Complex Investment Strategies & Exchange Traded Products

FIRMA 2019

J.P.Morgan

EXCHANGE-TRADED FUND FOUNDATIONS

ETF FOUNDATIONS

Building a stronger understanding of exchange-traded funds

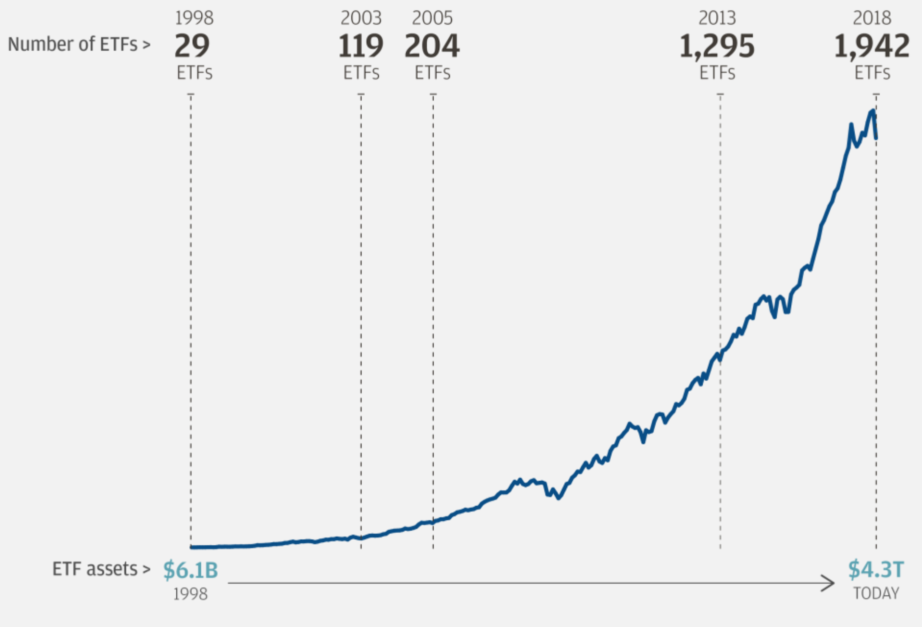
ETFs by J.P.Morgan Asset Management

What are ETFs?

ETFs are mutual funds that trade like stocks

ETFs are growing rapidly

ETF assets have grown by an average of 39% each year over the past two decades.



- ETFs pool investors' money into broadly diversified, professionally managed "baskets" of stocks and bonds, like mutual funds
- ETFs are bought and sold on an exchange, like a stock
- Enable investors to access markets and their money throughout the trading day

What can ETFs help you do?

- Conveniently make trades
- Flexibly access markets
- Broadly diversify portfolios
- Efficiently manage fees and taxes

Sources: ETF assets, Morningstar. Data from 1/31/98 to 10/31/18. Number of ETFs, Investment Company Institute and Strategic Insight Simfund. Data from 1998 to 9/30/18. Shown for illustrative purposes only.

Why are ETFs growing so fast?

ETFs offer three unique advantages

E

EFFICIENT:
ETFs are cost-effective and tax-friendly, allowing investors to keep more of what they earn.

T

TRADABLE:
ETFs can be easily traded throughout the day and turned into cash as needed.

F

FLEXIBLE:
ETFs offer access to virtually every market worldwide – with the flexibility to quickly move in and out of them as conditions change.

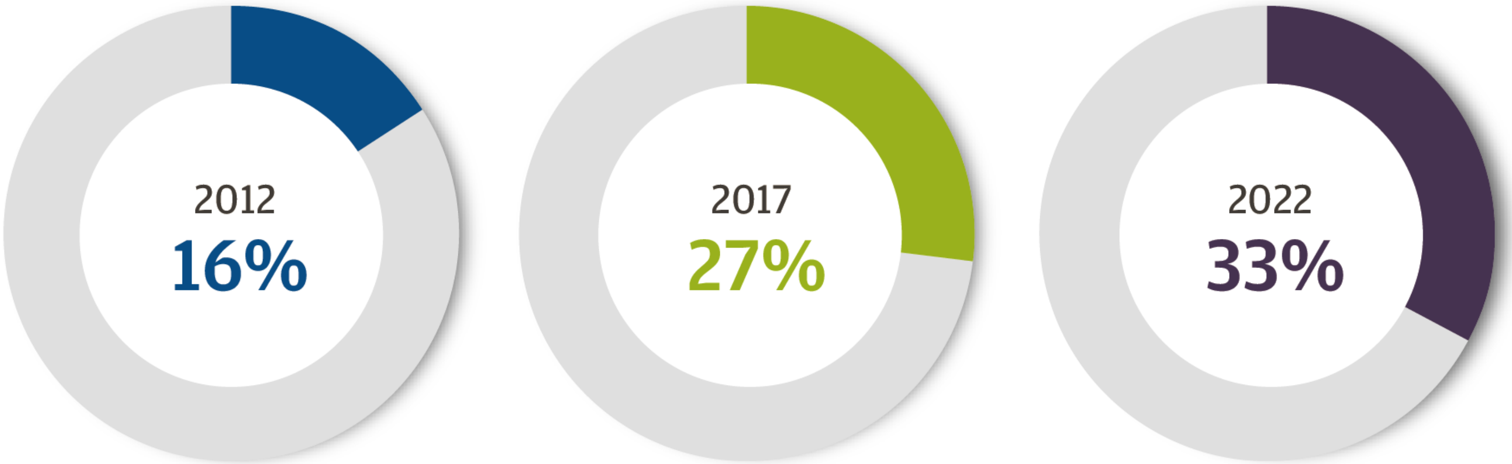
How fast are ETFs growing?

If you saved $1 million every hour of every day, it would take you nearly 500 years to reach $4.3 trillion. **ETFs got there in just 25 years.**

Diversification does not guarantee investment returns and does not eliminate the risk of loss. Diversification among investment options and asset classes may help to reduce overall volatility.

ETFs are making up a bigger part of investor portfolios

Percentage of portfolios invested in ETFs

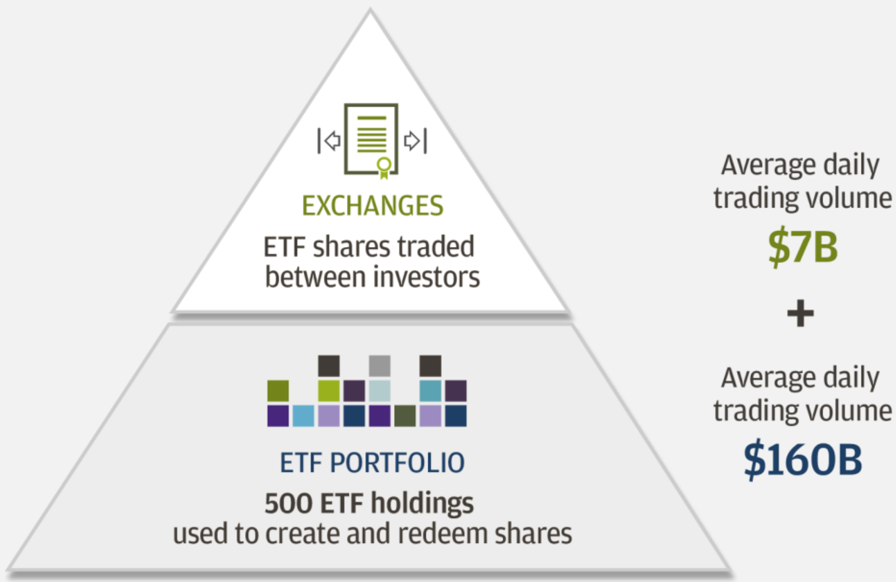


Source: Charles Schwab, 2017 ETF Investor Study. Shown for illustrative purposes only.

How does an ETF work (liquidity)?

ETFs offer more liquidity than meets the eye

Average ETF tracking the S&P 500 Index



Source: J.P. Morgan Asset Management. For illustrative purposes only.

ETFs are easy to buy and sell

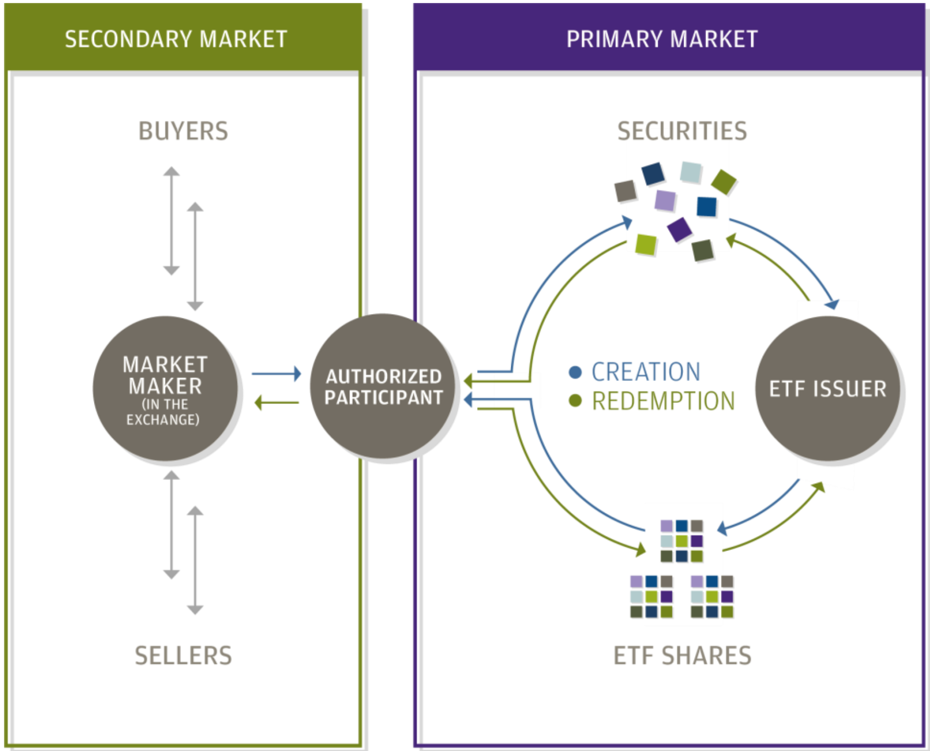
- Liquidity – How quickly and easily an investment can be traded without significantly affecting its price
- Low liquidity can be a risk since investors may be forced to accept less favorable prices if there aren't enough interested buyers or sellers
- The supply of ETF shares isn't fixed and can change at any time to meet investor demands, therefore creating liquidity
- This liquidity arises since even if an ETF is lightly traded, its underlying basket of securities can still be actively bought and sold

Why does liquidity matter?

When ETFs are liquid, it's less likely investors will have to pay more to buy shares or accept less to sell – **both of which can reduce returns.**

How does an ETF work (creation and redemption)?

Creating and redeeming shares helps ETFs trade at prices close to the market value of their portfolio holdings



DEFINITIONS

Market Maker – A dealer that buys or sells at specified prices at all times; also known as liquidity providers.

Primary Market – Market where ETF shares are created and redeemed.

Secondary Market – An exchange where ETFs are traded, (i.e., New York Stock Exchange).

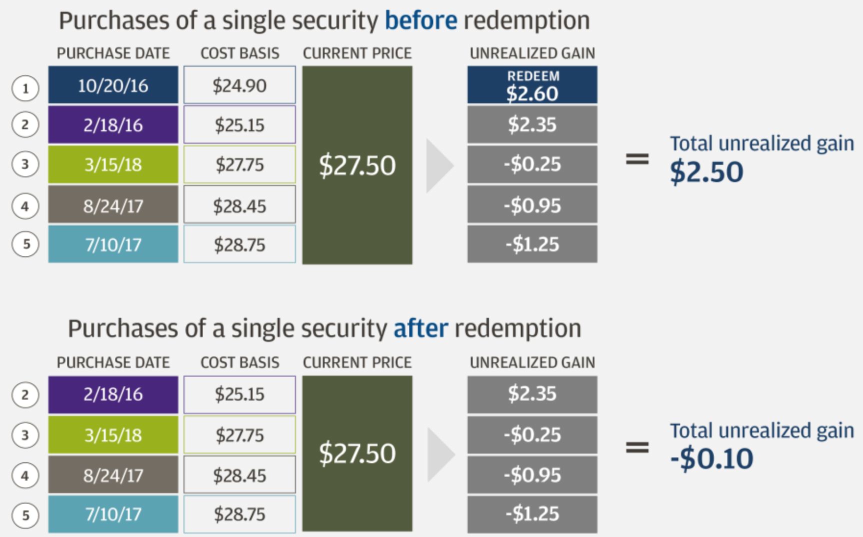
Authorized Participant (AP) – A Broker-dealer that is contracted with the ETF issuer to create or redeem shares on behalf of market makers and institutional investors.

Source: J.P. Morgan Asset Management. For illustrative purposes only.

How does an ETF work (taxes)?

ETFs can reduce taxes

ETFs remove purchases with the lowest cost basis when redemptions occur – without taxes



- When mutual funds sell securities at a profit, they must pass along those “capital gains” – and their taxes – to shareholders.
- When investors sell ETFs on an exchange, shares are usually transferred directly to a buyer.
- When redemptions occur, purchases of securities with the lowest cost basis are moved out of the portfolio without being taxed.
- Together, these two processes can significantly reduce or completely avoid taxable gains that would otherwise have to be distributed to shareholders.

DID YOU KNOW…

Only 7% of ETFs made capital gains distributions in 2017?*

DEFINITIONS
Cost Basis – Original purchase price used to determine capital gains and losses.
Unrealized Gain – Profit, if any, on a security that has not been sold (current price minus cost basis).

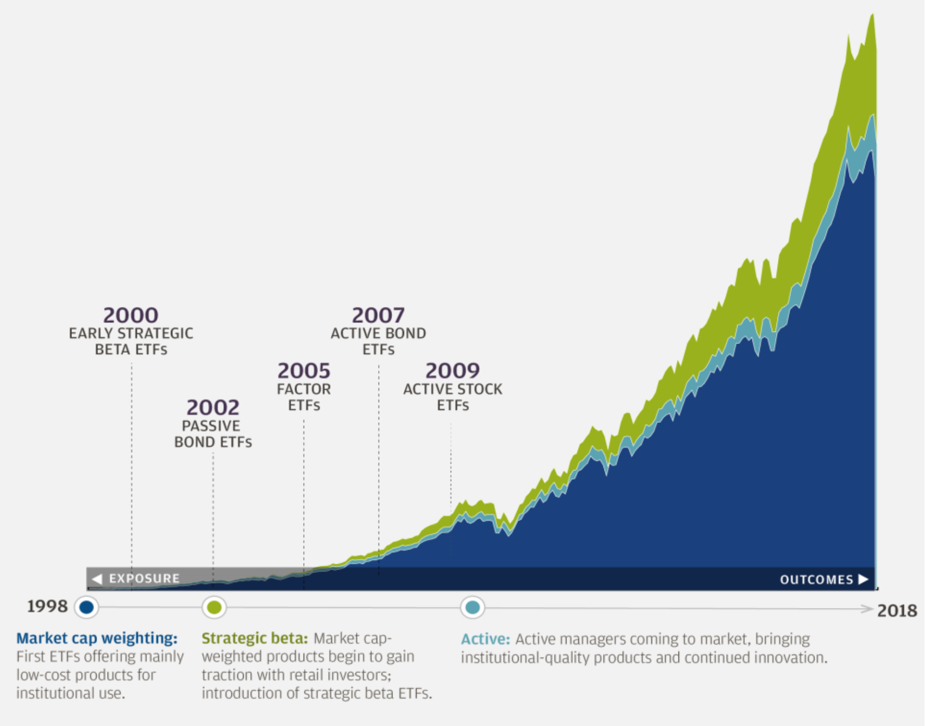
*Source: ETF.com 2017 Capital Gains Report, 12/18/17.
Source: J.P. Morgan Asset Management. For illustrative purposes only.
The information in this piece is not intended to provide, and should not be relied on for, accounting, legal, or tax advice or investment recommendations. The views and strategies described in the piece may not be suitable to all readers.

The Evolving ETF Landscape

What types of ETFs are available?

ETFs continue to expand and evolve

The ETF evolution:
From Market Cap, to Strategic Beta, to Active
Total assets by ETF type



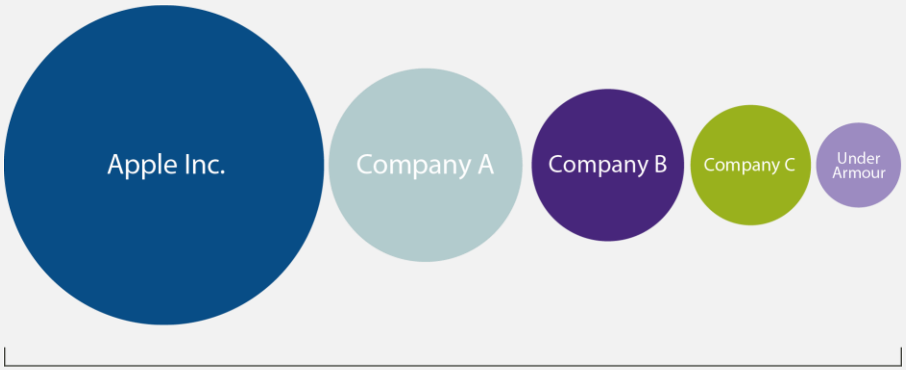
- Purely passive ETFs – Track broad market indexes.
- Active ETFs – Managers decide what securities to buy and sell.
- Strategic Beta ETFs – Combine elements of both passive and active investing.
  - **Passive Investing (Indexing):** Seeks to match the portfolio holdings and performance of a market benchmark, such as the S&P 500 Index.
  - **Active Investing:** Seeks to achieve a specific outcome by picking only those securities considered most attractive.

Source: Morningstar. Data from 1/31/98 to 10/31/18. Shown for illustrative purposes only.

What types of ETFs are available?

The early years: Market cap-weighted indexing

Market cap weighting:
Building ETF portfolios based on company size
Market caps of companies in the S&P 500 Index



BIGGER COMPANIES MAKE UP A BIGGER PART OF MARKET CAP-WEIGHTED ETFs.

- The earliest ETFs tracked traditional market cap-weighted indexes and are still among the most commonly used today.
- Market cap – Measures a company's size by the total value of all its outstanding stock.
- Market cap weighting – Process of building a portfolio based on company size.
  - Bigger companies make up more of the portfolio, smaller companies make up less.
- ETFs tracking the S&P 500 seek to earn very similar returns by investing in the same companies, in the same proportions.
- Investors own them because they offer an easy, low-cost way to "buy the entire market," without deviating in any way from an index.

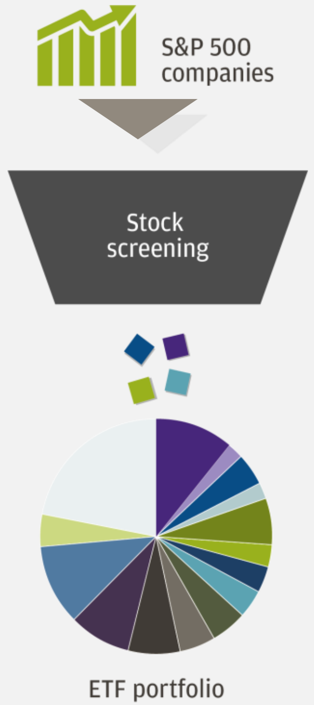
Source: J.P. Morgan Asset Management. For illustrative purposes only.

ETFs by J.P.Morgan Asset Management

What types of ETFs are available?

The first evolution: Strategic Beta ETFs

Strategic Beta:
Screening for stocks with desired characteristics



- Strategic Beta ETFs also track an index, but the index isn't market cap-weighted and often represents a subset of a larger investment universe.
  - Some weight stocks equally
  - Some screen stocks with specific characteristics, or "factors"
    - Factors – Characteristics that help explain a stock's return and risk over time
      - Ex) low valuations, strong earnings, price momentum
      - Single-factor ETFs – Focus on one characteristic when screening stocks
      - Multi-factor ETFs – Combine several characteristics together
  - Some do both
- Investors own them because they can combine the efficiencies of index investing with enhanced portfolio construction or security selection

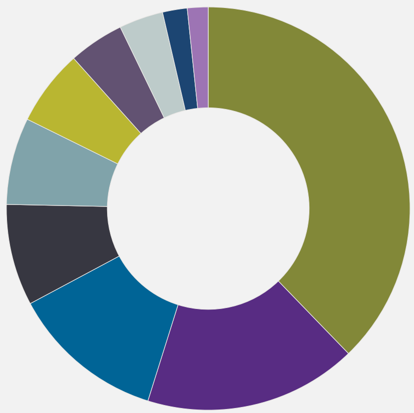
Source: J.P. Morgan Asset Management. For illustrative purposes only.

What opportunities exist to evolve market-cap weighted ETFs?

The first evolution: Strategic Beta ETFs

Risk

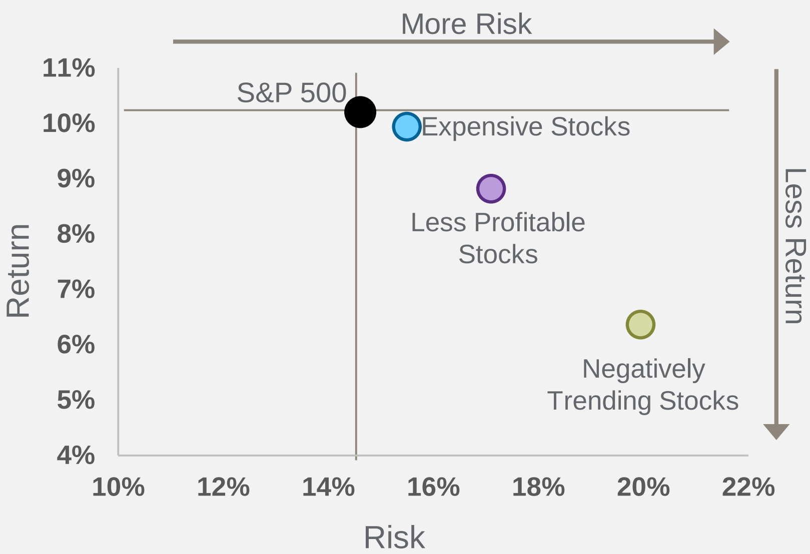
SECTOR RISK[1] CONCENTRATION
Russell 1000 (market cap-weighted index)
January 1999 – December 2001



38%
of risk[2] was attributed to the technology sector

Return

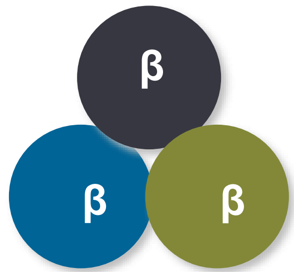
RETURNS OF BOTTOM 40% OF STOCKS[3]
1963-2017



Source: FTSE, J.P. Morgan Asset Management. For illustrative purposes only.
[1]Risk contribution describes how much the price changes in a given asset have affected (or would have affected) the value of a portfolio over a given time period. It can be calculated by taking the product of weight, volatility and correlation of the asset to the whole portfolio.
[2]Contribution to realized volatility over the period of January 1999 – December 2001 using daily returns.
[3]Analysis of Tuck French Data Library using average returns for bottom four deciles of stocks sorted by exposure to attributes. "Expensive Stocks" utilizes P/B and P/E, "Less Profitable Stocks" utilizes operating profitability, and "Negative Trending Stocks" utilizes 12 month price momentum minus a 2 month lag. Analysis time frame from 12/31/1963 – 12/31/2017.

How are these products being used in portfolios?

The first evolution: Strategic Beta ETFs



MULTI-FACTOR | **SINGLE FACTOR**

CORE ⟷ TARGETED

Increase return and **reduce volatility** over the cycle by replacing core market-cap exposure

Increase **net of fee** return and reduce fees by replacing active

Increase return by increasing factor exposure and/or taking tactical views

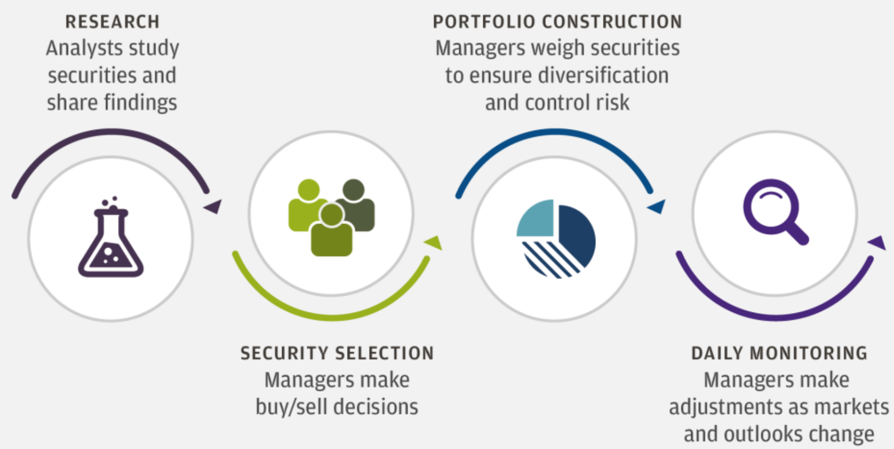
Balance portfolio factor exposures through use as portfolio construction tool.
Bottoms up portfolio construction using single factors

Source: J.P. Morgan Asset Management as of December 31, 2018. Shown for illustrative purposes only.

What types of ETFs are available?

The latest evolution: Actively managed ETFs

Active ETFs:
Capturing research insights and manager expertise
Managed by people, focused on outcomes



- Active ETFs – Rely on investment professionals to pursue a specific outcome.
  - Ex) Generating income, outperforming a passive index, or reducing risk
  - Offer investors access to opportunities that might be missing when using a passive index in their portfolios.
- Portfolio managers oversee active ETFs, usually with support from a team of research analysts.
  - Together, they study potential investments and choose only those considered most attractive.
- Investors own them because they offer the best of both worlds – the easy trading and potential tax efficiencies of an ETF, plus the experience and expertise of fund managers.

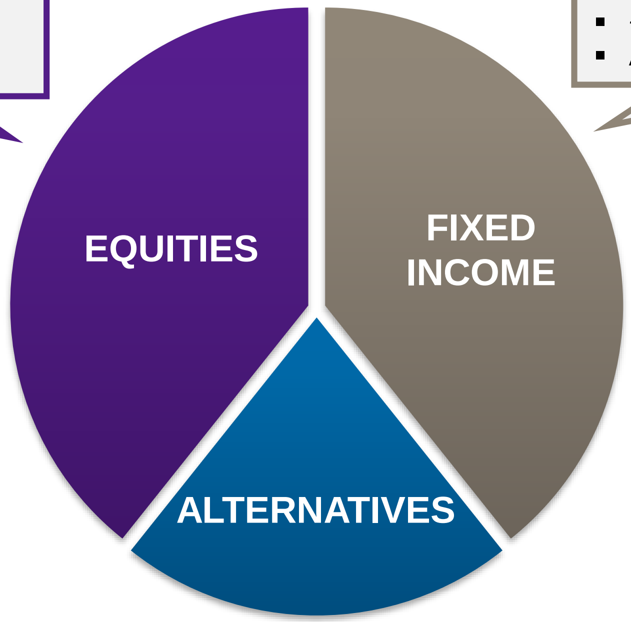
Source: J.P. Morgan Asset Management. For illustrative purposes only.

What is an example of innovation in active ETFs?

The latest evolution: Actively managed ETFs

Equities: Large Cap Core
- ~**150 ETFs** with ~**$885Bn** in AUM
- Average fund size ~$5.9Bn

Fixed Income: Intermediate-Term
- ~**46 ETFs** with ~**$183Bn** in AUM
- Average fund size ~$4.0Bn



Alternatives: Multi-alternative
- ~**7 ETFs** with ~**$1.3Bn** in AUM
- Average fund size ~$191mm

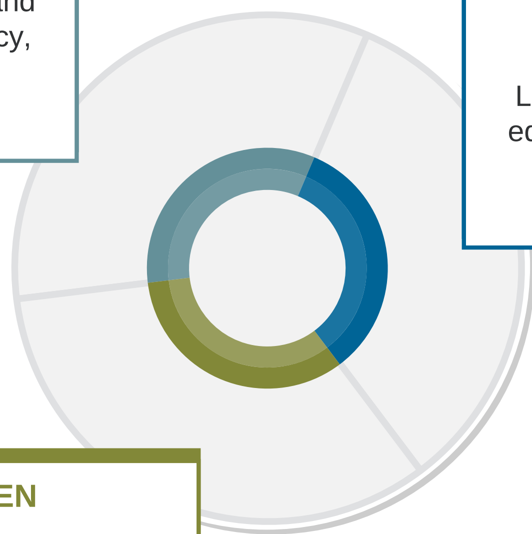
Source: JPMorgan Asset Management, Morningstar. Based on Morningstar category groups. As of 3/28/2019

What is an example of innovation in active ETFs?

The latest evolution: Actively managed ETFs

MACRO / MANAGED FUTURES

Capture exposure to momentum and carry across fixed income, currency, commodity and equity markets



EQUITY LONG SHORT

Long/short extension of well known equity factors such as value, quality, momentum, and size

EVENT-DRIVEN

Seeks to exploit mispricing related to companies that are undergoing significant corporate change or across capital structure

JPHF, bottom-up approach

~800 individual positions

Source: J.P. Morgan Asset Management. For illustrative purposes only.

Appendix

What is a factor?

The first evolution: Strategic Beta ETFs

A FACTOR IS A DESCRIPTION OF RISK

- Factors can be used to **describe and decompose investment returns**
  - They can be used to explain diversification across asset classes
  - **Compensated** factors are backed by strong economic rationale and expected to provide persistent positive returns
- Example factors include Value, Quality and Momentum
  - Ideally, factors have **low mutual correlation**

RISK

Get rewarded for bearing additional risk

BEHAVIORAL

Behavioral biases create opportunities

STRUCTURAL

Take advantage of structural inefficiencies

Examples of Impacted Factors

Value

Quality

Momentum

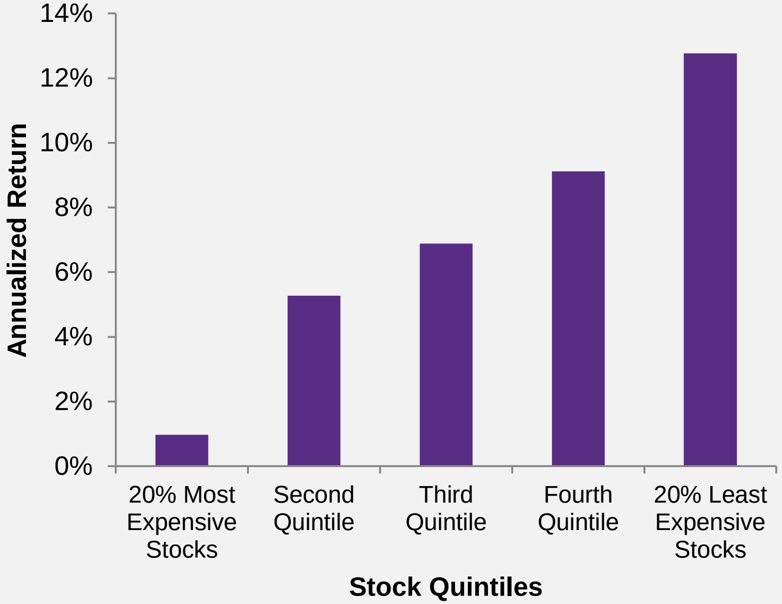
Shown for illustrative purposes only. Opinions, estimates, and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice

How do factors add value to portfolios?

The first evolution: Strategic Beta ETFs

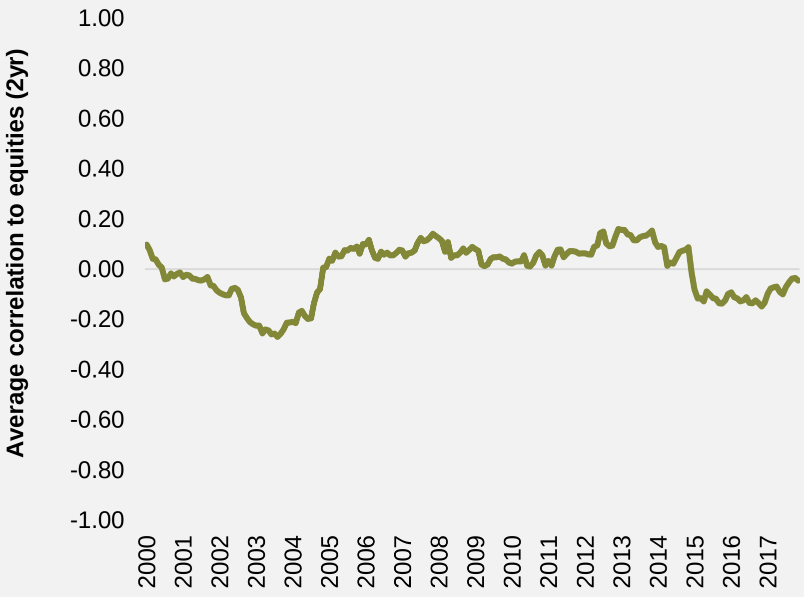
ENHANCED RETURNS

VALUE FACTOR EXAMPLE:
UNDERVALUED STOCKS TEND TO OUTPERFORM OVER TIME



Risk Mitigation

FACTORS TEND TO EXHIBIT LOW CORRELATION TO EQUITIES

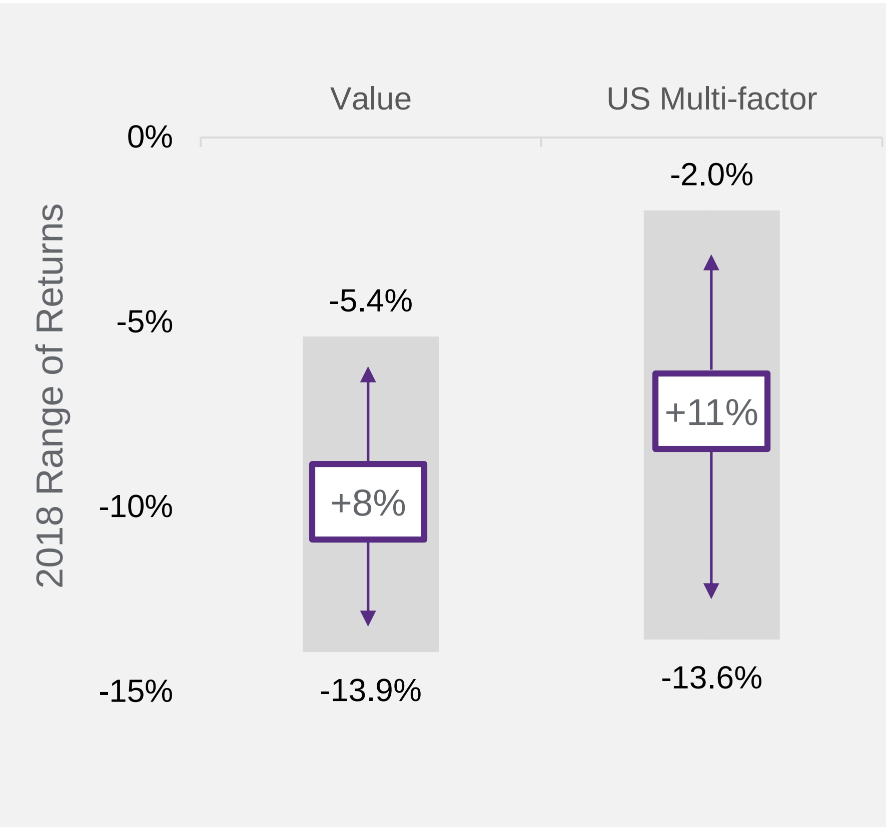


Source: J.P. Morgan Asset Management. For illustrative purposes only. Data as of December 2017.
Source: J.P. Morgan Asset Management, Kenneth R. French data library. As of 31 December 2016. Analysis period: July 1926 – December 2016. For illustrative purposes only.
There is no assurance that behavioral finance strategies will protect against the loss of capital.

ETFs by J.P.Morgan Asset Management

How can advisor do due diligence in this space?

The first evolution: Strategic Beta ETFs



KEY PORTFOLIO CONSTRUCTION QUESTIONS

1. What factors are included?
2. How are factors combined in a portfolio?
3. What other parameters are considered (sector weighting, stock selection, ect.)
4. How are transactions costs and liquidity considered?

Source: J.P. Morgan Asset Management, Morningstar as of December 31, 2018. Shown for illustrative purposes only.

Should an advisor invest in multi or single factor ETFs?

The first evolution: Strategic Beta ETFs

															2004 - 2018	
2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Ann.	Vol.
Multi-Factor 21.1%	Momen. 19.3%	High Div. 21.1%	Momen. 17.8%	Min. Vol. -25.7%	Cyclical 36.9%	Small Cap 26.9%	High Div. 14.3%	Cyclical 20.1%	Small Cap 38.8%	Min. Vol. 16.5%	Momen. 9.3%	Small Cap 21.3%	Momen. 37.8%	Min. Vol. 1.5%	Momen. 10.4%	Small Cap 18.6%
Small Cap 18.3%	Multi-Factor 15.7%	Small Cap 18.4%	Defens. 17.7%	Defens. -26.7%	Quality 32.0%	Multi-Factor 18.3%	Min. Vol. 12.9%	Small Cap 16.3%	Multi-Factor 37.4%	High Div. 14.9%	Quality 7.0%	High Div. 16.3%	Cyclical 27.3%	Momen. -1.6%	Multi-Factor 9.6%	Cyclical 17.4%
Momen. 16.9%	Defens. 11.1%	Multi-Factor 16.6%	Quality 10.6%	High Div. -27.6%	Multi-Factor 29.8%	Momen. 18.2%	Defens. 10.1%	Multi-Factor 15.7%	Cyclical 35.0%	Multi-Factor 14.8%	Min. Vol. 5.6%	Cyclical 14.0%	Quality 26.0%	High Div. -2.3%	Min. Vol. 9.4%	Momen. 16.2%
Min. Vol. 14.5%	Min. Vol. 6.6%	Defens. 15.9%	Multi-Factor 5.5%	Quality -30.2%	Small Cap 27.2%	Cyclical 17.9%	Quality 8.4%	Momen. 15.1%	Momen. 34.8%	Momen. 14.7%	Cyclical 2.6%	Multi-Factor 13.7%	Multi-Factor 21.5%	Quality -2.6%	Quality 9.3%	Multi-Factor 15.4%
Defens. 11.9%	Small Cap 4.6%	Cyclical 15.0%	Min. Vol. 4.3%	Small Cap -33.8%	High Div. 18.4%	High Div. 15.9%	Multi-Factor 7.3%	Quality 14.0%	Quality 33.5%	Cyclical 13.6%	High Div. 0.7%	Min. Vol. 10.7%	High Div. 19.5%	Defens. -2.9%	High Div. 8.8%	High Div. 13.2%
High Div. 11.8%	High Div. 3.7%	Min. Vol. 15.0%	High Div. 0.0%	Multi-Factor -39.3%	Min. Vol. 18.4%	Min. Vol. 14.7%	Momen. 6.1%	Min. Vol. 11.2%	High Div. 28.9%	Defens. 13.0%	Multi-Factor 0.4%	Quality 8.0%	Min. Vol. 19.2%	Cyclical -5.3%	Defens. 8.4%	Quality 13.0%
Quality 10.2%	Cyclical 2.5%	Quality 12.0%	Cyclical -0.8%	Momen. -40.9%	Momen. 17.6%	Quality 12.6%	Cyclical -3.4%	Defens. 10.7%	Defens. 28.9%	Quality 11.8%	Defens. -0.9%	Defens. 7.7%	Small Cap 14.6%	Multi-Factor -9.7%	Small Cap 7.5%	Defens. 12.1%
Cyclical 10.0%	Quality 2.5%	Momen. 10.7%	Small Cap -1.6%	Cyclical -44.8%	Defens. 16.5%	Defens. 12.0%	Small Cap -4.2%	High Div. 10.6%	Min. Vol. 25.3%	Small Cap 4.9%	Small Cap -4.4%	Momen. 5.1%	Defens. 12.3%	Small Cap -11.0%	Cyclical 7.3%	Min. Vol. 11.5%

Source: FactSet, MSCI, Russell, Standard & Poor's, J.P. Morgan Asset Management. The MSCI High Dividend Yield Index aims to offer a higher than average dividend yield relative to the parent index that passes dividend sustainability and persistence screens. The MSCI Minimum Volatility Index optimizes the MSCI USA Index using an estimated security co-variance matrix to produce low absolute volatility for a given set of constraints. The MSCI Defensive Sectors Index includes: Consumer Staples, Energy, Health Care, Telecommunication Services and Utilities. The MSCI Cyclical Sectors Index contains: Consumer Discretionary, Financials, Industrials, Information Technology and Materials. Securities in the MSCI Momentum Index are selected based on a momentum value of 12-month and 6-month price performance. Constituents of the MSCI Quality Index are selected based on three main variables: high return on equity, stable year-over-year earnings growth and low financial leverage. The Russell 2000 is used for small cap. The MSCI USA Diversified Multiple Factor Index aims to maximize exposure to four factors – Value, Momentum, Quality and Size. *Guide to the Markets – U.S.* Data are as of December 31, 2018.

Why do ETFs trade at premiums and discounts?

Price discrepancies are not usually cause for concern

- Factors that contribute to ETFs trading above or below the value of their underlying securities:
  - Differences in time zones between foreign and U.S. markets
  - Different methods for pricing underlying securities in bond ETFs
  - Light trading volume for the ETF
- These premiums and discounts don't typically get too big or last too long because the process of creating and redeeming shares helps move ETF prices closer to basket value.

KNOW YOUR TERMS

Net Asset Value (NAV)
Value of all underlying ETF holdings; calculated once per day after markets close.

Intraday Net Asset Value (iNAV)
Value of all underlying ETF holdings; calculated every 15 seconds during the trading day.

Market Price
Price at which ETF shares are bought and sold throughout the trading day.

Premium
Occurs when an ETF trades above its NAV.

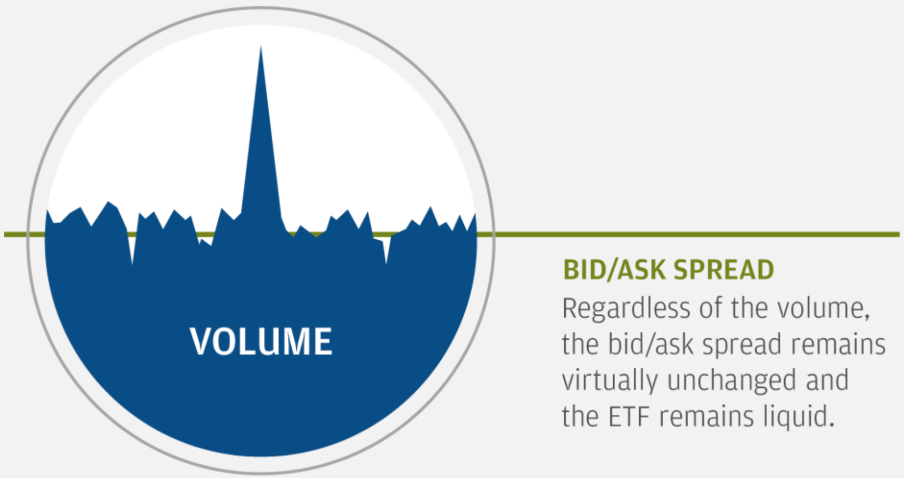
Discount
Occurs when an ETF trades below its NAV.

Source: J.P. Morgan Asset Management. Shown for illustrative purposes only.

Can ETFs handle large trades?

Big trades usually have little impact on ETF prices

ETFs can move large dollar amounts without moving markets



- If a large buy order for an ETF comes in, new shares can be created to meet the demand.
- If a large sell order for an ETF comes in, shares can be removed from the market to reduce the supply.
- In both cases, the dozens or hundreds of different securities inside an ETF's basket provide the trading power needed to handle large transactions.

What is "bid/ask spread" and why does it matter?

Bid – Highest price a buyer is willing to pay for an ETF.

Ask – Lowest price a seller is willing to accept.

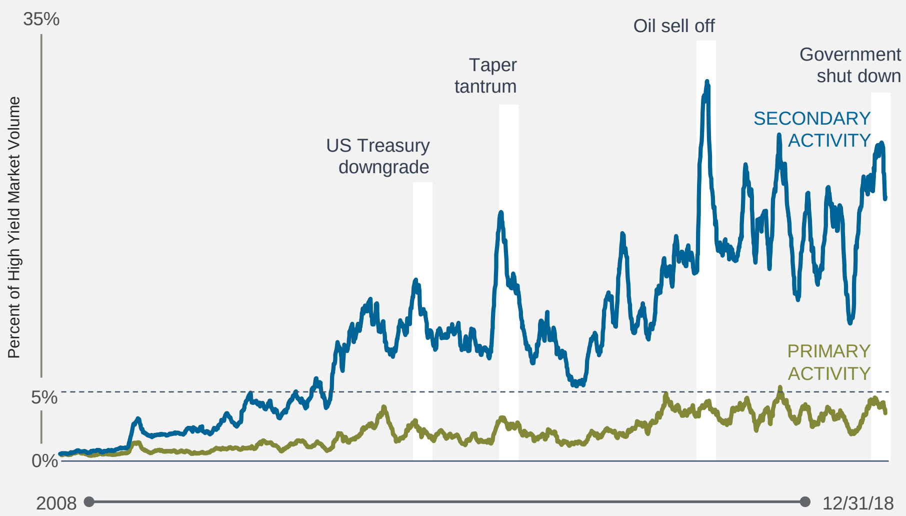
Spread – Difference between the bid and the ask. Narrow spreads are usually a sign that ETFs are heavily traded.

Source: J.P. Morgan Asset Management. Shown for illustrative purposes only.

Are bond markets liquid enough for ETFs?

Bond markets and ETFs are both liquid

High yield ETFs haven't needed bond market liquidity
High yield ETF volume spikes during times of market stress



- Contrary to popular belief, bond market liquidity hasn't dried up since new regulations were put in place after the 2008 financial crisis.
  - More than $700 billions of bonds are traded each day, on average.*
- **Secondary activity** – The trading volume of existing ETF share on exchanges
- **Primary activity** – Trading volume of ETFs' underlying bonds when more liquidity was needed.

*Source: SIFMA and Bloomberg. Data as of 12/31/18.
Source: Bloomberg. Data as of 12/31/18. Shown for illustrative purposes only.

ETFs by J.P.Morgan Asset Management

Want to learn more about ETFs?

- Consult your financial advisor
- Visit www.jpmorganetfs.com
- Call 1-844-4JPM-ETF (1-844-457-6383)

FB-ETF-FOUNDATIONS

Introduction to Alternative Investments

FIRMA

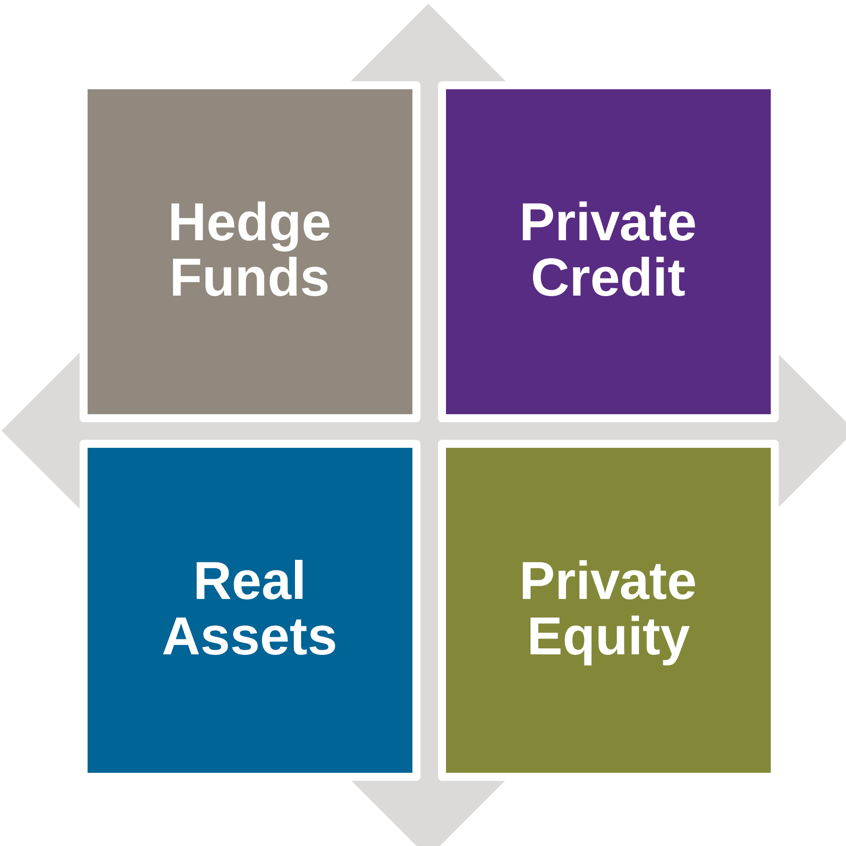
May 7th, 2019

ALTs by J.P.Morgan Asset Management

Agenda

- **Introduction to Alternatives as an Asset Class**
  - Hedge Funds
  - Private Equity
  - Private Credit
  - Real Estate
  - Infrastructure
- Constructing Alternatives Portfolios
- Important Considerations

What are Alternatives?

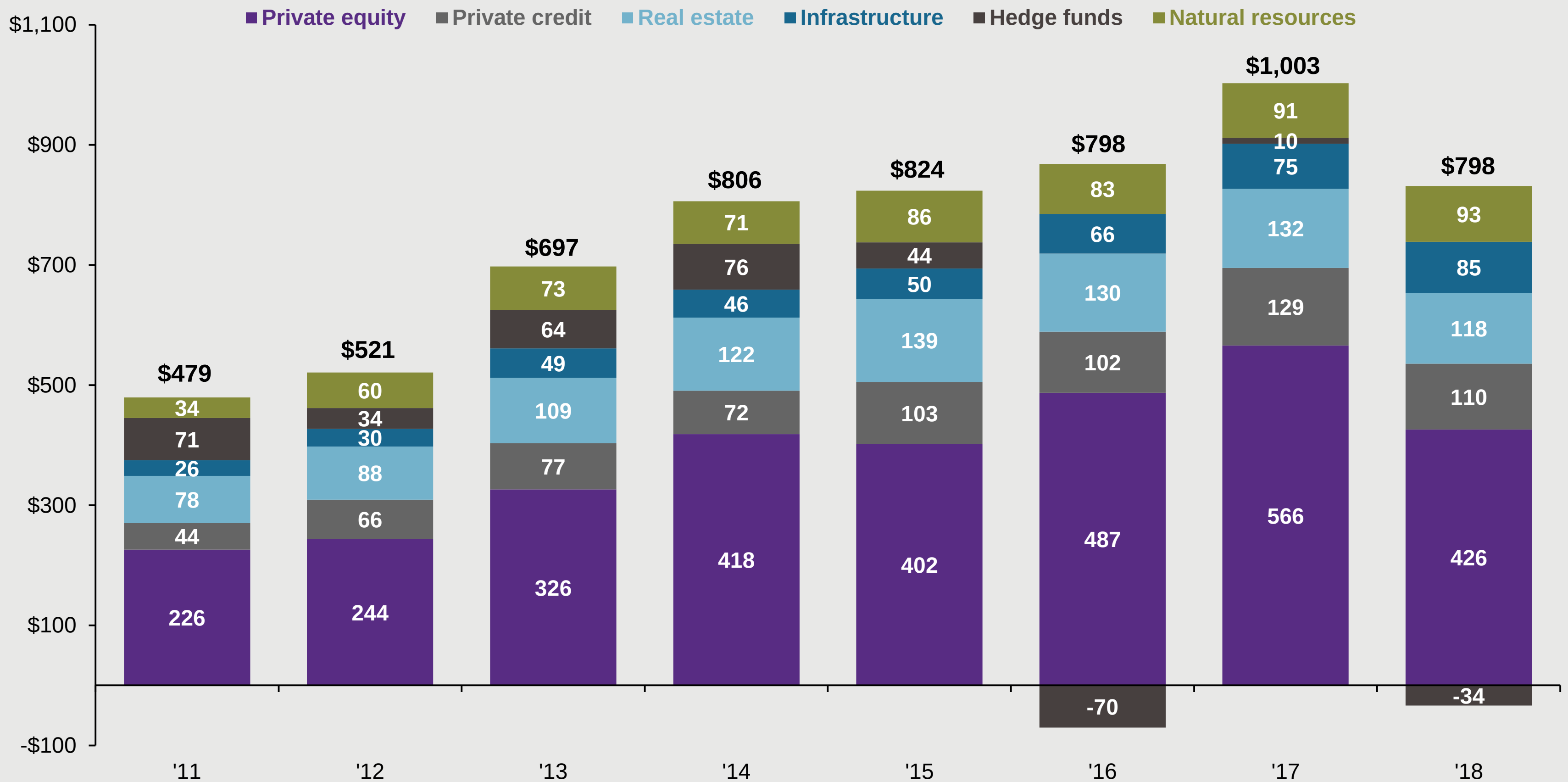


Alternative Strategies

- Flexible, unconstrained investing using non-traditional strategies in both **public and private markets**
- **Alternatives are not a single asset class** and provide different benefits to investment portfolios
- May provide a **diversified return stream** to complement traditional stock/bond portfolios

Global private capital fundraising

Billions USD



Source: Preqin, HFRI, J.P. Morgan Asset Management.

Fundraising categories are provided by Preqin, and represent their estimate of annual capital raised in closed-end funds. Hedge fund fundraising numbers are represented by net flows and come from HFRI.

Data are as of December 31, 2018.

J.P.Morgan Asset Management

Agenda

- Introduction to Alternatives as an Asset Class
  - **Hedge Funds**
  - Private Equity
  - Private Credit
  - Real Estate
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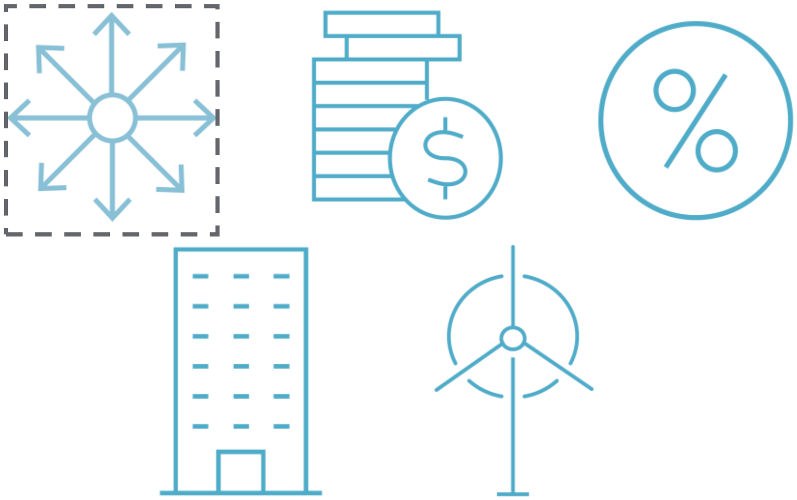
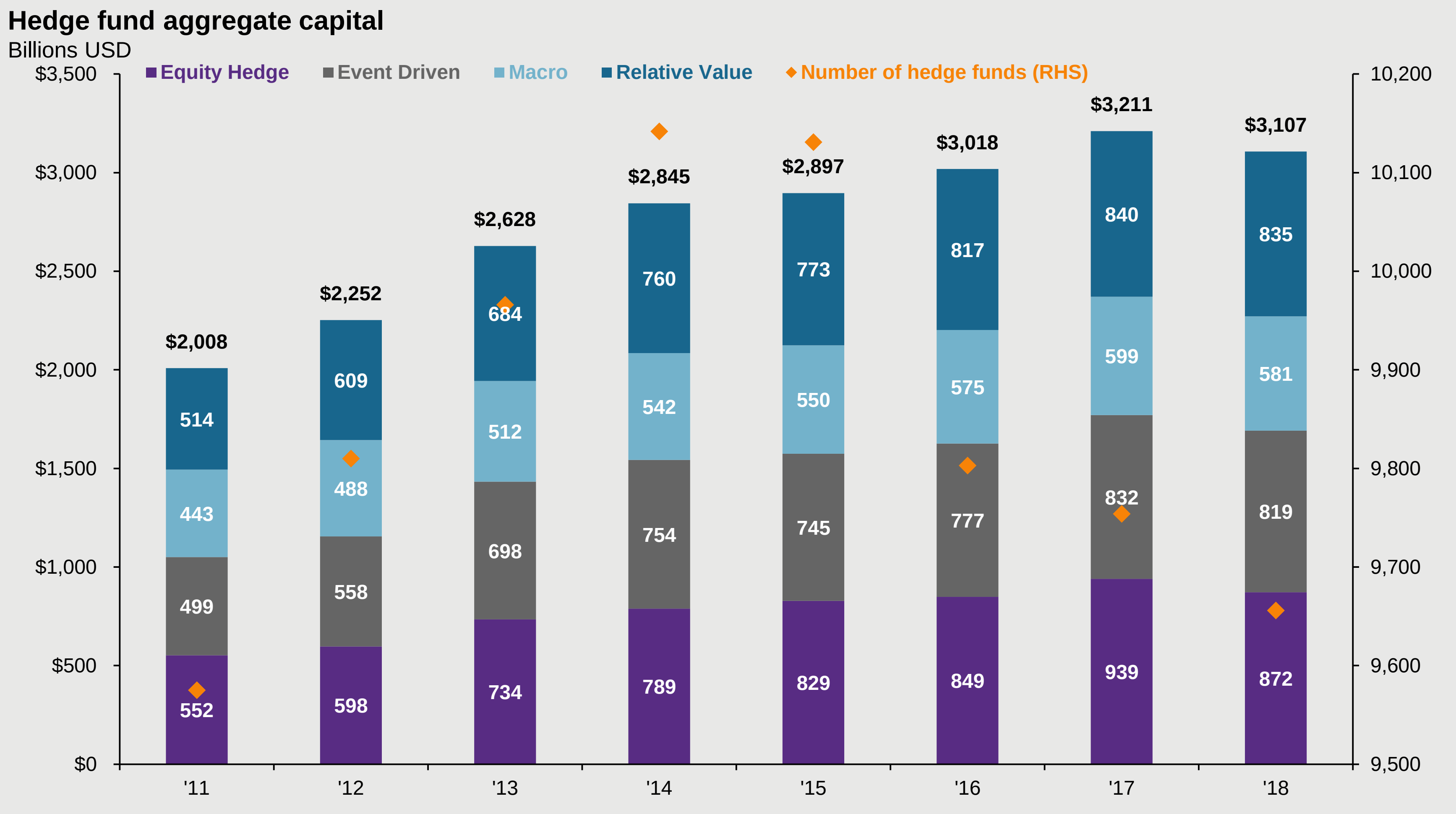


What can hedge funds offer portfolios?

	Mutual Funds	Hedge Funds
Investment Strategy / Approach	Various strategies; typically long only	Various strategies; flexibility to go long and short
Benchmark	Benchmark-oriented	Benchmark-agnostic / Absolute Return
Manager Dispersion	Lower	Higher
Leverage/Derivatives	Limited	Greater flexibility
Liquidity	Daily	Often quarterly; potential lock-ups
Fees	Management fee only	Management and performance fees

Opinions and analysis offered are illustrative and are subject to change without notice. For illustrative and discussion purposes only.

Hedge fund industry fundraising & growth



Source: HFRI, J.P. Morgan Asset Management.

Hedge fund fundraising numbers are represented by net flows and come from HFRI. Count of hedge funds is an annual estimate by HFRI and included funds of funds.

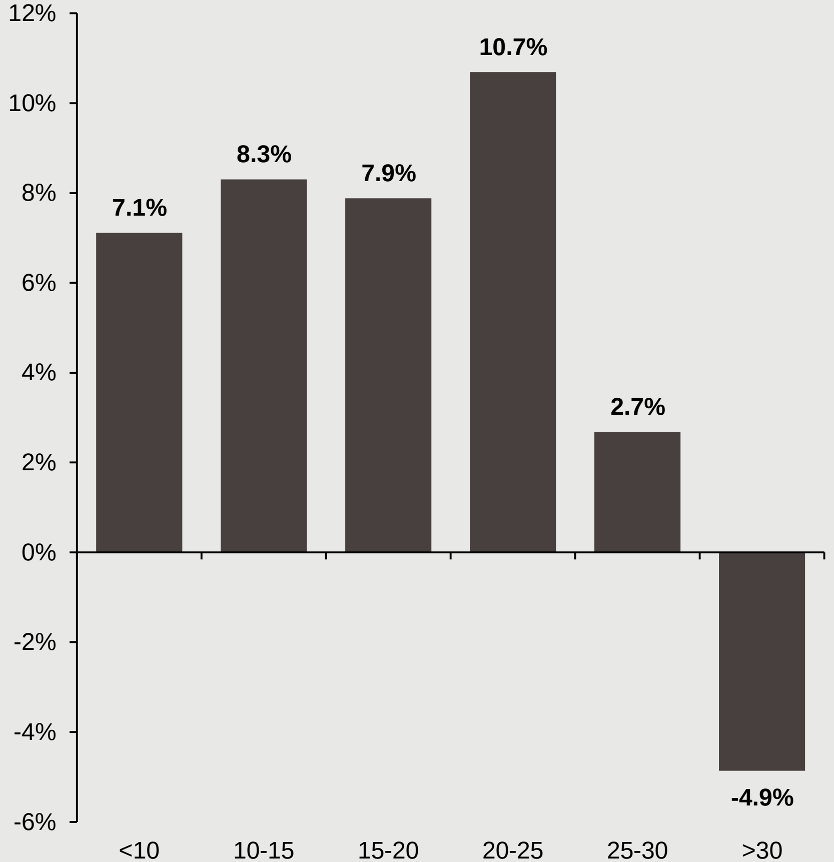
Data are as of December 31, 2018.

Hedge funds

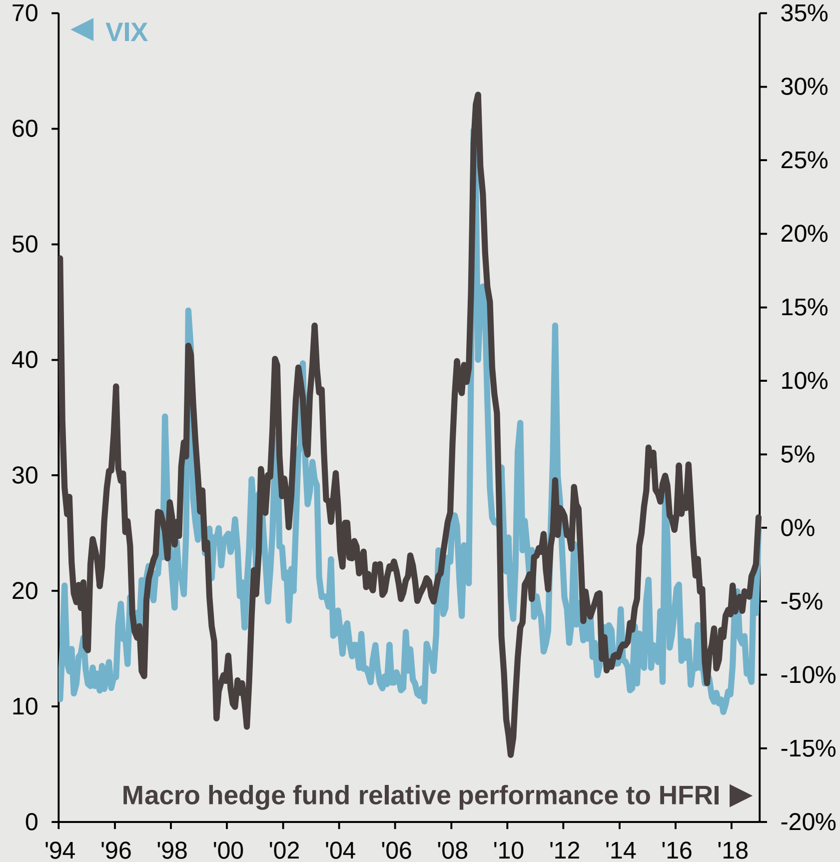
J.P.Morgan Asset Management

Hedge funds and volatility

Hedge funds and volatility
Average y/y hedge fund returns by VIX level, 25 years



Macro hedge fund relative performance & volatility
VIX index level, y/y change in rel. perf. of HFRI Macro index



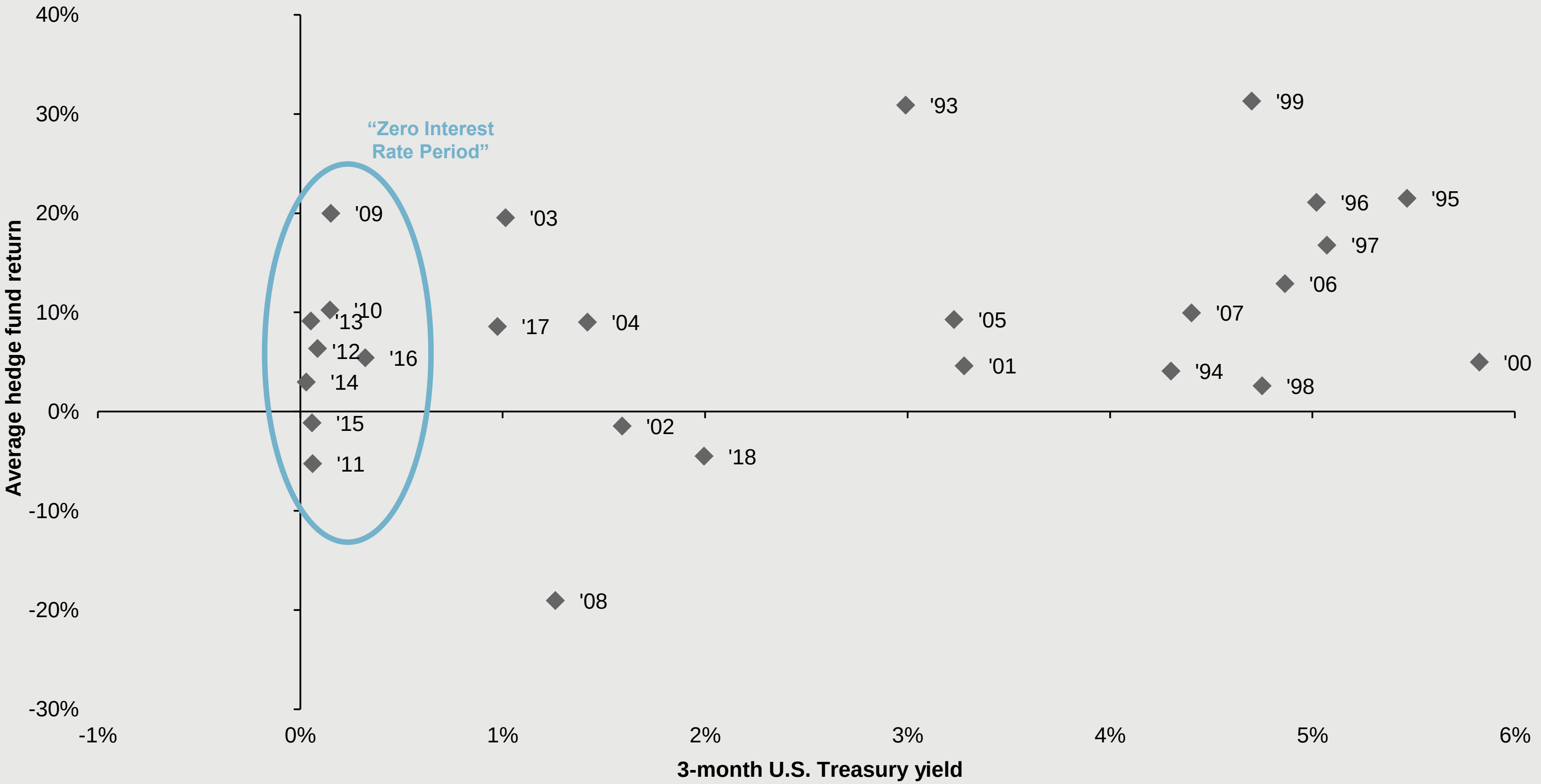
Source: HFRI, CBOE, FactSet, J.P. Morgan Asset Management.
Data are as of December 31, 2018.

Hedge funds

J.P.Morgan Asset Management

Hedge fund returns and cash rate

Yearly average HFRI fund weighted composite return, 3-month U.S. Treasury yield



Source: Bloomberg, Federal Reserve, HFRI, J.P. Morgan Asset Management.
Data are as of December 31, 2018.

J.P.Morgan Asset Management

Agenda

- Introduction to Alternatives as an Asset Class
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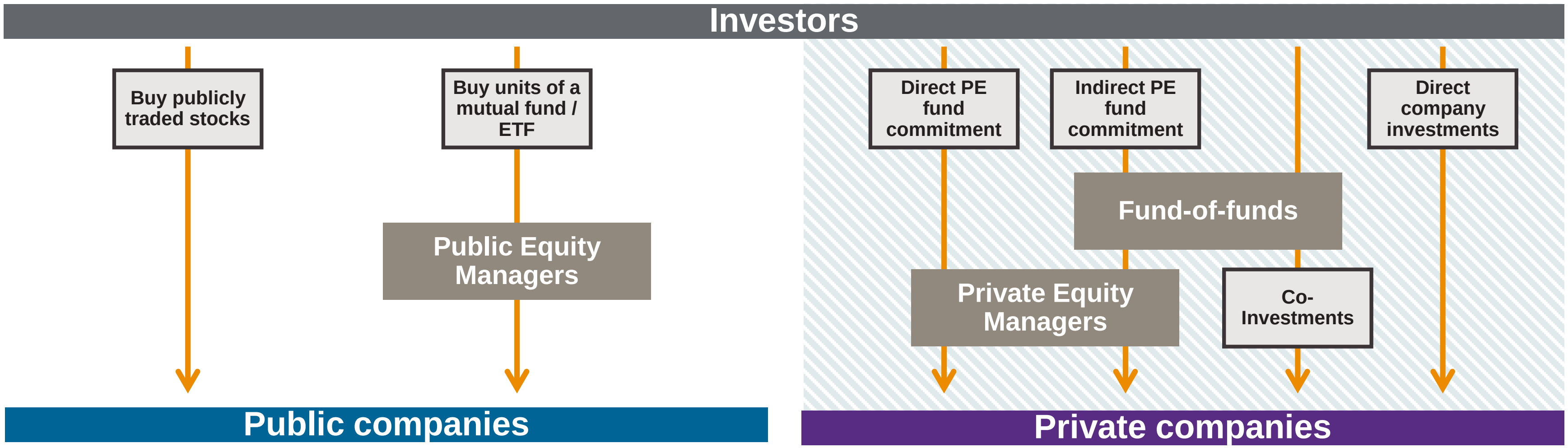
- Important Considerations

How can investors access private equity markets?

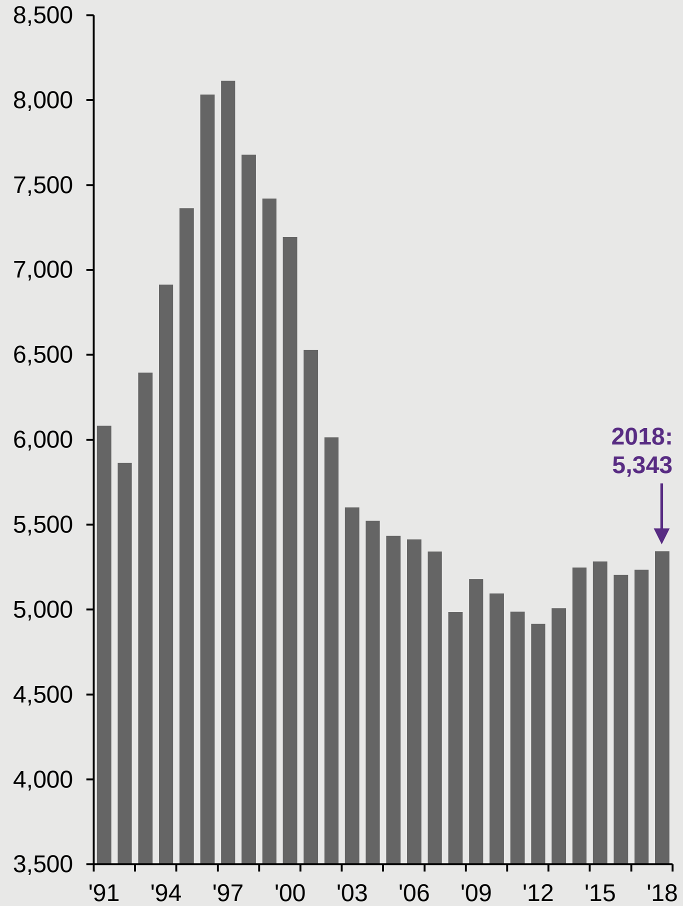
With more companies remaining private today, private equity investors can access an expanded opportunity set



Opinions and analysis offered are illustrative and are subject to change without notice. For illustrative and discussion purposes only.

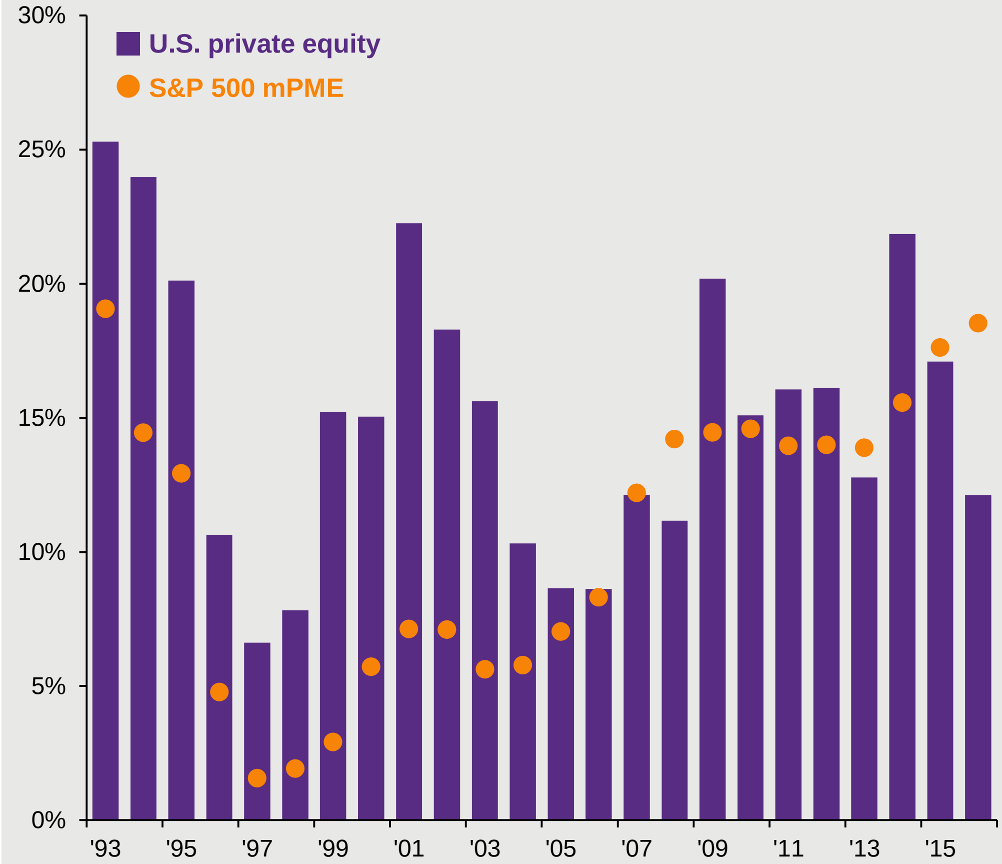
U.S. public vs. private equity

Number of listed U.S. companies*



U.S. public vs. private equity returns

By vintage year



Sources: Cambridge Associates, World Federation of Exchanges, Standard & Poor's, J.P. Morgan Asset Management.

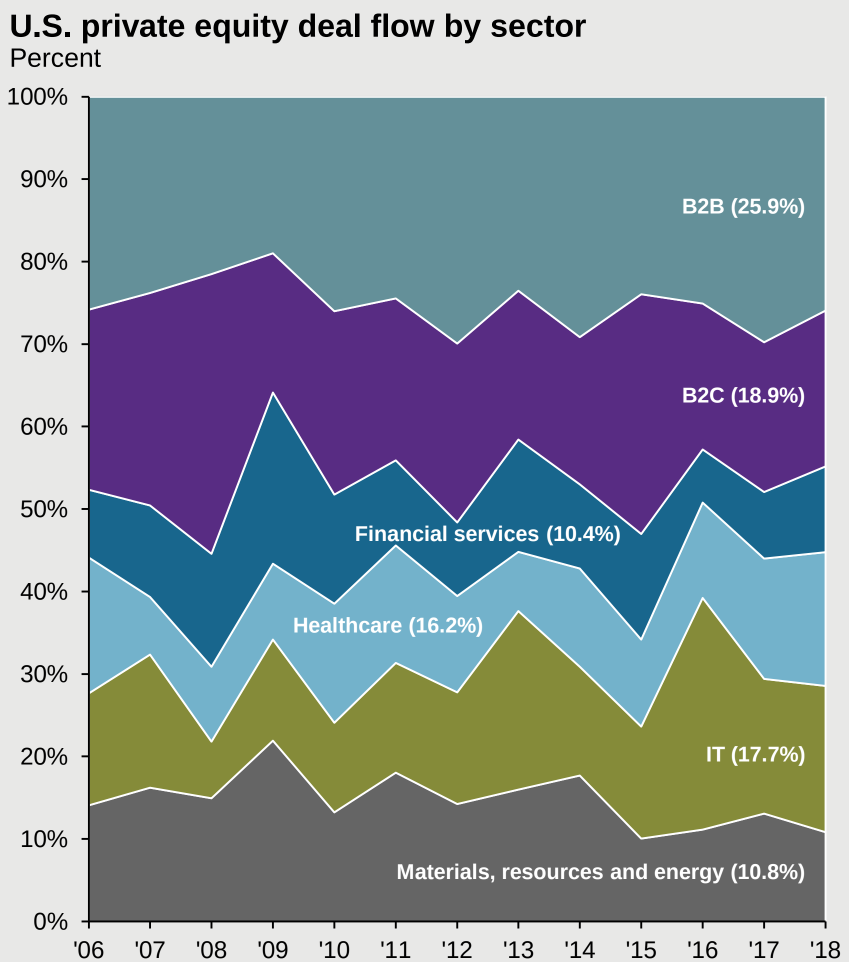
*Number of listed U.S. companies is represented by the sum of number of companies listed on the NYSE and the NASDAQ.

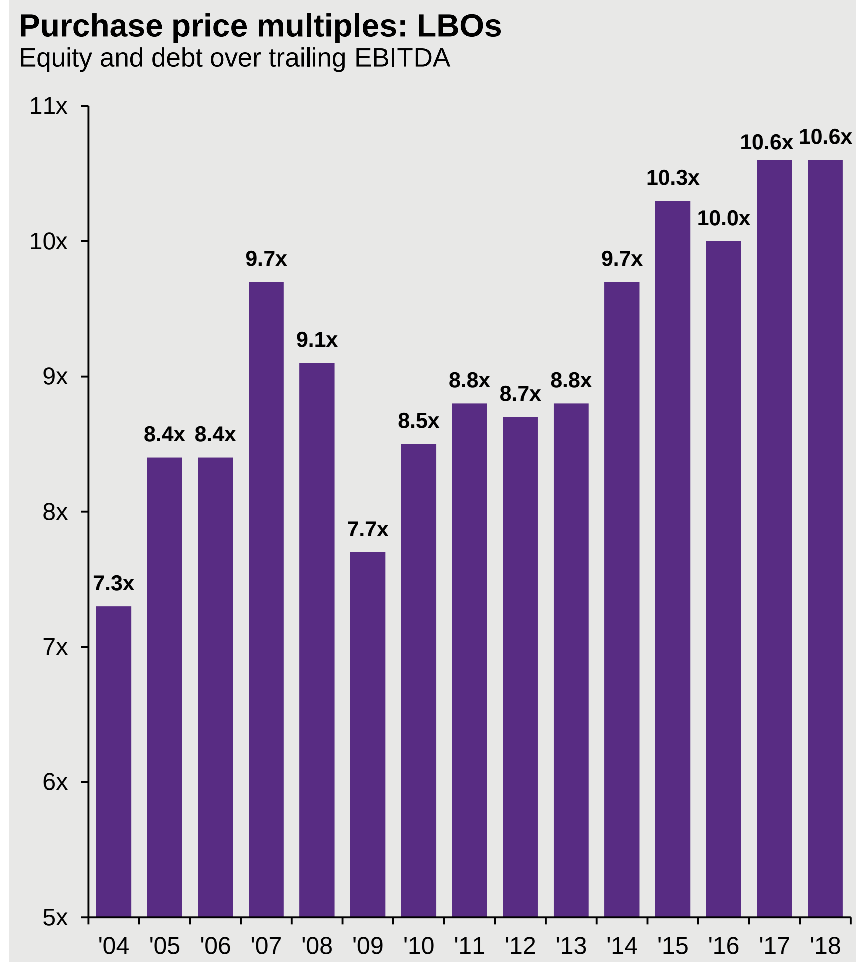
The Cambridge Associates Modified Public Market Equivalent (mPME) methodology determines how much the private equity funds' cash flows would have earned had they been invested in the S&P 500 instead.

Data are as of December 31, 2018.

J.P.Morgan Asset Management

U.S. private equity deal flow and multiples





Source: Preqin, Pitchbook, S&P LCD, J.P. Morgan Asset Management.

For U.S. private equity deal flow by sector, B2B is Business to Business, B2C is Business to Consumer, IT is Information Technology. Most recent share of deals is shown in parentheses.

Data are as of December 31, 2018.

J.P.Morgan Asset Management

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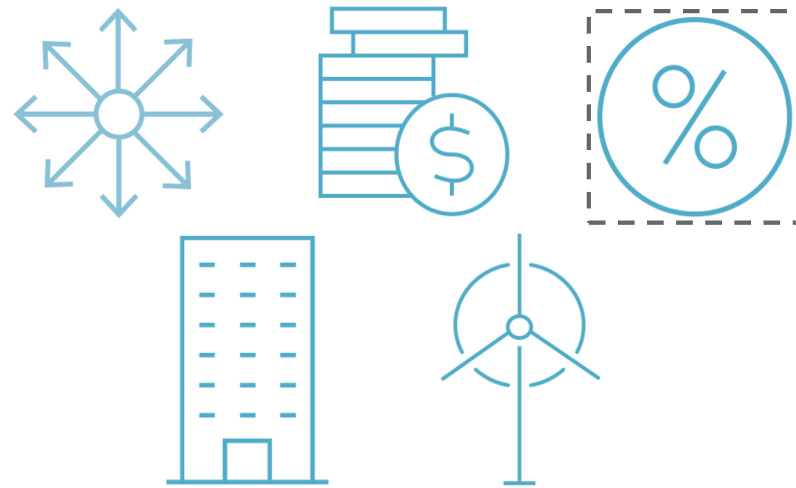


What is private credit?

Senior Debt	Mezzanine Debt	Distressed Debt	Niche / Relative Value
First ranking, secured loans Typically used to finance buyout transactions and growth funding. Returns are generated mostly by the current interest payments	**Unsecured subordinated debt or second lien term debt** Typically used in leveraged buyout transactions to fill the gap between the sponsor's equity capitalization and optimal senior debt levels	**Debt trading at a discount in the secondary market** Typically acquire sound assets at a discount to their face value where companies have run into financial difficulties	**Non-traditional credit opportunities** Niche opportunities across asset sales and new loan origination that typically exhibit price dislocation and barriers to entry

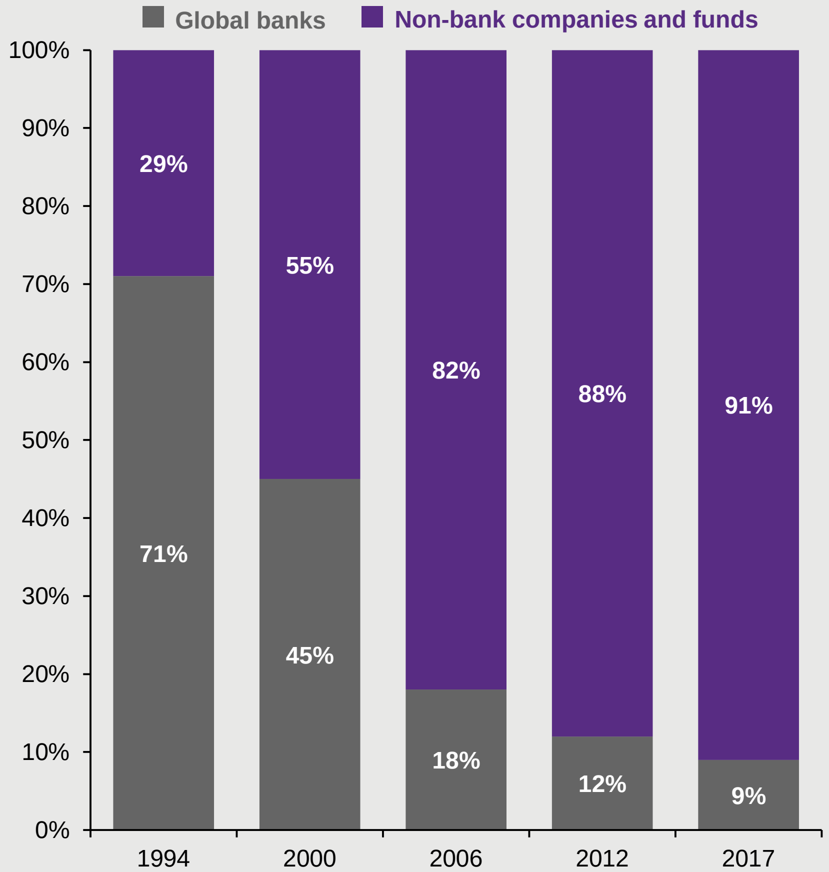
Opinions and analysis offered are illustrative and are subject to change without notice. For illustrative and discussion purposes only.

Credit market participants and issuance

Private markets

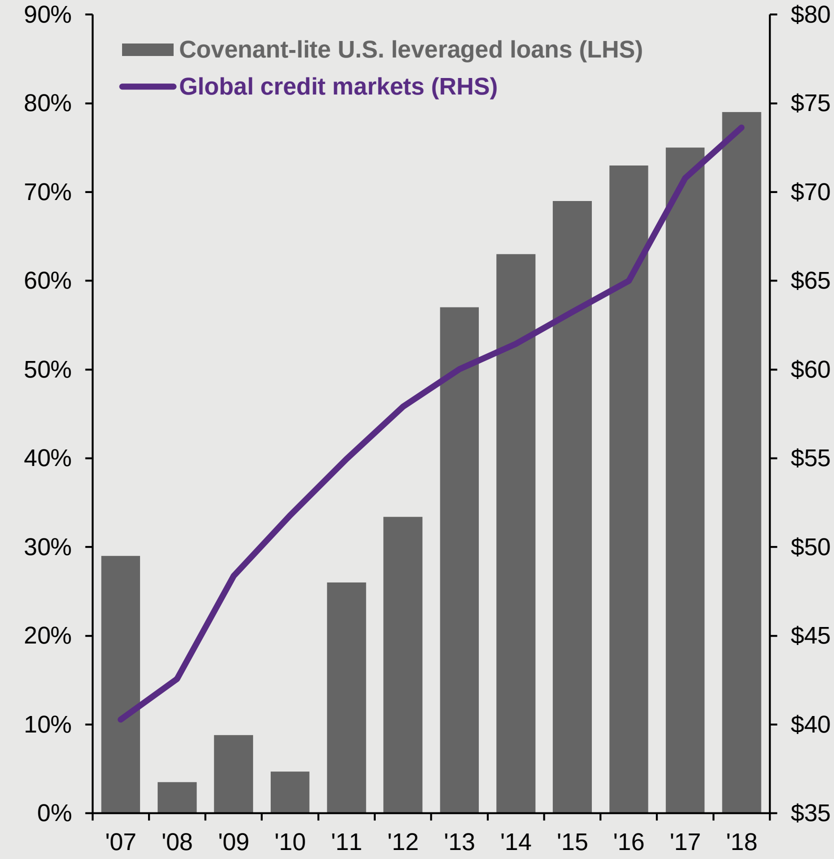
U.S. leveraged loan market participants

Share of total market, percent



Covenant-lite loan issuance and credit markets

Percent of issuance, trillions USD



Source: Ares, J.P. Morgan High Yield Research, S&P LCD, J.P. Morgan Asset Management.

Covenant-lite loans are a type of financing that is issued with fewer restrictions on the borrower with regard to collateral, level of income, and loan payment terms, and fewer protections for the lender, including financial maintenance tests that measure the debt-service capabilities of the borrower.

Data are as of December 31, 2018.

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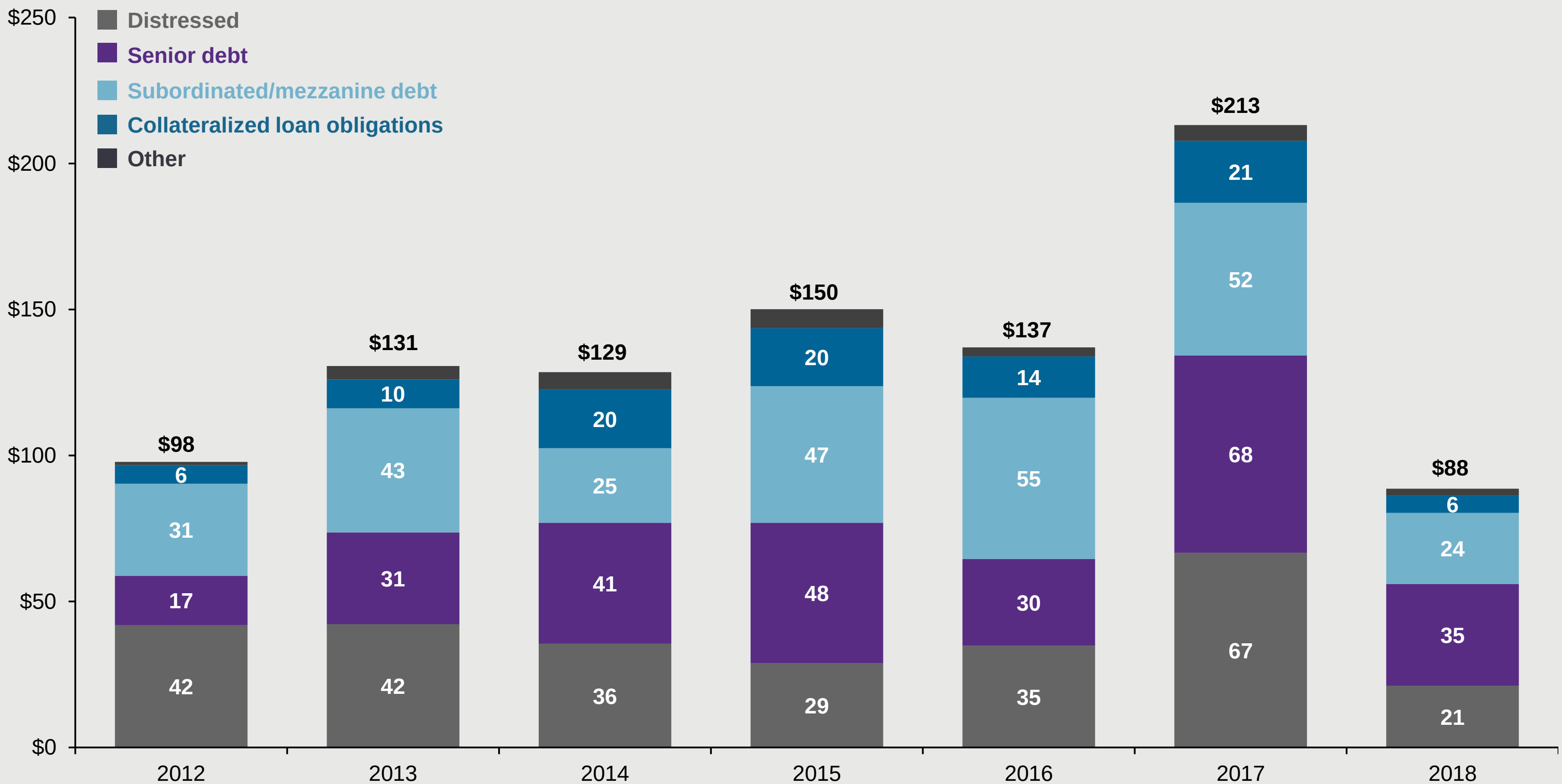
Global private credit fundraising

Global private credit fundraising by strategy
Billions USD



Source: Private Debt Investor, J.P. Morgan Asset Management. *2018 figure is a year-to-date as of September 30, 2018.
Data are as of September 30, 2018.

Private markets

J.P.Morgan Asset Management

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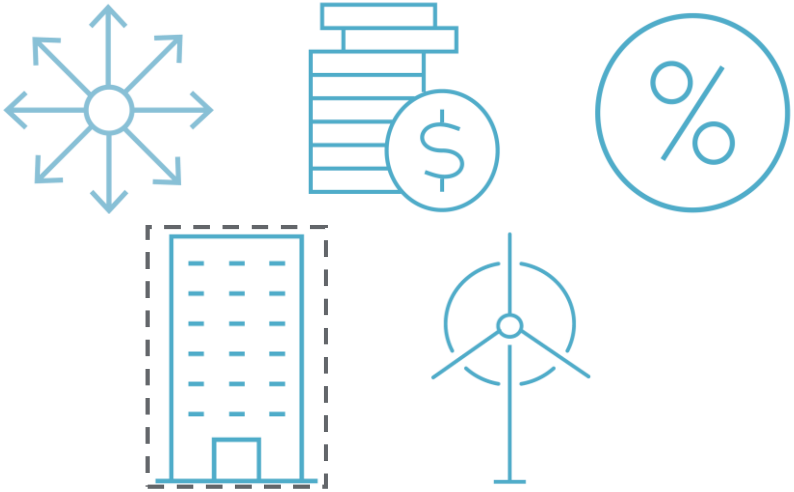
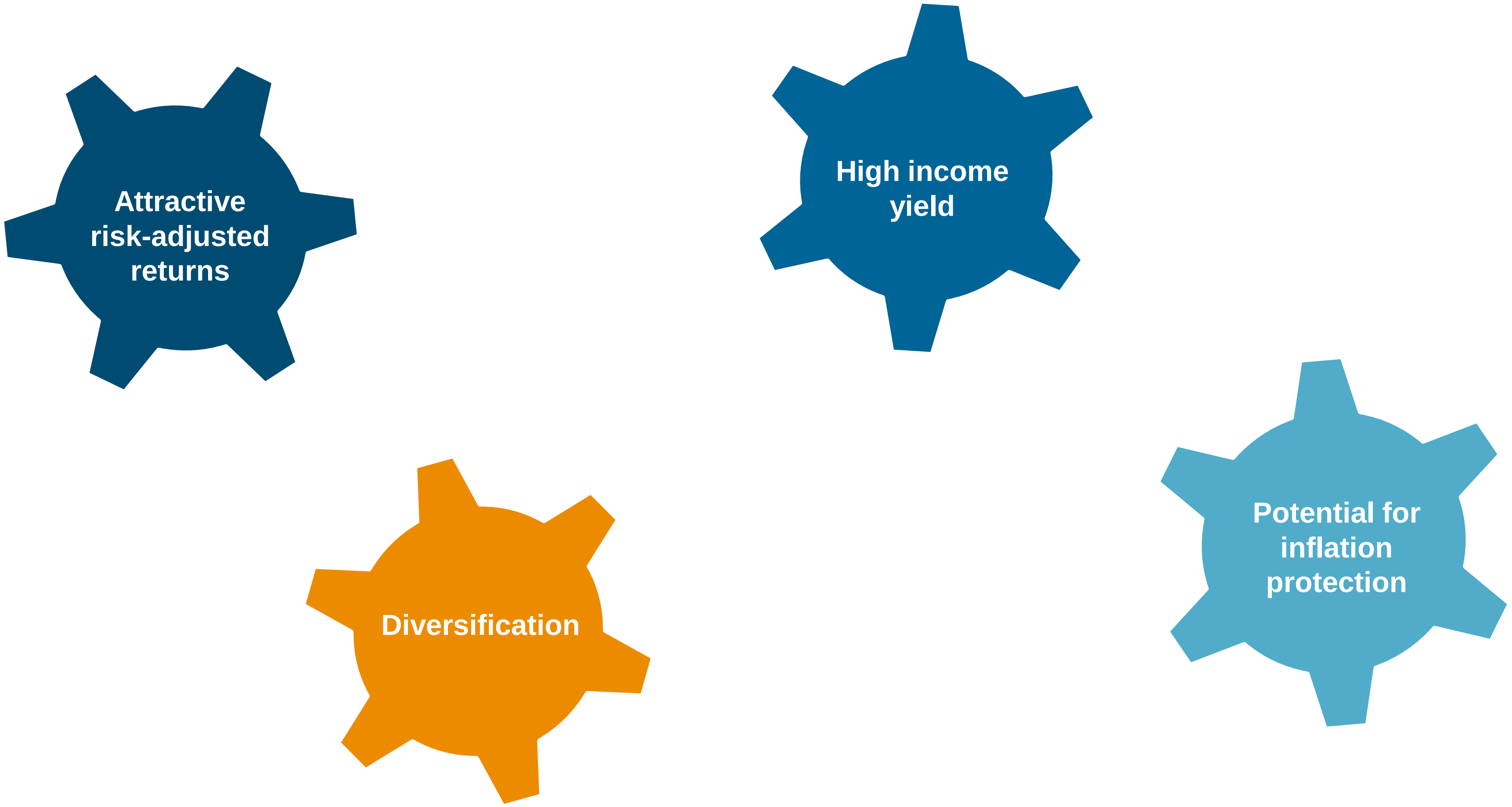


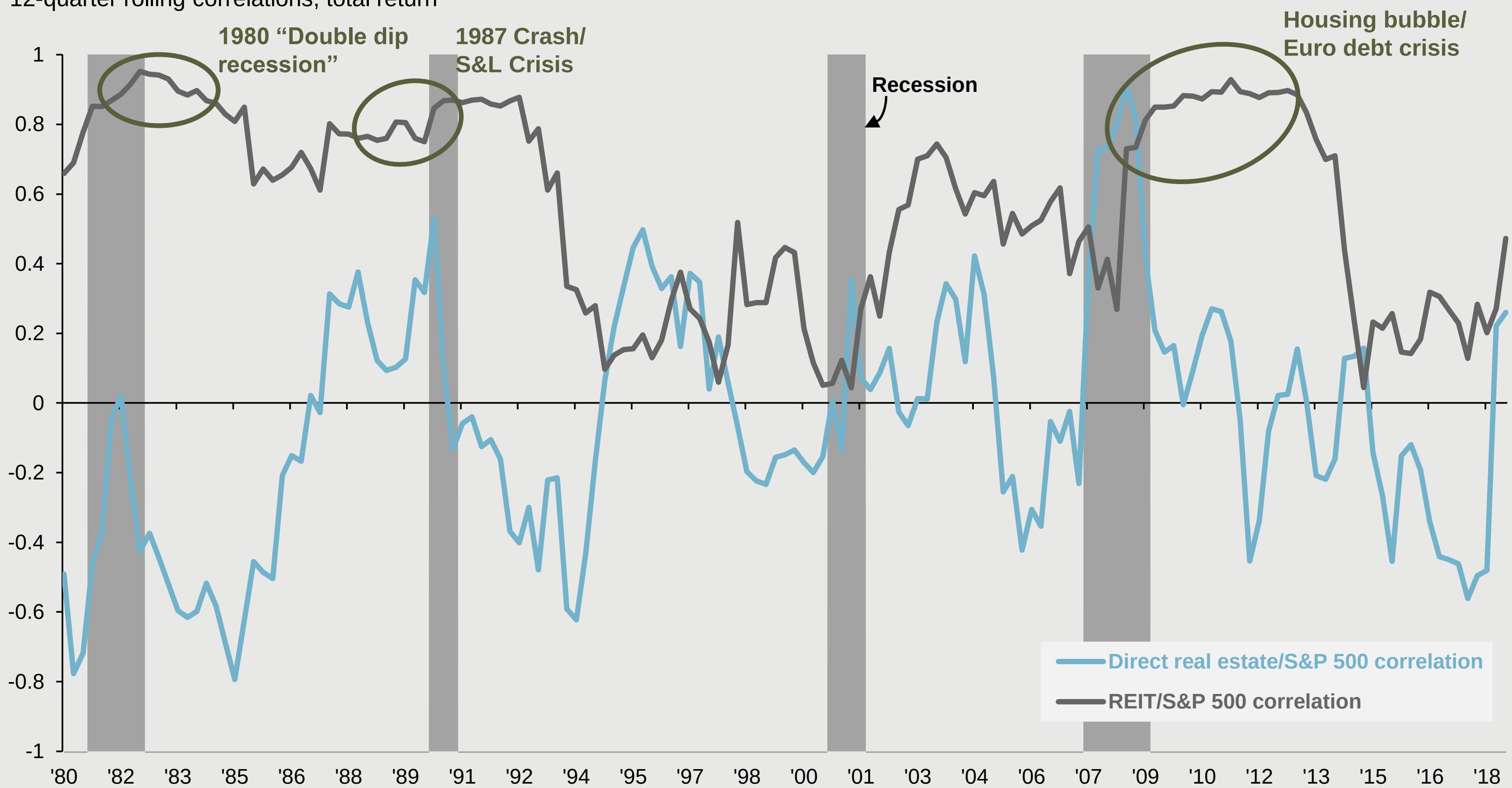
The benefits of adding real estate to diversified portfolios



As of June 30, 2018. The manager seeks to achieve the stated objectives. There can be no guarantee the objectives will be met.

U.S. REITs, real estate, and equities

12-quarter rolling correlations, total return



Source: NAREIT, NCREIF, Standard & Poor's, FactSet, J.P. Morgan Asset Management.

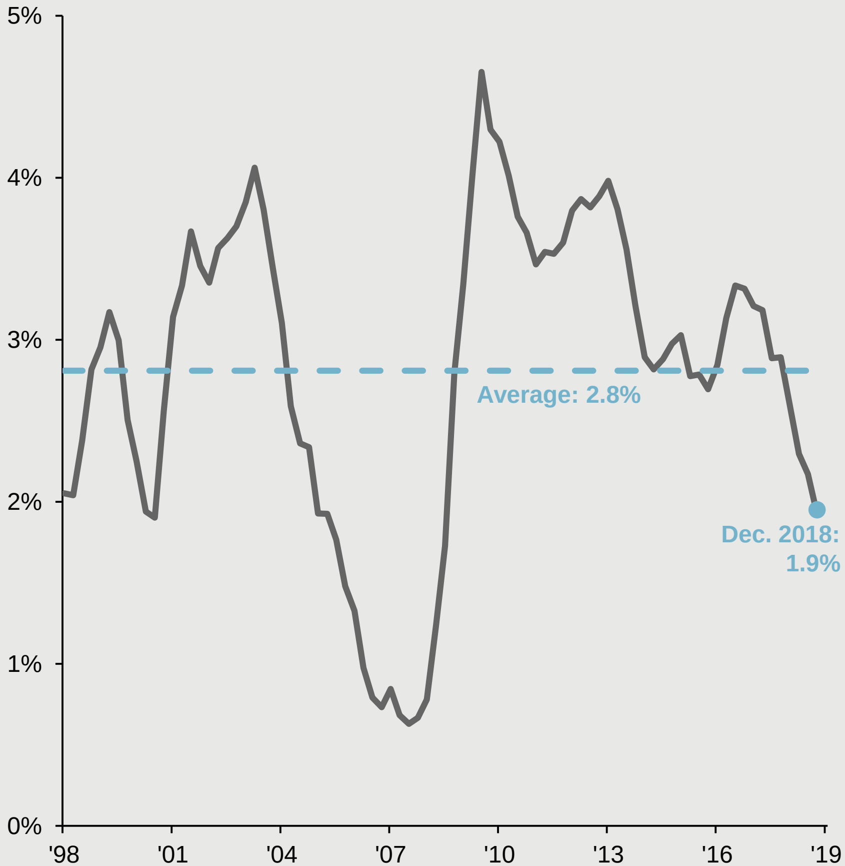
Real estate investment trusts (REITs). Indices do not include fees or operating expenses and are not available for actual investment. Past performance is not necessarily a reliable indicator for current and future performance.

Data are as of December 31, 2018.

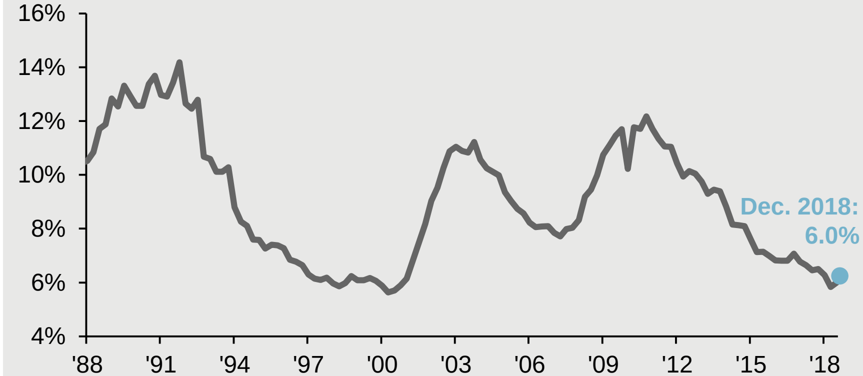
Real estate

U.S. real estate dynamics

U.S. real estate cap rate spreads
Transactions based, spread to 10y UST, 4-quarter rolling average



U.S. vacancy rates
Percent



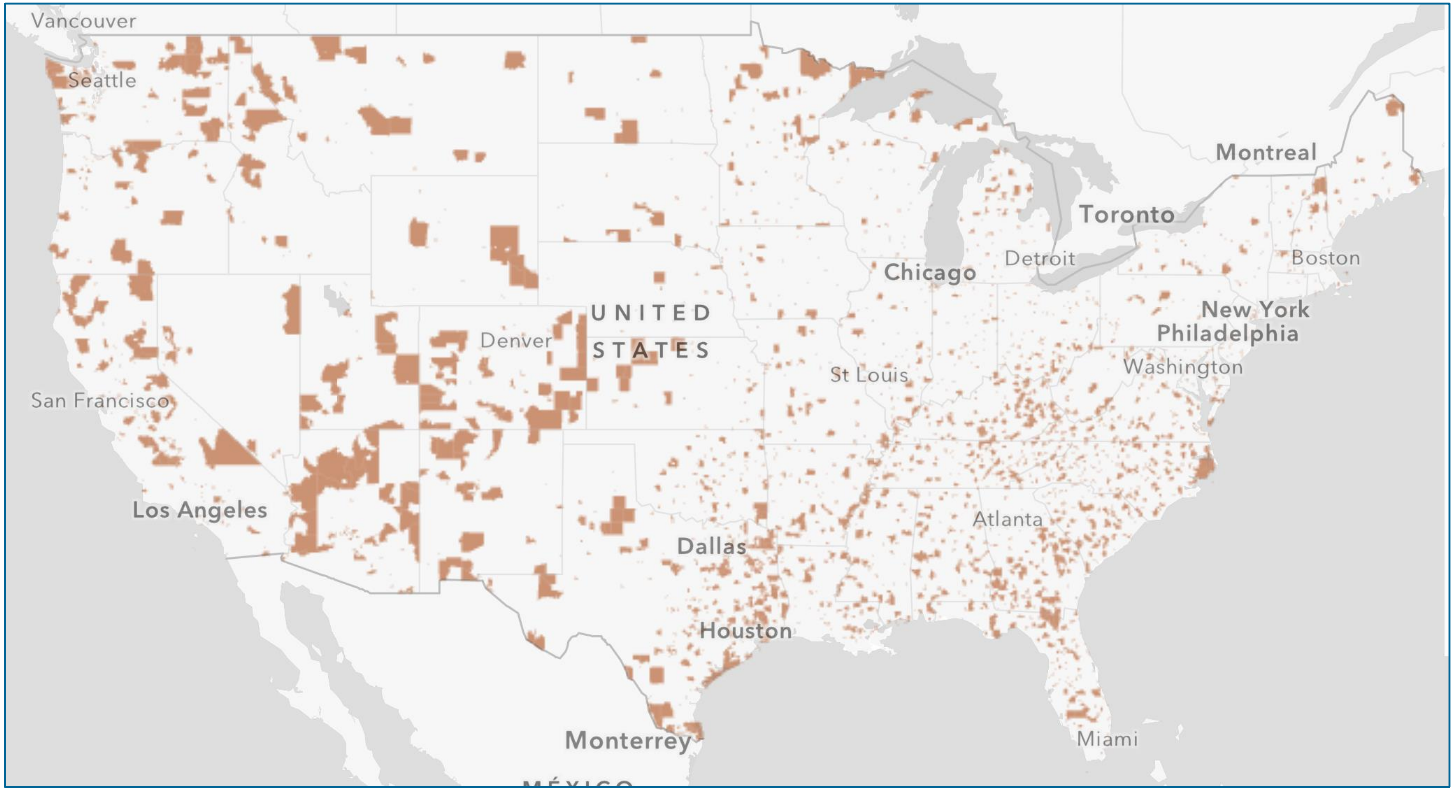
U.S. real estate construction costs
PPI construction materials, year-over-year % change

Source: NCREIF, Federal Reserve, BLS, J.P. Morgan Asset Management.
The cap rate, which is computed as the net operating income over sales price, is the rate of return on a real estate investment property.
Data are as of December 31, 2018.

J.P.Morgan Asset Management

Opportunity Zones present compelling real estate investments

Opportunity Zones are in real, investable areas, and tax benefits can be an added benefit



The manager seeks to achieve the stated objectives. There can be no guarantee the objectives will be met.

ALTs by J.P.Morgan Asset Management

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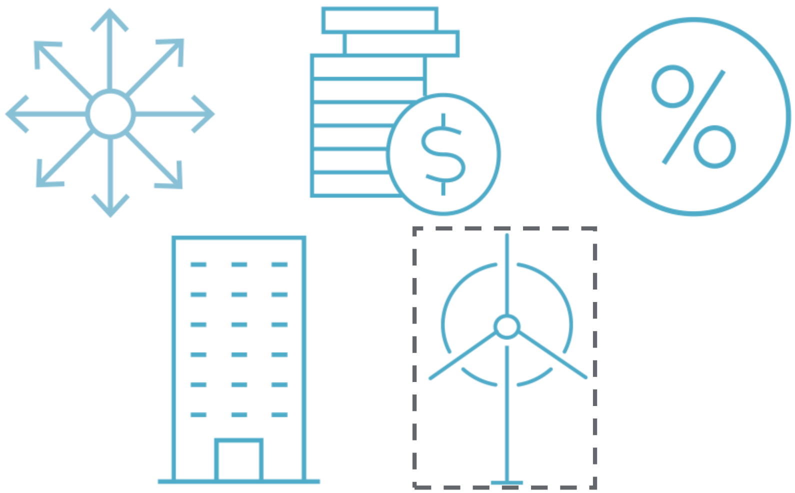


ALTs by J.P.Morgan Asset Management

How can investors access infrastructure today?

Distributed / Regulated Assets:
Monopolistic regulatory frameworks give visibility into stable cash flows

- Water and wastewater
- Electricity distribution/transmission
- Natural gas distribution

Long-Term Contracted Assets:
Long-term contracts with volume minimums which typically result in yield approximating total return

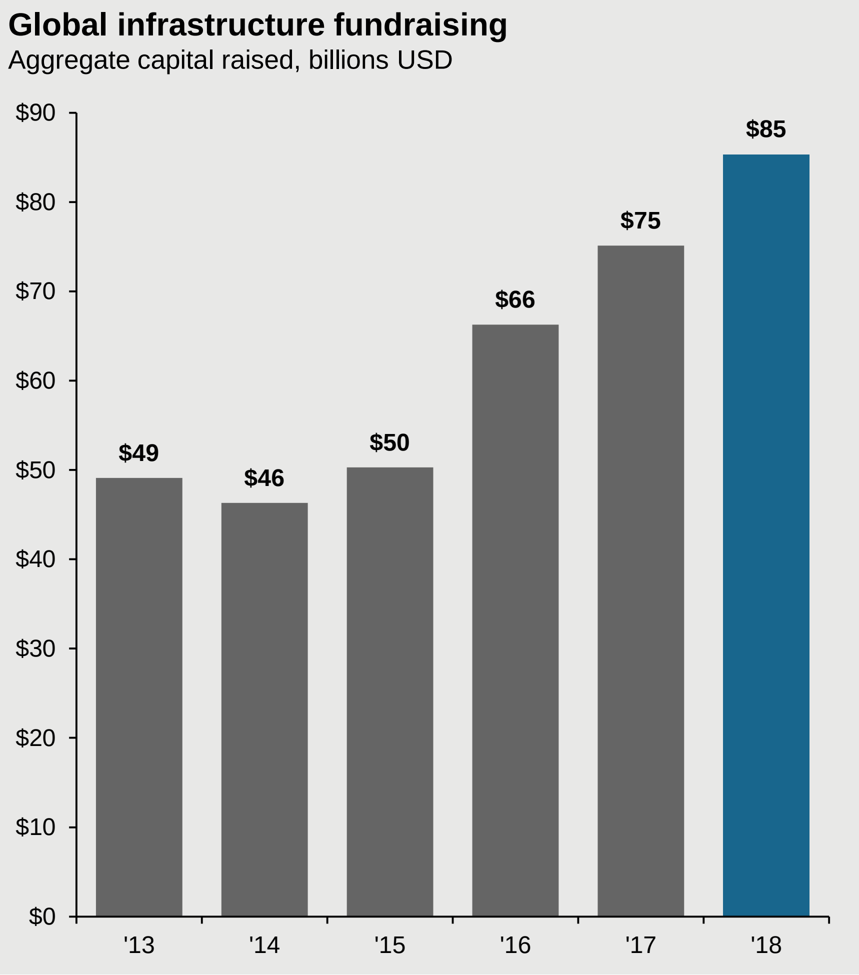
- Conventional generation
- Renewable generation
- Storage

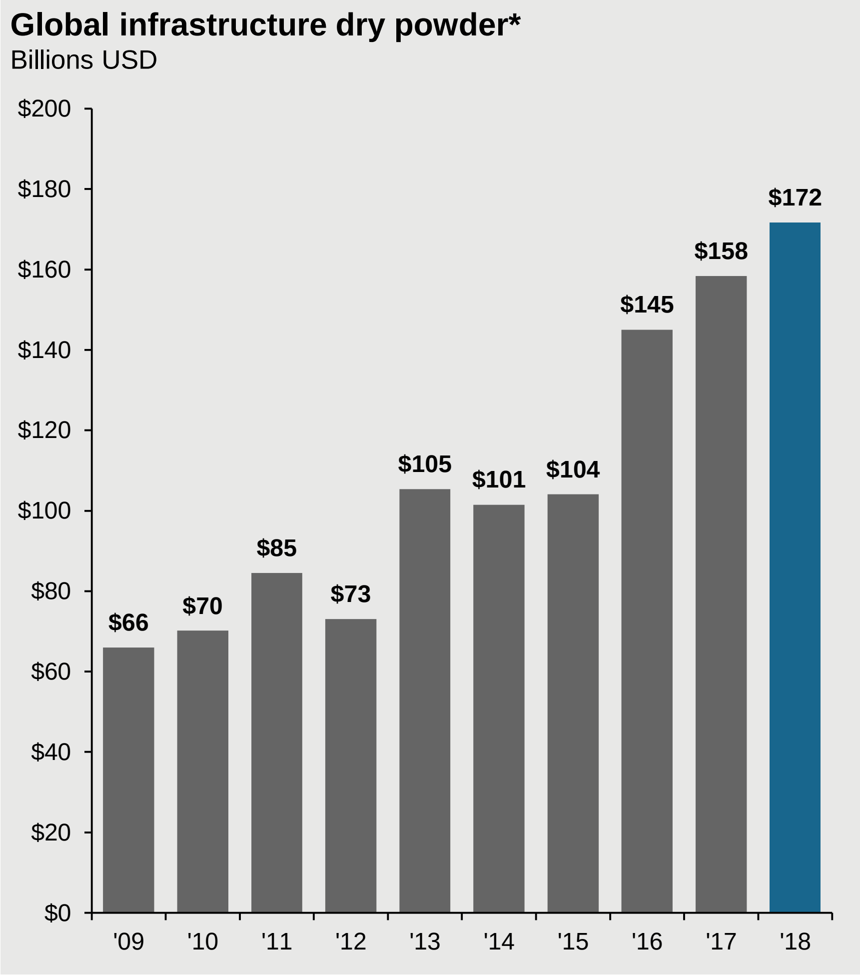
GDP-Sensitive Assets:
Mature assets with significant demand history often underpinned by long-term contracts

- Airports *(with contracts)*
- Seaports *(with contracts)*
- Rail Leasing *(with contracts)*

For illustrative purposes only.

Global infrastructure fundraising and dry powder





Source: Preqin, J.P. Morgan Asset Management.
*Dry powder refers to the amount of cash reserves or liquid assets available for use.
Data are as of December 31, 2018.

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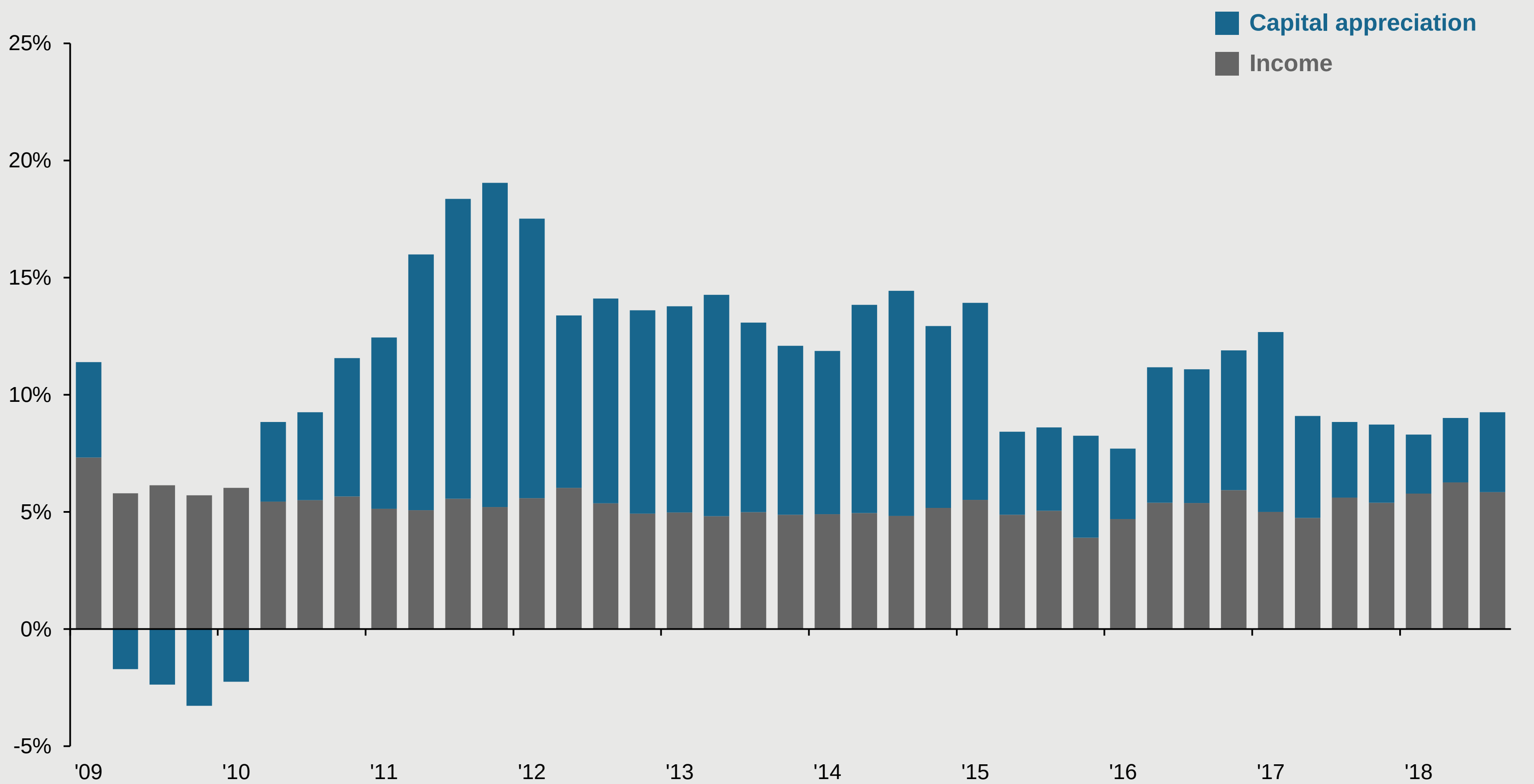
Sources of global infrastructure returns

Global core infrastructure returns

Rolling 4-quarter returns from income and capital appreciation



Source: MSCI, J.P. Morgan Asset Management. Infrastructure returns represented by the "low risk" category of the MSCI Global Quarterly Infrastructure Asset Index. Data show rolling one-year returns from income and capital appreciation. The chart shows the full index history, beginning in the first quarter of 2009.

Past performance is not indicative of future results. Alternative investments carry more risk than traditional investments and are recommended only for long-term investment. Some alternative investments may be highly leveraged and rely on speculative investments that can magnify the potential for loss or gain. Diversification does not guarantee investment returns or eliminate the risk of loss.

Data are as of December 31, 2018.

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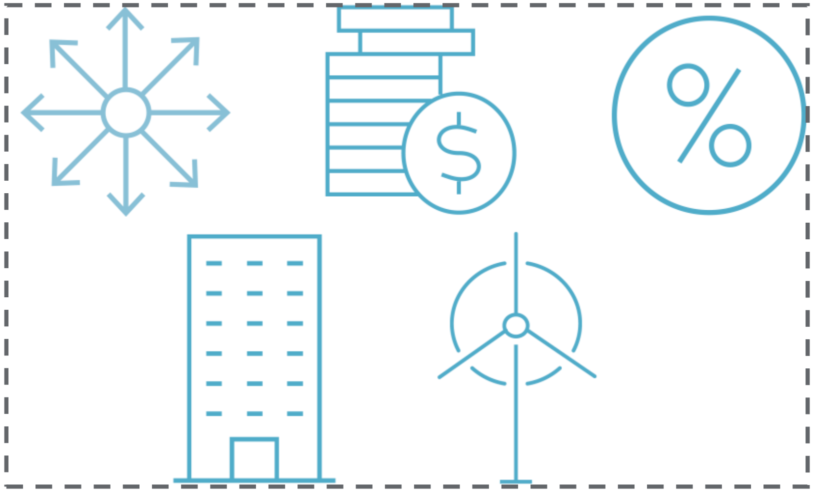


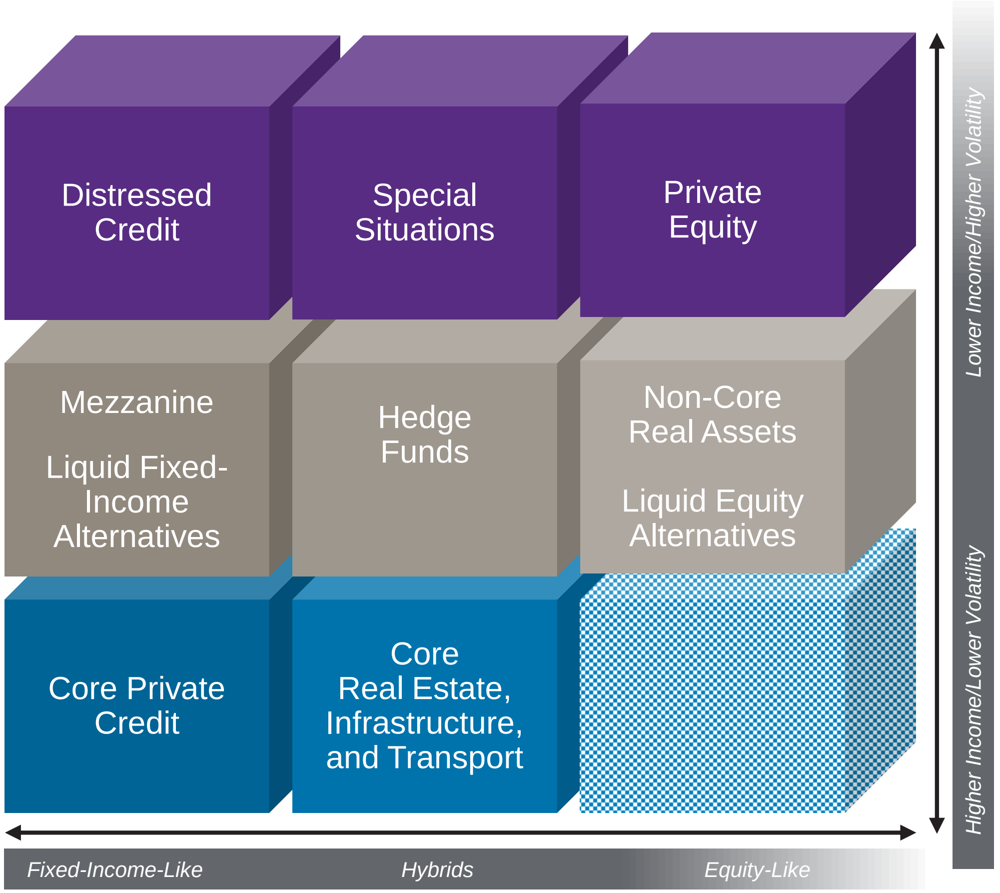
The Alternatives Solutions Building Blocks: building diversified portfolios

What role do different alternative categories play in the portfolio?

RETURN ENHANCERS
Global tactical/opportunistic returns

CORE COMPLEMENTS
Added diversification and/or enhanced returns

CORE FOUNDATION
Stable income with lower volatility, diversification, plus inflation sensitivity



ALTs by J.P.Morgan Asset Management

The range of asset classes and strategies provides a variety of benefits

	Diversifiers		Return Enhancers	
	Liquid Alts / Hedge Funds	Real Assets	Private Credit	Private Equity
Description	Various strategies including long/short investing in public markets	Private investments in real estate and infrastructure	Direct lending to companies	Investing in private companies
Portfolio Diversification	✓	✓		
Volatility Mitigation	✓	✓		
Current Income		✓	✓	
Inflation Protection		✓	✓	
Return Enhancement			✓	✓

Source: J.P. Morgan Asset Management as of 12/31/2017. Opinions, estimates, forecasts, and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice

Public and private market correlations

Public and private market correlations

10-years, quarterly returns

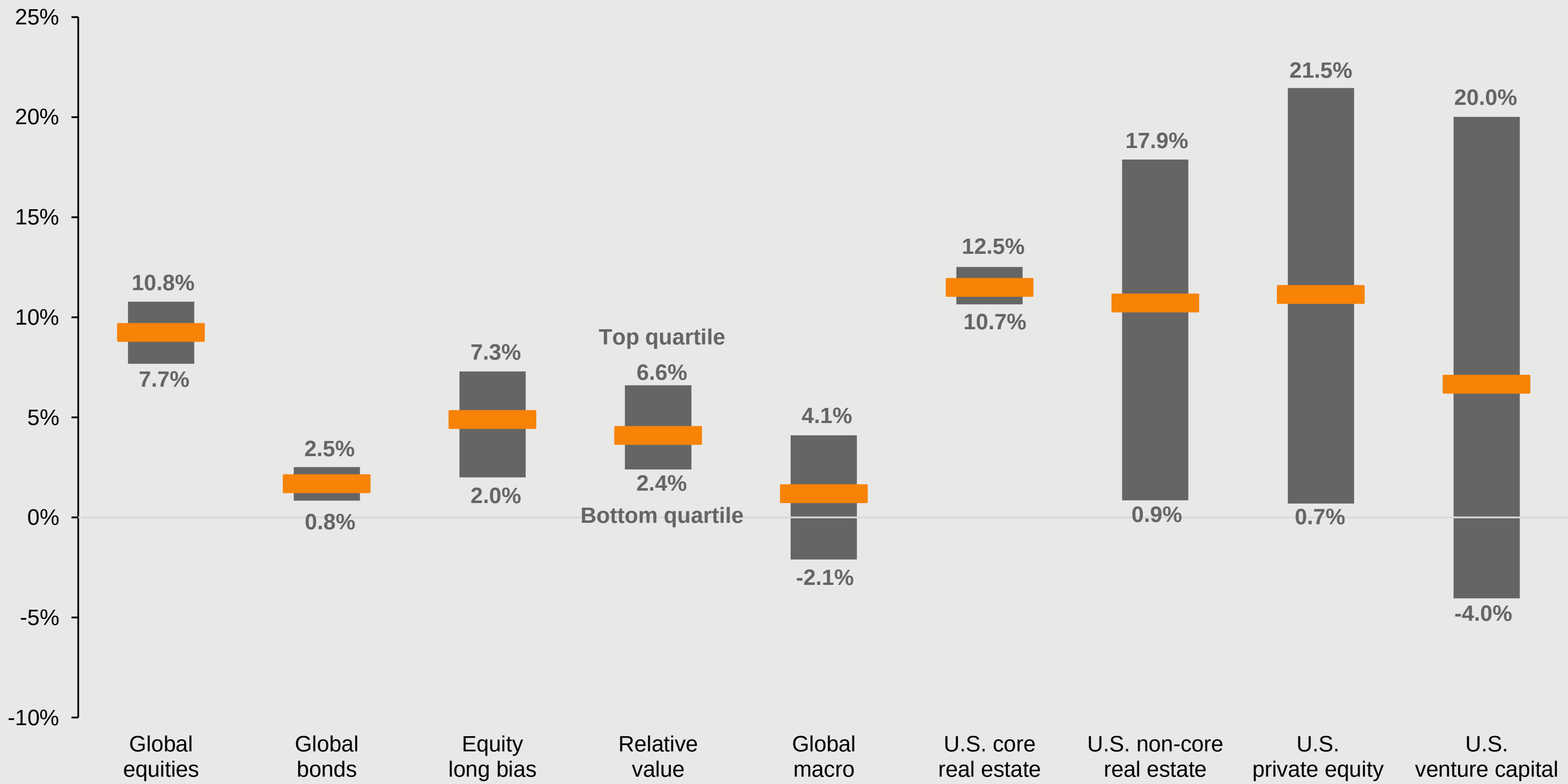
		Global bonds	Global equities	U.S. core RE	Europe core RE	APAC core RE	Global infra.	U.S. direct lending	U.S. venture capital	U.S. private equity	Equity long/short	Relative value	Global macro
Financial assets	Global bonds	1.0											
	Global equities	0.3	1.0										
Global real estate	U.S. core RE	-0.1	0.1	1.0									
	Europe core RE	0.0	0.3	0.6	1.0								
	APAC core RE	0.1	0.4	0.8	0.8	1.0							
Other real assets	Global infrastructure	-0.1	0.0	0.5	0.4	0.5	1.0						
Private markets	U.S. direct lending	-0.1	0.7	0.4	0.4	0.4	0.3	1.0					
	U.S. venture capital	-0.2	0.5	0.6	0.5	0.5	0.4	0.6	1.0				
	U.S. private equity	0.0	0.8	0.4	0.6	0.6	0.3	0.9	0.7	1.0			
Hedge funds	Equity long/short	0.2	1.0	0.0	0.4	0.3	0.0	0.7	0.5	0.8	1.0		
	Relative value	0.1	0.8	0.0	0.3	0.2	0.0	0.8	0.4	0.8	0.9	1.0	
	Global macro	0.4	0.4	-0.1	0.3	0.1	-0.1	0.0	0.0	0.1	0.4	0.2	1.0

Source: MSCI, Bloomberg Barclays, NCREIF, Cliffwater, Burgiss, HFRI, J.P. Morgan Asset Management. RE – real estate. Global equities: MSCI AC World Index. Global bonds: Bloomberg Barclays Global Aggregate Index. U.S. core real estate: NCREIF Property Index – Open End Diversified Core Equity component. Europe core real estate: IPD Global Property Fund Index – Continental Europe. Asia Pacific (APAC) core real estate: IPD Global Property Fund Index – Asia-Pacific. Global infrastructure (infra.): MSCI Global Quarterly Infrastructure Asset Index (equal-weighted blend). U.S. direct lending: Cliffwater Direct Lending Index. U.S. private equity: Cambridge Associates U.S. Private Equity Index. U.S. venture capital: Cambridge Associates U.S. Venture Capital Index. Hedge fund indices include equity long/short, relative value, and global macro and are all from HFRI. All correlation coefficients are calculated based on quarterly total return data for the period 9/30/08 –9/30/18. Returns are denominated in USD.

Data are as of December 31, 2018.

J.P.Morgan Asset Management

Private and public manager dispersion
Based on returns from 2013 – 2018



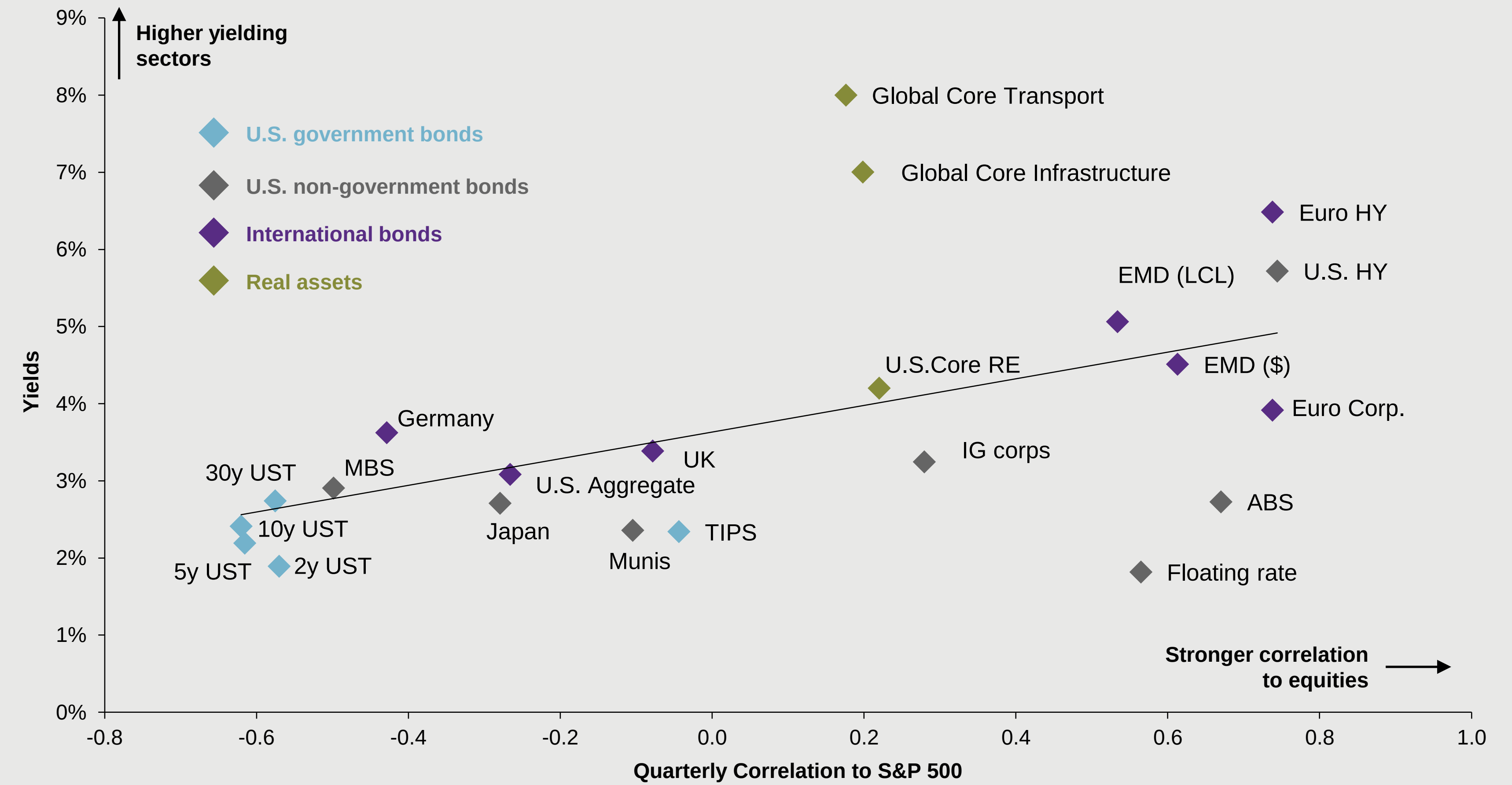
Sources: Lipper, NCREIF, Cambridge Associates, HFRI, J.P. Morgan Asset Management.

Global equities (large cap) and global bonds dispersion are based on the world large stock and world bond categories, respectively. Manager dispersion is based on: 2013 – 2018 annual returns for global equities, global bonds, U.S. core real estate and hedge funds. U.S. non-core real estate, U.S. private equity and U.S. venture capital are represented by the 5-year horizon internal rate of return (IRR).

Data are as of December 31, 2018.

Risk and return of fixed income and real assets

Correlation vs. S&P 500 and yields

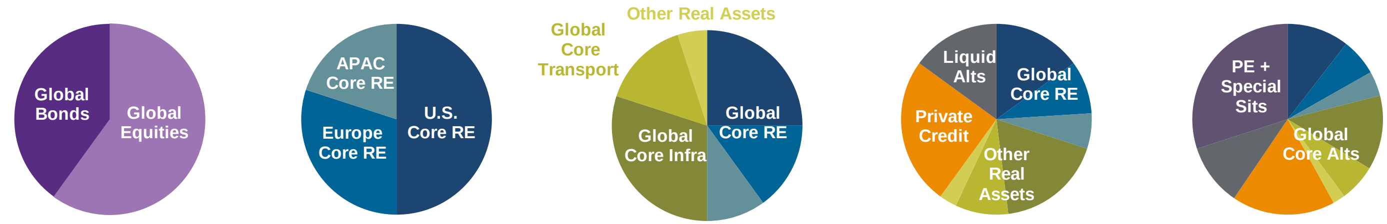


Source: Bloomberg, FactSet, ICE, NECRIF, Clarksons, J.P. Morgan Asset Management, as of December 31, 2017. Illustrative 10-year analysis using quarterly asset class data from 2008 to 2017 in local terms. Fixed income sectors shown above are provided by Bloomberg and are represented by –Barclay's U.S. Aggregate; MBS: U.S. Aggregate Securitized -MBS; ABS: Barclays ABS + CMBS; IG corps: U.S. Corporates; Municipals: Muni Bond 10-year; U.S. High Yield: Corporate High Yield; TIPS: Treasury Inflation-Protection Securities (TIPS); Floating Rate: FRN (BBB); EMD ($): Barclay's EM USD Aggregate; EMD (LCL): Barclay's EM Local Currency Government Index; European Corporates: Bloomberg Barclays Euro Aggregate Corporate Index; Euro HY: Bloomberg Barclays Pan-European High Yield index. Country yields are represented by the global aggregate for each country except where noted. Yield and return information based on bellwethers for Treasury securities. International fixed income sector correlations are in hedged U.S. dollar returns except EMD local index. Yields for all fixed income indices are in hedged returns using three-month LIBOR rates between the U.S. and international LIBOR. The U.S. Core Real Estate yield is derived from the J.P. Morgan Asset Management-GRA U.S. Core Real Estate strategy trailing 12-month income return (as of December 31, 2017), the Core Infrastructure yield is derived from the J.P. Morgan Asset Management-GRA OECD Infrastructure strategy trailing 12-month cash yield (as of December 31, 2017), and the Transport Assets yield is derived from the J.P. Morgan Asset Management-GRA target yield for income-oriented transport assets.

J.P.Morgan Asset Management

Adding alternatives to portfolios can increase risk-adjusted returns

	60/40 Global Equities/Bonds	Global Core Real Estate		Global Core Real Assets		Global Core Alternatives		Global Core-Plus Alternatives	



Target Return Characteristics			vs. 60/40		vs. 60/40		vs. 60/40		vs. 60/40
Target Net Compound	4 - 6%	6 - 8%	↑	6.5 - 8.5%	↑	6.5 - 8.5%	↑	7 - 9%	↑
Target Income Return	1.5 - 2.5%	4.5 - 5.5%	↑	5.5 - 6.5%	↑	4.5 - 5.5%	↑	3 - 4%	↑

Historical Risk/Return Characteristics									
Historical Return	6.3%	8.9%	↑	9.4%	↑	8.4%	↑	9.7%	↑
Volatility	11.0%	10.4%	↓	7.6%	↓	4.7%	↓	6.6%	↓
Return per unit of Risk	0.6	0.9	↑	1.2	↑	1.8	↑	1.5	↑
Max Drawdown	-21%	-29%	↓	-19%	↑	-6%	↑	-9%	↑
Equity Beta (vs. MSCI World)	0.6	0.2	↓	0.1	↓	0.1	↓	0.2	↓
Inflation Sensitivity	61%	72%	↑	83%	↑	83%	↑	83%	↑

Sources: Bloomberg, MSCI, Barclays Capital, HFRI, NCREIF, CBRE, Jones Lang LaSalle, Clarksons, Burgiss, and JPMAM Global Alternatives Research. DISCLAIMER: Past performance is not indicative of future results. Diversification does not guarantee investment returns and does not eliminate the risk of loss. J.P. Morgan seeks to achieve the stated objectives, but there can be no guarantee the objectives will be met. For discussion purposes only. Notes: (1) Illustrative 20-year analysis using asset class data from 1998 to 2017. (2) The target returns are for illustrative purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the target returns shown above. Because of the inherent limitations of the target returns, potential investors should not rely on them when making a decision on whether or not to invest in the strategy. Please see the complete Target Return disclosure at the conclusion of the presentation for more information on the risks and limitation of target returns. (3) Return per unit of risk is calculated by dividing the 20-year CAGR by the 20-year standard deviation. (4) Volatility is calculated using historical annual 1998-2017 standard deviation of historical returns. (5) The max drawdown denotes the maximum historical peak to trough decline in asset values. (6) The inflation sensitivity is calculated using the U.S CPI Index + 4% on a rolling 3-year basis. (7) The portfolios assume annual rebalancing.

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Risks to consider when making alternative investments

- The following summarizes certain risk factors that are fully set out, along with other risk factors, in the offering memorandum (the "Memorandum") of each J.P. Morgan Alternatives fund (each, a "Fund"). Prospective investors should carefully consider the summaries of each Fund's Memorandum and should consult with their own financial, legal and tax advisors with respect thereto. J.P. Morgan does not provide tax or regulatory advice. It is the sole responsibility of each prospective investor to ensure that it invests in a Fund that suits its personal circumstances and status.
- **General risks:** Alternative investments are subject to significant risks. While J.P. Morgan believes that alternative investments have compelling risk and return characteristics, past performance is no guarantee of future results, and any risk or return analyses should not be relied upon. Risk/return continuums and other relative comparisons are based on J.P. Morgan's analysis of information available to it on developments in the referenced asset classes, and such information may not be accurate or complete. There can be no assurance that any Fund will succeed in meeting its investment objective or target return, or that there will be any return on capital or of the original capital invested. Investors will only have recourse to the assets of their particular Fund for any losses suffered.
- **Lack of or limited liquidity:** Each Fund's interests are subject to restrictions on transferability and resale under various securities laws and may not be transferred or resold except in compliance with those laws and with the prior written approval of the applicable Fund's governing body (which generally may be withheld or conditioned in its absolute discretion). There will be no public market for such interests. Some Funds may allow for periodic redemptions of invested capital. In such cases, invested capital is generally accessible for redemption only on a quarterly or annual basis.
- **Regulatory and tax risks:** The operation of a Fund and the tax consequences of an investment in the Fund are substantially affected by legal requirements, including those imposed by regulations promulgated under applicable U.S. laws, and by the laws, including tax laws, of the Cayman Islands, Canada, Germany and any other jurisdiction in which a Fund may be organized, formed or incorporated or in which an underlying fund investment may be made. To ensure compliance with such regulations and laws that may affect a group of investors, a Fund's investment adviser may, acting reasonably and in good faith, take actions to ensure compliance with such regulations and laws. Such actions or omissions may have an adverse effect on certain investors. J.P. Morgan does not provide tax or regulatory advice.
- **Future investments; inability to invest committed capital:** Investments that will be acquired by a Fund in the future have not yet been identified. The activity of identifying, completing and realizing attractive investments is highly competitive and involves a high degree of uncertainty. A Fund may be competing for investments with other investment vehicles, as well as financial institutions and other institutional investors. No assurance can be given that a Fund will be successful in obtaining suitable investments.
- **Risks associated with Non-U.S. investments:** Some Funds expect to invest a substantial portion of its assets outside of the U.S. Such investments involve certain risk factors not typically associated with investing in the U.S. including, but not limited to, risks relating to (i) currency exchange matters, (ii) differences between U.S. and non-U.S. markets, the absence of uniform accounting, auditing and financial reporting standards, practices and disclosure requirements, and differences in government supervision and regulation, (iii) certain economic and political risks, including potential exchange-control regulations and potential restrictions on non-U.S. investments, (iv) changes in tax legislation, treaties, administrative practices or understandings, and (v) certain geographically specific risks (such as weather).
- **Leverage:** Some Funds may leverage their investments with recourse and non-recourse debt and may also obtain credit facilities or subscription lines. Although the use of leverage can enhance returns and increase the number of investments that can be made, it can also substantially increase the risk of loss for such leveraged investments.
- **Diversification**: Some Funds may concentrate their assets in a particular asset class. Such Funds will be more susceptible to adverse economic or regulatory occurrences affecting that asset class than a fund that is not concentrated in a single asset class. Such possibly limited degree of diversification means the performance of such Funds may be more susceptible to a single economic, political or social event.
- **New and emerging managers:** Some Funds may invest their assets with emerging managers. Investments with such sponsors may involve greater risks than are generally associated with investments with more established sponsors. Less established sponsors tend to have fewer resources (including capital and employees) and, therefore, are often more vulnerable to financial failure. Such sponsors may also experience start-up or growth related difficulties that are not faced by established sponsors. Furthermore, assessing the integrity of sponsors with limited experience may necessarily be based on less background information than would be the case with more experienced sponsors. The general risks involved in investing in pooled vehicles may be accentuated in a pooled vehicle with a sponsor that has been established relatively recently.

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Risks to consider when making alternative investments (continued)

- **Dependence on manager**: A Fund's success is dependent on its investment adviser to develop and successfully implement investment strategies that meet investment objectives. The investment advisers of the Funds are subject to the J.P. Morgan Global Investment Management policies and procedures, including but not limited to Conflicts of Interest, Market Abuse, Anti-Money Laundering, Data Protection and Risk Management which will be applicable to the ongoing management of the Funds. With little or no public market coverage, investors must rely on the investment adviser for periodic information. Decisions made by a Fund's investment adviser may cause such Fund to incur losses or to miss profit opportunities on which it would otherwise have capitalized.
- **Volatility**: Investment techniques used may include the use of leverage and derivative instruments such as futures, options and short sales, which amplify the possibilities for both profits and losses and may add volatility to a Fund's performance.
- **Potential conflicts of interest:** The payment of a performance-based fee to a Fund's investment adviser creates an incentive for such investment adviser to cause the Fund to make riskier or more speculative investments than it would in the absence of such performance-based fee. Further, an investment adviser and/or portfolio manager could be subject to various other conflicts of interest, which could influence how they invest a Fund's assets.
- **Valuation:** Because of overall size or concentration in particular markets of positions held by a Fund or other reasons, the value at which its investments can be liquidated may differ, sometimes significantly, from the interim valuations arrived at by a Fund. Since a Fund's investments have limited or no liquidity, the actual value received upon liquidation may significantly differ from the interim valuations arrived at by a Fund.
- **Target Returns:** The target returns discussed herein have been established as of the date of this presentation. The target returns have been established by each investment adviser based on its assumptions and calculations using data available to it and available investment opportunities and is subject to the risks set forth herein and set forth more fully in the applicable Fund's Memorandum. A more detailed explanation along with the data supporting the target returns is on file with the applicable investment adviser and is available for inspection upon request. The target returns are for illustration/discussion purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the target returns shown above. The target returns are the investment advisor's estimate based on the investment adviser's assumptions, as well as past and current market conditions, which are subject to change. Each investment adviser has the discretion to change the target returns for the Fund at any time. Because of the inherent limitations of the target returns, potential investors should not rely on them when making a decision on whether or not to invest in any Fund. The target returns cannot account for the impact that economic and market factors have on the implementation of an actual investment program. Unlike actual performance, the target returns do not reflect actual trading, liquidity constraints, fees, expenses, and other factors that could impact the future returns of a Fund. Any investment adviser's ability to achieve the target returns is subject to risk factors over which such investment adviser may have no or limited control. No representation is made that a Fund will achieve the target return or its investment objective. Actual returns could be higher or lower than the target returns.
- **Infrastructure investment risks generally**: Investing in infrastructure assets involves a variety of risks, not all of which can be foreseen or quantified, and which include, among others: the burdens of ownership of infrastructure; local, national and international economic conditions; the supply and demand for services from and access to infrastructure; the financial condition of users and suppliers of infrastructure assets; risks related to construction, regulatory requirements, labor actions, health and safety matters, government contracts, operating and technical needs, capital expenditures, demand and user conflicts, bypass attempts, strategic assets, changes in interest rates and the availability of funds which may render the purchase, sale or refinancing of infrastructure assets difficult or impracticable; changes in environmental laws and regulations, investments in other funds, troubled infrastructure assets and planning laws and other governmental rules; changes in energy prices; negative developments in the economy that may depress travel activity; force majeure acts, terrorist events, under-insured or uninsurable losses; and other factors which are beyond the reasonable control of a Fund or its investment adviser. Many of these factors could cause fluctuations in usage, expenses and revenues, causing the value of its investments to decline and negatively affecting a Fund's returns.
- **Real estate investment risks generally:** An investment in a Fund is subject to certain risks associated with the ownership of real estate and the real estate industry in general. These risks include, among others, possible declines in the value of real estate; risks related to general and local economic conditions; possible lack of availability of mortgage funds; overbuilding; extended vacancies of properties; increases in competition; property taxes and transaction, operating and foreclosure expenses; legal fees and expenses incurred to protect a Fund's investments; changes in zoning laws; costs resulting from the clean-up of, and liability to third parties for damages resulting from, environmental problems; casualty or condemnation losses; uninsured damages from floods, earthquakes or other natural disasters; limitations on and variations in rents; and changes in interest rates. To the extent that assets underlying the investments are concentrated geographically, by property type or in certain other respects, a Fund may be subject to certain of the foregoing risks to a greater extent.

Risks to consider when making alternative investments (continued)

- **Transportation investment risks generally**: An investment in the Strategy is subject to certain risks associated with the ownership of transportation assets and the transportation industry in general, including: the burdens of ownership of transportation-related assets; local, national and international economic conditions; the supply and demand for assets; the financial condition of operators, buyers and sellers of assets that include the market values of transportation assets (i.e., ships, aircraft, fleet vehicle and heavy equipment) and lease rates that include the price at which interests in said assets can be acquired, the future value of those assets (particularly at the time the Operating Leases expire), and the Lease Rates applicable to those assets; changes in interest rates and the availability of credit which may render the sale or refinancing of assets difficult or impracticable; changes in environmental laws and regulations, planning laws and other governmental rules and fiscal and monetary policies; Oil and fuel price risks that include significant volatility in fuel prices which make up a material component of a transportation assets' cost base. Oil price volatility may have an impact on individual operators ability to meet lease payments as well as demand for travel/shipping generally; Concentration risk in the short term whilst the Fund is building its portfolio of assets, there is likely to be a concentration of asset type, lessee and/or region; An investment in the strategy is illiquid. Whilst there is a secondary market for the assets, this will depend on prevailing market conditions; changes in taxation laws or Government taxation policy affecting domestic and international investments and depreciation; planning laws and other governmental rules and fiscal and monetary policies; environmental claims arising in respect of assets acquired with undisclosed or unknown defects or problems resulting in environmental liabilities or as to which inadequate reserves have been established; changes in tax rates; changes in energy prices; negative developments in the economy that depress commercial transportation activity; uninsured casualties; force majeure acts, terrorist and piracy events, under-insured or uninsurable losses; and other factors which are beyond the reasonable control of the Strategy and the Investment Adviser. In addition, as recent experience has demonstrated, transportation assets are subject to long-term cyclical trends that give rise to significant volatility in values.
- **Hedge funds investment risks generally:** Investments in hedge funds involve a high degree of risk and are only suitable for investors who fully understand and are willing to assume the risks involved. Hedge funds often engage in leveraging speculative investment practices that may increase the risk of investment loss. The regulatory environment for hedge funds is evolving and changes therein may adversely affect the ability of hedge funds to obtain leverage they might otherwise obtain or to pursue their investment strategies.
- **Private equity investment risks generally:** Private equity funds invest exclusively or almost entirely in financial instruments issued by companies that are not listed (or that take-over publicly listed companies with a view to delisting them). Investment in private equity funds is typically by way of commitment (i.e. whereby an investor agrees to commit to invest a certain amount in the fund and this amount is drawn down by the fund as and when it is needed to make private equity investments). Interest in an underling private equity fund will consist primarily of capital commitments to, and investments in private equity strategies and activities which involve a high level of risk and uncertainty. Except for certain secondary funds, private equity funds will have no operating history upon which to evaluate their likely performance. Historical performance of private equity funds is not a guarantee or prediction of their future performance. Investments in private equity are often illiquid and investors seeking to redeem their holdings can experience significant delays and fluctuations in value.
- **Forward-looking statements:** The statements herein containing words such as "may," "will," "should," "expect," "anticipate," "estimate," "intend," "continue" or "believe" or the negatives thereof or other variations thereon or comparable terminology are forward-looking statements and not historical facts. For example, the target returns noted herein are forward-looking statements. Due to various risks, uncertainties and assumptions, including, without limitation, those set forth herein and in the Memorandums, actual events or results or the actual performance of a Fund may differ materially from those reflected in or contemplated by such forward-looking statements. Among the factors that could cause actual results to differ materially are: the general economic climate, inflationary trends, competition and the supply of, and demand for, property investments in the target markets, interest rate levels, the availability of financing, potential environmental liability and other risks associated with the ownership, development and acquisition of infrastructure assets, changes in the legal or regulatory environment, and greater than anticipated construction or management costs.

J.P. Morgan Asset Management – Index definitions

All indexes are unmanaged and an individual cannot invest directly in an index. Index returns do not include fees or expenses.

Equities:

The **MSCI ACWI (All Country World Index)** is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets.

The **Russell 2000 Index**® measures the performance of the 2,000 smallest companies in the Russell 3000 Index.

The **S&P 500 Index** is widely regarded as the best single gauge of the U.S. equities market. The index includes a representative sample of 500 leading companies in leading industries of the U.S. economy. The **S&P 500 Index** focuses on the large-cap segment of the market; however, since it includes a significant portion of the total value of the market, it also represents the market.

Fixed income:

The **Bloomberg Barclays 1-3 Month U.S. Treasury Bill Index** includes all publicly issued zero-coupon US Treasury Bills that have a remaining maturity of less than 3 months and more than 1 month, are rated investment grade, and have $250 million or more of outstanding face value. In addition, the securities must be denominated in U.S. dollars and must be fixed rate and non convertible.

The **Bloomberg Barclays Municipal Index**: consists of a broad selection of investment- grade general obligation and revenue bonds of maturities ranging from one year to 30 years. It is an unmanaged index representative of the tax-exempt bond market.

The **Bloomberg Barclays US Dollar Floating Rate Note (FRN) Index** provides a measure of the U.S. dollar denominated floating rate note market.

The **Bloomberg Barclays US Corporate Investment Grade Index** is an unmanaged index consisting of publicly issued US Corporate and specified foreign debentures and secured notes that are rated investment grade (Baa3/BBB or higher) by at least two ratings agencies, have at least one year to final maturity and have at least $250 million par amount outstanding. To qualify, bonds must be SEC-registered.

The **Bloomberg Barclays US High Yield Index** covers the universe of fixed rate, non-investment grade debt. Eurobonds and debt issues from countries designated as emerging markets (sovereign rating of Baa1/BBB+/BBB+ and below using the middle of Moody's, S&P, and Fitch) are excluded, but Canadian and global bonds (SEC registered) of issuers in non-EMG countries are included.

The **Bloomberg Barclays US Mortgage Backed Securities Index** is an unmanaged index that measures the performance of investment grade fixed-rate mortgage backed pass-through securities of GNMA, FNMA and FHLMC.

The **Bloomberg Barclays US TIPS Index** consists of Inflation-Protection securities issued by the U.S. Treasury.

The **U.S. Treasury Index** is a component of the U.S. Government index.

Other asset classes:

The **Bloomberg Commodity Index** and related sub-indices are composed of futures contracts on physical commodities and represents twenty two separate commodities traded on U.S. exchanges, with the exception of aluminum, nickel, and zinc

The **Cambridge Associates U.S. Global Buyout and Growth Index®** is based on data compiled from 1,768 global (U.S. & ex – U.S.) buyout and growth equity funds, including fully liquidated partnerships, formed between 1986 and 2013.

The **CS/Tremont Hedge Fund Index** is compiled by Credit Suisse Tremont Index, LLC. It is an asset-weighted hedge fund index and includes only funds, as opposed to separate accounts. The Index uses the Credit Suisse/Tremont database, which tracks over 4500 funds, and consists only of funds with a minimum of US$50 million under management, a 12-month track record, and audited financial statements. It is calculated and rebalanced on a monthly basis, and shown net of all performance fees and expenses. It is the exclusive property of Credit Suisse Tremont Index, LLC.

The **HFRI Monthly Indices (HFRI)** are equally weighted performance indexes, utilized by numerous hedge fund managers as a benchmark for their own hedge funds. The HFRI are broken down into 4 main strategies, each with multiple sub strategies. All single-manager HFRI Index constituents are included in the HFRI Fund Weighted Composite, which accounts for over 2200 funds listed on the internal HFR Database.

The **NAREIT EQUITY REIT Index** is designed to provide the most comprehensive assessment of overall industry performance, and includes all tax-qualified real estate investment trusts (REITs) that are listed on the NYSE, the American Stock Exchange or the NASDAQ National Market List.

The **NFI-ODCE**, short for NCREIF Fund Index - Open End Diversified Core Equity, is an index of investment returns reporting on both a historical and current basis the results of 33 open-end commingled funds pursuing a core investment strategy, some of which have performance histories dating back to the 1970s. The NFI-ODCE Index is capitalization-weighted and is reported gross of fees. Measurement is time-weighted.

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J.P. Morgan Structured Investments

Giving investors greater control over the risk and return in portfolios

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What are Structured Investments?

Structured Investments

- Structured Investments (SIs) are Market Linked CDs and Registered Notes that **create specific payout profiles** – payable at maturity – that are tied to various market outcomes. Structures can be based on the performance of a variety of underlyings across asset classes.
- SIs can be used to **complement** traditional portfolio models, **reduce risk**, **generate income**, **explicitly express** your particular market view, or **diversify** the exposure in your clients' portfolios via access to hard to reach underlyings.
- SIs are typically built by combining a zero-coupon bond with **options written on the chosen underlying**

Market Linked Certificates of Deposit

- Issued by JPMorgan Chase Bank N.A. (Aa2/A+)
- Full Repayment of principal at maturity
- FDIC insured up to the applicable limits
- Features an estate put at par
- Treated as a bank deposit as opposed to a security
- Issued in $1,000 denominations

Registered Notes

- Issued by JPMorgan Chase Financial Company LLC
- Complete range of risk and return profiles (principal return and principal at risk structures)
- Diversified maturity payout profiles (monthly interest payments, annual coupons, point to point appreciation)
- Principal at risk structures qualify for long term capital gains treatment
- Issued in $1,000 denominations
- The notes are unsecured and unsubordinated obligations of JPMorgan Chase Financial Company LLC
- Any payment on the notes is subject to the credit risk of JPMorgan Financial, as issuer of the notes, and the credit risk of JPMorgan Chase & Co., as guarantor of the notes (A2/A-)

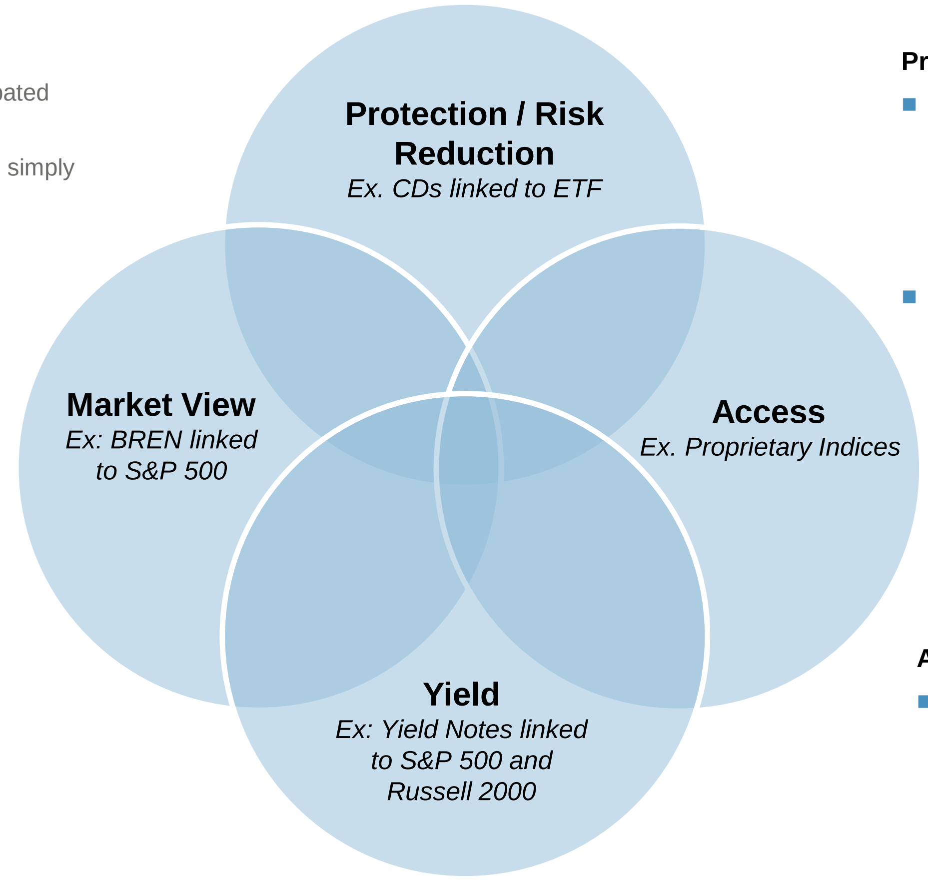
Why Structured Investments?

Market View

- Can be tailored to fit an anticipated market outcome
- Allow for greater freedom than simply going “long” or “short”

Yield

- Opportunity to earn a higher interest rate than the current yield on a conventional debt security with the same maturity issued by us
- Fixed monthly interest payments or contingent quarterly interest payments
- Potential early exit as a result of an automatic call feature



Protection/Risk Reduction

- Full Repayment of Principal available
  - Best suited for conservative investors
  - Useful re-allocation tool
  - Best Suited for Qualified Accounts
- Reduce risk through the use of buffers
  - Protect against first 10% of downside exposure
  - Potential for Long-term Capital Gains tax treatment

Access

- Structured investments linked to “hard to reach” underlyings
  - Alternatives
  - Commodities
  - International Equities
- Volatile underlyings available with the added benefit of full or partial principal protection

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Agenda

Market Linked CDs vs. Traditional Bank CDs

Features of Market Linked CDs

- Issued by JPMorgan Chase Bank N.A. (Aa2/A+)
- Full repayment of principal at maturity
- FDIC insured up to the applicable limits
- Features an estate put at par
- Treated as a bank deposit as opposed to a security
- Issued in $1,000 denominations

Market Linked CD vs. Traditional CD features

	Market Linked CDs	Traditional Fixed Income CDs
Issuer	JPMorgan Chase Bank, NA	JPMorgan Chase Bank, NA
Bank Deposit	Yes	Yes
Fixed Maturity	Yes	Yes
FDIC Insured	Yes, principal only	Yes, principal only
Underlier	**Variable**	**Fixed**
Coupon	Yes	Yes
Return	**Variable**	**Fixed**
Commission	**Variable**	**Fixed**

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Market Linked CDs Protect Principal

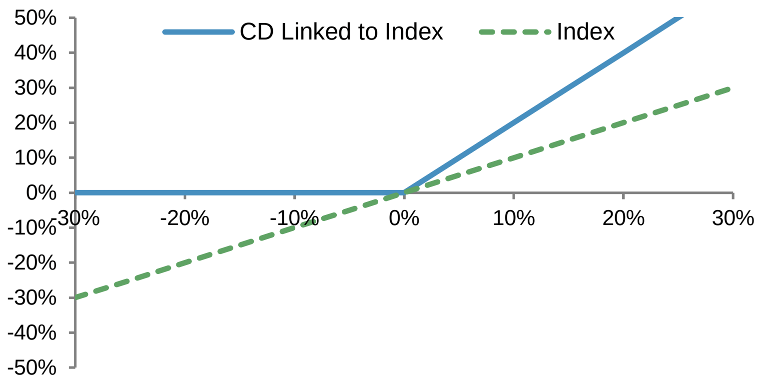
Market Linked CDs can be used for a variety of purposes

- **Maintain** broad-based exposure to a portfolio of your choosing while **protecting capital**
- **Generate** income to augment a fixed income allocation
- **Access** asset classes that are otherwise difficult to implement

Client Perspective:*

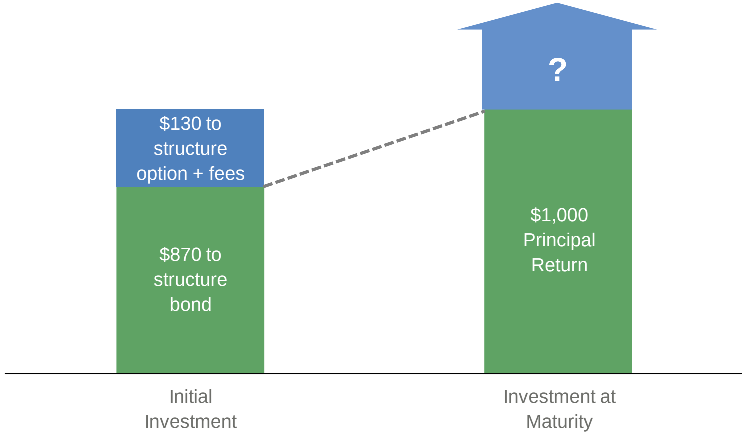
Buy **Zero Coupon Bond**	$870
Buy 2 **ATM Call** Options (enhanced upside exposure)	$70
Commission	$30
Origination Fees	$30
Total	**$1,000**

Certificate of Deposit Linked to a Market Index



*Hypothetical example of a 5y CD linked to an Index, 200% participation, 100% principal return at maturity

Hypothetical Payoff



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Agenda

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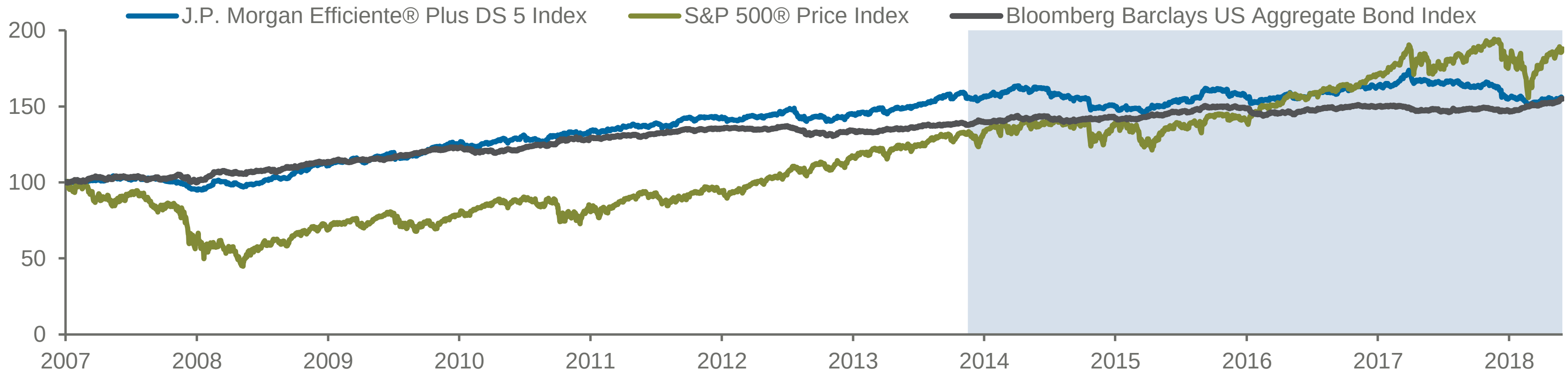
J.P. Morgan Efficiente Plus DS 5 Index (Net ER)

Backtested hypothetical index returns (Nov '07 – Mar '19)



Source: Bloomberg

Backtested hypothetical returns (Mar '09 – Mar '19)

Annualized return	4.60%
Annualized volatility	5.31%
Sharpe ratio	0.87
Max. drawdown	13.69%

Backtested hypothetical correlations (Mar '09 – Mar '19)

	JPM Efficiente Plus DS 5 Index (Net ER)	S&P 500 (ER)	Bloomberg Barclays U.S. Aggregate (ER)
JPM Efficiente Plus DS 5 Index (Net ER)	**100%**	**33.44%**	**25.87%**
S&P 500 (ER)		**100%**	**-31.65%**
Bloomberg Barclays U.S. Agg. (ER)			**100%**

Note: S&P 500 (ER) represents a hypothetical index constructed from the total returns of the S&P 500 Index with the returns of the Cash Index deducted. Bloomberg Barclays U.S. Aggregate (ER) represents a hypothetical index constructed from the total returns of the Bloomberg Barclays U.S. Aggregate Bond Index with the returns of the Cash Index deducted. Volatility is calculated as the annualized standard deviation of the daily logarithmic returns over the relevant measurement period. The Sharpe Ratio, which is a measure of risk-adjusted performance, is computed as the annualized historical excess return divided by the annualized volatility for the relevant measurement period.

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Historical performance

Hypothetical and historical returns for the J.P. Morgan Efficiente Plus DS 5 Index

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Full Year
2008	1.27%	1.61%	-0.76%	-0.57%	0.09%	0.65%	-1.25%	-0.79%	-1.94%	-3.78%	1.70%	4.85%	**0.82%**
2009	-2.55%	-0.64%	0.73%	0.97%	3.36%	-0.24%	3.79%	1.21%	3.50%	-0.38%	1.98%	0.12%	**12.29%**
2010	0.43%	0.61%	1.84%	1.88%	-2.44%	1.33%	2.22%	2.65%	0.98%	0.34%	-1.22%	1.01%	**9.94%**
2011	0.74%	2.12%	-0.14%	2.05%	-1.75%	-1.06%	2.49%	1.23%	-0.18%	1.01%	0.20%	1.20%	**8.10%**
2012	1.44%	0.53%	-0.69%	1.35%	-1.04%	1.56%	2.35%	0.23%	-0.07%	0.06%	-1.26%	0.25%	**4.74%**
2013	0.97%	0.23%	1.22%	1.75%	-3.15%	-0.89%	0.85%	-1.88%	1.59%	1.61%	1.07%	1.39%	**4.72%**
2014	-1.48%	2.11%	0.19%	0.84%	1.51%	2.10%	-0.76%	2.67%	-2.69%	1.15%	1.23%	0.30%	**7.26%**
2015	2.65%	-0.75%	-0.07%	-1.96%	-0.57%	-1.79%	0.21%	-3.83%	-0.27%	0.73%	-0.56%	-0.54%	**-6.67%**
2016	-0.23%	1.59%	1.26%	1.39%	-0.88%	3.80%	1.53%	-0.92%	-0.72%	-1.57%	-2.12%	0.71%	**3.75%**
2017	0.94%	1.60%	-0.95%	1.09%	0.68%	-0.05%	1.68%	0.74%	-0.47%	0.65%	0.21%	1.87%	**8.25%**
2018	2.70%	-2.70%	-0.56%	-0.31%	0.24%	-1.04%	-0.46%	1.66%	-1.64%	-4.64%	0.53%	-2.94%	**-9.00%**
2019	2.11%	-0.57%	0.67%										**2.21%**

Source: J.P. Morgan. Past performance is no guarantee of future performance. Represents the monthly and full calendar year performance of the Index based on as applicable to the relevant measurement period, the hypothetical back tested daily closing levels from January 2, 2008 through December 30, 2014, and the actual historical performance of the Index based on daily closing levels through February 28, 2018.

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J.P. Morgan Efficiente Plus DS 5 Index: Historical Allocations

Simulated and historical monthly allocations for the J.P. Morgan Efficiente Plus DS 5 Index (Mar 2017 – Mar 2019)

	Equities					Investment Grade Fixed Income					Non-IG Fixed Income					Alternatives					Cash
	VOO	VB	VEA	SCZ	VWO	TLT	IEF	TIP	LQD	VCSH	JNK	HYS	BKLN	PFF	EMB	VNQ	GDX	MLPI	DBC	IAU	
Apr-17	20%	10%	20%									10%	10%					5%			25%
May-17	20%	10%	10%	10%								5%	10%	10%		10%					15%
Jun-17	15%		20%	10%	5%	5%					10%	5%		10%	10%					10%	
Jul-17	5%		20%	10%	15%	10%			15%		5%			10%						10%	
Aug-17	5%		20%	10%	15%	15%			20%		5%			10%							
Sep-17			20%	10%	15%	20%	15%		5%					10%						5%	
Oct-17			20%	10%	20%	15%			20%		15%										
Nov-17	10%		10%	10%	20%	20%			20%										10%		
Dec-17	10%	10%		10%	20%	5%			20%					5%	5%	5%			10%		
Jan-18	20%	5%		10%	15%	10%			5%						10%		10%		10%	5%	
Feb-18	20%		20%	5%		10%	15%								10%				5%		
Mar-18	20%	5%		10%								10%	10%						10%		35%
Apr-18				10%	15%								10%						10%	10%	45%
May-18	5%	10%		10%								10%	10%						10%	10%	35%
Jun-18		10%		10%									10%				5%	5%	10%	5%	45%
Jul-18		10%											10%	10%		10%			10%		50%
Aug-18	15%	10%										10%		10%			10%				45%
Sep-18	5%	10%				20%		5%			5%	10%		10%		10%		10%	5%		10%
Oct-18	20%	10%								5%	10%	10%	5%			10%		10%			20%
Nov-18	20%									10%			10%			10%					50%
Dec-18							15%			10%		5%	10%			10%					50%
Jan-19							20%			5%		5%			10%					10%	50%
Feb-19						20%	20%			10%					10%	10%	10%			10%	10%
Mar-19							15%			10%			10%		10%	5%	15%			10%	25%
Apr-19						20%	20%		10%		5%			10%	10%	10%	10%			5%	

Over the simulated history, the index has been allocated to ~8 ETFs per month on average

Note: The weights above are not adjusted for the variable exposure inherent in the daily series mechanism.

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J.P. Morgan Efficiente Plus DS 5 Index: Investment Universe

Investment breakdown

Asset class	Name	Ticker	Cap
Equities			**50%**
US Large Cap Equities	Vanguard S&P 500 ETF	VOO	20%
Developed Large Cap Equities ex-US	Vanguard FTSE Developed Markets ETF	VEA	20%
Emerging Markets Equities	Vanguard FTSE Emerging Markets ETF	VWO	20%
US Small Cap Equities	Vanguard Small-Cap ETF	VB	10%
Developed Small Cap Equities ex-US	iShares® MSCI EAFE Small-Cap ETF	SCZ	10%
Investment Grade Fixed Income			**50%**
US Long-Term Treasury Bonds	iShares® 20+ Year Treasury Bond ETF	TLT	20%
US Intermediate-Term Treasury Bonds	iShares® 7-10 Year Treasury Bond ETF	IEF	20%
US Investment Grade Corporate Bonds	iShares® iBoxx $ Investment Grade Corporate Bond ETF	LQD	20%
US Treasury Inflation-Protected Securities	iShares® TIPS Bond ETF	TIP	10%
US Short-Term Investment Grade Corporate Bonds	Vanguard Short-Term Corporate Bond ETF	VCSH	10%
Other Fixed Income			**50%**
US High Yield Corporate Bonds	SPDR® Barclays High Yield Bond ETF	JNK	20%
US Short-Term High Yield Corporate Bonds	PIMCO 0-5 Year High Yield Corporate Bond Index ETF	HYS	10%
US Leveraged Loans	PowerShares Senior Loan Portfolio	BKLN	10%
US Preferred Stock	iShares® U.S. Preferred Stock ETF	PFF	10%
Emerging Markets Bonds	iShares® J.P. Morgan USD Emerging Markets Bond ETF	EMB	10%
Alternatives			**50%**
Global Gold Miners	Market Vectors® Gold Miners ETF	GDX	20%
US Real Estate Investment Trusts	Vanguard REIT ETF	VNQ	10%
US Master Limited Partnerships	ETRACS Alerian MLP Infrastructure Index ETN	MLPI	10%
Commodity Futures	PowerShares DB Commodity Index Tracking Fund	DBC	10%
Gold	iShares® Gold Trust	IAU	10%
Cash	J.P. Morgan Cash Index USD 3 Month	JPCAUS3M	50%

J.P. Morgan Efficiente Plus DS 5 Index is an index and represents a basket of notional exposures to the component assets. There is no actual portfolio of assets to which any person is entitled or in which any person has an ownership interest.

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“A diversified approach to investing maintains exposure to a variety of asset classes to attempt to generate positive returns in a wide range of market environments”

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Annualized Return
LT US Trsy 29.7%	Energy 82.0%	Gold ETF 33.5%	LT US Trsy 33.5%	MSCI US Small Eq. 20.5%	US Small Eq 37.3%	Real Est. 30.0%	MSCI US Small Eq. 8.7%	Gold ETF 51.8%	MSCI US Small Eq. 31.3%	MT US Trsy -1.6%	US Small Eq 6.3%
MT US Trsy 13.7%	EM Eq. 73.8%	Energy 33.4%	Energy 15.6%	EM Eq. 18.4%	US Large Eq. 31.9%	LT US Trsy 27.0%	Preferred 3.9%	Commod. 17.5%	EM Eq. 30.1%	ST Corp -1.7%	US Large Eq. 5.7%
Gold 0.9%	Senior Loan 49.8%	Gold 29.0%	MT US Trsy 15.2%	Intl. Eq. 17.7%	MSCI US Small Eq. 28.2%	Preferred 13.8%	Real Est. 2.0%	US Small Eq 17.3%	Intl. Eq. 25.0%	HY Bond -3.3%	HY Bond 4.9%
Efficiente 0.8%	HY Bond 47.6%	Real Est. 27.9%	TIPS 12.8%	US Small Eq 17.5%	Energy 26.7%	US Large Eq. 13.2%	MT US Trsy 1.1%	Energy 15.8%	US Large Eq. 20.4%	Senior Loan -3.9%	Real Est. 4.8%
IG Bonds -1.8%	MSCI US Small Eq. 46.3%	US Small Eq 27.7%	IG Bonds 9.3%	Preferred 17.4%	Intl. Eq. 21.4%	MT US Trsy 8.7%	US Large Eq. 0.9%	HY Bond 13.9%	US Small Eq 14.9%	TIPS -4.0%	LT US Trsy 4.5%
TIPS -4.7%	Junk Bond 38.1%	MSCI US Small Eq. 21.1%	Gold 9.1%	Real Est. 16.8%	HY Bond 7.4%	IG Bonds 7.8%	ST Corp 0.9%	Junk Bond 13.3%	Gold 11.5%	LT US Trsy -4.2%	EM Bond 4.0%
ST Corp -7.2%	Preferred 37.2%	EM Eq. 19.0%	Real Est. 8.2%	EM Bond 16.1%	Junk Bond 5.5%	Energy 7.3%	EM Bond 0.6%	EM Eq. 11.1%	Gold ETF 10.6%	Gold -4.4%	Efficiente 3.8%
EM Bond -16.4%	Gold ETF 35.2%	US Large Eq. 14.6%	Efficiente 8.1%	US Large Eq. 15.3%	Efficiente 4.7%	US Small Eq 7.3%	Intl. Eq. -0.8%	US Large Eq. 11.1%	EM Bond 8.9%	Junk Bond -5.9%	IG Bonds 3.6%
HY Bond -24.4%	US Small Eq 34.4%	Junk Bond 13.5%	EM Bond 7.2%	Junk Bond 12.6%	Senior Loan 3.7%	Efficiente 7.3%	IG Bonds -1.7%	EM Bond 8.2%	Efficiente 8.3%	IG Bonds -6.4%	Junk Bond 3.6%
Junk Bond -27.7%	Real Est. 28.6%	Preferred 13.4%	Junk Bond 4.7%	HY Bond 12.2%	Real Est. 1.9%	EM Bond 5.7%	TIPS -2.2%	Senior Loan 8.1%	LT US Trsy 7.8%	US Large Eq. -7.1%	Preferred 3.1%
Gold ETF -30.3%	EM Bond 26.2%	HY Bond 12.9%	ST Corp 2.6%	IG Bonds 9.8%	ST Corp 1.0%	TIPS 3.2%	LT US Trsy -2.2%	Real Est. 7.5%	Preferred 6.7%	Preferred -7.2%	MT US Trsy 3.0%
Preferred -32.2%	Intl. Eq. 26.0%	Commod. 11.6%	HY Bond 2.5%	Senior Loan 9.5%	Preferred -1.4%	ST Corp 1.5%	Senior Loan -3.5%	Gold 7.2%	IG Bonds 5.7%	EM Bond -8.1%	Energy 2.5%
Senior Loan -32.8%	US Large Eq. 24.9%	EM Bond 10.4%	US Large Eq. 1.6%	Gold 6.0%	IG Bonds -2.4%	Junk Bond 0.4%	US Small Eq -4.1%	IG Bonds 5.1%	Junk Bond 5.1%	Real Est. -8.6%	Gold 2.5%
Commod. -35.9%	Gold 22.4%	Efficiente 9.9%	Senior Loan -0.5%	TIPS 5.6%	EM Eq. -5.3%	Senior Loan 0.2%	HY Bond -5.0%	Efficiente 3.7%	HY Bond 4.4%	Efficiente -9.0%	ST Corp 2.0%
US Small Eq -40.1%	Commod. 14.7%	MT US Trsy 8.9%	Preferred -2.5%	ST Corp 4.7%	MT US Trsy -6.5%	EM Eq. -0.4%	Efficiente -6.7%	TIPS 3.6%	Real Est. 3.5%	Gold ETF -11.4%	Senior Loan 2.0%
Real Est. -41.1%	ST Corp 14.4%	IG Bonds 8.9%	Commod. -3.1%	Efficiente 4.7%	Commod. -8.1%	HY Bond -0.5%	Junk Bond -7.2%	Intl. Eq. 1.6%	Commod. 3.5%	US Small Eq -11.9%	MSCI US Small Eq. 1.8%
US Large Eq. -41.2%	Efficiente 12.3%	LT US Trsy 8.6%	US Small Eq -3.2%	MT US Trsy 2.8%	EM Bond -8.2%	Gold -2.4%	Gold -11.0%	MSCI US Small Eq. 1.5%	TIPS 1.5%	Commod. -14.2%	TIPS 1.6%
Energy -43.3%	TIPS 7.5%	Senior Loan 8.5%	Intl. Eq. -12.7%	Commod. 2.7%	TIPS -8.9%	Intl. Eq. -6.3%	EM Eq. -16.2%	ST Corp 1.5%	MT US Trsy 1.2%	Energy -15.1%	Intl. Eq. -0.8%
Intl. Eq. -44.8%	IG Bonds 7.0%	Intl. Eq. 7.9%	MSCI US Small Eq. -15.6%	Energy 2.5%	LT US Trsy -13.8%	MSCI US Small Eq. -6.4%	Gold ETF -25.1%	Preferred 0.2%	ST Corp 0.8%	Intl. Eq. -17.4%	EM Eq. -1.9%
MSCI US Small Eq. -51.4%	MT US Trsy -8.1%	TIPS 5.7%	Gold ETF -16.5%	LT US Trsy 1.8%	Gold -28.6%	Gold ETF -12.7%	Commod. -28.0%	LT US Trsy 0.0%	Senior Loan 0.7%	EM Eq. -17.4%	Gold ETF -7.6%
EM Eq. -56.6%	LT US Trsy -23.3%	ST Corp 5.4%	EM Eq. -19.2%	Gold ETF -9.7%	Gold ETF -54.4%	Commod. -28.4%	Energy -32.3%	MT US Trsy -0.1%	Energy -10.8%	MSCI US Small Eq. -20.2%	Commod. -7.9%

Agenda

The S&P Economic Cycle Factor Rotator Index

Ticker: SPECFR6P

- The S&P Economic Cycle Factor Rotator Index attempts to provide a dynamic rules-based allocation to one of four equity indices and the S&P 5-Year U.S. Treasury Note Futures Excess Return Index while targeting a level volatility
- Each month, the Index determines the current phase of the business cycle based on the level and trend of the Chicago Fed National Activity Indicator, and selects one of the four equity constituents below accordingly:
  - If the business cycle is in slowdown, the Index allocates to **Buyback FCF**
  - If the business cycle is in contraction, the Index allocates to **High Div Low Vol**
  - If the business cycle is in recovery, the index allocates to **Value**
  - If the business cycle is in expansion, the Index allocates to **Momentum**

Summary of the equity constituents

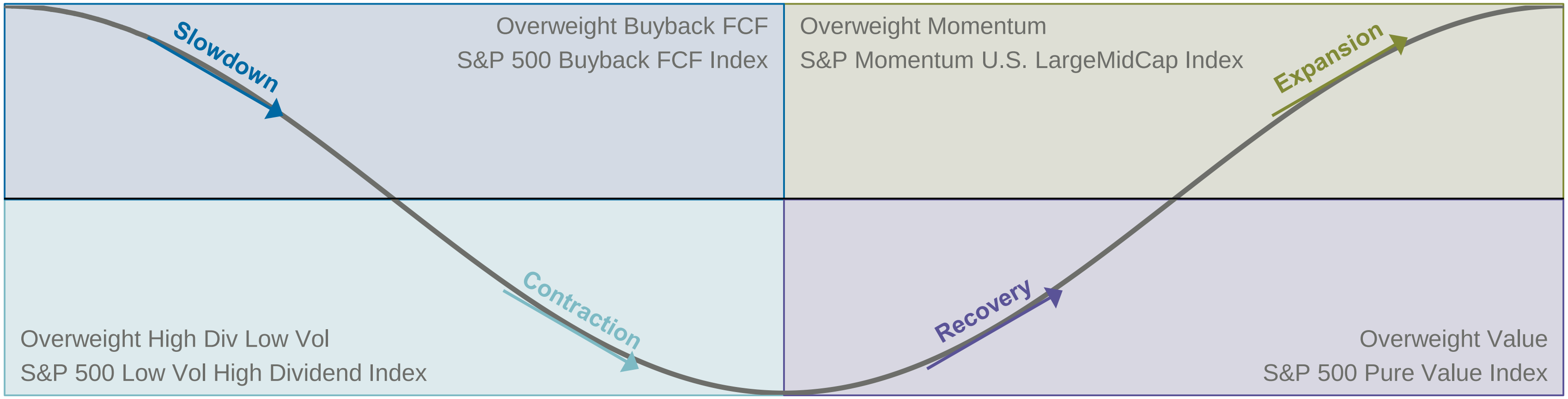
Stage	Strategy	Equity constituent	Equity constituent description
Slowdown	Buyback FCF	S&P 500® Buyback FC Excess Return Index	Large-cap U.S. stocks with relatively higher rates of buying back their own stock, and relatively higher free cash flow yields, compared to the S&P 500® Index.
Recovery	Value	S&P 500® Pure Value Excess Return Index	Large-cap U.S. stocks with relatively cheaper prices (compared to fundamentals) and relatively lower growth compared to the S&P 500® Index.
Contraction	High Div Low Vol	S&P 500® Low Volatility High Dividend Excess Return Index	Large-cap U.S. stocks with relatively higher dividends and lower volatility compared to the S&P 500® Index.
Expansion	Momentum	S&P Momentum United States LargeMidCap (USD) Excess Return Index	Large- and mid-cap U.S. stocks with relatively higher recent performance.

Style investing and the business cycle

Style investing

- Style investing is an investment approach that identifies certain 'styles' that have historically performed well in different market cycles and rotates through them
  - In a slowdown, stocks with strong buybacks and free cash flows ("**Buyback FCF**") may provide insurance against an impending contraction as they are well capitalized (free cash flows) and are supporting their stock through buybacks.
  - In a contraction, defensive names that are high dividend payers and exhibit low volatility ("**High Div Low Vol**") may be desirable in the event that markets selloff with increased volatility.
  - In a recovery, stocks with low prices compared to fundamentals and low growth ("**Value**") may provide the highest leverage to the reflation of asset prices
  - In an expansion, stocks with strong price momentum ("**Momentum**") that have performed well so far in the cycle may continue to perform

Business cycle and style allocations



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Identifying the business cycle

Introduction to the Chicago Fed National Activity Index

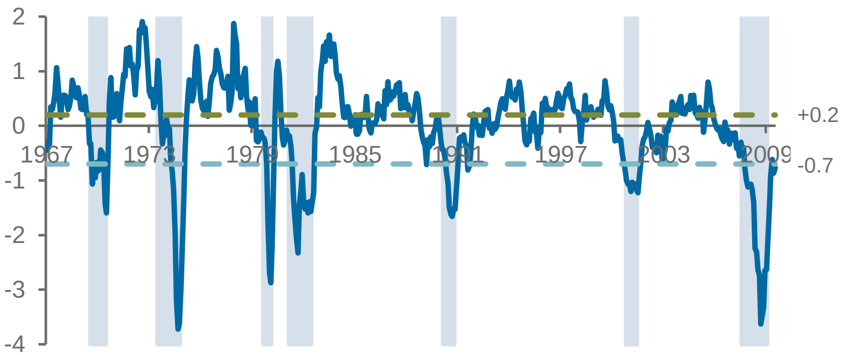
- The Chicago Fed National Activity Index (CFNAI), is an index designed to gauge economic activity and related inflationary pressures, as an indicator of business cycle turning points
- A positive CFNAI value signals above-average economic growth and a negative value signals below-average economic growth

What is the CFNAI?

- The Chicago Fed National Activity Index, CFNAI is a monthly index of U.S. economic activity constructed to summarize variations in 85 data series classified into four groups: **production and income; employment, unemployment, and hours; personal consumption and housing; and sales orders, and inventories**
- The index was designed as a co-incident indicator of national economic activity and to serve as an indicator of activity related inflationary pressures

The CFNAI and recessions

- Given quarterly cycle of GDP prints, the 3-Month Moving Average of the CFNAI has been tested by the Chicago Fed as a recession predictor
  - A 3-Month moving average CFNAI value below -0.7 is defined as indicating a significant likelihood that a recession has begun according to the levels published by the National Bureau of Economic Research
  - A recession is likely to have ended based on CFNAI 3-month moving average returning to a level of +0.2 after having crossed the -0.7 threshold



- These thresholds would have been highly effective based on in-sample data from 1967 to 2009
  - The -0.7 threshold would have correctly predicted a recession month (as officially identified by the NBER) with 86% accuracy
  - The +0.2 threshold would have correctly predicted the end of each recession with 100% accuracy

Source: Scott A. Brave, "The Chicago Fed National Activity Index and Business Cycles", Chicago Fed Letter, No. 268, November 2009

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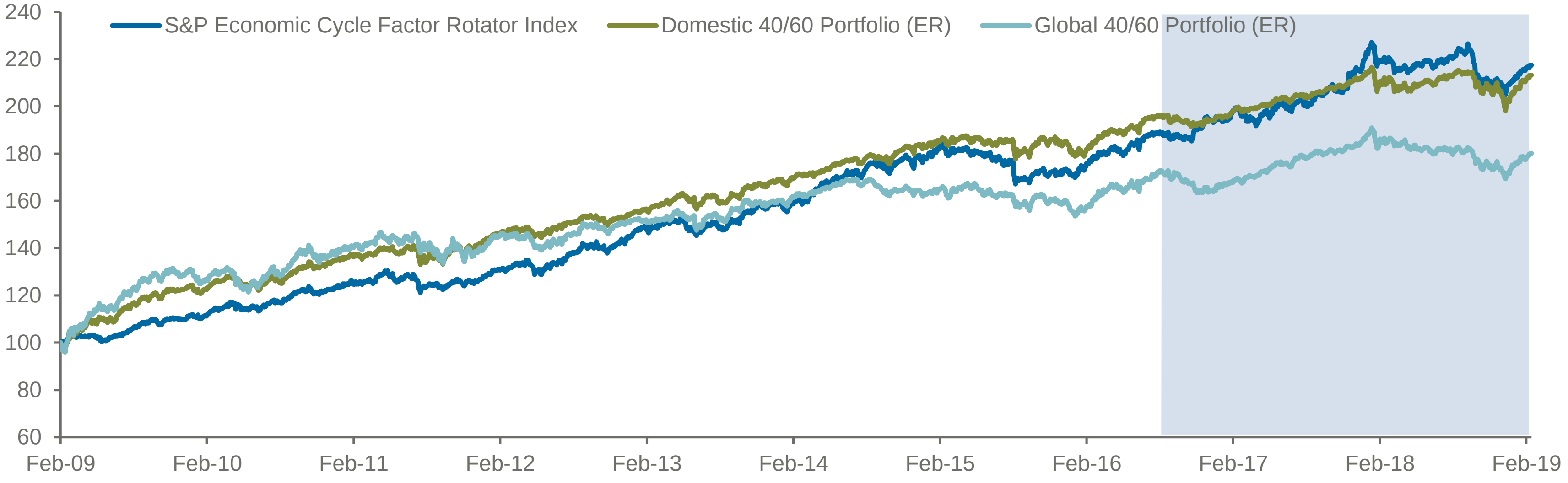
The S&P Economic Cycle Factor Rotator Index

Index performance

Hypothetical and actual historical performance : Feb 2009 – Feb 2019



Hypothetical and actual historical returns and volatilities: Feb 2009 – Feb 2019

	1 Year Return	3 Year Return (Annualized)	5 Year Return (Annualized)	10 Year Return (Annualized)	10 Year Volatility (Annualized)	Sharpe Ratio
S&P Economic Cycle Factor Rotator Index	-0.96%	7.10%	6.25%	8.04%	5.99%	1.34
Domestic 40/60 Portfolio (ER) (40% S&P 500, 60% Bloomberg Barclays Aggregate)	1.16%	5.17%	4.43%	7.93%	6.05%	1.31
Global 40/60 Portfolio (ER) (40% MSCI ACWI, 60% J.P. Morgan Global Agg Bond)	-2.85%	4.39%	1.95%	6.10%	6.61%	0.92

Note: Past performance is no guarantee of future performance. Performance above based on the hypothetical back tested daily closing levels from September 30, 2008 through August 15, 2016, and the actual historical performance of the Index based on daily closing levels thereafter.

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Monthly returns versus S&P 500® Price Index (ER)

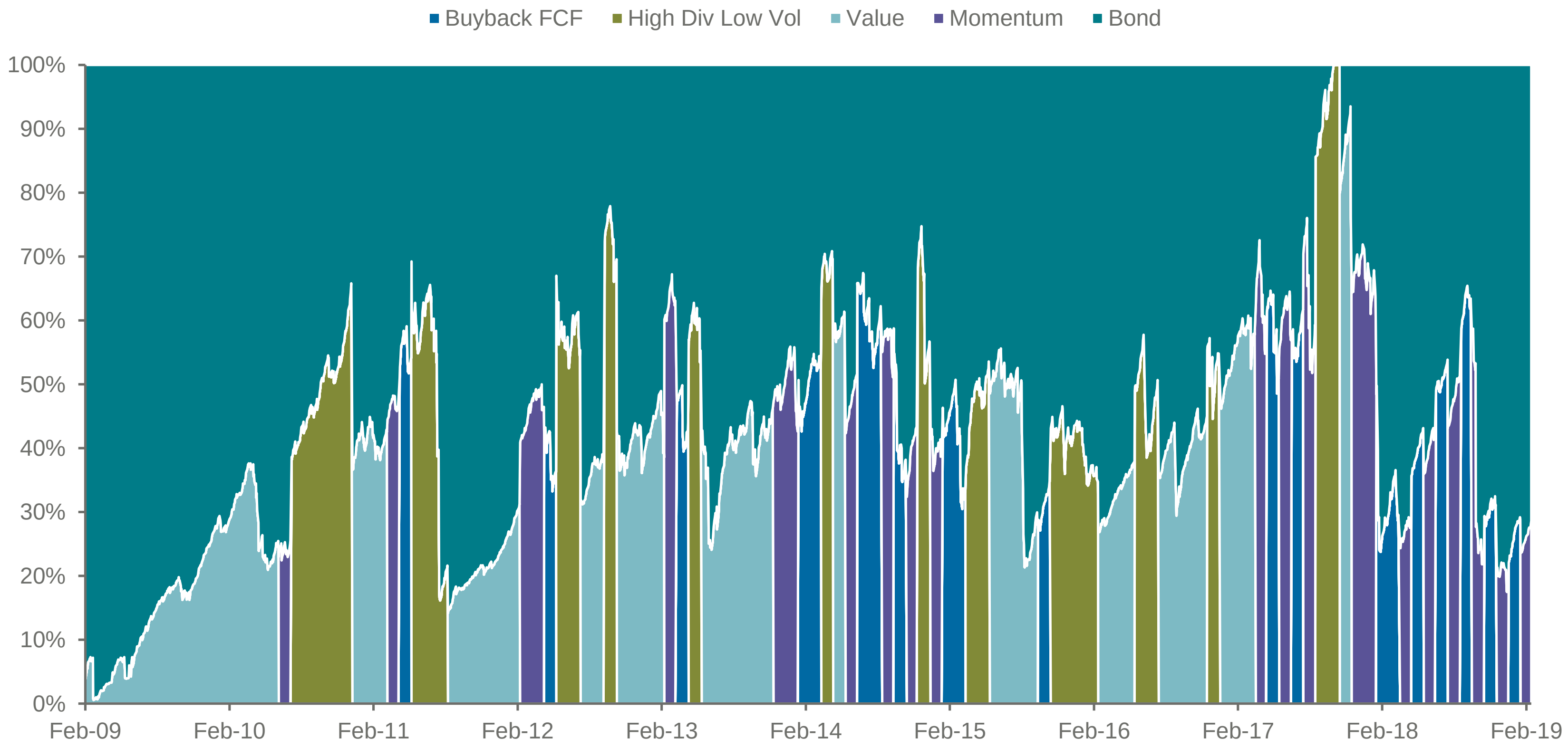
Year	Index	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
2008	Index	-0.13%	0.51%	-0.51%	-0.94%	-1.19%	-3.38%	0.10%	1.78%	0.14%	-1.45%	4.19%	2.23%	**1.15%**
	S&P 500 Price (ER)	-7.49%	-3.75%	-0.92%	4.56%	0.77%	-8.82%	-1.26%	0.96%	-9.11%	-17.41%	-7.92%	-1.03%	**-42.20%**
2009	Index	-1.93%	-1.52%	3.00%	-0.60%	0.03%	-0.47%	2.01%	2.72%	1.79%	-0.87%	2.20%	-0.48%	**5.88%**
	S&P 500 Price (ER)	-7.51%	-11.12%	8.32%	9.18%	5.10%	-0.10%	7.29%	3.25%	3.52%	-2.01%	5.70%	2.78%	**24.63%**
2010	Index	0.82%	1.29%	1.94%	1.98%	-1.57%	-0.69%	2.50%	0.29%	3.04%	1.24%	-1.38%	1.71%	**11.63%**
	S&P 500 Price (ER)	-4.69%	2.83%	5.86%	1.46%	-8.20%	-5.46%	6.79%	-4.83%	8.72%	3.66%	-0.26%	6.50%	**11.15%**
2011	Index	1.28%	1.42%	0.37%	2.03%	0.33%	-1.19%	-0.84%	-1.38%	-1.51%	2.38%	0.01%	0.31%	**3.16%**
	S&P 500 Price (ER)	2.23%	3.17%	-0.14%	2.81%	-1.39%	-1.86%	-2.17%	-5.70%	-7.21%	10.72%	-0.55%	0.78%	**-0.44%**
2012	Index	2.05%	1.52%	1.58%	1.21%	-3.30%	2.59%	1.49%	2.23%	1.21%	0.00%	0.60%	1.54%	**13.35%**
	S&P 500 Price (ER)	4.25%	3.97%	3.06%	-0.82%	-6.33%	3.88%	1.18%	1.91%	2.36%	-2.04%	0.24%	0.67%	**12.48%**
2013	Index	3.08%	0.00%	2.46%	0.24%	-2.31%	-0.80%	2.03%	-1.45%	2.17%	2.86%	1.93%	0.35%	**10.89%**
	S&P 500 Price (ER)	5.00%	1.07%	3.57%	1.77%	2.04%	-1.53%	4.91%	-3.16%	2.94%	4.43%	2.78%	2.33%	**29.08%**
2014	Index	-1.25%	2.15%	0.81%	3.75%	1.26%	0.65%	-0.30%	3.52%	-0.55%	0.59%	1.40%	-0.66%	**11.82%**
	S&P 500 Price (ER)	-3.59%	4.28%	0.66%	0.59%	2.08%	1.88%	-1.54%	3.73%	-1.58%	2.29%	2.43%	-0.45%	**11.01%**
2015	Index	0.70%	2.23%	-0.91%	-0.28%	-0.11%	-1.59%	-0.60%	-3.92%	-0.36%	2.40%	-0.41%	0.15%	**-2.81%**
	S&P 500 Price (ER)	-3.13%	5.46%	-1.77%	0.82%	1.02%	-2.14%	1.94%	-6.29%	-2.69%	8.25%	0.02%	-1.77%	**-1.13%**
2016	Index	0.60%	1.67%	2.50%	0.80%	-0.31%	2.11%	1.80%	-0.46%	0.03%	-0.78%	2.29%	1.29%	**12.11%**
	S&P 500 Price (ER)	-5.14%	-0.49%	6.51%	0.20%	1.45%	0.00%	3.50%	-0.23%	-0.23%	-2.05%	3.31%	1.71%	**8.37%**
2017	Index	0.47%	2.22%	-1.68%	0.38%	1.27%	0.67%	1.21%	0.06%	1.47%	0.41%	3.74%	0.35%	**10.99%**
	S&P 500 Price (ER)	1.67%	3.62%	-0.15%	0.81%	1.13%	0.39%	1.81%	-0.07%	1.81%	2.09%	2.70%	0.89%	**17.96%**
2018	Index	4.86%	-2.76%	-1.35%	-0.30%	0.81%	-0.13%	1.40%	2.07%	-0.26%	-5.84%	0.22%	-0.91%	**-2.51%**
	S&P 500 Price (ER)	5.44%	-4.01%	-2.84%	-0.01%	1.88%	0.26%	3.34%	2.78%	0.24%	-7.14%	1.57%	-9.43%	**-8.66%**
2019	Index	2.71%	0.86%											**3.59%**
	S&P 500 Price (ER)	7.55%	2.71%											**10.47%**

Note: Past performance is no guarantee of future performance. Performance above based on the hypothetical back tested daily closing levels from January 2, 2008 through August 15, 2016, and the actual historical performance of the Index based on daily closing levels thereafter.

Each day, the index rebalances the selected equity and bond constituents to weights that would have generated recent volatility of 6%

Daily weighting mechanism

Hypothetical backtested and historical weights (Feb 2009 – Feb 2019)



Note: Past performance is no guarantee of future performance. Performance above based on the hypothetical back tested daily closing levels from September 30, 2008 through August 15, 2016, and the actual historical performance of the Index based on daily closing levels thereafter.

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J.P. Morgan

Use BRENs to reshape and manage risk in portfolios

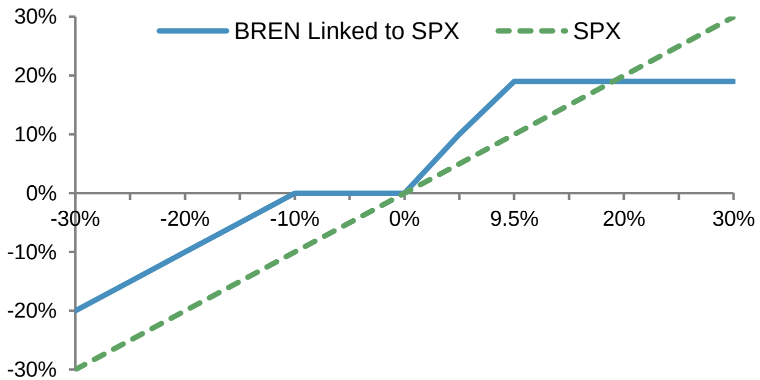
BRENs are tailored to articulate a view

- **Lever** returns that an investor deems likely to occur
- **Protect** against sell-offs an investor deems possible
- **Cap** returns an investor deems unlikely to occur
- **Access** asset classes that are otherwise difficult to implement

Client Perspective:*

Buy **Zero Coupon Bond**	$980
Sell 1 **OTM Put** Option (downside exposure)	($75)
Buy 2 **ATM Call** Options (enhanced upside exposure)	$170
Sell 2 **OTM Call** Options (caps upside exposure)	($90)
Commission (Fee-Based Offering)	$0
Origination Fees	$15
Total	**$1,000**

Buffered Return Enhanced Note Linked to the S&P 500 Index



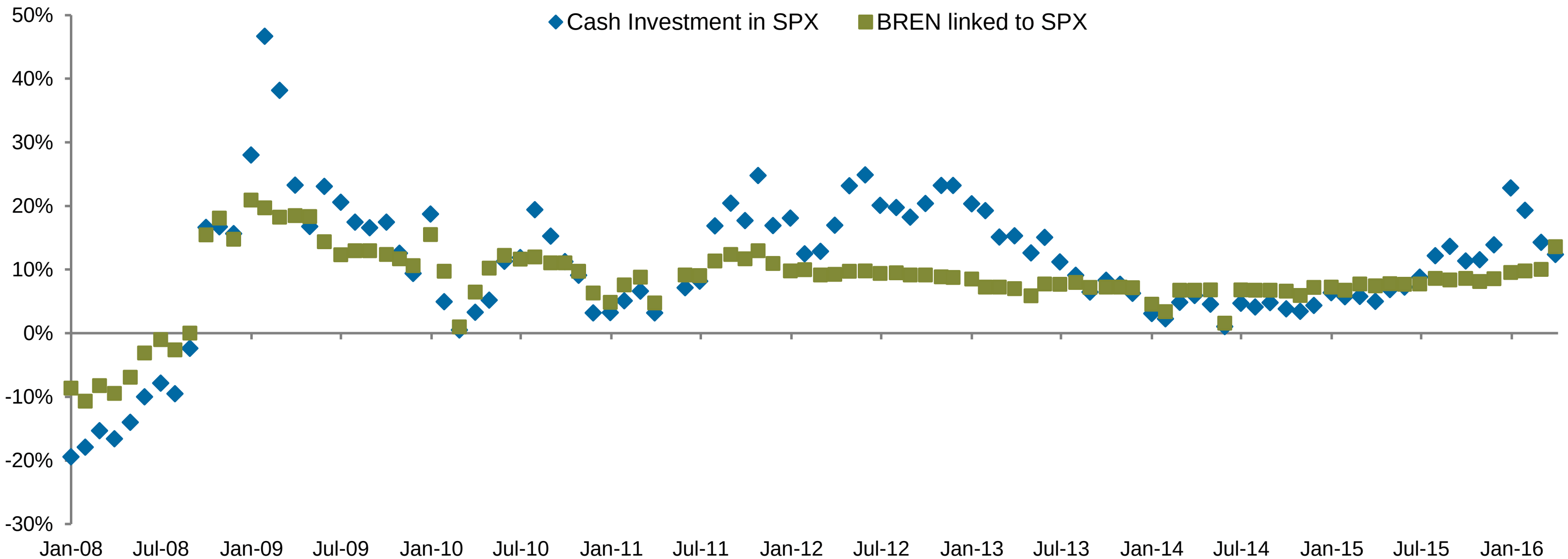
*Hypothetical Example of a 2y BREN linked to the S&P 500 Index, 200% Participation, 10% Buffer, 19.00% Maximum Return

Hypothetical Payoffs*

Final Index Value	Index Return	Total Return on the Notes
150.00	50.00%	19.00%
120.00	20.00%	19.00%
109.50	9.50%	19.00%
105.00	5.00%	10.00%
100.00	0.00%	0.00%
95.00	-5.00%	0.00%
90.00	-10.00%	0.00%
80.00	-20.00%	-10.00%
70.00	-30.00%	-20.00%
60.00	-40.00%	-30.00%
50.00	-50.00%	-40.00%

Case Study: Returns of JPMorgan BRENs vs. a Direct Investment in SPX

Annualized Returns of BRENs linked to SPX vs. the Index



*Graph above represents return of investment at maturity, if held from the issuance date indicated above through to final maturity
Source: Bloomberg, J.P. Morgan. Past performance is no guarantee of future performance

Market Linked Certificates of Deposit

	BRENs	SPX
Average Annualized Returns[1]	8.17%	10.64%
Standard Deviation	5.74%	10.84%

[1] Average returns and standard deviations above are based on advisory SPX BREN offerings issued between January 2008 and April 2016

Conclusions

- Generally, a laddered investment in the calendar BRENs linked to the S&P 500 would've resulted comparable returns, with outperformance in bearish and moderately bullish markets.
- Furthermore, the standard deviation of returns is reduced dramatically, primarily due to the buffer on the downside

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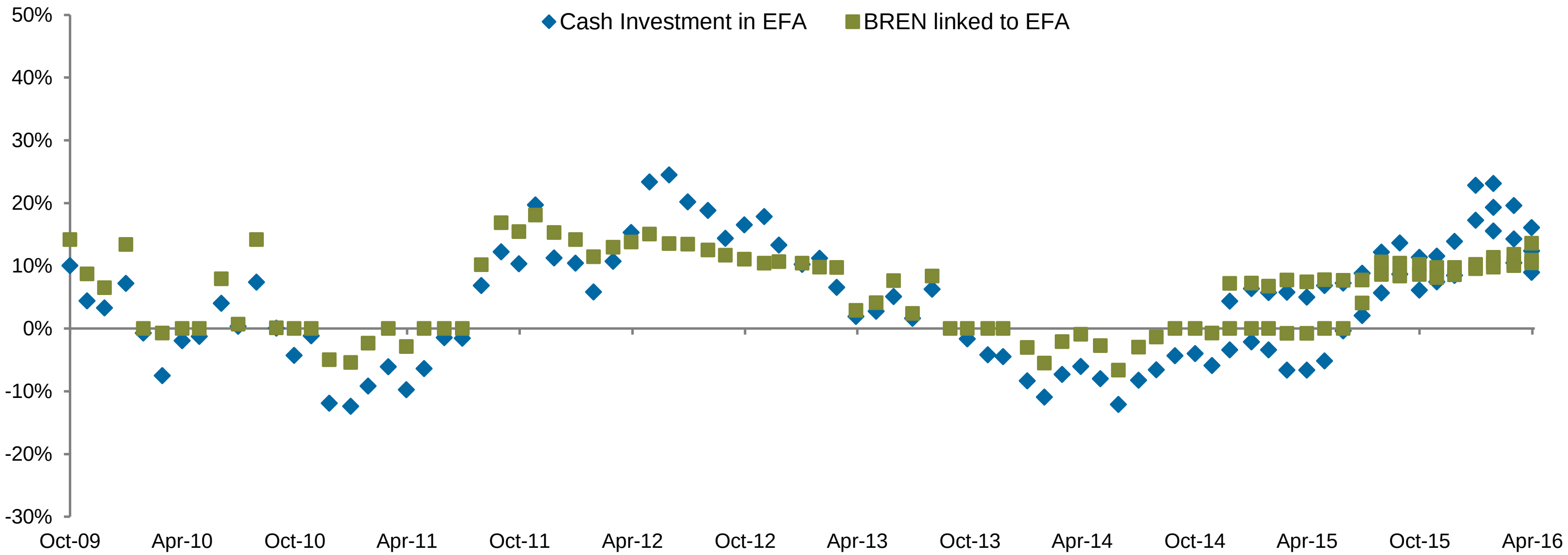
Case Study: Returns of JPMorgan BRENs vs. a Direct Investment in EFA

Annualized Returns of BRENs linked to EFA vs. the ETF



*Graph above represents return of investment at maturity, if held from the issuance date indicated above through to final maturity
Source: Bloomberg, J.P. Morgan. Past performance is no guarantee of future performance

Market Linked Certificates of Deposit

	BRENs	EFA
Average Annualized Returns[1]	5.07%	2.42%
Standard Deviation	6.64%	10.27%

[1] Average returns and standard deviations above are based on advisory EFA BREN offerings issued between October 2009 and April 2016

Conclusions

- Generally, a laddered investment in the calendar BRENs linked to the iShares MSCI EAFE ETF would've resulted comparable returns, with outperformance in bearish and moderately bullish markets.
- Furthermore, the standard deviation of returns is reduced dramatically, primarily due to the buffer on the downside

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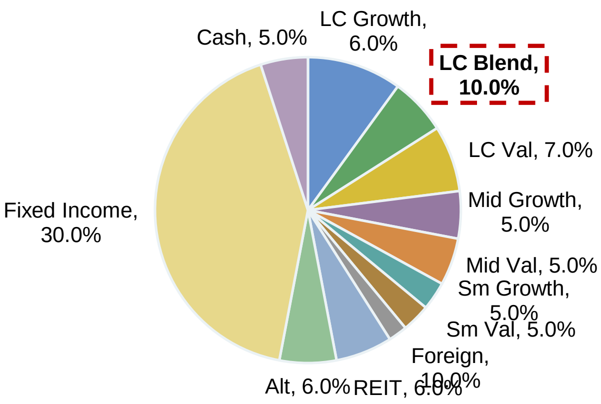
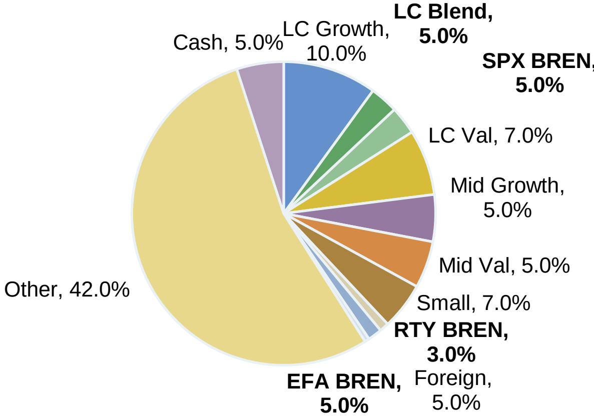
“Diversified Growth” Model

Mutual Fund Model Allocations



Asset class	Allocation
Large Cap Domestic Growth	6.0%
Large Cap Domestic Blend	10.0%
Large Cap Domestic Value	7.0%
Mid Cap Domestic Growth	5.0%
Mid Cap Value	5.0%
Small Cap Domestic Growth	5.0%
Small Cap Value	5.0%
International Equities	10.0%
REIT	6.0%
Alternatives	6.0%
Fixed Income	30.0%
Cash	5.0%

Integrated Model Allocations



Asset class	Allocation
Large Cap Domestic Growth	6.0%
Large Cap Domestic Blend	***5.0%***
SPX BREN	***5.0%***
Large Cap Domestic Value	7.0%
Mid Cap Domestic Growth	5.0%
Mid Cap Value	5.0%
Small Cap Domestic Growth	3.5%
Small Cap Value	3.5%
Russell 2000 BREN	***3.0%***
International Equities	5.0%
EFA BREN	***5.0%***
Other (FI and Alt)	42.0%
Cash	5.0%

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Partially Principal Protected Notes (PPPNs) provide partial principal protection and upside participation

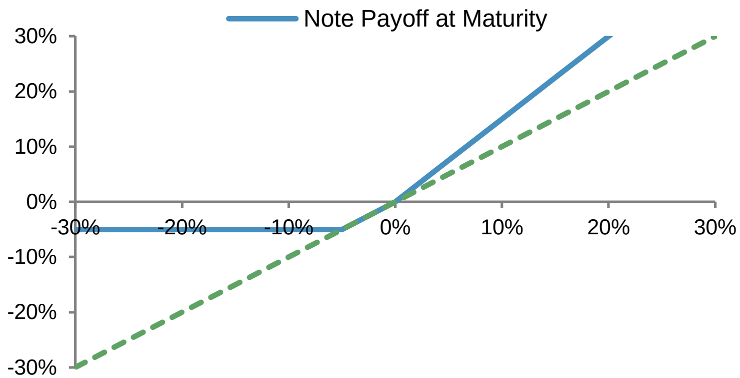
PPPNs can be used for a variety of purposes

- **Maintain** broad-based exposure to a portfolio of your choosing **while partially protecting capital**
- **Access** asset classes that are otherwise difficult to implement

Client Perspective:*

Buy **Zero Coupon Bond**	$905
Sell 1 **ATM Put** Option (downside exposure)	($135)
Buy 1 **OTM Put** Option (caps downside exposure)	$110
Buy 1.65 **ATM Call** Options (enhanced upside exposure)	$100
Commission (Fee-Based Offering)	$0
Origination Fees	$20
Total	**$1,000**

PPPNs Linked to EURO STOXX50® Index:



*Hypothetical Example of a 3y PPN linked to EURO STOXX50®, 165% participation, 5% maximum loss

Hypothetical Payoffs*

Final Index Value	Index Return	Total Return on the Notes
160.00	60.00%	99.00%
150.00	50.00%	82.50%
130.00	30.00%	49.50%
110.00	10.00%	16.50%
100.00	0.00%	0.00%
95.00	-5.00%	-5.00%
90.00	-10.00%	-5.00%
70.00	-30.00%	-5.00%
60.00	-40.00%	-5.00%
50.00	-50.00%	-5.00%
40.00	-60.00%	-5.00%

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Use Accelerated Barrier Notes to reshape and manage risk in portfolios

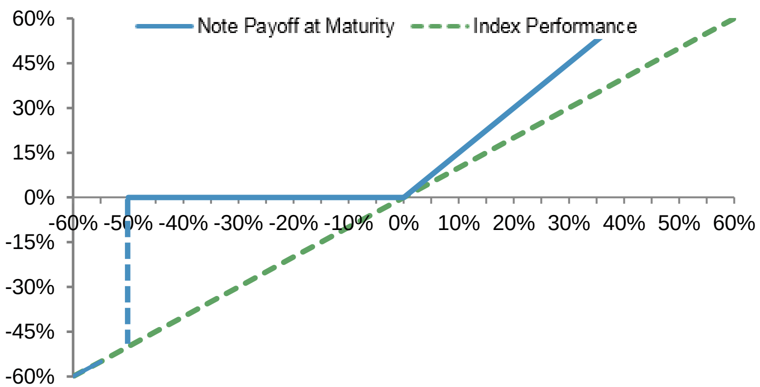
Accelerated Barrier Notes are tailored to articulate a view

- **Lever** returns that an investor deems likely to occur
- **Protect** against sell-offs an investor deems possible
- **Access** asset classes that are otherwise difficult to implement

Client Perspective:*

Buy **Zero Coupon Bond**	$980
Sell 1 **Knock-In Barrier Put** Option (downside exposure)	($75)
Buy 1.5 **ATM Call** Options (enhanced upside exposure)	$80
Commission (Fee-Based Offering)	$0
Origination Fees	$15
Total	**$1,000**

Accelerated Barrier Note Linked to the S&P 500 Index



Hypothetical Payoffs*

Final Index Value	Index Return	Total Return on the Notes
140.00	40.00%	60.00%
130.00	30.00%	45.00%
110.00	10.00%	15.00%
100.00	0.00%	0.00%
90.00	-10.00%	0.00%
80.00	-20.00%	0.00%
70.00	-30.00%	0.00%
60.00	-40.00%	0.00%
50.00	-50.00%	0.00%
49.99	-50.01%	-50.01%
40.00	-60.00%	-60.00%

*Hypothetical Example of a 5y Accelerated Barrier Noted linked to the S&P 500 Index, 150% Participation, 50% contingent protection observed at maturity only

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Use Dual Directional Notes to reshape and manage risk in portfolios

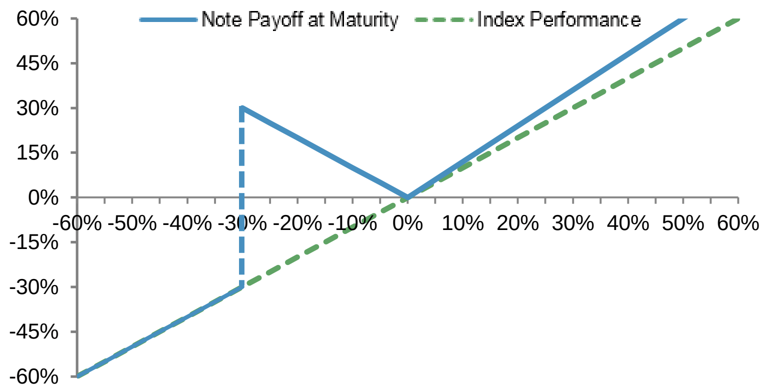
Dual Directionals are tailored to articulate a view

- **Lever** returns that an investor deems possible
- **Provide returns** in a sell-off an investor deems possible
- **Cap** returns an investor deems unlikely to occur
- **Access** asset classes that are otherwise difficult to implement

Client Perspective:*

Buy **Zero Coupon Bond**	$915
Sell 1 **Knock-In Barrier Put** Option (downside exposure)	($145)
Buy 1.2 **ATM Call** Options (enhanced upside exposure)	$130
Buy 1 **Knock-Out Barrier Put** Option (absolute return exposure)	$45
Commission	$30
Origination Fees	$25
Total	**$1,000**

Dual Directional Note Linked to the Lesser Performing of the S&P 500 Index and the Russell 2000 Index



*Hypothetical Example of a 4y Dual Directional Note linked to the Lesser Performing of the S&P 500 Index and the Russell 2000 Index.120% Participation, 30% Contingent Protection observed at maturity only

Hypothetical Payoffs*

Final Value	Index Return	Absolute Index Return	Total Return on the Notes
165.00	65.00%	N/A	78.00%
150.00	50.00%	N/A	60.00%
130.00	30.00%	N/A	36.00%
110.00	10.00%	N/A	12.00%
100.00	0.00%	N/A	0.00%
95.00	-5.00%	5.00%	5.00%
90.00	-10.00%	10.00%	10.00%
70.00	-30.00%	30.00%	30.00%
69.99	-30.01%	N/A	-30.01%
60.00	-40.00%	N/A	-40.00%
20.00	-80.00%	N/A	-80.00%

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Use Callable Yield Notes to Enhance Income

Yield notes are tailored to enhance income in portfolios

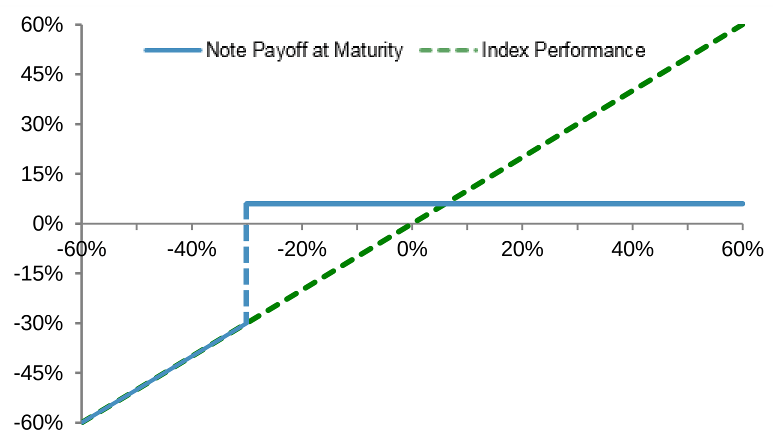
Product Benefits

- **Enhanced** income stream relative to standard reverse convertible and dividend on underlying stock
- Call feature may **shorten duration** on the note if underlying has performed well
- Contingent barrier provides **downside protection** if underlying trades above trigger level over a certain monitoring period
- The notes may offer a **higher interest rate** than the yield on debt securities of comparable maturity

Client Perspective:*

Buy **Zero Coupon Bond**	$980
Sell 1 **Knock-In Barrier Put** Option (downside exposure)	($90)
Buy quarterly **Knock-Out Contingent Coupon Stream**	$85
Commission	$15
Origination Fees	$10
Total	**$1,000**

Contingent Interest Callable Yield Note Linked to SPX/RTY



*Hypothetical Example of a 15m Contingent Interest Auto Callable Yield Note linked to SPX/RTY, 6.00% p.a. coupon, 30.00% contingent protection observed daily

Hypothetical Payoffs*

	Payment at Maturity 6.00% p.a. Contingent Interest Rate	
Least Performing Underlying Return	**If a Trigger Event Has Not Occurred**	**If a Trigger Event Has Occurred**
40.00%	$1,015.00	$1,015.00
20.00%	$1,015.00	$1,015.00
5.00%	$1,015.00	$1,015.00
0.00%	$1,015.00	$1,015.00
-5.00%	$1,015.00	$965.00
-20.00%	$1,015.00	$815.00
-30.00%	$1,015.00	$715.00
-30.01%	N/A	$699.90
-50.00%	N/A	$500.00

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Use Callable Yield Notes to Enhance Income (cont'd)

Product Benefits

- Enhanced income stream relative to standard reverse convertible and dividend on underlying stock
- Call feature may shorten duration on the note if underlying has performed well
- Fixed or contingent barrier provides downside protection in event underlying trades above trigger level over a certain monitoring period
- The notes may offer a higher interest rate than the yield on debt securities of comparable maturity

Product Risks

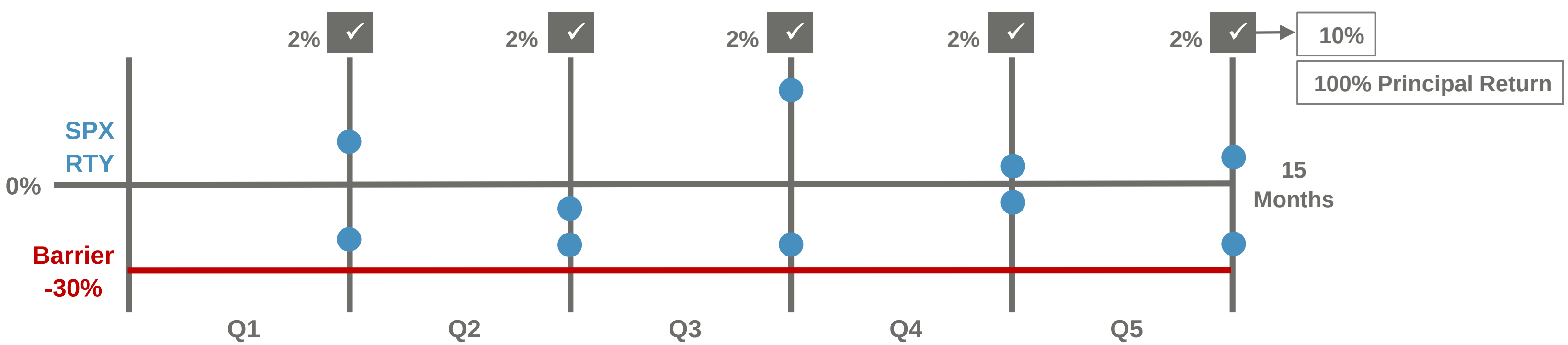
- If coupon is contingent, possibility that investment will not generate any income if underlying trades below interest barrier level on relevant interest review dates
- Reinvestment risk if note is called prior to maturity
- If the barrier level is contingent, 100% principal at risk if underlying trades below trigger level over a certain monitoring period
- Return potential on the notes is limited to the interest payment amount
- Any payment on the notes is subject to the credit risk of JPMorgan Financial, the issuer of the notes, and the credit risk of JPMorgan Chase &Co., the guarantor of the notes

Auto Callable Yield Note Example

Sample Terms

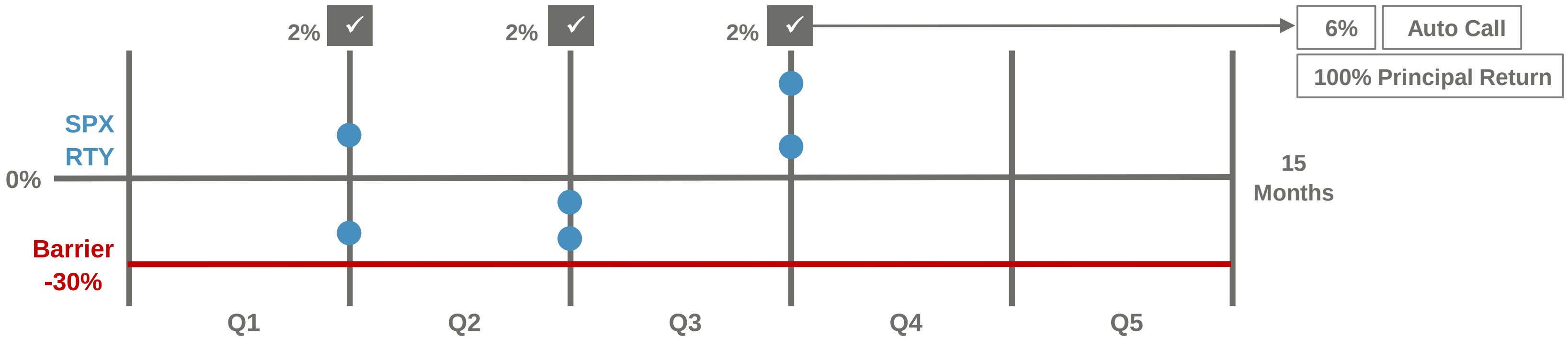
INDEX	DURATION	CONTINGENT COUPON	PRINCIPAL & COUPON BARRIER
Lesser performing of S&P 500 Index (SPX) and Russell 2000 Index (RTY)	15 months	2% Quarterly	70% of Initial Index Value

Scenario 1 – Not Called

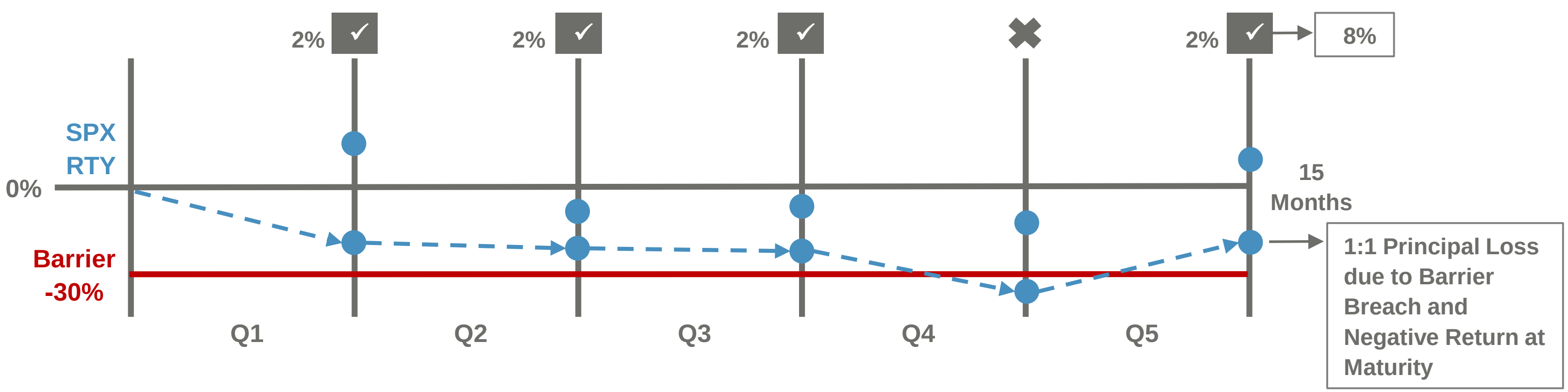


Auto Callable Yield Note Example (cont'd)

Scenario 2 – Called



Scenario 3 – Barrier Breach



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The Interest Rate Impact: Secondary Market

Statement Pricing – Influencing Factors

- Daily Influencing Factors (among others)
  - Interest Rates
  - Appreciation/Depreciation of the Index
  - Accretion of Zero Coupon Bond
  - Credit Spreads

Inverse Relationship – Price vs. Interest Rates

- Existing structured notes have a fixed duration, and therefore indicative present values are inversely correlated with interest rates
- A **rising interest rate environment** will negatively effect the statement /indicative bid value, as the value of the Zero Coupon Bond **depreciates**
- A **declining interest rate environment** will positively effect the statement/indicative bid value, as the value of the Zero Coupon Bond **appreciates**
- Impact of rising rates is generally equal to “change in rates multiplied by remaining duration” → longer duration means more impact

Note: Rates do not impact payments at maturity for structured notes

Rising Rates Environment

Statement impact from the Zero Coupon Bond Component

- Day 1 (Indicative) $990
- Day 2 (Interest rates rise 10bps) **$986**

- Year 2 $995
- Year 2 + 1 Day (Interest rates rise 10bps) **$993**

- Maturity – 1 Day $999
- Maturity (Interest rates rise 10bps) **$1000**

*The depiction is hypothetical and for illustrative purposes only. The example is constructed using a 4 year SPX Buffered Note.

Declining Rates Environment

Statement impact from the Zero Coupon Bond Component

- Day 1 (Indicative) $990
- Day 2 (Interest rates fall 10bps) **$994**

- Year 2 $995
- Year 2 + 1 Day (Interest rates fall 10bps) **$997**

- Maturity – 1 Day $999
- Maturity (Interest rates fall 10bps) **$1000**

*The depiction is hypothetical and for illustrative purposes only. The example is constructed using a 4 year SPX Buffered Note.

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