If They Build It, Will Investors Come?

Introduction

Baseball Hall of Famers such as Mike Schmidt built a career on power hitting while Ty Cobb operated as a deadball era contact hitter, yet both are considered among the best hitters of all time. Using baseball as an analogy, investing doesn't always mean swinging for the fences; consistently hitting singles and doubles over a storied career can still generate a trip to the Baseball Hall of Fame. When discussing asset allocation with clients, our goal is to construct portfolios with long-term durability—not attempting to be the hero hitting a game-winning homerun. As actor Art LaFleur said as "The Babe" (Babe Ruth) in the 1990s film *The Sandlot*, "Remember kid, there's heroes and there's legends. Heroes get remembered, but legends never die." We prefer our portfolios be of the "legend" variety.

This philosophy means constructing a portfolio that acknowledges the cyclical nature of markets, as well as being clear about the longer-term return potential of the asset classes in which one is invested. Today, based on the valuation environment and what we believe to be the later innings of the business cycle, our view is that it is advisable to "move forward, but with caution."[1] What does that look like? We think it means having portfolios that are in line with allocation targets, perhaps looking abroad where more attractive valuations paint a better long-term return picture, and also looking for asset classes with qualities that are more conducive to the current environment. As it relates to the latter, we think exposure to infrastructure can be additive to portfolio allocations.

We begin by offering some interesting statistics:

- The United States has a "D+" rating for infrastructure from the American Society of Civil Engineers (ASCE).[2]
- Since 2015 there are more electric vehicle (EV) charging stations than traditional petrol stations—in Japan.[3]
- Over the last five years, U.S. water/sewer service annualized Consumer Price Index (CPI) has been 4.1% while headline CPI is just 1.3%.[4]
- China is the world's largest solar panel installer, more so than the next two countries, the United States and Japan, combined.[5]
- General Motors is targeting 500,000 new energy vehicle sales in China on an annual basis by 2025.[6]
- In Sweden, drones equipped with automated external defibrillators have consistently reduced dispatch times compared to traditional emergency medical service response teams.[7]

Where can you find crumbling bridges, electrical brownouts, and multiyear water shortages? Believe it or not, we are not describing North Korea but rather the United States! The largest economy in

[1] Howard Marks Memo to Oaktree Clients, "There They Go Again...Again," July 2017.

[2] American Society of Civil Engineers, "Failure to Act: Closing the Infrastructure Investment Gap for America's Economic Future," May 2016.

[3] https://www.bloomberg.com/news/articles/2015-02-13/japan-has-more-car-chargers-than-gas-stations-carbon-climate.

[4] https://www.bls.gov/news.release/cpi.t02.htm.

[5] IEA Snapshot of Global PV, 1992–2016.

[6] https://www.bloomberg.com/news/articles/2017-09-14/gm-s-record-deliveries-in-china-mask-muted-electric-car-sales.

[7] Andreas Claesson, Anders Bäckman, Mattias Ringh, et al., "Time to Delivery of an Automated External Defibrillator Using a Drone for Simulated Out-of-Hospital Cardiac Arrests vs. Emergency Medical Services," *Journal of the American Medical Association,* June 13, 2017.

the world has a glaring infrastructure investment gap estimated by the ASCE at $2 trillion over the next 10 years. The quality of existing public works will likely continue to deteriorate unless significant capital investments are made. For U.S. investors, it is common to associate infrastructure with "shovel-ready" jobs, traditionally funded by various taxing authorities at the state and local level. From an international perspective, however, the dynamic between private enterprise and government-funded infrastructure operations is quite the opposite. For example, just 15% of water projects are supported by the private sector in the United States, whereas that number jumps to 75% in the United Kingdom and 33% in China.[8] Within the United States, efforts are being made to shift the funding landscape toward the international model. For example, the Trump administration has suggested paying state and local governments a bonus for privatizing a project, with the size of the bonus tied to the size of the project. The proceeds of that privatization could then be used for other infrastructure projects, in what is referred to as asset recycling.[9] As more infrastructure projects worldwide are funded by private capital (or existing infrastructure is privatized), the opportunity set for investors will likely continue to expand.

As many yield-seeking investors look for investments that can help achieve their long-term return objectives, we think infrastructure may be an option. While a relatively new investment solution to a broad base of U.S. investors, asset flows into infrastructure investments suggest demand is far from outpacing the supply of global projects. Furthermore, projects dedicated to clean energy and water provide a unique opportunity to act as both a long-term income-generating asset as well as an *impact investment* to help potentially fulfill the needs of responsible investing (RI) investors—a win-win, in our view.

In this edition of *Strategy Insights,* we explore the world of global infrastructure, outlining the key defining characteristics of the asset class, what role we expect infrastructure to play in portfolios, and why now might be an attractive time to add this asset class to existing positions or initiate new ones.

Defining Global Infrastructure

Defining infrastructure can be a challenging exercise and may lead to more questions than answers because the asset class is quite broad and heterogeneous. Is the definition intended to be specific to publicly traded securities such as utilities? Or is it trying to access infrastructure investment via illiquid, private vehicles? Does the definition include miscellaneous social programs such as mission-oriented institutional infrastructure for schools or hospitals?

CFA Institute defines infrastructure investing as "the private sector designing, financing, and operating physical assets needed for the functioning of a society."[10] In this variation of the definition, an investor literally maintains the asset on behalf of the public sector (that is, the government), which pays leasing fees for use of that asset. When operators want to exit their investment, they typically sell their interest to other investors, which allows the governing body to avoid raising taxes or issuing new debt to finance the continuation of that project. We believe in thinking about global infrastructure from multiple angles, where portfolio exposures can be accessed through more direct private vehicles or through publicly traded exchange-traded funds (ETFs) and actively managed mutual funds. We will discuss these varying exposure options later in the report.

Currently, there are four primary categories of investable themes across the global infrastructure spectrum: energy, telecommunications, transportation, and water. In Table 1 (page 3), we have highlighted both the challenges and opportunities associated with each category, as well as the common sectors/industries affected by each.

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[8] RobecoSAM, *Water: The Market of the Future* (2015).

[9] Strategas Research Partners, "Trump Plan Provides New Model for Investment," June 6, 2017.

[10] Yves Courtois, *Infrastructure: An Emerging Global Asset Class,* CFA Institute, November 2013.

Table 1
Infrastructure Investable Themes

	Challenges	Opportunities	Sectors/Industries Affected
Energy	Drilling efficiencies Finite resources Renewable energy initiatives	Unconventional oil projects Pipelines Renewable energy projects EV charging stations	Oil & gas exploration Pipelines Utilities Renewable energy equipment
Telecommunications	Finite mobile demand Limited fiber optic cables	5G technology Dark fiber networks Data centers	Telecommunication services Telecommunication carriers Semiconductors
Transportation	Federal Aviation Admin. Suboptimal traffic flow	Toll roads Drones High-speed rail “One Belt, One Road”	Construction Engineering services Rails & airports
Water	Finite resource Irrigation demands	Waste water treatment Desalination “Smart” watering	Utilities Measurement instruments

Source: PNC

Distinguishing Between Public Versus Private

As with most asset classes, there are a number of different ways to gain exposure. When thinking about infrastructure, along with the ubiquitous active/passive choice, one must understand the difference between public and private investment options. Currently, we gain our infrastructure exposure through publicly traded ETFs and mutual funds, but private investments also exist. We have not introduced private investment vehicles to our platform, but we will continue to explore options in the private universe as the private funding of infrastructure projects expands the opportunity set of available investments. Private infrastructure investment vehicles will likely provide investors with more “pure” exposure to the asset class; however, there are other considerations such as accessibility, liquidity, and fees to consider.

Public/Listed Global Infrastructure Equity

Investing in public equity infrastructure typically means investing in the publicly traded equity of companies involved in a wide range of sectors and industries, from energy production to telecommunication carriers and beyond. Using the MSCI World Infrastructure Index (MSCI Infra) as a representative sample or benchmark for global infrastructure, one can see the sector weightings vary significantly from a common proxy used for large cap core equities, such as the MSCI World Index (MSCI World) (Table 2, page 4). The red blocks highlight the sectors where the index has no sector exposure, and the green blocks highlight the top three sectors for both indexes. Notice the high degree of concentration in both the Utilities and Telecommunication Services sectors in the MSCI Infra, whereas the MSCI World has the most exposure to Financials, Consumer Discretionary, and Industrials. Thus, the composition of these two indexes is markedly different, which means their inherent factor exposures and behavior across market cycles are likely to be materially different as well. Even when taking into account the higher beta securities within the Energy and Industrials sectors (3-year beta of 1.07 and 1.01, respectively), MSCI Infra has a lower overall beta of 0.62 relative to the MSCI World with the significant overweights to Telecommunication Services and Utilities (3-year beta of 0.76 and 0.42, respectively).[11]

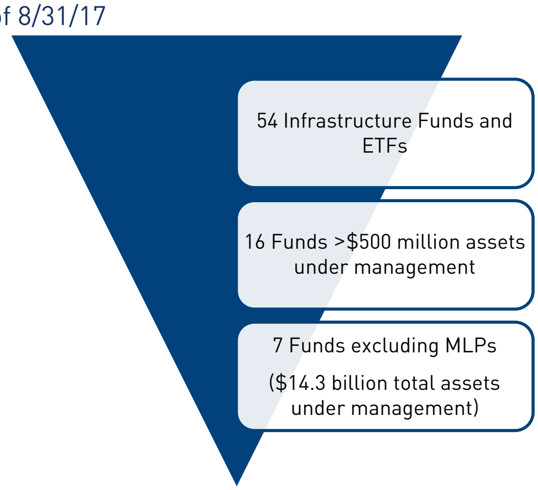
[11] Beta is a measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market as a whole.

Table 2
Sector Weightings
As of 8/31/17

Sector	MSCI World Infrastructure	MSCI World
Consumer Discretionary	0%	12.1%
Consumer Staples	0%	8.9%
Energy	9.5%	6.2%
Financials	0%	18.1%
Health Care	2.1%	12.4%
Industrials	5.1%	11.6%
Information Technology	0%	16.2%
Materials	0%	5.1%
Real Estate	0%	3.1%
Telecommunication Services	39.1%	2.9%
Utilities	44.2%	3.1%

Source: Bloomberg L.P.

Chart 1
Investable Mutual Funds Categorized as Infrastructure Funds
As of 8/31/17



Source: Bloomberg L.P.

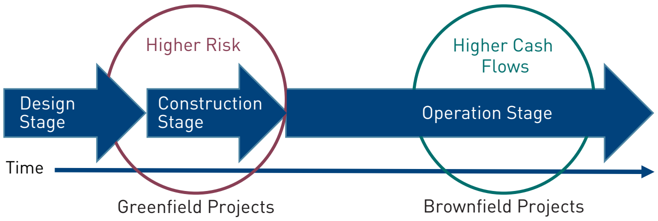
There are many publicly traded vehicles that technically fall under the Infrastructure umbrella, for example, Utilities and Industrials sector-specific portfolios; natural gas master limited partnerships (MLPs); municipal revenue bonds; and technology, media, and telecommunications (TMT) securities. But most of these do not precisely fit our preferred definition of global infrastructure. Compared to private investments, the universe of investable mutual funds categorized as infrastructure funds is quite limited (Chart 1). Per Bloomberg L.P., there are only 54 such infrastructure funds domiciled in the United States, including ETFs. The universe with a scalable asset base to support large institutional and ultra-high-net-worth investors shrinks to just 16 funds, and when excluding funds specifically dedicated to MLPs (which in our view, have separate, distinct investment characteristics), leaves 7 infrastructure funds.

Private Infrastructure

Investing in private infrastructure typically requires the use of limited partnerships or direct co-investments as the operator of an asset, which can make investor access a bit more limited. Private infrastructure investing can take on two general forms—Greenfield and Brownfield projects—depending on the point in time of the life cycle of the investment fund. Greenfield projects (a term originally coined to describe projects built on virgin land) occur before the fund is operational, which includes the initial planning and design stage as well as the construction stage. The construction stage of an infrastructure project is generally considered the highest risk stage due to the level of capital outlays required, potential budget overruns, the possibility of the project being cancelled, and little to no cash flows distributed to the investor. Taken a step further, Greenfield projects are closer from a risk-reward perspective to commodity-based real assets or private equity, and when lumped in with public/listed infrastructure they can have a tendency to skew the potential reward-risk expectations for the entire asset class of infrastructure.

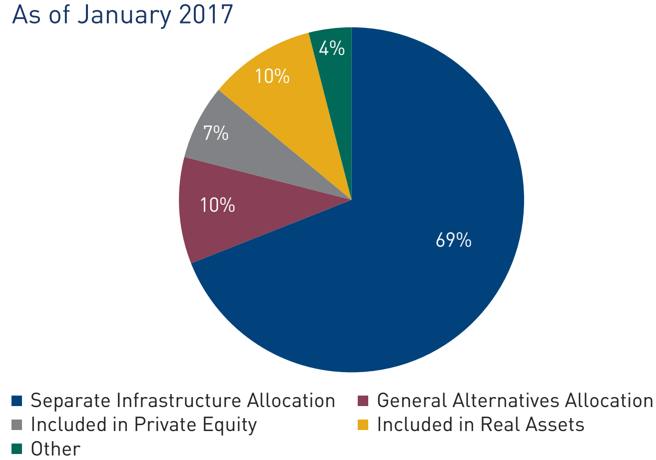
Brownfield investments include projects already in operation or in need of additional financing for ongoing maintenance and other capital expenditures. Often the operator is looking to create new, greater efficiencies in order to reduce expenses. With a lower risk profile than Greenfield projects, funds in Brownfield projects

Chart 2
Brownfield versus Greenfield Investments



Source: PNC

Chart 3
Infrastructure Categorization
As of January 2017



Source: Preqin

tend to generate steady cash flows and maintain a quasi-monopolistic structure due to long-dated government contracts (Chart 2).

On the surface, private infrastructure investing has some characteristics that resemble private equity in that both are typically illiquid, with long-term investment horizons. Compared to other commodity-based real assets, a commonality is that both invest in income-generating physical assets. Aside from those characteristics, that is where the similarities between private equity, real assets, and infrastructure end. Private equity investments typically follow a J-curve[12] investment trajectory compared to Brownfield infrastructure projects, which generate a highly predictable, stable income stream. Commodity-based real assets, including the project's initial construction and design, contain significantly higher risk profiles than do infrastructure operators already in production/ operational stages.

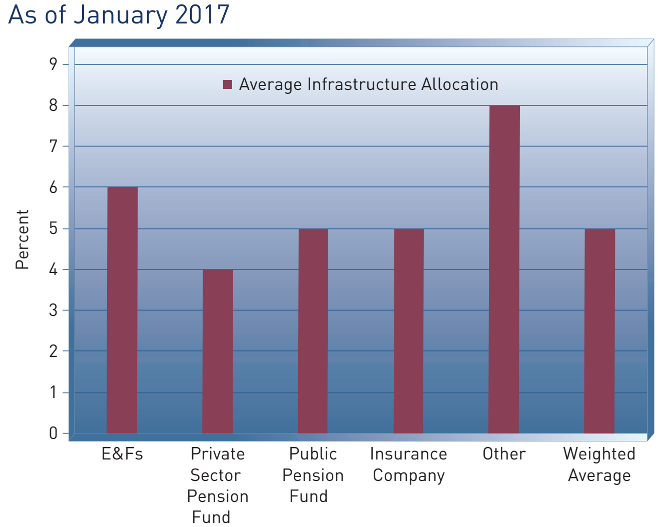
In an Asset Class of its Own

Given these reasons, we believe infrastructure retains a distinct asset class categorization. In a recent survey by Preqin, nearly 70% of investors surveyed count infrastructure as a standalone asset class, and this estimate increases to nearly 80% when including responders that codify it in the real asset category (Chart 3).

Reviewing the Investor Landscape

Given the still relatively limited but growing supply of global infrastructure projects, the size and opportunity set for infrastructure investments remain vast, making these projects more available for a wider institutional investor audience in recent years. Excluding public equity exposure such as utilities, construction companies within the Industrials sector, and natural gas pipeline MLPs, the average asset allocation is 5% for infrastructure investments (Chart 4). The "other" column in the chart includes a wide variety of investors including

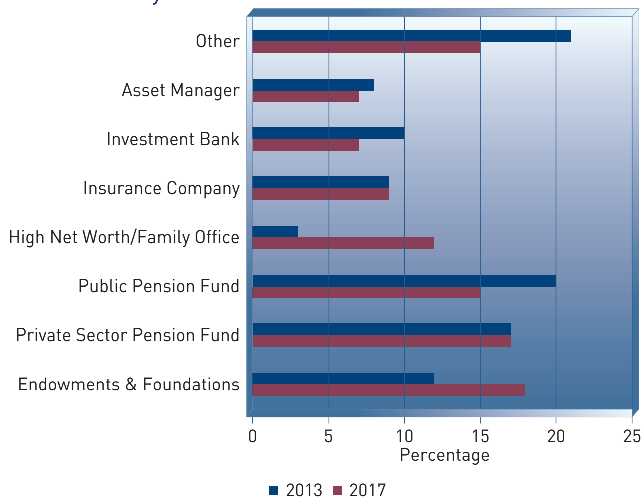
Chart 4
Infrastructure Allocation by Investor
As of January 2017



Source: Preqin

[12] See the PNC white paper *Going Private: A Guide to Private Investments*, December 2016.

Chart 5
Infrastructure Investors by Type
As of January 2017



Source: Preqin

sovereign wealth funds, supranational funds, and quasi-government agencies that have a wide range of allocation targets.

The growing investment demand and overwhelming need for infrastructure capital investments have allowed new entrants to participate in the asset class just within the last few years (Chart 5). For example, just four years ago, infrastructure was predominantly invested in by major pension plans and sovereign wealth funds with the size, scope, and scale to become the actual infrastructure operator, rather than invest through a traditional limited partnership or private placement.[13] As global infrastructure demand becomes more prevalent among investors of all sizes and types, new private funds are coming to market allowing access to infrastructure funds for first-time investors. Indeed, as seen in Chart 5, investor interest from endowments and foundations, as well as ultra-high-net-worth individuals, has experienced the fastest adoption rates of all investor types from 2013 to 2017. This is not to suggest investor demand is decreasing within certain investor types depicted in the chart, but rather depicting a shrinking share of the overall pie of sorts, as the total allocations in the chart equal 100%.

Global Infrastructure Investment Thesis

In Table 3, we compare a few select asset classes and our 10-year capital market return/volatility assumptions and calculate their Sharpe ratios. Over long horizons, we believe global infrastructure has the potential to outperform most other asset classes on a risk-adjusted return basis.

Another way to view infrastructure's positioning within an asset allocation framework is to plot the reward-risk characteristics of various asset classes on a continuum (Chart 6, page 7). With fixed income and private equity at the extremes, infrastructure falls somewhere in between. With monopolistic features and contracts embedded with inflation-adjusters, infrastructure has attributes that provide relatively

Table 3
10-Year Capital Market Assumptions for Select Asset Classes
As of 9/30/17

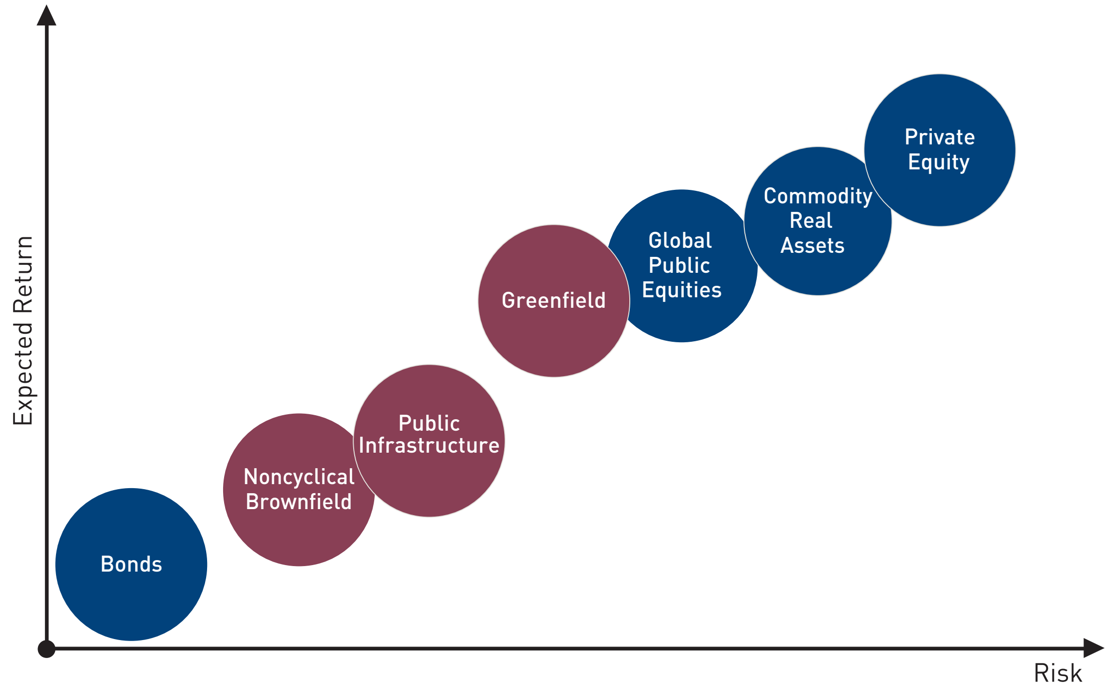
Asset Class	Total Return	Volatility	Sharpe Ratio
Private Debt	9.70%	17.85%	0.43
Private Equity	12.80%	27.20%	0.40
Private Real Estate	9.05%	17.60%	0.40
Global Infrastructure	*6.75%*	*11.75%*	*0.40*
Developed International Equities	8.80%	18.75%	0.36
Domestic Equities	7.35%	15.25%	0.35
Emerging Market Equities	10.95%	26.25%	0.34
Hedge Funds	5.25%	10.78%	0.30
High Yield Bonds	5.55%	12.20%	0.29
Investment Grade Bonds	3.00%	3.95%	0.25
Real Estate Investment Trusts	7.05%	24.80%	0.20

Source: PNC

[13] https://www.wsj.com/articles/ontario-teachers-others-to-buy-london-city-airport-1456434642.

Chart 6

Infrastructure Risk-Return Expectations Compared to Other Asset Classes and within Infrastructure Subsectors



Source: PNC

lower risk expectations than both private equity and traditional large cap core public equities. Relative to fixed income securities, infrastructure is unique in that the asset provides stable cash flows like traditional fixed-coupon bonds, with the potential for capital appreciation.

In Table 4, we have highlighted what we believe are the key merits and risks of investing in global infrastructure as an asset class.

Infrastructure has historically exhibited defensive and high income qualities. Investing mostly in publicly traded companies that own assets such as airports, seaports, toll roads, and utilities, the bull thesis for these assets is relatively straightforward—investing in companies that tend to have stable, predictable, inflation-linked cash flows is attractive when interest rates are low and growth is slow. Referring to our 2017 outlook,

Table 4

Key Merits and Risks of Investing in Global Infrastructure as an Asset Class

Merits	Risks
Global diversification/exposure	Currency translation for U.S.-based investors
Stable, recurring revenue base	Technological obsolescence
Generally high operating margins	Regulatory/political climate
Consistent income/cash flow generation	Slower long-run growth profile than other equity asset classes
Inflation-linked investment returns	Less upside capture in rapidly rising public equity markets
Low correlation to traditional asset classes	Heterogeneous reward/risk potential
Less cyclical/more defensive behavior across market cycles	May be vulnerable to rising costs of capital/interest rates

Source: PNC

as published in the first-quarter 2017 *Strategy Insights, Great Expectations*, we acknowledged the likelihood of a flattening yield curve. We pointed out that in all nine of the Federal Reserve's (Fed's) previous tightening cycles, the yield curve has flattened in response. Analyzing the five periods of curve flattening since the early 1990s finds infrastructure-heavy sectors such as Utilities and Industrials outperforming the broad S&P 500®. Although we believe interest rates may rise as we move into 2018, we continue to think rates will remain historically low and the yield curve will have a flattening bias as the Fed tightens policy. Therefore, from a sector exposure perspective, infrastructure funds may continue to be well positioned. In an environment in which rates are likely to remain low by historic standards, infrastructure funds often exhibit greater cash flow stability relative to other equity sectors, meaning higher dividend yields and less volatile price fluctuations (Table 5).

Given there have been few prolonged periods since the 2008 recession with rising interest rates, we did look at two distinct episodes where yields did spike in a relatively short timeframe in order to assess the behavior of the asset class: the "taper tantrum" of 2013 and the postelection reaction in late 2016-early 2017. In both instances, yields rose quickly, albeit for different reasons. For example, when markets were caught off-guard during the taper tantrum, infrastructure investments outperformed nearly all asset classes on a relative basis. Although likely influenced by investor expectations regarding the Trump administration's policy plans, when interest rates spiked and risk assets rallied after the election in 2016, infrastructure slightly outperformed the broader equity market.[14]

Business Cycle Framework

The first and perhaps most important component of our overarching investment process is the analysis we perform on the business cycle. It is indeed the first leg of the proverbial three-legged stool. Based on examining what stage of the business cycle we are in, the attractiveness of different parts of

Table 5
Risk and Return Metrics
As of 8/31/17

Risk/Return Metrics (5 year unless noted)	MSCI World Infrastructure Index	MSCI World Index	MSCI World REIT Index	Alerian MLP Index	Bloomberg Barclays Aggregate Bond
Annualized Return	7.7%	11.8	7.6%	-0.3%	2.2%
Standard Deviation	10.1%	9.7	12.0%	17.5%	2.8%
Sharpe Ratio	0.76	1.16	0.65	-0.03	0.71
3-Year Beta (to S&P 500)	0.59	0.98	0.69	1.20	-0.04
3-Year Average Operating Margin	12.2%	10.7%	26.0%	9.0%	n/a
Forward price/earnings (P/E)	16.6x	17.6x	23.9x	21.5x	n/a
3-Year Average Forward P/E	16.8x	16.9x	24.5x	23.2x	n/a
3-Year Average Return on Equity	10.0%	10.6%	9.9%	4.6%	n/a
Maximum Drawdown	-9.8%	-20.9%	-14.2%	-48.5%	-3.7%
Correlation	1.00	0.73	0.77	0.55	0.44

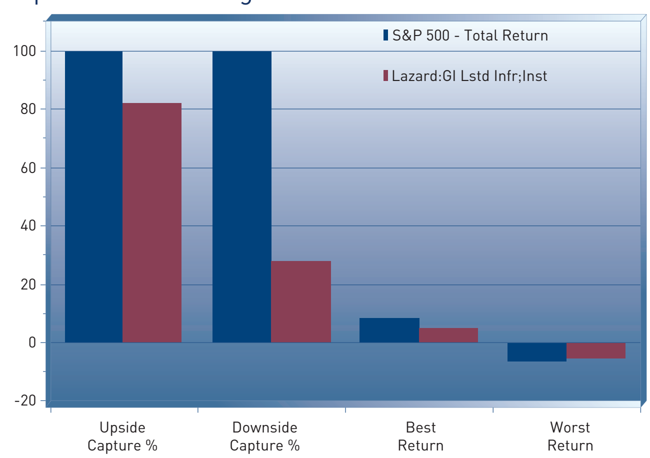
Source: Morningstar

[14] From November 14, 2016 through February 28, 2017, the S&P 500 had a total return of 9.9% versus MSCI World Infrastructure return of 10.3%.

the investable universe become more apparent. According to our proprietary business cycle analysis, we remain in the "slowing expansion" phase of the current cycle, characterized by an economy that continues to grow, albeit sluggishly, and at a decelerating pace. Historically, infrastructure investments have outperformed the broader equity markets during this phase, capturing less of the downside when markets correct (Charts 7 and 8).

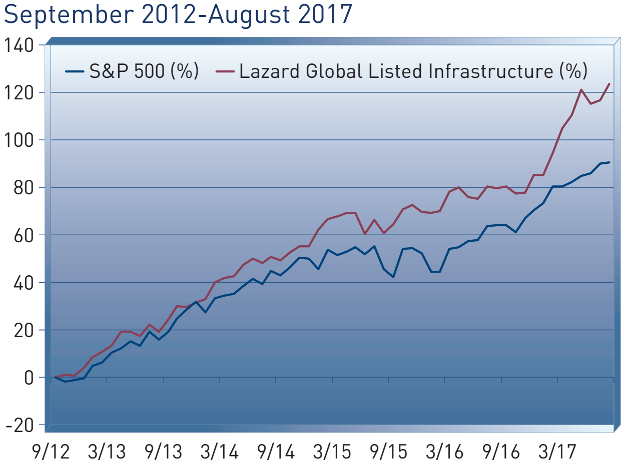
Volatility currently remains anchored at the extreme lower end of historical experience,

Chart 7
Multi-Statistic Performance versus S&P 500
September 2012-August 2017



Source: FactSet Research Systems Inc.

Chart 8
Cumulative Return versus S&P 500
September 2012-August 2017



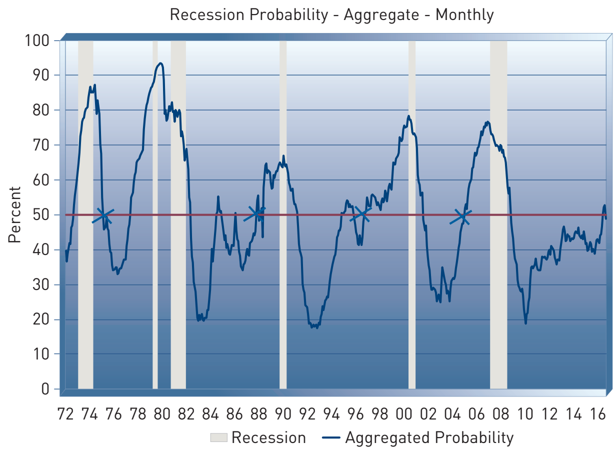
Source: FactSet Research Systems Inc.

reflecting the market's confidence that the global economy will continue to expand. Still, we believe drawdown management remains important—markets remain vulnerable to exogenous shocks; the short-term combination of heightened geopolitical risk and U.S. policy uncertainty concerns are likely to remain; the emerging risks appear to be more political than economic, which makes them especially challenging to price in; and, perhaps most importantly, high valuations may increase the potential magnitude of drawdowns. Over the past month, the Dow Jones Industrial Average has traded in a range (from high to low) of 1.4%. Going back to 1970, that's the least volatile period in history. At 2.2%, the same range for the S&P 500 is not the lowest ever, but it's close. In fact, if the year ended today, the largest drawdown we have seen in 2017 (3%) would be the lowest annual drawdown *ever*. Looking throughout history, low volatility alone is not a reliable harbinger of poor forward returns. However, what we can say with a reasonable degree of certainty is that periods of extremely low volatility tend to be followed by periods of higher volatility. In other words, volatility tends to be mean reverting. Timing the inevitable rise in volatility is extraordinarily difficult, but given its extremely low level today, investors should expect an increase. This is part of the reason we believe global infrastructure is a good complement to our overall equity exposure that may be more exposed to market fluctuations. Again, this may mean we do not capture all of the upside in a low volatility bull market, but it will likely provide for some stability within portfolios when volatility rises.

Lastly, from a macro perspective, the infrastructure asset class is certainly not immune to economic contractions and performs best when the economy is expanding. Therefore, it is critical to note that we do not believe the economy is in imminent danger of contracting based on our proprietary recession probability indicator, which employs a combination of economic and financial market variables. The aggregated indicator is depicted in Chart 9 (page 10).

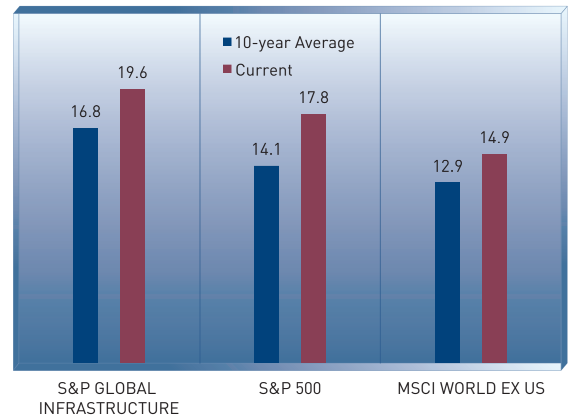
Dating back to the 1970s, our analysis indicates that once the probability of recession crosses definitively above 50%, as measured by the red horizontal line in Chart 9, we can typically expect a recession

Chart 9
Recession Probability
As of 9/30/17



Source: PNC

Chart 10
10-Year Average Forward Price/Earnings Ratio Comparison
As of 8/31/17



Source: FactSet Research Systems Inc.

to occur about eight quarters hence. This is substantial lead time and allows us to confirm this signal with other leading and coincident economic data/indicators we track. The aggregated recession probability as of August 31, 2017, was 49.0%. For perspective, the average probability at the start of a recession is typically 75.2%. The lowest the probability has ever been at the start of a recession is 65%, while the highest is 88%. The longest "false positive" (indicator above 50% then moving back below 50%) is 12 months, but during that period the indicator never rose above 54%. In short, we believe the current expansion can continue, even if growth remains well below what might be considered average or normal from a historical perspective. Therefore, even if volatility increases, we should remain in a business cycle phase that tends to be supportive of the global infrastructure asset class.

Valuation Methodology

The second component of our investment process (that is, the second leg of the stool) is an in-depth examination of global valuations. Once we have identified where we think we are in the cycle, our valuation work tells us about the long-term return potential of an asset class versus its own historical return profile, as well as compared to other competing asset classes. The question here is whether there is still opportunity in an asset class that has enjoyed such strong performance over the past few years. Generally, in light of the recent strength in the broad asset class, the current opportunity set of attractively priced investments for infrastructure managers is smaller today than it has been in the past several years. Therefore, as reflected in our annual Capital Market Assumptions, it is likely that the return on public infrastructure investments will be lower than the average annual return of almost 9.0% investors have gotten used to postfinancial crisis.[15] However, that can also be said for almost all equity sectors, and the relatively stable returns and higher yields offered in the infrastructure universe are attractive, in our view. We do prefer investments in actively managed funds that can identify pockets of value, but generally speaking the infrastructure asset class does not appear meaningfully more extended than the broader equity markets (Chart 10).

Technical Analysis

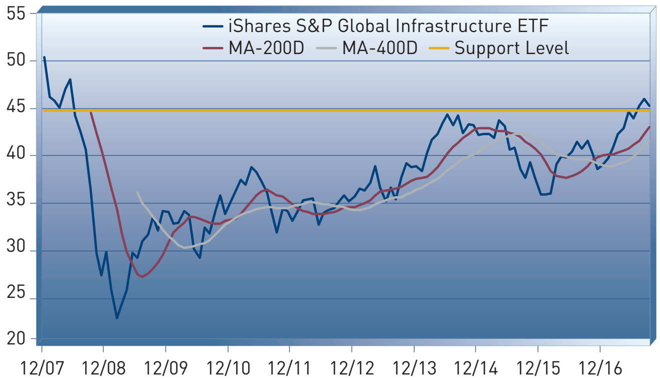
The third leg of the stool of our investment process focuses on technical analysis, which helps forecast the direction of security prices through the study of past market data and primarily focuses on trends related to prices and volumes. This is not market timing so much as it is telling us when the appropriate time to move into or out of an investment might be (that is, when is the right time to not fight the market on entry). An investment

[15] Average annual return is the arithmetic average of annual returns of the MSCI World Infrastructure Index from 2009 to 2016.

Chart 11

S&P Global Infrastructure Moving Averages

As of September 2017



Source: FactSet Research Systems Inc., PNC

opportunity could look attractive based on the business cycle and valuation metrics for a long time but be "dead money" if the market is directionally working against it. The technicals help us identify what those forces might be.

Global infrastructure, just like most other equity indexes, has delivered solid performance since the start of the year with the passive implementation or proxy for global infrastructure, as measured by the S&P Global Infrastructure, up about 9% year to date. The 200- and 400-day moving averages are both in rising trends (with decent momentum and underlying support), so the asset class looks attractive based on these technical measures. This particular index has recently broken out and is nearing its highs achieved post the 2008 financial crisis. If the former resistance levels around the 45.33 range hold, it would become the new support level, suggesting a continuation of current trends is possible (Chart 11).

"Am I Just a Bill Stuck on Capitol Hill?"

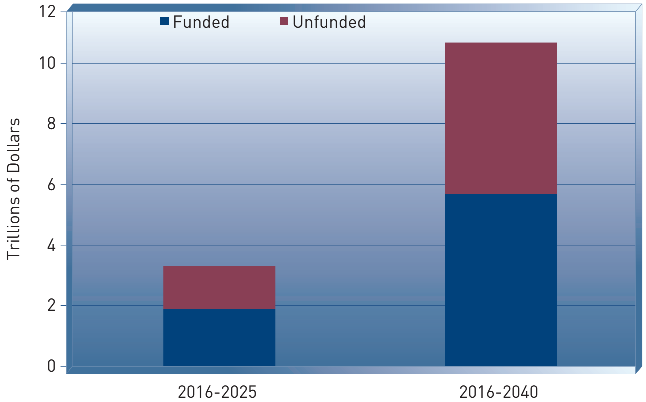
The one topic we have not yet discussed is fiscal policy support for infrastructure projects. In other words, is infrastructure investing just riding the coattails of fiscal stimulus expectations from the new administration? President Donald Trump campaigned on a platform calling for, among many other policy adjustments, renewed infrastructure spending leading up to the November 2016 presidential election. However, this is much easier said than done, in our view, and is imperative to recognize and understand the complexities associated with raising taxes, which is how an infrastructure package would ultimately be funded via strictly the public sector. Headlines continue to make reference to a pending $1 trillion infrastructure plan under the Trump administration; however, it was originally proposed by Commerce Secretary Wilbur Ross during the campaign as a "revenue-neutral" package.[16] During the campaign, President Trump was only seeking $550 billion over 10 years to support transportation infrastructure. As recently as August 17, 2017, he announced he was dissolving the National Infrastructure Advisory Council, leaving a potential infrastructure stimulus package in uncertain territory, in our view. Of course, public-private partnerships for infrastructure investment are still a possibility, but given the long list of to-dos on the policy front in Washington, D.C., we do not expect this agenda item to take center stage in the short run.

For perspective, it took President Barack Obama two attempts over the course of four years (that is, during his second term in office) for Congress to approve an infrastructure bill, the first dedicated infrastructure program sponsored at the federal level in more than 10 years. In 2009, the American Recovery and Reinvestment Act did include $105 billion out of the total $831 billion specifically allocated for infrastructure projects. The initial 2015 plan was for $478 billion; however, the final package was reduced to $305 billion and was designated solely for highway and bridge repairs. Infrastructure support within Congress is not typically considered to be a partisan issue (for example, the GOP-controlled House passed the 2015 Infrastructure bill by a 359-65 vote); however, based on comparable success rates for President Obama, the final amount of an infrastructure package could wind up being far less than President Trump's initial campaign expectations, in our view.

Despite these difficulties to pass infrastructure legislation, the ASCE estimates the next 10 years will require approximately $4.6 trillion in annual spending costs just to maintain current conditions, which generally are quite poor. With an estimated

[16] Wilbur Ross and Peter Navarro, *Trump Versus Clinton on Infrastructure,* October 27, 2016.

Chart 12
An Infrastructure Misadventure



Source: ASCE, PNC

funding gap of $2 trillion, regardless of a stimulus program from the federal government in the near to medium term, the need for infrastructure investment has been and continues to appear quite dire (Chart 12). So, clearly the need is there, but will the dollars ever come? That is literally the two trillion dollar question, in our view.

To *belabor* the point, our 10-year capital market projections were established well before the outcome of the 2016 presidential election was known, and our thesis for global infrastructure is irrespective of new legislation-related stimulus, which we believe has a low probability of success in the near term. In our opinion, should an infrastructure program come to fruition, it would provide additional support to our already strong, base-case, fundamental investment thesis.

A Few Thoughts on Benchmarking

Selecting a benchmark can sometimes be a fairly simple/straightforward task and, at other times, can become a more challenging exercise. Given the high degree of heterogeneity across the global infrastructure asset class, in terms of passive, active, and private investment options, as well as their different reward-risk profiles, choosing an appropriate benchmark is critically important but may fall closer to the more challenging end of the spectrum. A number of global infrastructure indexes exist in the marketplace today, with some of the most commonly referenced including MSCI World Infrastructure, S&P Global Infrastructure, Dow Infrastructure Composite, and FTSE Global Infrastructure. Each has different geographic, sector, and industry exposures that will generally cause them to behave/perform differently across a market cycle. For example, we did a quick geographic comparison between a well-known actively managed global infrastructure fund and the MSCI World Infrastructure index. The mutual fund had just 16% exposure to the United States while MSCI World had approximately 49% exposure. On this basis alone, we would expect markedly different performance characteristics over time. In our view, there is no benchmark index that is perfectly representative of all actively managed strategies. The bottom line is "know your benchmark." It is essential to help set appropriate expectations, as well as define and measure success over time.

A typical infrastructure contract is long term (10+ years), in which the investor provides financing for the project and receives cash flows for the life of the project. Unlike traditional fixed income securities, infrastructure contracts are generally linked to inflation measures through various adjusters, either on an annual or multiyear adjustment basis, helping to preserve asset values over time. Infrastructure assets themselves also tend to be linked to various measures of inflation (utilities or toll roads, for example), further protecting investors from unexpected interest rate volatility. Therefore, it should come as no surprise to most investors that private infrastructure investments, as disclosed by various public pension plans, employ absolute return benchmarks to measure and evaluate performance (Table 6). An absolute return

Table 6
Pension Plans and Benchmarks Used

Plan	Infrastructure Benchmark Used
CalPERS	CPI + 4%
CalSTRS	CPI + 4%
Ontario Teachers	CPI + 4%
CPPIB	CPP Reference Portfolio
N. Dakota PERS	CPI-W (social security)

Source: Company Reports, PNC

benchmark is a hurdle rate that the investment should strive to meet or exceed over longer horizons. This hurdle rate can be simply the required return objective outlined in a client's investment policy statement. Over a period less than one year, however, holding an investment or asset class to this level of return could be inappropriate or unreasonable. However, when measured over 3-, 5-, and 10-year periods, a return consistent with or in excess of that return objective seems more feasible/reasonable.

It is imperative to understand not only the construction methodology of the funds or indexes in question but also the benchmark chosen. Using a one-size-fits-all approach to compare any or all global infrastructure strategies to the S&P 500 is akin to measuring all fixed income strategies against the Barclays Aggregate Bond Index, in our view. Results may differ quite materially at times because it is not a proper apples-to-apples comparison.

Additionally, in the case of global infrastructure, there are certain indexes that hedge currency exposure. In an international equity portfolio that has exposure to a basket of currencies, some will likely have positive returns in local currency terms while others will be negative at times. In theory, this counterbalancing effect should result in currency exposures netting themselves out over time. In addition, currency returns are largely uncorrelated (or at least, not strongly positively correlated) and, as such, they tend to help an equity portfolio on the diversification front. Further, there is ample empirical evidence (cited by CFA Institute and others) suggesting that the standard deviation (that is, volatility) of currency is only about half the standard deviation of stock prices. This suggests unhedged currency exposure may actually help to reduce an international equity portfolio's volatility over time. As currencies also tend to revert to a theoretical "fair value"/mean over time, currency-related volatility/risk tends to fall or wash out, so to speak, becoming a less critical component of equity risk. Thus, over the long term (that is, on a strategic basis) our preference is to be unhedged.

"Cleaning Up" with Responsible Investing Infrastructure

As technological change creates new investment opportunities, a new breed of infrastructure projects is beginning to emerge that can help bridge the global economy into the 21st century. Due to the history of how regulated industries evolved over time and oftentimes specific to country and region, most of the opportunities for RI infrastructure projects are found outside of the United States. For example, with Switzerland being surrounded by the Alps, their primary source of locally generated energy is actually hydropower—a practical but strategic decision made primarily as a function of the low opportunity cost rather than as a purposeful/intentional sense of environmentalism.[17] Contrast this particular case with the challenges facing rural India where more than 50% of the population still does not have access to electricity. The infrastructure buildout there is primarily focused on developing off-grid renewable energy solutions.[18] Other clean energy solutions include renewable energy storage and the underlying next generation technologies in energy efficiencies themselves. Mankind's eternal quest to capture, store, and harness energy has seen significant breakthroughs in recent years, giving rise to companies that specialize in battery power technology. These are just a few of the numerous, and perhaps unexpected, clean technology-related solutions that overlap with RI and infrastructure investing, if only one takes a closer look.

As regional governments continue to establish laws requiring increasingly strenuous vehicle emissions standards and/or some form of electric vehicles, we expect the shift toward renewable energy infrastructure projects to accelerate. As the efficiency of photovoltaic cells and related semiconductors continues to grow, new clean energy technology should generate even more demand for RI-infrastructure opportunities. Turning to water projects, China has been a leading example of creating successful private-public partnerships for water infrastructure investment in what has

[17] Swiss Federal Office of Energy.

[18] http://mnre.gov.in/file-manager/annual-report/2015-2016/EN/Chapter%201/chapter_1.htm.

been traditionally dominated by municipalities in the United States. Through Build-Operate-Own and Build-Operate-Transfer contractual arrangements, private companies have been working closely with the Chinese government to develop water infrastructure projects. Throughout the course of our research, we have discovered a number of investable themes having the unique distinction of serving dual purposes within the realms of global infrastructure and RI/impact investments. These elusive "impact unicorns," as we refer to them, have the potential to achieve both a market rate of financial return and high levels of impact, whether it be social, environmental, or other qualitative metrics.[19]

Conclusion

We believe infrastructure investing may be well positioned for the later innings of the business cycle, supported at least in part by rising global demand for the asset class. We believe there are secular forces at play (for example, low productivity growth and global monetary policy cross currents) that may continue to weigh on interest rates for some time. Therefore, investors may be compelled to continue to look for consistent income generation coupled with capital appreciation potential over the proverbial "home run" investment idea. This is not just a play on lower-than-average interest rates, however, as we have described many of the other elements that currently make the asset class attractive, in our opinion. Given the present valuation backdrop, we prefer investments in actively managed funds that can identify pockets of value. The asset class offers attractive cash flows relative to most fixed income asset classes, and relatively less volatility than broader equity markets, and as such, we believe infrastructure should be considered a viable portfolio option in today's market.

Jeffrey D. Mills

Managing Director and Chief Investment Strategist
Hawthorn, PNC Family Wealth®

[19] See our white paper *Responsible Investing: A Ripple in Still Water*, September 2017.

Hawthorn Asset Allocation Playbook
(As of 9/30/17)

Asset Class	Sub Asset Class	Favorability: -			Neutral			+	Points of View
Equities				●					
U.S.	Large Cap					●			Relative valuation, our view on the current phase of the business cycle, and vulnerability to overall market volatility cause us to narrowly favor large over small. If we see tangible momentum on the policy front, small-cap companies may enjoy an outsized benefit from changes in tax rates and regulation. We are starting to see some developments on taxes, and small caps have performed well.
	Mid Cap				●				
	Small Cap				●				
Non-U.S.	Intl. Large/Mid Cap				●				Valuations appear relatively more attractive versus domestic equities, potentially making these markets the better long-term value. Near term, we believe these markets are more vulnerable to any softening of global growth (which we have yet to see).
	Intl. Small Cap			●					
	Emerging Markets			●					Although we like emerging markets for the long term, we believe the rally to be overextended. Any reversal (higher) in U.S. rates or the dollar would also be a headwind, especially after a 30% year-to-date gain.
Fixed Income				●					
U.S.	Short Muni Fixed Income			●					With the possibility of longer-term rates remaining range-bound, we favor intermediate-duration fixed income. To date, core fixed income has outperformed short, and we believe this trend will persist for the balance of 2017.
	Core Muni Fixed Income				●				
	U.S. High Yield			●					Overall credit conditions remain favorable, but credit spreads are tight, leaving high yield less room to outperform.
	U.S. Leveraged Loans				●				Perhaps more attractive than high yield given their place higher in the capital structure and protection from rising rates.
	U.S. TIPS				●				A reasonable hedge if inflation overshoots, and inflation expectations have come down throughout the year.
Non-U.S.	Global Bond				●				Flexibility provides for diversification if rates should steadily rise (a primary risk to fixed income in this market).
	Unconstrained Bond						●		
	Emerging Market Bond			●					
Alternatives						●			
Private	Private Real Estate						●		
	Private Debt					●			
	Private Equity						●		
Hedge Funds	Equity Long/Short					●			Can generate outperformance in a market where the overall risk/reward balance may be skewed toward risk. Equity market correlations are falling, and the removal of extreme monetary policy accommodation, which compressed the cost of capital across the quality spectrum, should help swing the performance pendulum back in favor of certain hedge fund strategies. However, should the market move steadily higher with little volatility, these allocations will likely underperform.
	Event Driven					●			
	Relative Value					●			
	Directional					●			
Cash						●			
Tactical Allocations						●			
Tactical	Master Limited Partnerships					●			Massive headwind from oil price drop is gone; valuation not nearly as stretched versus other yield-oriented areas of the market; and tight credit spreads indicate overall sector health.
	Infrastructure					●			Defensive qualities and income potential which we like in this market.
	Currency Hedged Europe				●				The dollar surprised us by moving lower this year, but it appears to be putting in a near-term bottom. We continue to like Europe.
	Structured Note (Drawdown)					●			Ability to earn a coupon while waiting for a more attractive entry point into equities can be an attractive strategy, especially versus cash.

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