

ANNUAL MARKET REVIEW

2017

Quarterly Topic: To Bit or Not to Bit

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What Should Investors Make of Bitcoin Mania?

Bitcoin and other cryptocurrencies are receiving intense media coverage, prompting many investors to wonder whether these new types of electronic money deserve a place in their portfolios.

Cryptocurrencies such as bitcoin emerged only in the past decade. Unlike traditional money, no paper notes or metal coins are involved. No central bank issues the currency, and no regulator or nation state stands behind it.

Instead, cryptocurrencies are a form of code made by computers and stored in a digital wallet. In the case of bitcoin, there is a finite supply of 21 million¹, of which more than 16 million are in circulation². Transactions are recorded on a public ledger called blockchain.

People can earn bitcoins in several ways, including buying them using traditional fiat currencies³ or by “mining” them—receiving newly created bitcoins for the service of using powerful computers to compile recent transactions into new blocks of the transaction chain through solving a highly complex mathematical puzzle.

For much of the past decade, cryptocurrencies were the preserve of digital enthusiasts and people who believe the age of fiat currencies is coming to an end. This niche appeal is reflected in their market value. For example, at a market value of \$16,000 per bitcoin⁴, the total value of bitcoin in circulation is less than one tenth of 1% of the aggregate value of global stocks and bonds. Despite this, the sharp rise in the market value of bitcoins over the past weeks and months have contributed to intense media attention.

1. Source: Bitcoin.org.

2. As of December 14, 2017. Source: Coinmarketcap.com.

3. A currency declared by a government to be legal tender.

4. Per Bloomberg, the end-of-day market value of a bitcoin exceeded \$16,000 USD for the first time on December 7, 2017.

What are investors to make of all this media attention? What place, if any, should bitcoin play in a diversified portfolio? Recently, the value of bitcoin has risen sharply, but that is the past. What about its future value?

You can approach these questions in several ways. A good place to begin is by examining the roles that stocks, bonds, and cash play in your portfolio.

EXPECTED RETURNS

Companies often seek external sources of capital to finance projects they believe will generate profits in the future. When a company issues stock, it offers investors a residual claim on its future profits. When a company issues a bond, it offers investors a promised stream of future cash flows, including the repayment of principal when the bond matures. The price of a stock or bond reflects the return investors demand to exchange their cash today for an uncertain but greater amount of expected cash in the future. One important role these securities play in a portfolio is to provide positive expected returns by allowing investors to share in the future profits earned by corporations globally. By investing in stocks and bonds today, you expect to grow your wealth and enable greater consumption tomorrow.

Government bonds often provide a more certain repayment of promised cash flows than corporate bonds. Thus, besides the potential for providing positive expected returns, another reason to hold government bonds is to reduce the uncertainty of future wealth. And inflation-linked government bonds reduce the uncertainty of future inflation-adjusted wealth.

Holding cash does not provide an expected stream of future cash flow. One US dollar in your wallet today does not entitle you to more dollars in the future. The same logic applies to holding other fiat currencies — and holding bitcoins in a digital wallet.

Quarterly Topic: To Bit or Not to Bit Continued

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So we should not expect a positive return from holding cash in one or more currencies unless we can predict when one currency will appreciate or depreciate relative to others.

The academic literature overwhelmingly suggests that short-term currency movements are unpredictable, implying there is no reliable and systematic way to earn a positive return just by holding cash, regardless of its currency. So why should investors hold cash in one or more currencies? One reason is because it provides a store of value that can be used to manage near-term known expenditures in those currencies.

With this framework in mind, it might be argued that holding bitcoins is like holding cash; it can be used to pay for some goods and services. However, most goods and services are not priced in bitcoins.

A lot of volatility has occurred in the exchange rates between bitcoins and traditional currencies. That volatility implies uncertainty, even in the near term, in the amount of future goods and services your bitcoins can purchase. This uncertainty, combined with possibly high transaction costs to convert bitcoins into usable currency, suggests that the cryptocurrency currently falls short as a store of value to manage near-term known expenses. Of course, that may change in the future if it becomes common practice to pay for all goods and services using bitcoins.

If bitcoin is not currently practical as a substitute for cash, should we expect its value to appreciate?

SUPPLY AND DEMAND

The price of a bitcoin is tied to supply and demand. Although the supply of bitcoins is slowly rising, it may reach an upper limit, which might imply limited future supply. The future supply of cryptocurrencies, however, may be very flexible as new types are developed and innovation in technology makes many cryptocurrencies close substitutes for one another, implying the quantity of future supply might be unlimited.

Regarding future demand for bitcoins, there is a non-zero probability⁵ that nothing will come of it (no future demand) and a non-zero probability that it will be widely adopted (high future demand).

Future regulation adds to this uncertainty. While recent media attention has ensured bitcoin is more widely discussed today than in years past, it is still largely unused by most financial institutions. It has also been the subject of scrutiny by regulators. For example, in a note to investors in 2014, the US Securities and Exchange Commission warned that any new investment appearing to be exciting and cutting-edge has the potential to give rise to fraud and false “guarantees” of high investment returns⁶. Other entities around the world have issued similar warnings. It is unclear what impact future laws and regulations may have on bitcoin’s future supply and demand (or even its existence). This uncertainty is common with young investments.

All of these factors suggest that future supply and demand are highly uncertain. But the probabilities of high or low future supply or demand are an input in the price of bitcoins today. That price is fair, in that investors willingly transact at that price. One investor does not have an unfair advantage over another in determining if the true probability of future demand will be different from what is reflected in bitcoin’s price today.

5. Describes an outcome that is possible (or not impossible) to occur.

6. “Investor Alert: Bitcoin and Other Virtual Currency-Related Investments,” SEC, 7 May 2014.

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WHAT TO EXPECT

So, should we expect the value of bitcoins to appreciate? Maybe. But just as with traditional currencies, there is no reliable way to predict by how much and when that appreciation will occur. We know, however, that we should not expect to receive more bitcoins in the future just by holding one bitcoin today. They don't entitle holders to an expected stream of future bitcoins, and they don't entitle the holder to a residual claim on the future profits of global corporations.

None of this is to deny the exciting potential of the underlying blockchain technology that enables the trading of bitcoins. It is an open, distributed ledger that can record transactions efficiently and in a verifiable and permanent way, which has significant implications for banking and other industries, although these effects may take some years to emerge.

When it comes to designing a portfolio, a good place to begin is with one's goals. This approach, combined with an understanding of the characteristics of each eligible security type, provides a good framework to decide which securities deserve a place in a portfolio. For the securities that make the cut, their weight in the total market of all investable securities provides a baseline for deciding how much of a portfolio should be allocated to that security.

Unlike stocks or corporate bonds, it is not clear that bitcoins offer investors positive expected returns. Unlike government bonds, they don't provide clarity about future wealth. And, unlike holding cash in fiat currencies, they don't provide the means to plan for a wide range of near-term known expenditures. Because bitcoin does not help achieve these investment goals, we believe that it does not warrant a place in a portfolio designed to meet one or more of such goals.

If, however, one has a goal not contemplated herein, and you believe bitcoin is well suited to meet that goal, keep in mind the final piece of our asset allocation framework: What percentage of all eligible investments do the value of all bitcoins represent? When compared to global stocks, bonds, and traditional currency, their market value is tiny. So, if for some reason an investor decides bitcoins are a good investment, we believe their weight in a well-diversified portfolio should generally be tiny⁷.

Because bitcoin is being sold in some quarters as a paradigm shift in financial markets, this does not mean investors should rush to include it in their portfolios. When digesting the latest article on bitcoin, keep in mind that a goals-based approach based on stocks, bonds, and traditional currencies, as well as sensible and robust dimensions of expected returns, has been helping investors effectively pursue their goals for decades.

7. Investors should discuss the risks and other attributes of any security or currency with their advisor prior to making any investment.

The opinions expressed are those of the author and are subject to change. The commentary above pertains to bitcoin cryptocurrency. Certain bitcoin offerings may be considered a security and may have different attributes than those described in this paper.

This material is not to be construed as investment advice or a recommendation to buy or sell any security or currency. Investing involves risks including possible loss of principal. Stocks are subject to market fluctuation and other risks. Bonds are subject to increased risk of loss of principal during periods of rising interest rates and other risks. There is no assurance that any investment strategy will be successful. Diversification does not assure a profit or protect against loss.

Annual Market Review

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OVERVIEW

Quarterly Topic: To Bit or Not to Bit: What Should Investors Make of Bitcoin Mania?

Market Summary

World Asset Classes

US Stocks

International Developed Stocks

Emerging Markets Stocks

Select Country Performance

Select Currency Performance vs. US Dollar

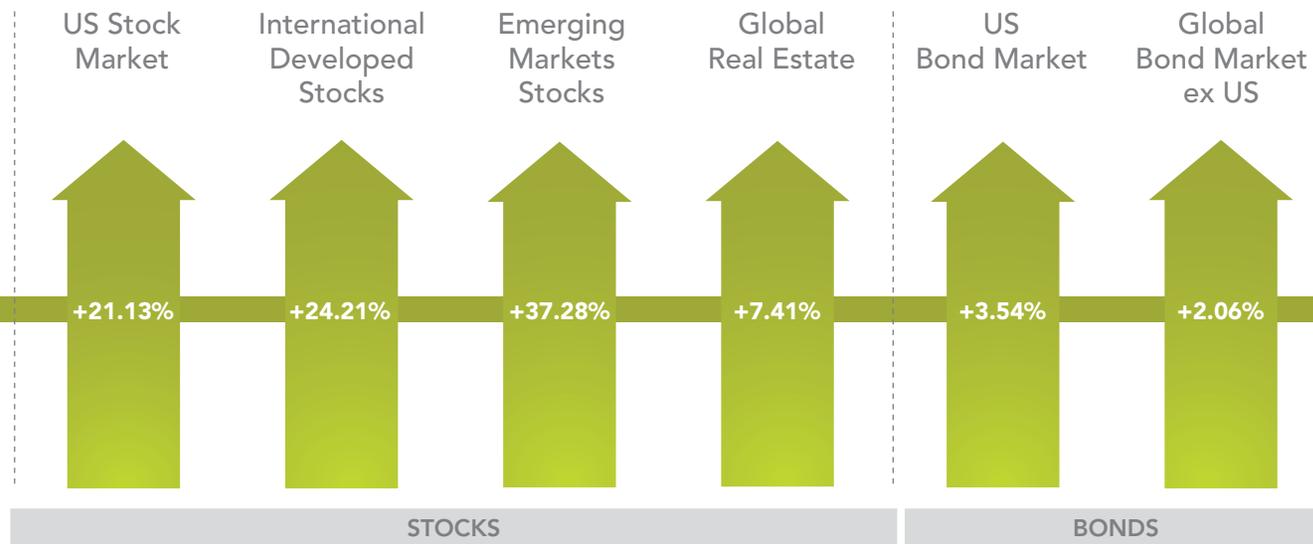
Real Estate Investment Trusts (REITs)

Impact of Diversification

This report features world capital market performance for the past year.

Market Summary: 2017 Index Returns

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Since Jan. 2001

Avg. Annual Return	8.4%	7.0%	14.8%	11.0%	4.8%	4.5%
Best Year	33.6% 2013	39.4% 2003	78.5% 2009	37.4% 2006	10.3% 2002	9.8% 2014
Worst Year	-37.3% 2008	-43.6% 2008	-53.3% 2008	-45.7% 2008	-2.0% 2013	1.4% 2013

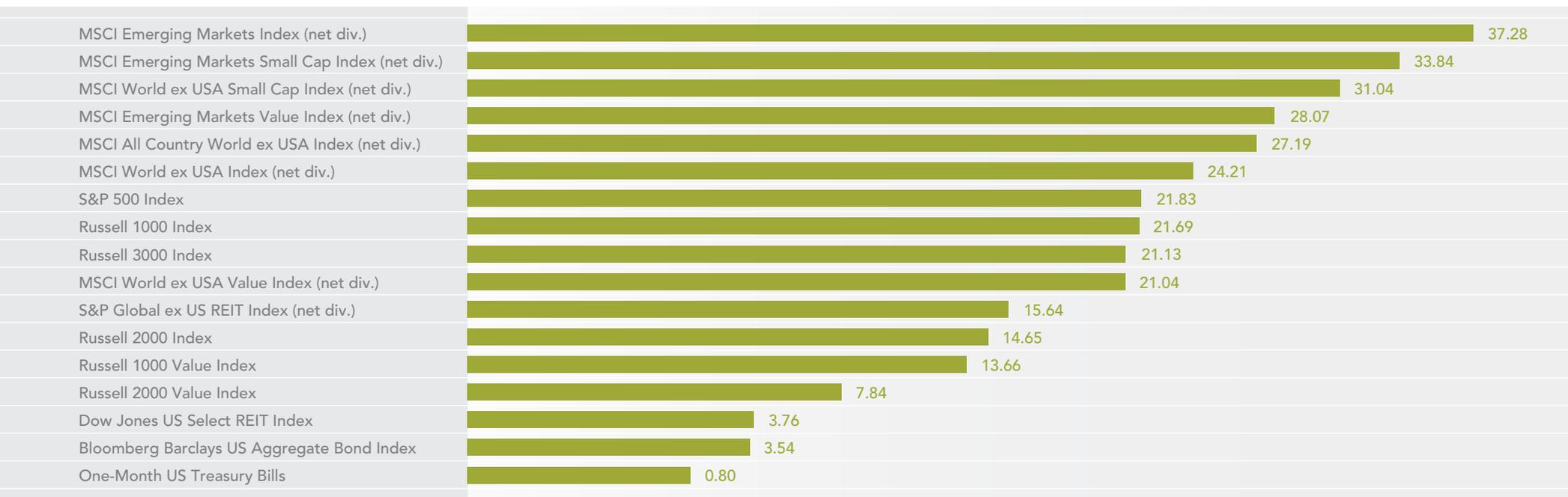
Past performance is not a guarantee of future results. Indices are not available for direct investment. Index performance does not reflect the expenses associated with the management of an actual portfolio. Market segment (index representation) as follows: US Stock Market (Russell 3000 Index), International Developed Stocks (MSCI World ex USA Index [net div.]), Emerging Markets (MSCI Emerging Markets Index [net div.]), Global Real Estate (S&P Global REIT Index [net div.]), US Bond Market (Bloomberg Barclays US Aggregate Bond Index), and Global Bond ex US Market (Citi WGBI ex USA 1–30 Years [Hedged to USD]). The S&P data are provided by Standard & Poor's Index Services Group. Frank Russell Company is the source and owner of the trademarks, service marks, and copyrights related to the Russell Indexes. MSCI data © MSCI 2018, all rights reserved. Bloomberg Barclays data provided by Bloomberg. Citi fixed income indices © 2018 by Citigroup.

World Asset Classes: 2017 Index Returns (%)

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Looking at broad market indices, emerging markets outperformed US and non-US developed markets in 2017.

The value effect was negative in the US, non-US developed markets, and emerging markets. Small caps outperformed large caps in non-US developed markets but underperformed in the US and emerging markets.



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US Stocks: 2017 Index Returns

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The US equity market posted positive returns for 2017 but underperformed non-US developed and emerging markets.

Value underperformed growth in the US across large and small cap indices.

Small caps underperformed large caps in the US.

World Market Capitalization—US



52%
 US Market
 \$27.4 trillion

Ranked Returns for 2017 (%)

Large Growth	30.21
Small Growth	22.17
Large Cap	21.69
Marketwide	21.13
Small Cap	14.65
Large Value	13.66
Small Value	7.84

Period Returns (%)

Asset Class	1 Year	3 Years*	5 Years*	10 Years*
Large Growth	30.21	13.79	17.33	10.00
Small Growth	22.17	10.28	15.21	9.19
Large Cap	21.69	11.23	15.71	8.59
Marketwide	21.13	11.12	15.58	8.60
Small Cap	14.65	9.96	14.12	8.71
Large Value	13.66	8.65	14.04	7.10
Small Value	7.84	9.55	13.01	8.17

* Annualized

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 Cap Value (Russell 1000 Value Index), Large Cap Growth (Russell 1000 Growth Index), Small Cap (Russell 2000 Index), Small Cap Value (Russell 2000 Value Index), and Small Cap 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. Frank Russell Company is the source and owner of the trademarks, service marks, and copyrights related to the Russell Indexes. MSCI data © MSCI 2018, all rights reserved.

International Developed Stocks: 2017 Index Returns

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In US dollar terms, non-US developed markets outperformed the US market but underperformed emerging markets during 2017.

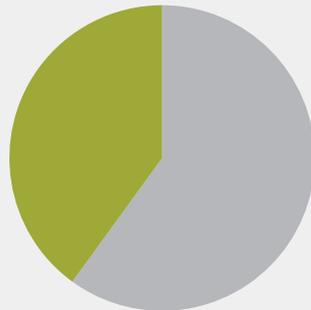
Looking at broad market indices, the value effect was negative.

Small caps outperformed large caps in non-US developed markets.

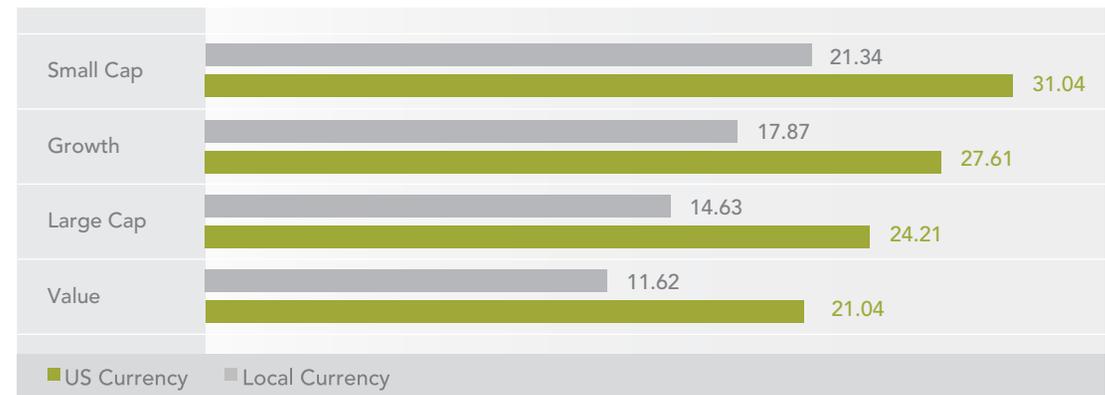
World Market Capitalization—International Developed

37%

**International
Developed
Market**
\$19.4 trillion



Ranked Returns for 2017 (%)



Period Returns (%)

Asset Class	1 Year	3 Years*	5 Years*	10 Years*
Small Cap	31.04	12.96	11.37	5.16
Growth	27.61	8.38	8.22	2.36
Large Cap	24.21	7.36	7.46	1.87
Value	21.04	6.26	6.64	1.32

* Annualized

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Emerging Markets Stocks: 2017 Index Returns

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In US dollar terms, emerging markets outperformed the US and non-US developed markets for the year.

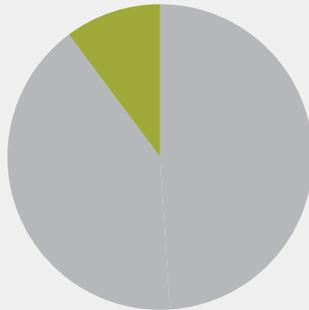
Across the large cap and mid cap space, the value effect was negative; however, in the small cap space, the effect was positive.

Overall, small caps underperformed large caps in emerging markets.

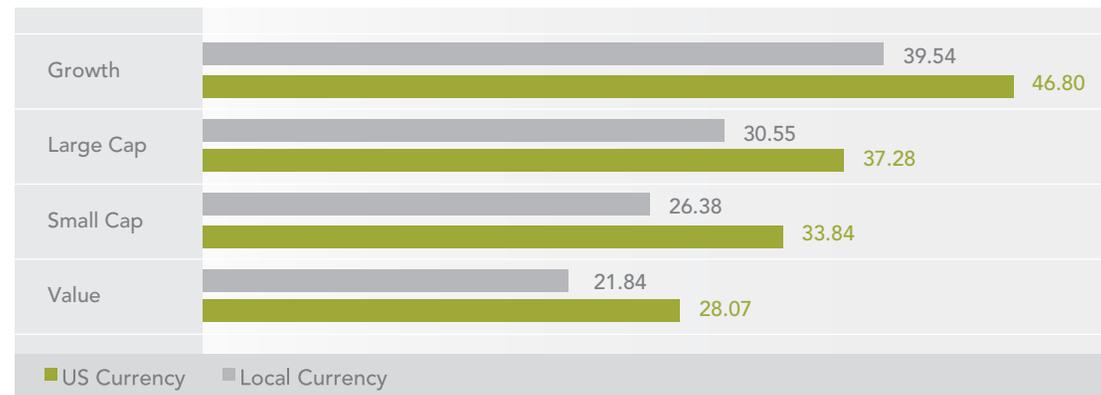
World Market Capitalization—Emerging Markets

12%

Emerging Markets
\$6.2 trillion



Ranked Returns for 2017 (%)



Period Returns (%)

Asset Class	1 Year	3 Years*	5 Years*	10 Years*
Growth	46.80	11.88	6.85	2.35
Large Cap	37.28	9.10	4.35	1.68
Small Cap	33.84	8.44	5.41	2.78
Value	28.07	6.21	1.75	0.91

* Annualized

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: Large Cap (MSCI Emerging Markets Index), Small Cap (MSCI Emerging Markets Small Cap Index), Value (MSCI Emerging Markets Value Index), and Growth (MSCI Emerging Markets Growth Index). All index returns are net of withholding tax on dividends. World Market Cap represented by Russell 3000 Index, MSCI World ex USA IMI Index, and MSCI Emerging Markets IMI Index. MSCI Emerging Markets IMI Index used as the proxy for the emerging market portion of the market. MSCI data © MSCI 2018, all rights reserved.

Select Country Performance: 2017 Index Returns

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In US dollar terms, Austria recorded the highest country performance in developed markets with a gain of more than 50%, while Israel posted the lowest return for the year. In emerging markets, Poland and China posted the highest country returns, each returning over 50%, while Pakistan and Qatar had the lowest performance.

Ranked Developed Markets (% Returns)

Austria	51.39
Denmark	35.40
Singapore	34.16
Hong Kong	33.95
Netherlands	33.47
Italy	32.02
Germany	30.48
France	29.53
Portugal	28.04
Spain	26.58
Japan	25.25
New Zealand	24.76
Switzerland	24.07
UK	23.70
Norway	23.35
Ireland	23.29
Finland	21.97
Australia	20.94
US	20.59
Sweden	20.51
Belgium	19.87
Canada	15.62
Israel	10.36

Ranked Emerging Markets (% Returns)

Poland	53.56
China	50.67
South Korea	46.04
India	43.72
Chile	43.25
Peru	38.95
Hungary	38.24
Turkey	37.84
Czech Republic	37.38
Greece	34.98
South Africa	33.99
Thailand	31.46
Taiwan	30.24
Malaysia	26.80
Brazil	26.38
Philippines	21.53
Indonesia	19.08
Mexico	15.01
Colombia	14.96
Egypt	13.65
Russia	5.13
UAE	2.25
Qatar	-12.79
Pakistan	-24.75

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Select Currency Performance vs. US Dollar: 2017

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Most developed market currencies appreciated against the US dollar in 2017. The euro and Danish krone appreciated the most with gains of almost 14%, while the Hong Kong dollar depreciated. In emerging markets, the Polish zloty and the Czech koruna appreciated more than 20%, while the Turkish lira depreciated over 7%.

Ranked Developed Markets (%)

Euro (EUR)	13.85
Danish krone (DKK)	13.70
Swedish krona (SEK)	10.96
Israel shekel (ILS)	10.86
British pound (GBP)	9.48
Singapore dollar (SGD)	8.10
Australian dollar (AUD)	8.02
Canadian dollar (CAD)	7.03
Norwegian krone (NOK)	5.24
Swiss franc (CHF)	4.29
Japanese yen (JPY)	3.54
New Zealand dollar (NZD)	1.99
Hong Kong dollar (HKD)	-0.82

Ranked Emerging Markets (%)

Czech koruna (CZK)	20.50
Poland zloty (PLZ)	20.13
Hungary forint (HUF)	13.36
South Korean won (KRW)	12.82
Malaysian ringgit (MYR)	10.85
South African rand (ZAR)	10.46
Thailand baht (THB)	9.88
Chilean peso (CLP)	8.91
Taiwanese NT dollar (TWD)	8.30
Chinese yuan (CNY)	6.72
Indian rupee (INR)	6.33
Russian ruble (RUB)	6.03
Mexican peso (MXP)	5.30
Peru sol (PEI)	3.47
Egyptian pound (EGP)	1.97
Colombian peso (COP)	0.59
Philippine peso (PHP)	-0.42
Indonesia rupiah (IDR)	-0.70
Brazilian real (BRC)	-1.88
Pakistani rupee (PKR)	-5.41
Turkish lira (TRY)	-7.23

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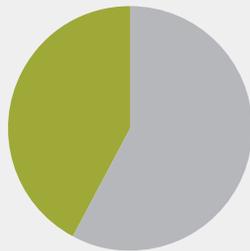
Real Estate Investment Trusts (REITs): 2017 Index Returns

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Non-US real estate investment trusts outperformed US REITs in 2017.

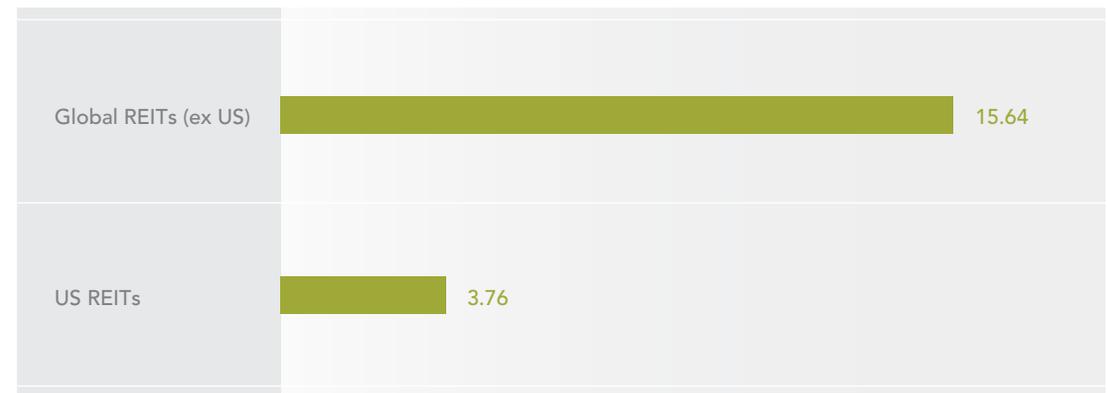
Total Value of REIT Stocks

42%
World ex US
 \$485 billion
 251 REITs
 (23 other countries)



58%
US
 \$672 billion
 101 REITs

Ranked Returns (%)



Period Returns (%)

Asset Class	1 Year	3 Years*	5 Years*	10 Years*
Global REITs (ex US)	15.64	4.78	5.49	2.05
US REITs	3.76	4.97	9.09	7.07

* Annualized

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 US Select REIT Index data provided by Dow Jones ©. S&P Global ex US REIT Index data provided by Standard and Poor's Index Services Group © 2018.

Impact of Diversification: 2017 Index Returns

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

Period Returns (%)

Asset Class	1 Year	3 Years*	5 Years*	10 Years*	10-Year STDEV ¹
100% Stocks	24.62	9.89	11.40	5.22	16.80
75/25	18.23	7.54	8.59	4.26	12.59
50/50	12.14	5.15	5.79	3.11	8.38
25/75	6.33	2.75	3.00	1.78	4.18
100% Treasury Bills	0.80	0.34	0.21	0.30	0.16

* Annualized

Ranked Returns for 2017 (%)



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. Past performance is not a guarantee of future results. Indices are not available for direct investment. Index performance does not reflect expenses associated with the management of an actual portfolio. Asset allocations and the hypothetical index portfolio returns are for illustrative purposes only and do not represent actual performance. Global Stocks represented by MSCI All Country World Index (gross div.) and Treasury Bills represented by US One-Month Treasury Bills. Globally diversified allocations rebalanced monthly, no withdrawals. Data © MSCI 2018, all rights reserved. Treasury bills © Stocks, Bonds, Bills, and Inflation Yearbook™, Ibbotson Associates, Chicago (annually updated work by Roger G. Ibbotson and Rex A. Sinquefeld).

About Hemington Wealth Management

Hemington Wealth Management provides high net worth individuals and families with a broad range of wealth management services including portfolio management. We are collaborative, accessible and responsive, making it easy for clients to work with our team.

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