL SHORT-TERM GOVERNMENT INDEX (HEDGED TO USD)

Compiled by Dimensional using data provided by Bloomberg. Based on securities in the universe of Bloomberg Global Aggregate 1–2 Year Index. Includes global government bonds only. Eligible currencies: AUD, CAD, CHF, EUR, GBP, JPY, and USD. Within the eligible universe, we apply market weights to construct the index. Rebalanced monthly. The index has been retroactively calculated by Dimensional and did not exist prior to March 2020. Accordingly, results shown during the periods prior to March 2020 do not represent actual returns of the index. Other periods selected may have different results, including losses.

## DIMENSIONAL GLOBAL SHORT-TERM GOVERNMENT VARIABLE MATURITY INDEX (HEDGED TO USD)

Compiled by Dimensional using FTSE data © 2022. Includes securities in the FTSE World Government Bond 1–3 Years and 3–5 Years indices. Countries: Australia, Austria, Belgium, Canada, France, Germany, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the UK, and the US. Countries with the steepest yield curves are overweight with respect to their market cap weight. For countries included, duration corresponds to the steepest segment of that country's yield curve. Rebalanced monthly. The index has been retrospectively calculated by Dimensional and did not exist prior to January 2019. Accordingly, results shown during the periods prior to January 2019 do not represent actual returns of the index. Other periods selected may have different results, including losses.

Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. The returns of indices presented herein reflect hypothetical performance and do not represent returns that any investor actually attained. Changes in the assumptions upon which such performance is based may have a material impact on the hypothetical returns presented. Hypothetical backtested returns have many inherent limitations. Unlike actual performance, it does not represent actual trading. Since trades have not actually been executed, results may have under- or overcompensated for the impact, if any, of certain market factors, such as lack of liquidity, and may not reflect the impact that certain economic or market factors may have had on the decision-making process. Hypothetical backtested performance also is developed with the benefit of hindsight. Other periods selected may have different results, including losses. There can be no assurance that Dimensional Fund Advisors will achieve profits or avoid incurring substantial losses.

# Sources and Descriptions of Data

## **DIMENSIONAL GLOBAL GOVERNMENT/CREDIT 1–3 YEAR UNHEDGED INDEX**

February 1999–present: Compiled by Dimensional using data provided by Bloomberg. Based on securities in the universe of Bloomberg Global Aggregate Index. Includes global government bonds and global investment grade corporate bonds. Eligible currencies: AUD, CAD, CHF, EUR, GBP, JPY, and USD. Within the universe, the index identifies the yield curves that offer higher expected returns, and the duration ranges on those yield curves offering higher expected returns, and assesses the increased expected returns associated with allocation to bonds with different credit qualities. It then overweights (with respect to their market cap weight) bonds of yield curves, duration ranges, and credit qualities that offer higher expected returns. It also employs credit quality, currency, and duration requirements relative to the eligible market. Rebalanced monthly. The index has been retrospectively calculated by Dimensional and did not exist prior to January 2020. Accordingly, results shown during the periods prior to January 2020 do not represent actual returns of the index. Other periods selected may have different results, including losses. Prior to February 1999: Compiled by Dimensional using data © 2022 by FTSE. Includes securities in the FTSE World Government Bond 1–3 Years Index. Countries: Australia, Austria, Belgium, Canada, France, Germany, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the UK, and the US as data becomes available. Rebalanced monthly based on market weights.

## **DIMENSIONAL GLOBAL ADJUSTED FIXED INCOME MARKET INDEX (HEDGED TO USD)**

Compiled by Dimensional using data provided by Bloomberg. Based on securities in the universe of the Bloomberg Global Aggregate Index and Global High Yield Index. Includes global government bonds, global investment grade corporate bonds, and global BB corporates. Eligible currencies: AUD, CAD, CHF, EUR, GBP, JPY, and USD. Within the universe, the index identifies the yield curves that offer higher expected returns, and the duration ranges on those yield curves offering higher expected returns, and assesses the increased expected returns

associated with allocation to bonds with different credit qualities. It then overweights (with respect to their market cap weight) bonds of yield curves, duration ranges, and credit qualities that offer higher expected returns. It also employs credit quality, currency, and duration requirements relative to the eligible market. Rebalanced monthly. The index has been retrospectively calculated by Dimensional and did not exist prior to November 2017. Accordingly, results shown during the periods prior to November 2017 do not represent actual returns of the index. Other periods selected may have different results, including losses.

## **DIMENSIONAL TARGETED CREDIT INDEX (HEDGED TO USD)**

Compiled by Dimensional using data provided by Bloomberg. Based on securities in the universe of Bloomberg Global Aggregate Index and Global High Yield Index. Includes global investment grade corporate bonds and global BB corporates only. Eligible currencies: AUD, CAD, CHF, EUR, GBP, JPY, and USD. Within the universe, the index identifies the yield curves that offer higher expected returns, and the duration ranges on those yield curves offering higher expected returns, and assesses the increased expected returns associated with allocation to bonds with different credit qualities. It then overweights (with respect to their market cap weight) bonds of yield curves, duration ranges, and credit qualities that offer higher expected returns. It also employs credit quality, currency, and duration requirements relative to the eligible market. Rebalanced monthly. The index has been retrospectively calculated by Dimensional and did not exist prior to January 2020. Accordingly, results shown during the periods prior to January 2020 do not represent actual returns of the index. Other periods selected may have different results, including losses.

Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. The returns of indices presented herein reflect hypothetical performance and do not represent returns that any investor actually attained. Changes in the assumptions upon which such performance is based may have a material impact on the hypothetical returns presented. Hypothetical backtested returns have many inherent limitations. Unlike actual performance, it does not represent actual trading. Since trades have not actually been executed, results may have under- or overcompensated for the impact, if any, of certain market factors, such as lack of liquidity, and may not reflect the impact that certain economic or market factors may have had on the decision-making process. Hypothetical backtested performance also is developed with the benefit of hindsight. Other periods selected may have different results, including losses. There can be no assurance that Dimensional Fund Advisors will achieve profits or avoid incurring substantial losses.