Marquette Associates

Investment Education

Agenda

- Basic Concepts
- Active vs. Passive
- Bonds
- Stocks
- Rebalancing
- Real Estate
- Infrastructure
- Private Equity

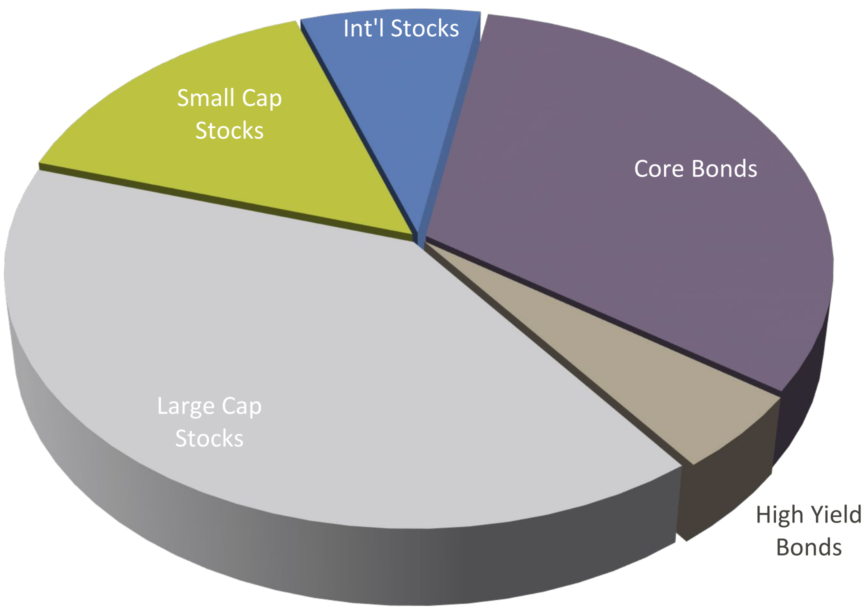
Basic Concepts

- Return
- Risk
- Diversification & Correlation
- Portfolio Construction

What's the goal?

The goal of portfolio construction is to build a portfolio of investments in different asset classes to achieve your target return while minimizing risk

Asset allocation

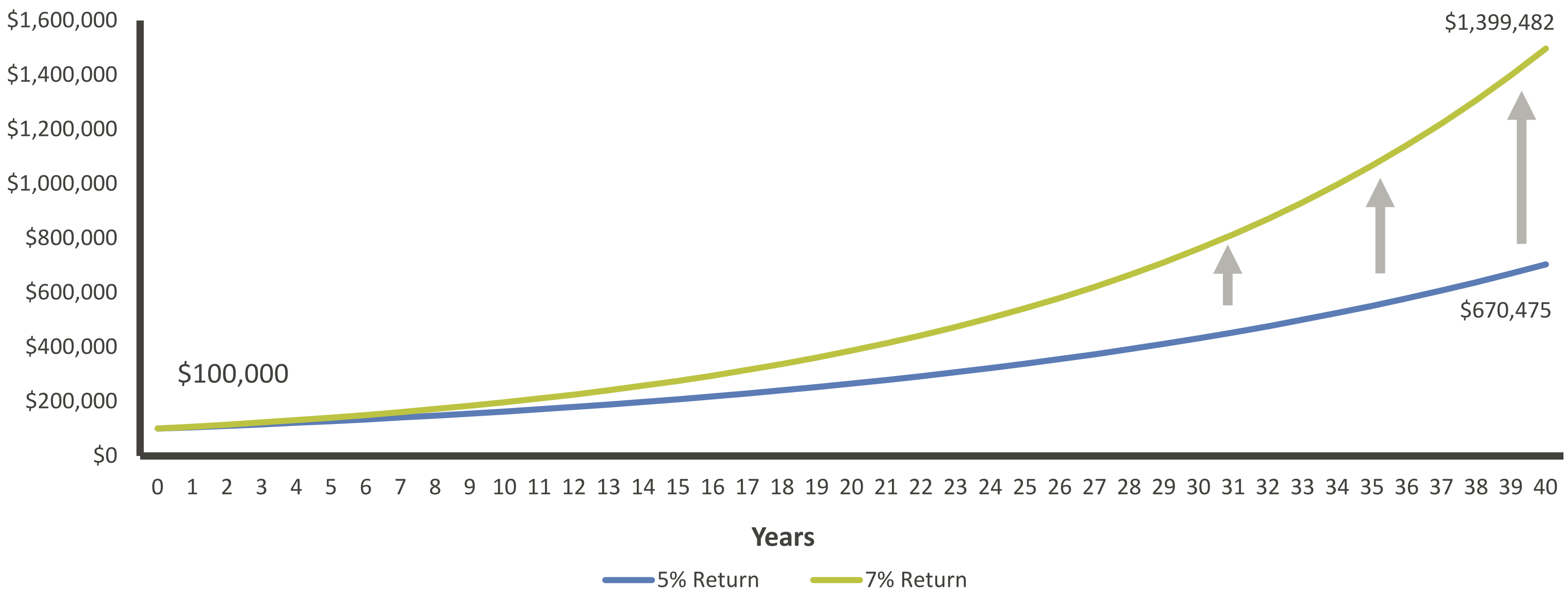


→ 7.5% Target

The eighth wonder of the world

Compound interest exponentially increases return over long periods of time

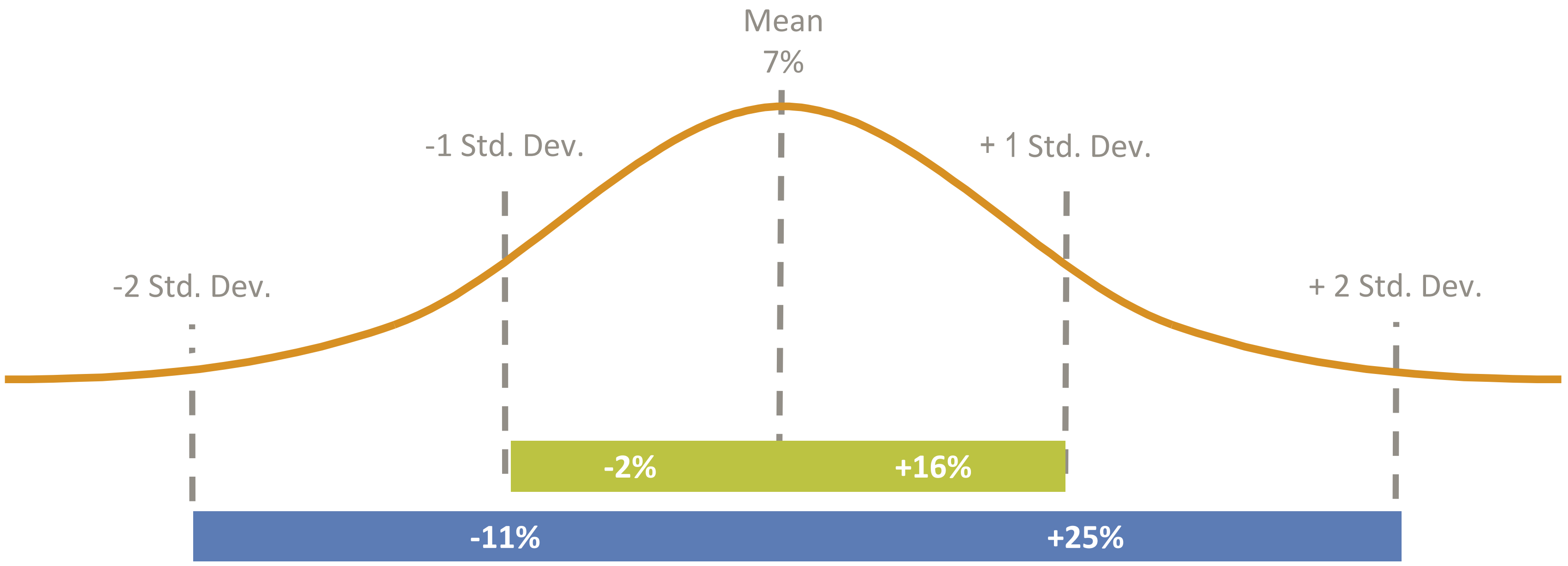
Illustrative example



How is risk measured?

Standard deviation is the deviation from the expected return, or, a measure of dispersion around the mean

- 7% return with 9% standard deviation



Diversification

- Not putting all your eggs in one basket has the benefit of protecting your portfolio at different extremes of the market
- Diversify while minimizing costs in terms of management fees, transaction charges and man-hours of oversight

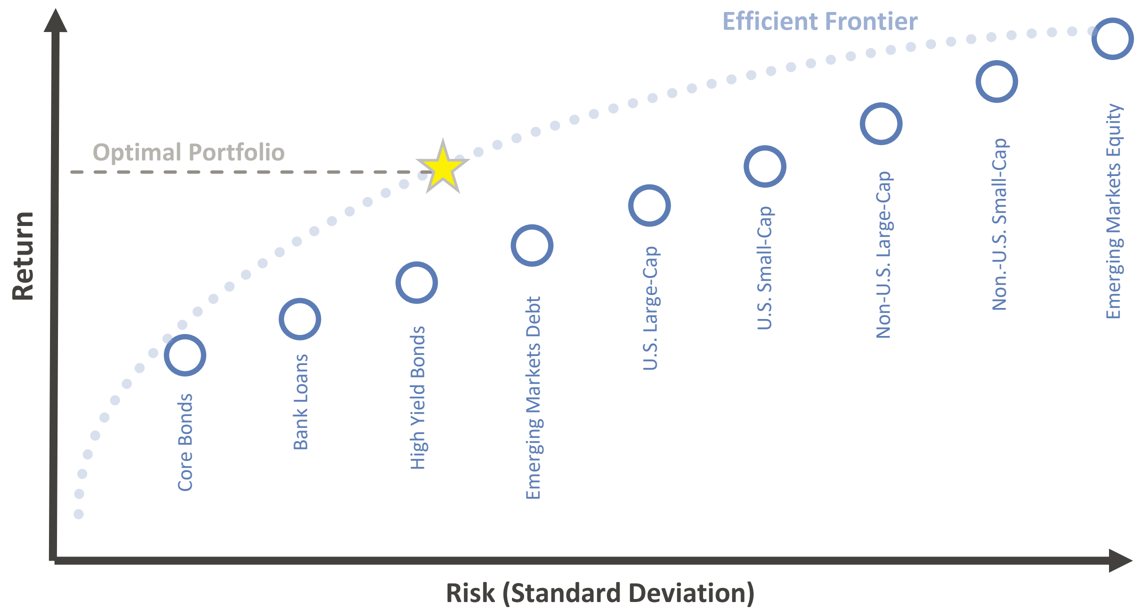
What is correlation?

Correlation is how closely two investments behave in relation to one another

	Fixed Income	Non-U.S. Equity	U.S. Equity
Fixed Income	1.0	0.2	0.2
Non-U.S. Equity	0.1	1.0	0.6
U.S. Equity	0.2	0.6	1.0

Source: eVestment Jan 1976 – Mar 2019. Fixed income is represented by the BbgBarc US Aggregate index, Non-U.S. Equity is the MSCI EAFE, U.S. Equity is the S&P 500.

Putting it all together



- The aim is to achieve the optimal portfolio on the risk/return spectrum by combining asset classes
- Lower correlation between asset classes reduces overall portfolio risk
- Choose the portfolio on the "Efficient Frontier" that meets your organization's target return

Active vs. Passive

- What is an index?
- What is active vs. passive management?
- Why use one over the other?

What is an index?

Key index criteria

1. **Replicable and investable** – investors should be able to invest in and closely replicate the performance of a given index

2. **Representative of the investment universe** – a well constructed index will approximate the characteristics and performance of the market it is meant to represent

3. **Maintained** – an index must be maintained to address changes to the companies in the index (mergers, acquisitions, bankruptcies)

Glossary of indices

	S&P 500	Russell 3000	Russell 2000	MSCI EAFE	MSCI ACWI
Representative Market	U.S. Large-Cap Stocks	All U.S. Stocks	U.S. Small-Cap Stocks	Developed World Non-U.S. Large-Cap Stocks	All Large-Cap Global Stocks
Geography	United States	United States	United States	Non-U.S.	Global
Market Value	$21 Trillion	$27 Trillion	$2 Trillion	$16 Trillion	$53 Trillion
Holdings	505	2,925	1,990	921	2,774
Methodology	Cap-weighted	Cap-weighted	Cap-weighted	Cap-weighted	Cap-weighted
Index Provider	S&P Dow Jones Indices A Division of S&P Global	FTSE Russell	FTSE Russell	MSCI	MSCI

What is active vs. passive management?

What exactly is active and passive management?

	Active Management	Passive Management
Objective	To outperform the index on an absolute or risk-adjusted basis	To match the return of the index
Return	Based on individual securities	Equal to the broad market
Risk	Less or more than the broad market	Equal to the broad market
Approach	Stock-picking through a top-down or bottom-up approach	Rules-based through replication or sampling
Decision Makers	Portfolio Managers and Analysts	Index Provider or Committee
Portfolio Construction	Conviction-Weighted	Market-Cap Weighted
Cost	Higher	Lower
Taxes	Varies by manager turnover	More tax efficient

Each management style in practice

S&P 500	S&P 500 Weight (%)	Active Manager Weight (%)	Passive Manager Weight (%)
1. Apple	3.81	0.00	3.80
2. Microsoft	2.89	4.33	2.83
3. Amazon.com	2.05	2.05	1.99
4. Facebook	1.84	2.02	1.84
5. Johnson & Johnson	1.67	0.00	1.65
6. Berkshire Hathaway	1.64	1.64	1.60
7. JP Morgan Chase	1.63	3.75	1.60
8. Exxon Mobil	1.55	0.00	1.55
9. Alphabet A	1.38	2.50	1.34
10. Alphabet C	1.38	1.38	1.34

Why choose one over the other?

Active management

Advantages

- Possibility of higher than index returns
- Ability to own securities not within the benchmark (index) securities
  - i.e., recently listed, new IPOs, etc.

Disadvantages

- Higher fees and operating expenses
- Managers can underperform and make mistakes
- Active management is a zero-sum game; investors in aggregate cannot outperform the market

Passive management

Advantages

- Lower fees
- Highly consistent performance – passive funds are designed to meet the returns of the index

Disadvantages

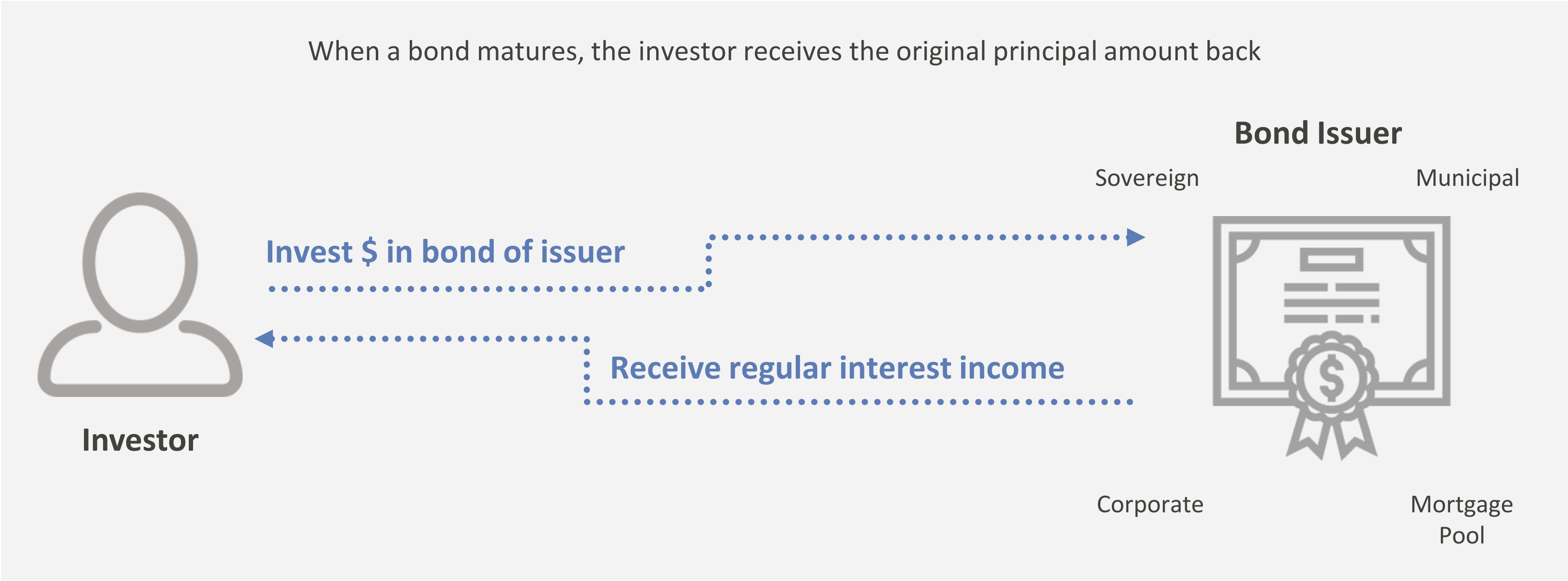
- Investors can only achieve market returns
- Not all asset classes are accessible with passive management

Bonds

- What is a bond?
- Categories
- Common terms

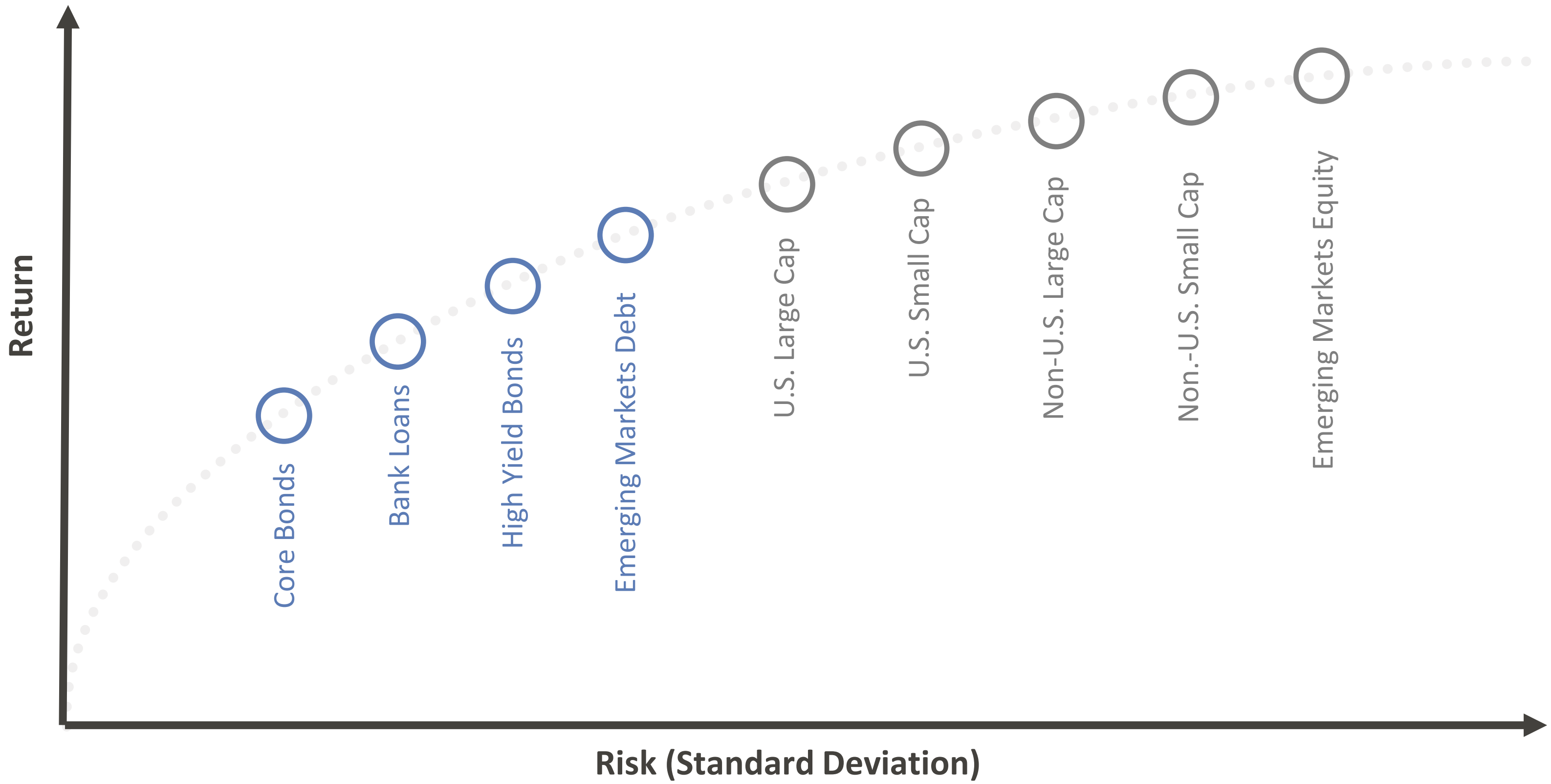
What is a bond?

- A bond is a loan to a government, a company or a group of individuals
- Investors choose bonds primarily to receive regular interest income



Risk/return profile of bonds

The fixed income spectrum ranges from core bonds to emerging markets debt



Non-U.S. bonds

Provide diversification through non-U.S. interest rates, credit and currency risk and return

Emerging Markets Debt


- Hard Currency Sovereign Bonds
- Local Currency Sovereign Bonds
- Hard Currency Corporate Bonds

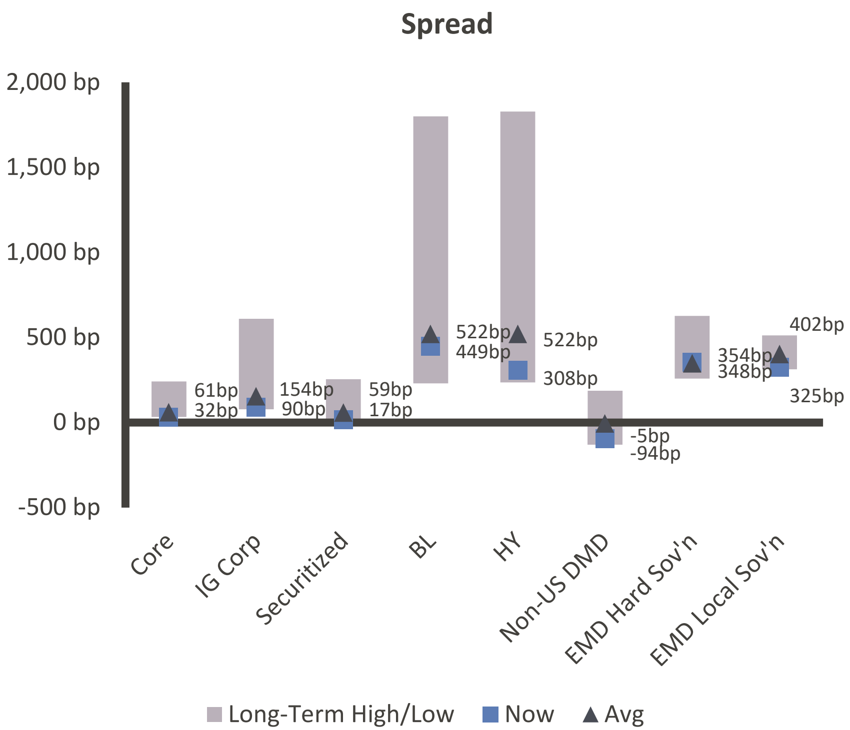
Global Bonds


- Includes U.S., non-U.S developed markets, and emerging markets debt
- May be hedged or unhedged

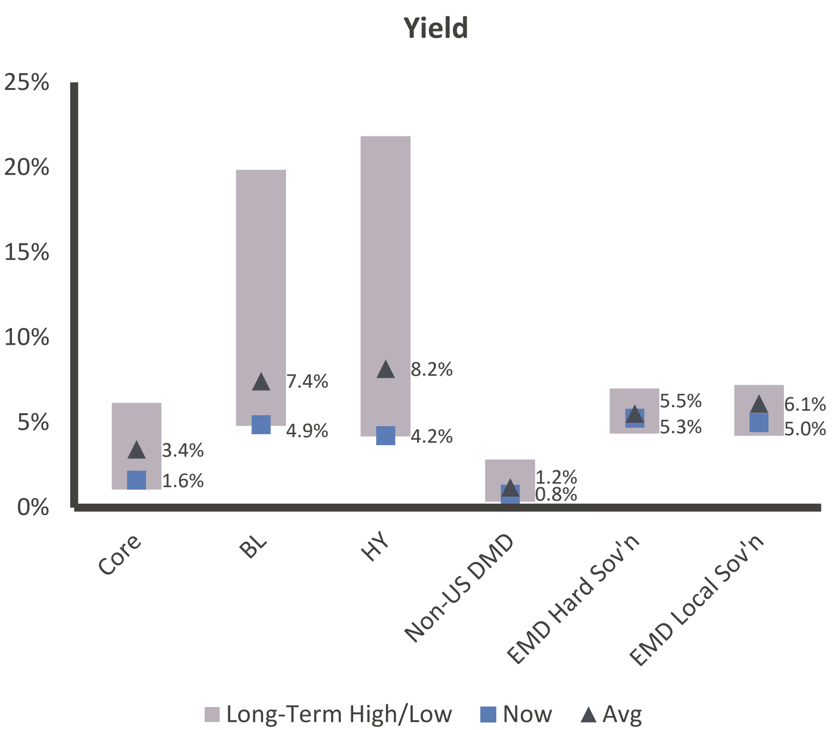
Common Terms

Spread and yield

A spread is the difference between the yield over its base rate



Bond yield is the bond's return to an investor



Note: Long-term high, low and average based on longest available data for each index
Sources: Bloomberg Barclays, Credit Suisse, Deutsche, JPMorgan, as of March 31, 2021

Duration and maturity

Maturity is the time until the bond pays back principal

Bond's Maturity: 10 Years

Duration is a bond's price sensitivity to interest rate changes

Bond's Duration: 7.2 Years

An inverse relationship: assume a bond has a duration of 7.2 years

- If interest rates drop by 1% (100 basis points), its price will rise by 7.2%
- If interest rates rise by 1% (100 basis points), its price will drop by 7.2%

Note: Duration measures the time it takes to recover half the present value of all future cash flows from the bond

Stocks

- What is a stock?
- How to categorize stocks
- How to invest in stocks

What is a stock?

- A stock is a share of ownership in a company
- Shares give an investor voting rights on the direction of the company
- Investors choose stocks primarily for price appreciation opportunity

Stock categories

Size (market cap)

Large-Cap (over $30B)	amazon
Mid-Cap ($5-$30B)	CINTAS
Small-Cap ($500M-$5B)	Abercrombie & Fitch
Micro-Cap (<$500M)	TANDEM DIABETES CARE

Style

Growth	amazon
Core	Refers to a blend of growth & value
Value	J.P.Morgan

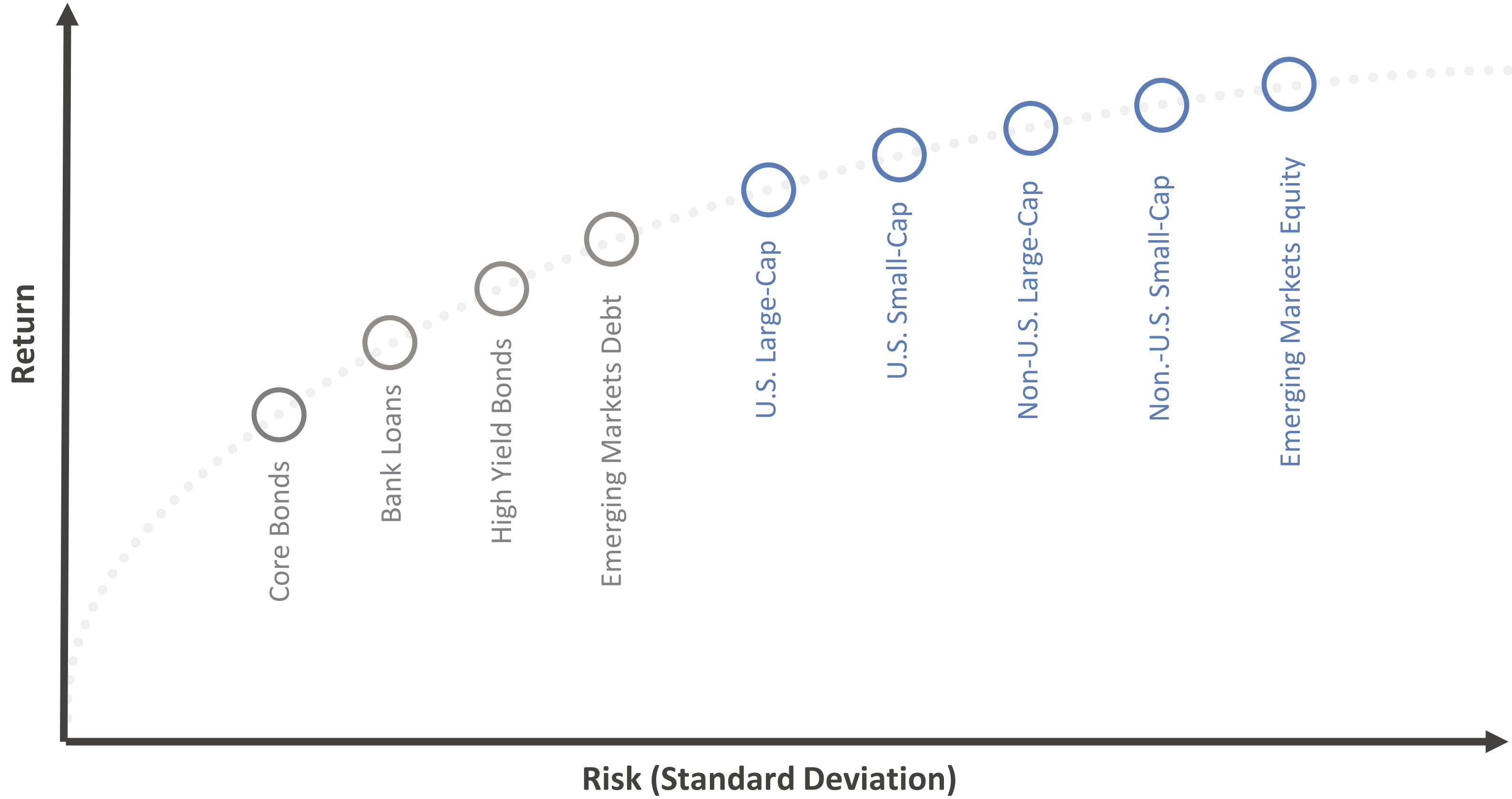
Stock categorization

	Value	Core	Growth
Large			amazon
Mid			
Small			

Non-U.S. stock categorization

MSCI ACWI INDEX					
MSCI WORLD INDEX			MSCI EMERGING MARKETS INDEX		
DEVELOPED MARKETS			EMERGING MARKETS		
Americas	**Europe & Middle East**	**Pacific**	**Americas**	**Europe, Middle East & Africa**	**Asia**
Canada United States	Austria Belgium Denmark Finland France Germany Ireland Israel Italy Netherlands Norway Portugal Spain Sweden Switzerland United Kingdom	Australia Hong Kong Japan New Zealand Singapore	Brazil Chile Columbia Mexico Peru	Czech Republic Egypt Greece Hungary Poland Qatar Russia Saudi Arabia South Africa Turkey United Arab Emirates	China India Indonesia Korea Malaysia Philippines Taiwan Thailand

Risk/return profile of stocks



More possibilities, but more risk

Pros

- Higher returns than bonds and cash
- Possibility of income and capital appreciation
- Voting rights
- Favorable liquidity
- Transparent financial reporting

Cons

- Higher volatility than cash and bonds
- Last in line to be paid in a bankruptcy
- No guaranteed return

Ways to access stocks

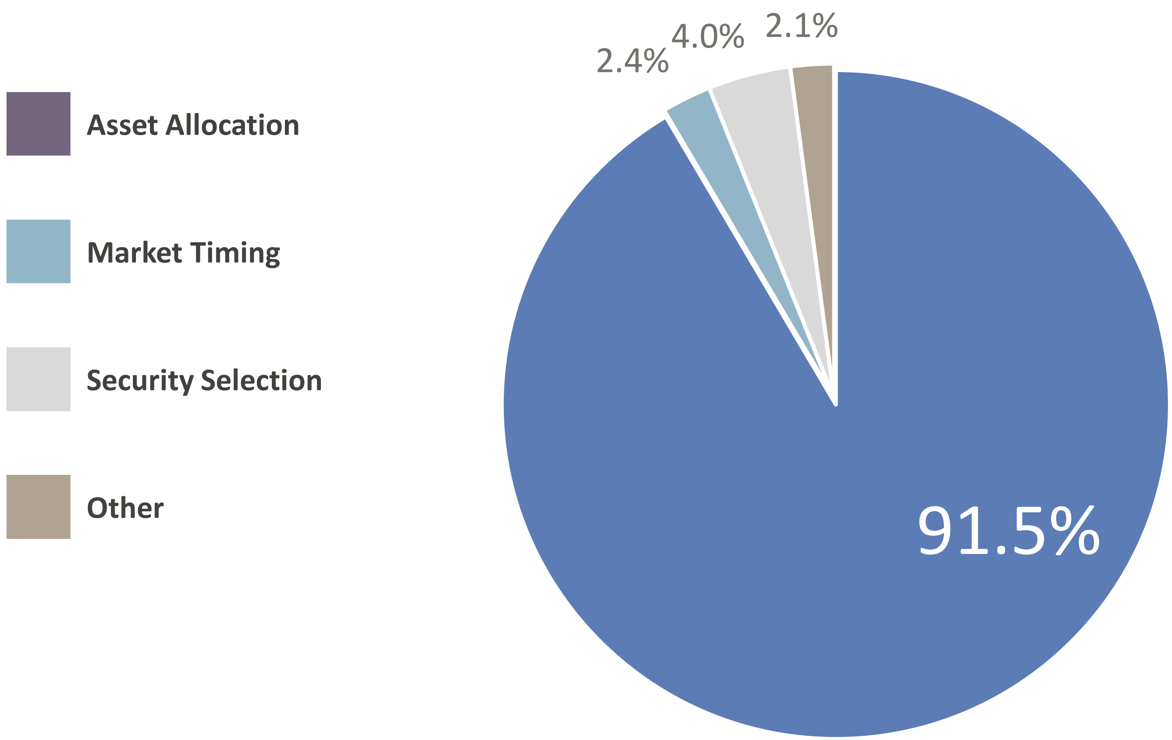
- **Mutual Funds** – most expensive, lowest investment minimum
- **Commingled Funds** – similar to a mutual fund but private and cheaper, less liquid, larger minimums
- **Separate Accounts** – highest minimums, direct investments, customizable

Rebalancing

- What is rebalancing?
- Why rebalancing is important
- How to rebalance

Asset allocation controls portfolio risk

Investing is more than just choosing securities and market timing

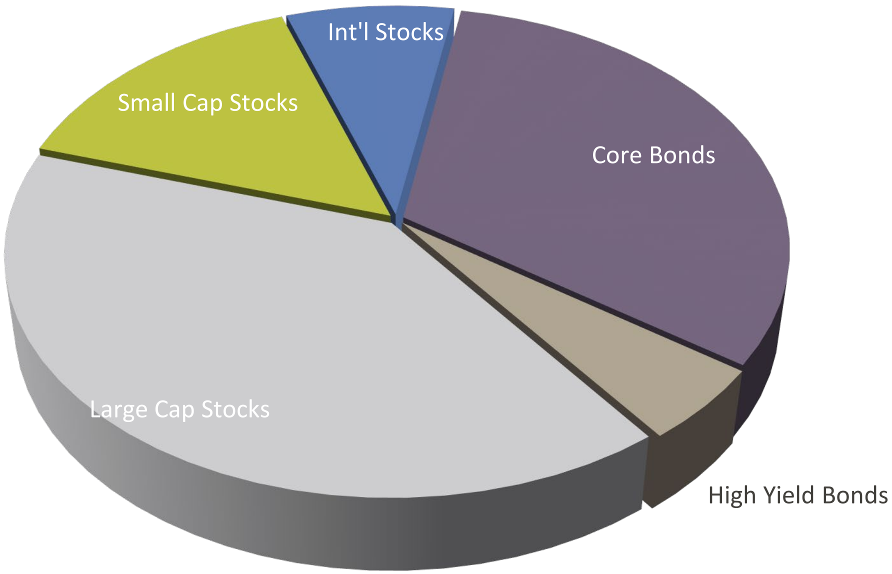


Source: Gary P. Brinson, L. Randolph Hood, and Gilbert L. Beebower, "Determinants of Portfolio Performance," Financial Analysts Journal. Gary P. Brinson, Brian D. Singer, and Gilbert L. Beebower, "Determinants of Portfolio Performance II: An Update," Financial Analysts Journal.

Asset allocation defined

The diversification of the portfolio and how much of it is in each investment

- Achieve your goals while minimizing risk
- Weightings change over time based on performance

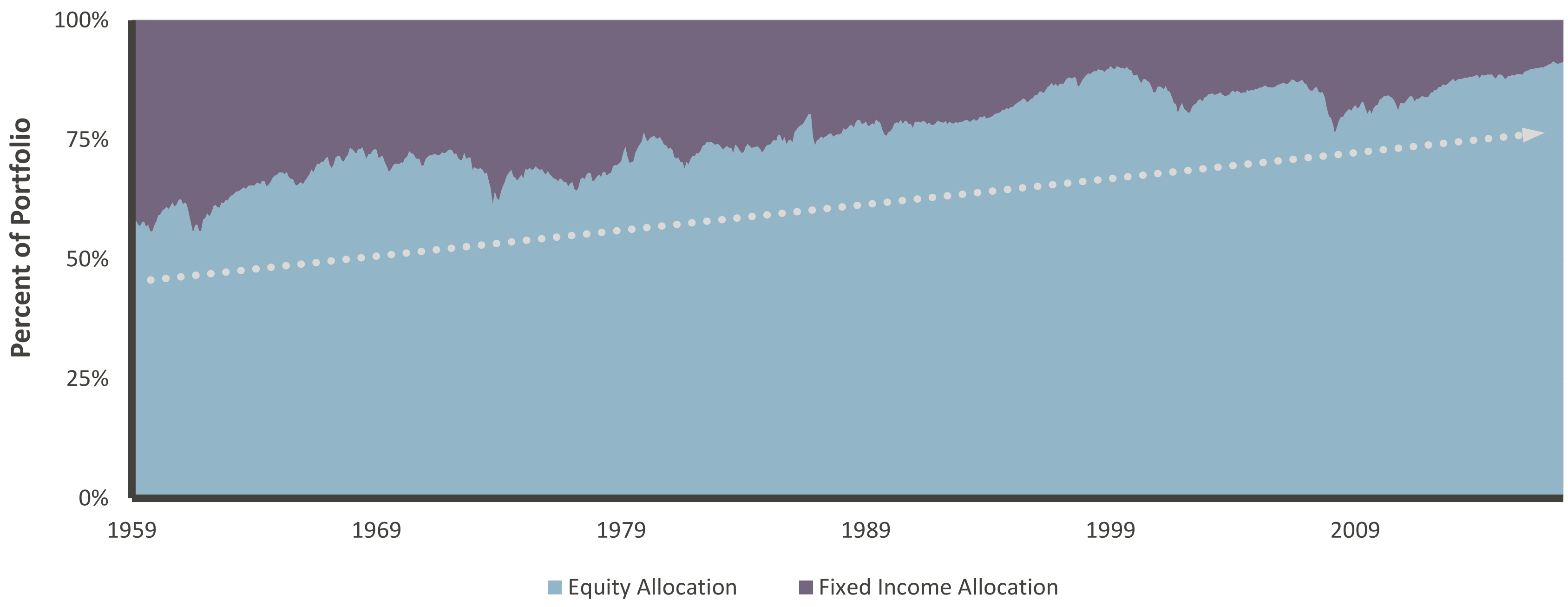


Why rebalance?

Portfolio drift

Equities gradually have greater weight in a portfolio due to higher performance

Allocation since 1960 for a portfolio that is not rebalanced

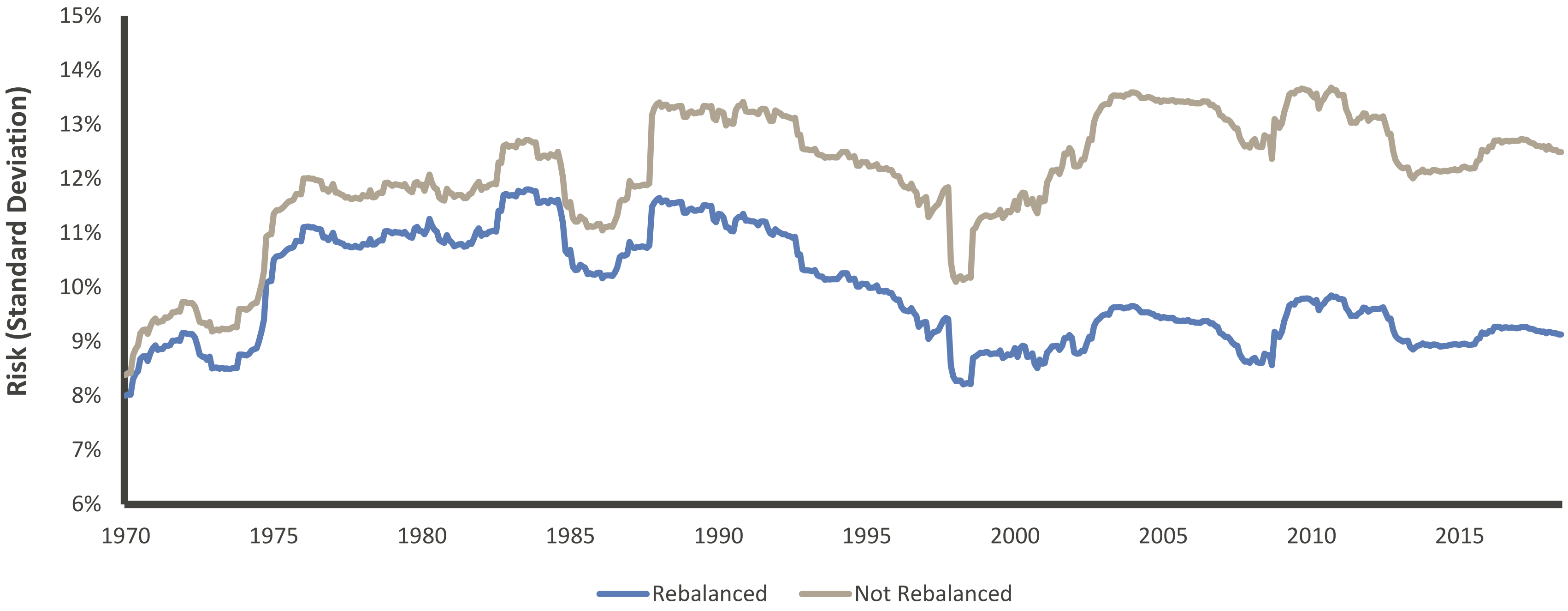


Illustrative example representing a simple portfolio made up of 60% stocks and 40% bonds, starting in 1960

Risk tolerance

Portfolios that are not rebalanced feature higher standard deviation over time

Example 10-Year Rolling Standard Deviation

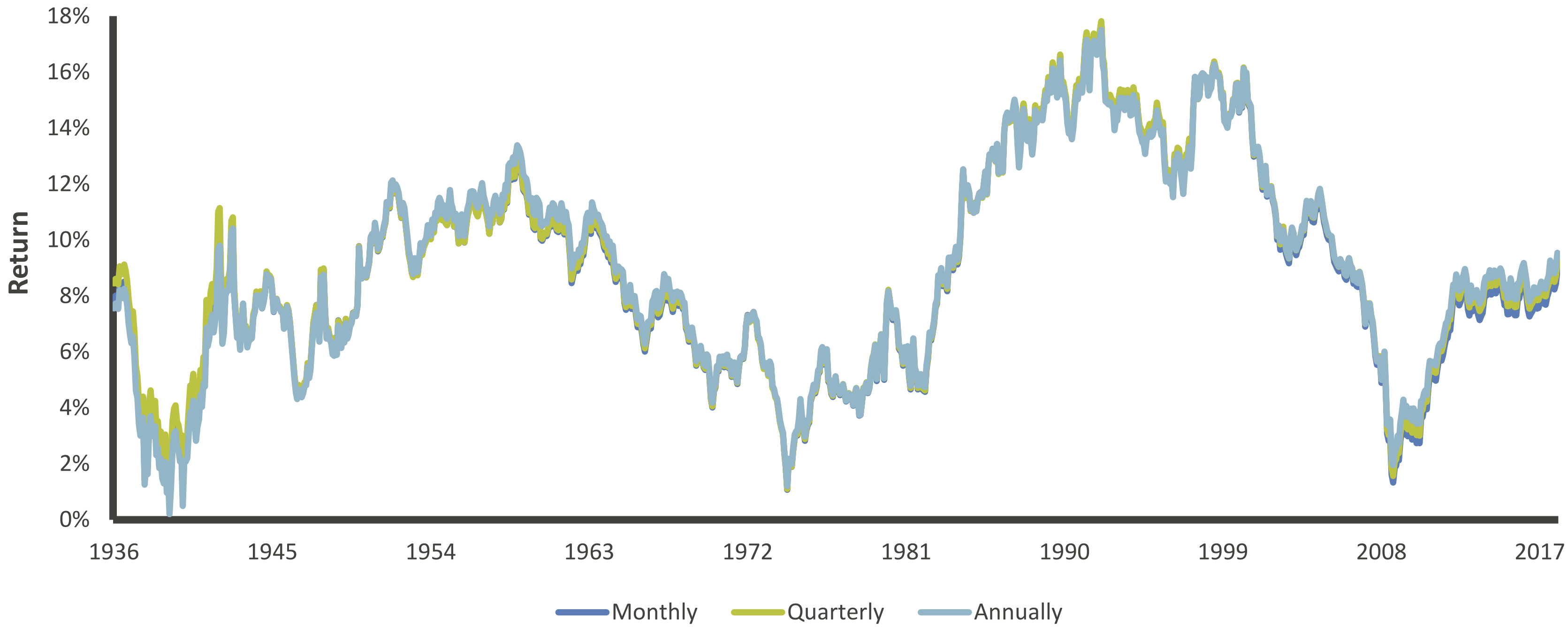


What’s the best way to rebalance?

Calendar rebalancing

Returning to the target asset allocation on a periodic basis – no monitoring required

Different frequencies of calendar rebalancing show little impact on return



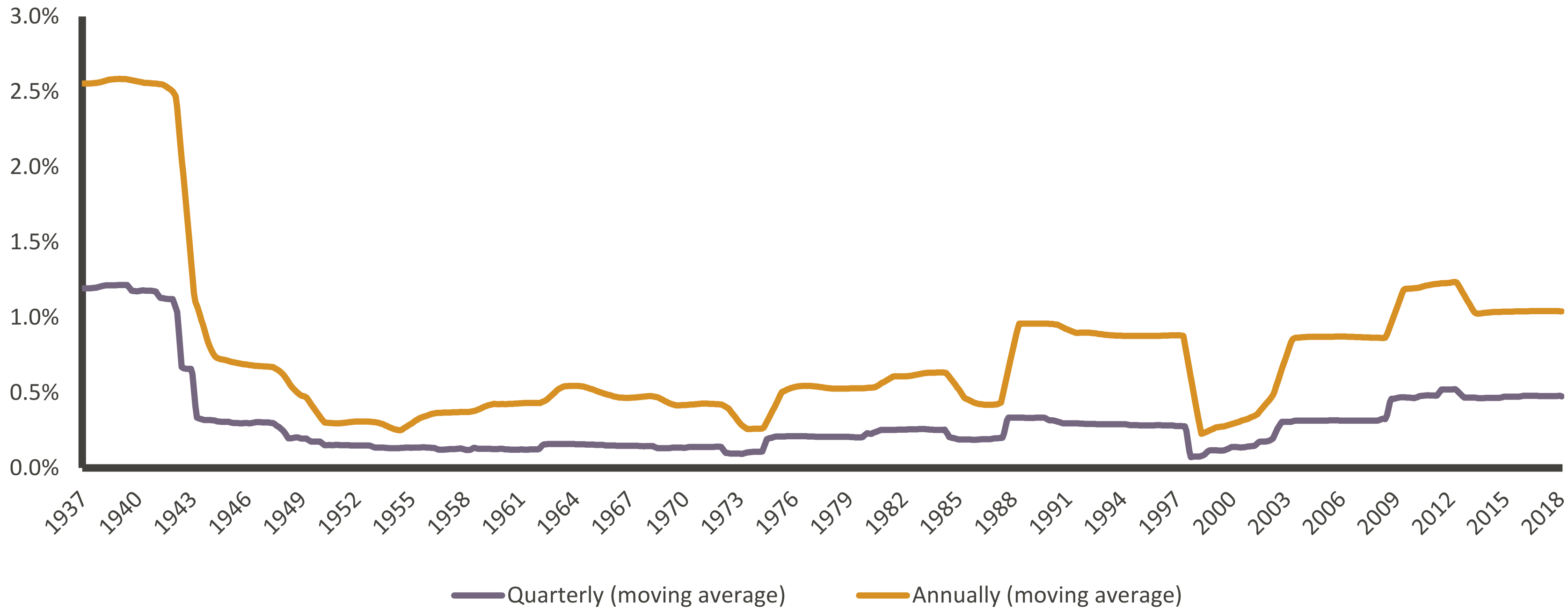
Illustrative example representing a simple portfolio made up of 60% stocks and 40% bonds

Calendar rebalancing

Less frequent rebalancing leads to higher tracking error

Tracking error of portfolios rebalanced quarterly vs. annually

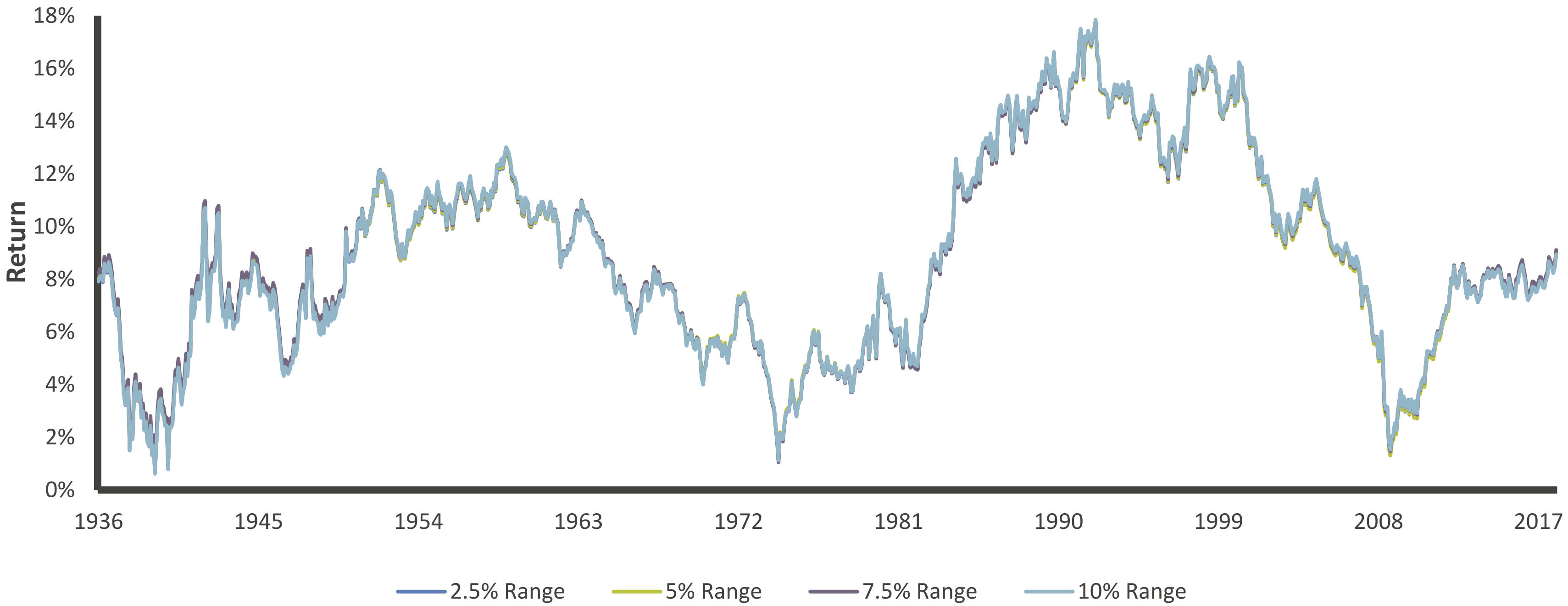
- Tracking error is a measure of the difference in return fluctuations between an investment portfolio and a chosen benchmark



Deviation from policy target

Range-based strategy based on how far the portfolio has deviated from its target, only when necessary, avoiding any unneeded transaction and operational costs

10-year rolling returns for different ranges of rebalancing shows limited effect on return

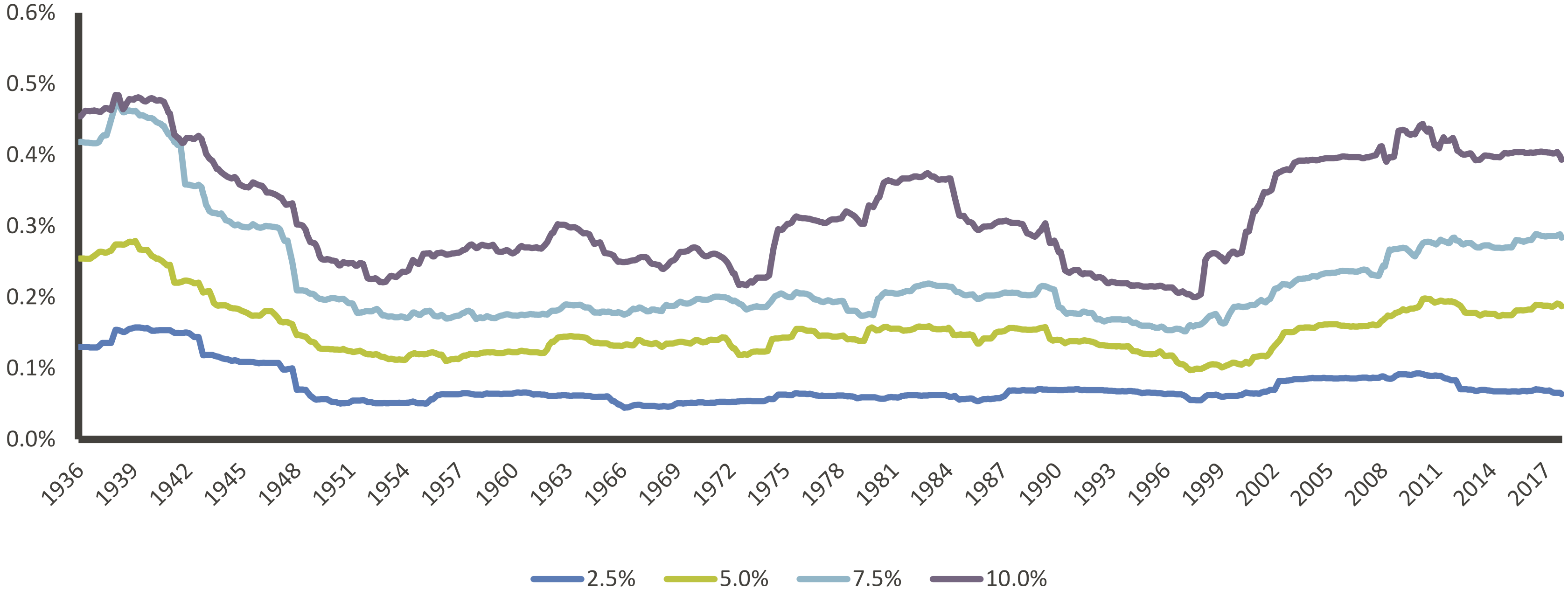


Deviation from policy target

Larger ranges also lead to higher tracking errors

Tracking error of portfolios rebalanced using various ranges

- Tracking error is a measure of the difference in return fluctuations between an investment portfolio and a chosen benchmark



Takeaway

Investors should choose a rebalancing program that best suits their constraints

- Target ranges are the optimal way to rebalance in order to minimize transaction costs
- Goal is to reduce risk by maintaining an asset allocation that meets investor's objectives
- Little return difference between strategies – other methods may suit other goals
- If using target ranges, we recommend the following ranges based on size of allocation:

Size of the Allocation	Percentage Range (+/-)	Absolute Range (+/-)
Up to 5%	+/- 20%	+/- 1.0%
6% to 19%	+/- 15%	+/- 1.5%
Greater than 20%	+/- 10%	+/- 2.0%

The only obvious mistake that investors make is when they abandon their rebalancing policies.

Real Estate

- Real estate primer
- How to invest in real estate
- Real estate in a diversified portfolio

Residential vs. commercial

Substantial differences exist between owning a home and owning commercial real estate

Residential

- Homeownership is primarily a necessity and a lifestyle choice
- Considered an investment asset second
- Homes produce no income for the owner; returns driven by appreciation
- Impacted by affordability, household formation, the shifting household age distribution, and employment

Commercial

- Primarily a business function that generates regular cash flow from the rental income of tenants
- Commercial buildings also appreciate over time, but generally represents a relatively small portion of total return
- Strongly impacted by business employment, consumer spending, and other economic factors

Property types

Traditional

Office
Commercial Business District (CBD), Suburban, Special Purpose

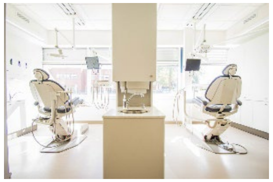
Industrial
Warehouse, R&D, Flex

Retail
Shopping Malls, Lifestyle Centers, Neighborhood & Community Centers

Multi-family (apartments)
High-Rise, Garden, Special Purpose

Non-traditional

Hotel	**Medical Office**
Self-Storage	**Land**
Senior Living	**Etc.**



Sources of exposure to real estate

Investments can be made directly, indirectly (private or public), and through equity or debt

	Private	**Public**
Debt	**Private Real Estate Debt** Whole Loans	**Public Real Estate Debt** FNMA, GNMA, CMBs, CMOs
Equity	**Private Equity Real Estate** LPs, LLCs, REITs	**Public Equity Real Estate** REITs

Typically institutional investors, not listed on an exchange

Open to the public, including retail investors

Real estate investment styles

The NCREIF has identified three distinct real estate investment styles

CORE

Equity investments:

- In high quality, fully-leased properties in prime locations
- Utilizing low leverage

Assets:

- Achieve relatively high percentage of return from income
- Are expected to exhibit low volatility

VALUE-ADDED

Equity investments:

- In direct properties with significant leasing risk or development risk
- Utilizing higher leverage

These properties can involve repositioning, renovation, and redevelopment of existing properties.

Assets exhibit one or more of the following attributes:

- Achieve significant portion of return from appreciation
- Exhibit moderate volatility
- Not currently considered core property types

OPPORTUNISTIC

Assets

- Are expected to derive most of their return from appreciation
- May exhibit significant volatility in returns

This may be due to a variety of **characteristics** such as:

- Exposure to development projects
- Significant leasing risk
- High leverage

but may also result from a combination of moderate risk factors that in total create a more volatile return profile.

Less Risk **More Risk**

Source: NCREIF "Real Estate Investment Styles" Whitepaper

Real estate portfolio characteristics

	CORE	VALUE-ADDED	OPPORTUNISTIC
Expected return	7.0% - 10.0%	10.0% - 15.0%	>13%
Property Types	4 Major	Major + Specialty	All
Property Life Cycle	80%+ Operating	Operating, leasing, redevelopment	All stages
Occupancy	80%+	N/A	N/A
Holding Period	7+ years	3-5 years	1-4 years
Markets	Primary/Domestic	Primary/Secondary/ Tertiary	Primary/Secondary/Tertiary/ International
Leverage	0% - 40%	40% - 70%	70%+
Income return as % of total return	70%+	40% - 60%	<30%
Investment vehicles available	Generally open-end	Most closed-end, few open-end	Closed-end
Typical fees	100 bps	180 – 200 bps all in	2% and 20%

Risks of real estate

General Real Estate Sector	▪ General economic conditions ▪ Financial condition of tenants ▪ Buyers and sellers of properties ▪ Changes in supply and demand ▪ Availability of financing ▪ Changes in interest rates
Liquidity	▪ Private equity commercial real estate is considerably less liquid than most financial assets ▪ Industry market cycles, downturns in demand, market disruptions, and the lack of available capital from potential lenders or investors will all impact liquidity ▪ Price and liquidity are jointly determined
Leverage	▪ Leverage magnifies the potential return on equity when income and property values are stable or improving ▪ Leverage can also magnify investor losses when income and property values are deteriorating ▪ Interest rate fluctuations will impact the mark-to-marking of debt
Transparency	▪ Private equity real estate is much less transparent than financial assets ▪ The property's underlying value is a function of its location, age, condition, and occupancy ▪ The property's financial and operational details are held by the investment manager and made available only to investors on a limited basis
Diversification	▪ Properties are subject to unique local and regional macroeconomic factors ▪ Returns can vary widely among markets and property types
Valuation Methodology	▪ Appraisal methodology is highly subjective ▪ Appraisal values tend to lag the underlying "true" market value ▪ Frequency of appraisals ▪ Internal vs. external appraisals

Real estate vehicles

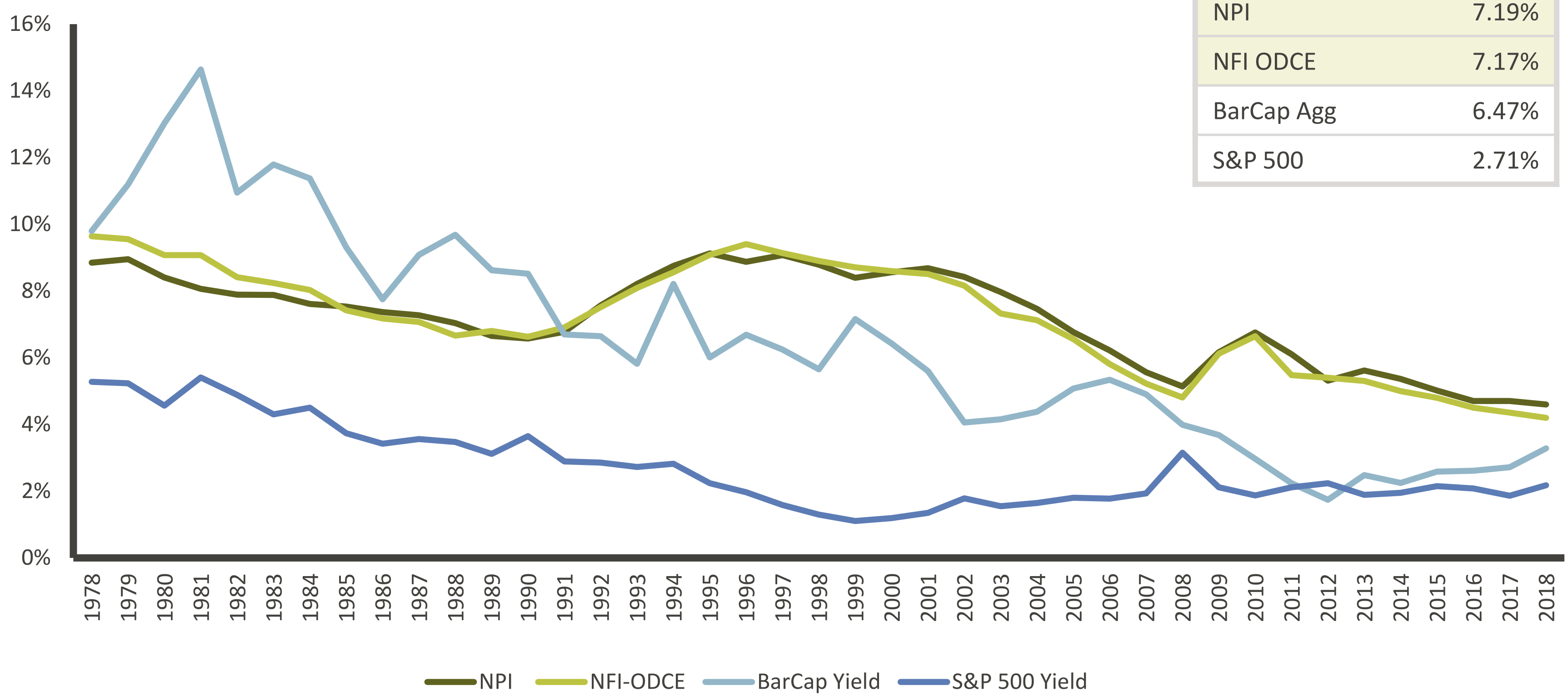
	OPEN-END FUND	CLOSED-END FUND	SEPARATE ACCOUNT	FUND OF FUNDS
Vehicle Life	Infinite	Limited life 8–12 years	Infinite	Limited life 8–12 years
Primary Style	Core, Select Core-Plus, Value-Added	Primarily Value-Added, Opportunistic	Multiple	Value-Added, Opportunistic
Minimum Investment	\$1M–\$10M	\$5M–\$10M	REIT: \$10M Private: +\$100M	\$1M–5M
Legal Structure	LLC Private REIT Bank Commingled Insurance Annuity	Limited Partner Private REIT	Various	Limited Partner
Liquidity	Quarterly[1]	N/A	Depends on investment type	N/A
Investor Control	Low	Medium	High	Low

Real Estate in a Diversified Portfolio

Annual income yield

Historical Annual Yields (1978 – 2018)

Average Annual Yield	
NPI	7.19%
NFI ODCE	7.17%
BarCap Agg	6.47%
S&P 500	2.71%



Sources: NCRIEF, Bloomberg

Benefits of real estate

Healthy current income

- Privately held and publicly traded real estate have generated attractive current income
- Produced compelling returns with lower volatility than other sectors

Superior risk-adjusted performance

- Expected total return is between investment-grade fixed income and large-cap equities

Large investable universe

- Wide range of strategies and opportunities

Diversification

- Low correlation with financial assets' returns
- Local economic factors and supply dynamics

Inflation hedge

- Potential hedge against inflation

Infrastructure

- What is infrastructure?
- Benefits
- How to invest in infrastructure

The “backbone” of an economy

Infrastructure is a prerequisite for sustainable economic, industrial, and social growth & development

Common attributes of infrastructure assets:

- Essential service to society
- Inflation protection
- Long asset life
- Low elasticity of demand
- Monopoly/quasi-monopoly
- Regulatory oversight
- Stable and predictable cash flows

Infrastructure sectors

Economic Infrastructure			Social Infrastructure
Transportation	**Energy & Utility**	**Communications**	
Airports	Electricity	Broadcast towers	Courthouses
Bridges	Gas	Cable networks	Hospitals
Rail	Oil	Mobile towers	Prisons
Roads	Pipelines	Satellite networks	Schools
Seaports	Water/wastewater		
Tunnels	Solar/wind		

Additional classification

Economic characteristics (demand and supply dynamics) are also used to identify sectors

Throughput assets	Regulated assets	Contracted assets
▪ Derive income per usage ▪ Prices determined by operator/owner	▪ Derive income per usage ▪ Prices determined by regulatory body ▪ Asset owner typically has some pricing power protection	▪ Operated by a contract between operator and entity ▪ Contract determines pricing system and identifiable revenues
Ex: roads, airports, rail	Ex: utilities, water, gas	Ex: schools, satellite networks, broadcast towers

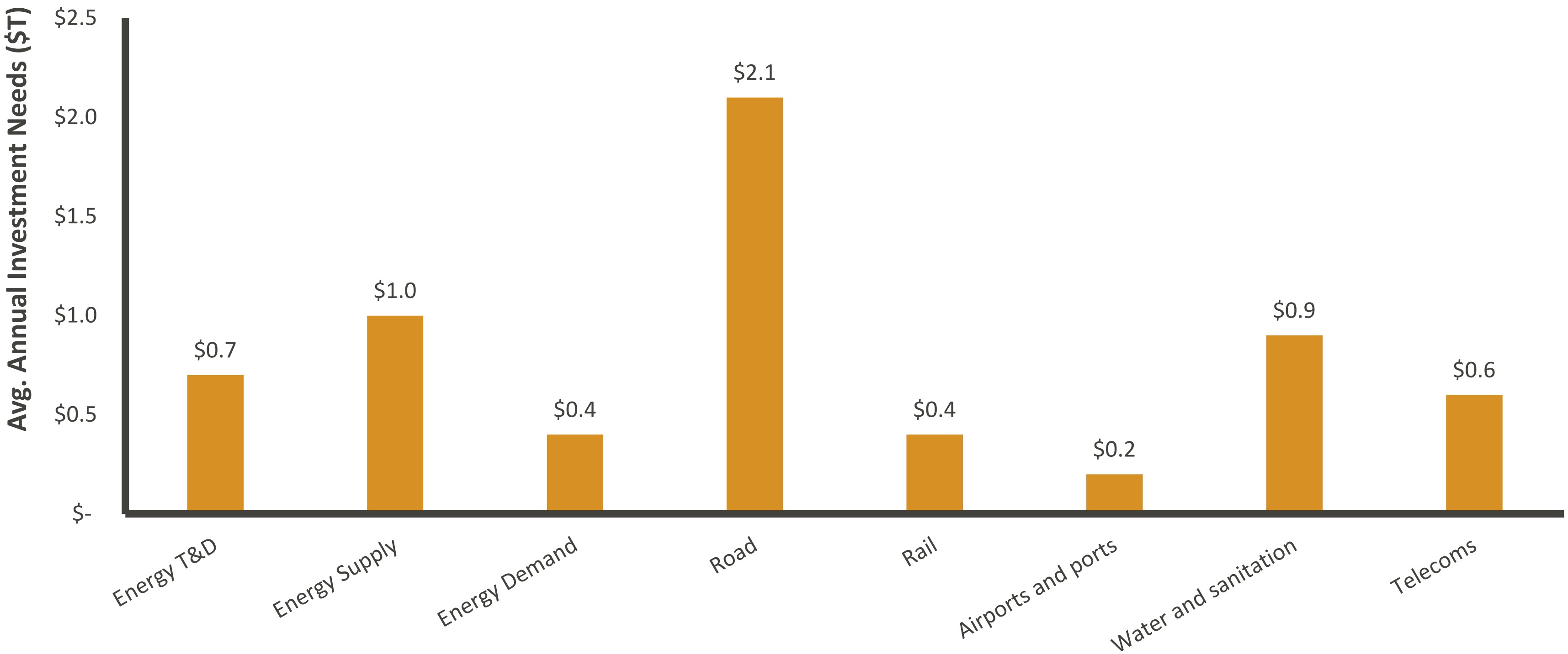
Infrastructure maturity states

Stage of project's development impacts the risk/return profile of investment

Greenfield	New construction or development
Brownfield	Existing, established asset
Rehabilitated Brownfield	Redevelopment

Growing need

Need for infrastructure projects and assets grows with population, but construction comes at a cost



Source: OECD, "Investing in Climate, Investing in Growth," July 2017

Diversification opportunity

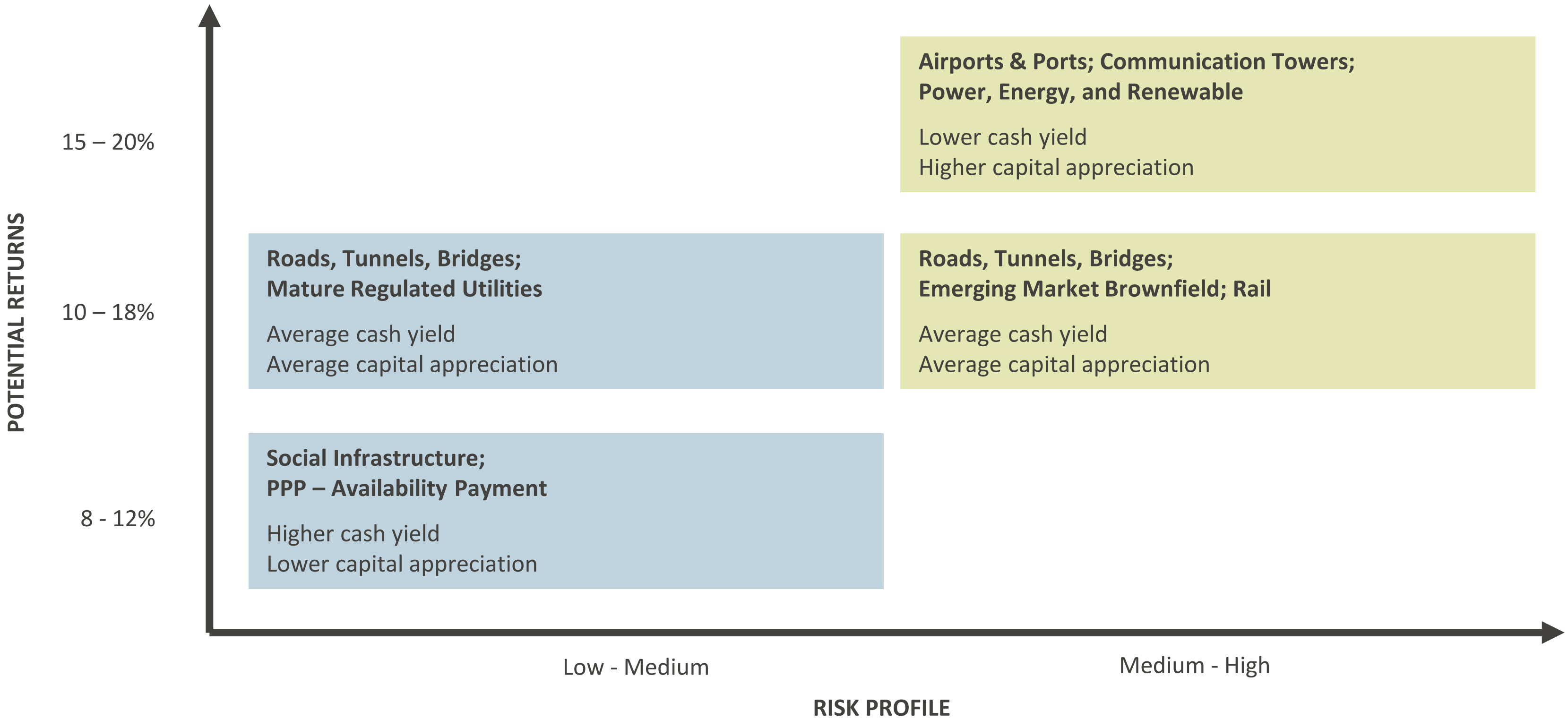
Correlation matrix (unlisted)
(common period March 2009 – June 2019)

	MSCI Global Infrastructure	Wilshire 5000	MSCI ACWI ex-U.S.	Barclays Agg	NCREIF
MSCI Global Infrastructure	1.00				
Wilshire 5000	-0.23	1.00			
MSCI ACWI ex-U.S.	-0.29	0.87	1.00		
Barclays Agg	0.01	-0.12	0.02	1.00	
NCREIF	0.44	-0.07	-0.23	-0.06	1.00

Source: Bloomberg

Performance expectations

Illustrative unlisted infrastructure return profiles



Source: RBC Global Asset Management, “The Global Infrastructure Investment Opportunity”

Mechanics

Private Vehicles/Unlisted Funds	Public Vehicles/Listed Funds
▪ Open-end fund ▪ Closed-end fund ▪ Co-investment or direct investment ▪ Fund of funds	▪ Open-end fund ▪ Listed closed-end fund

Unlisted vs. listed

Unlisted (Private) Infrastructure

Advantages

- Greater opportunity set
- Direct investing
- Control of asset more likely

Disadvantages

- Limited liquidity
- Potential lack of diversification and high leverage
- High capital requirements

Listed (Public) Infrastructure

Advantages

- Traded on an exchange
- Transparent
- Liquid

Disadvantages

- Limited opportunity set
- Indirect exposure
- High regulatory parameters of assets
- Market volatility

Key takeaways

- Provides diversification
- Cash flows not highly correlated to other asset classes
- Well matched for long-term horizons
- Further diversification by revenue generation, sector, and geography
- Large, growing opportunity set

Private Equity

- What is private equity?
- Market segmentation
- Advantages and risks
- Measuring performance
- Fund structure and lifecycle
- Terms and fees
- Considerations when starting a private equity program

Introduction

- Private equity encompasses any equity investment in a private business
- Private equity funds deploy capital as they acquire equity control of businesses they believe to be undervalued and where their operational and sector expertise can help to accelerate growth
- Institutional investors continue to shift equity allocations from “Wall Street” to “Main Street” as active managers are able to source investments from a larger opportunity set of over 600,000 private businesses in the U.S. employing over 20 individuals
- The number of private equity owned businesses in the U.S. is likely to grow considerably over the next decade

Sources: Pitchbook, Worldbank.org, and U.S. Census Bureau

Market segmentation

- The global private equity industry currently manages nearly $3 trillion in assets, as the industry has doubled in size over the past decade with dry powder (capital raised awaiting deployment) now exceeding $1 trillion
- Subsegments of the industry continue to evolve as increasing capital has attracted a growing number of investment professionals to focus on subsectors with more narrowly defined risk and return characteristics

Subcategory	Expected Return	Financing	Duration of Investment	Relative Risk	Stage	Success Rate	Ownership Stake
Venture Capital	20%+	100% Equity	5 years +	High	Early	Low	Less than 50%
Growth Equity	15%–20%	100% Equity	3–5 years +	Medium–High	Early Growth	Medium	Less than 50%
Buyout	13%–20%	100% Equity	3–5 years +	Medium	Mature	Medium	More than 50%
Private Debt / Mezz	7%–15%	100% Debt	1–5 years +	Low	Mature	High	None
Distressed/ Turnaround	Varies	Varies	1–5 years +	Low–Medium	Mature – Declining	Medium	0–100%

Source: Marquette Associates. This table represents Marquette's best estimate of typical returns, risk, duration, and investment style of each investment category.

Buyout

The largest portion of the PE market, buyouts focus on controlling a business through a leveraged buyout

EBITDA

Established businesses typically 10 to 35 years old

Middle Market Buyout

- Typically an established national or globally focused business with >$50M of EBITDA
- Generally institutional-owned
- Opportunities to expand geographic and product focus

Lower Middle Market Buyout

- Typically a more established nationally focused business with $10–50M of EBITDA
- Can be either founder-owned or institutional-owned
- Opportunities to professionalize management and operations

Small Buyout

- Typically a smaller, regionally focused business with <$10M of EBITDA
- Typically founder- or family-owned
- Significant opportunities for operational improvement and business growth

Time

Venture Capital

The second largest portion of the PE market, VC focuses on investments in the form of minority equity ownership in less mature but rapidly growing businesses

Revenue

Early stage businesses from start-up to under ~10 years old

Late Stage Venture or Growth Equity

- Expansion capital provided to a company that has proven a sustainable concept by generating a significant level of revenue
- May or may not be profitable
- Capital may be considered bridge financing for a business near the point of “going public” through an IPO

Early Stage Venture

- Capital provided to set up or expand production, marketing, and/or distribution network
- Company is often generating revenues but unprofitable

Angel or Seed

- Usually the first outside capital raised by an entrepreneur in order to launch a company, develop a concept, or build prototypes prior to entering the market
- Company is typically pre-revenue generating

Time

Competitive advantages

Over a long time horizon, private equity has consistently delivered higher returns relative to other asset classes

Return drivers include:

↘	**Business control**	Majority ownership allows for a greater ability to affect positive operational improvements in the underlying firm by leveraging the experience, sector knowledge, and network of a private equity firm
↘	**Investment leverage**	Private equity acquisitions are typically completed with significant borrowing (40–60% of business value) which often magnifies investor returns
↘	**Alignment of interests**	The relationship between the company management and private equity ownership ensures management maintains a sizable stake in the company, partaking in company performance
↘	**Price discovery**	Deals tend to be competitive and infrequent allowing for a high level of due diligence, often leading to better price discovery over the longer term

Risks

Risks for investors include:

↘ **Investment risks**	Private equity is riskier than public market investments because target firms tend to be smaller with more product and client concentration and with capital structures that are more aggressively leveraged
↘ **Fund risks**	Regulatory oversight is weak and funds tend to be highly concentrated
↘ **Illiquidity**	Private equity investments are illiquid, and after capital is committed, the investor has little to no control over the size and timing of future cash flows
↘ **High fees**	Funds tend to have high fees charged on committed capital and performance fees that require investors to split profits
↘ **Subjective performance**	Over the life of the fund, portfolio valuations are subjective because investments are not listed on public exchanges
↘ **Manager selection**	There is a large dispersion in returns between the top and bottom quartiles of funds

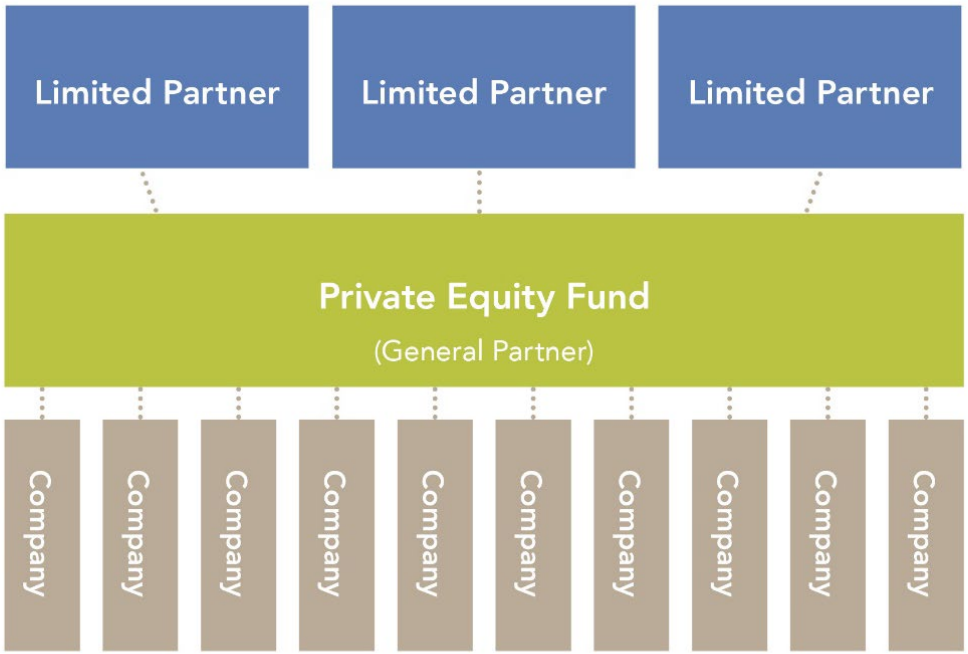
Performance measurement

Private equity investments are typically evaluated using three non-traditional performance measurements

Internal Rate of Return (IRR)	Total Value of Paid-In Capital (TVPI)	Public Market Equivalent (PME)
The annualized effective compounded return provided to investors in the fund calculated by determining the discount rate that sets the net present value of all cash distributions from the fund equal to the cash invested	The multiple is a cash-on-cash return multiple which is unaffected by the timing of cash flows and is calculated using the total cash returned to LPs divided by the total cash called by the GP	The timing and size of cash investments into a private equity fund is matched and converted to an equal purchase of a public index in order to generate a directly comparable IRR for evaluating relative performance

- Private equity return and benchmarking analysis requires patience.
- Fund returns are typically not meaningful indication of performance until at least year four due to the j-curve as well as the time it takes to deploy capital and begin to see operational improvement.

Legal structure



- Most private equity firms are organized as limited partnerships with the private equity firm acting as the general partner and the investors as the limited partners
- This structure limits the liability for the investors to their investments into the fund

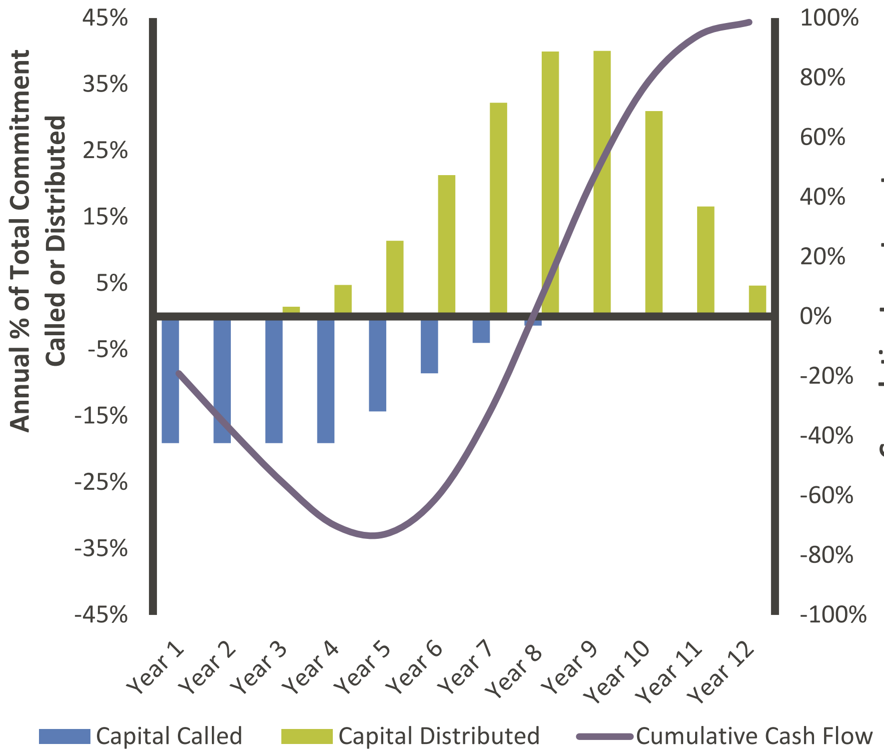
Fund lifecycle

- After fundraising concludes, managers typically make 8–15 investments over a four to five-year period, followed by a five to six-year period to grow and sell each business
- Private equity funds on average have a defined life of ten years
- Funds commonly include annual extension options of 1–3 years
- Full liquidation typically takes 11–15 years

Fund Raising (1 year) → **Investment Period** (4–5 years) → **Harvest Period** (5–6 years) → **Extension** (1–2 years)

Investment cash flows & the j-curve

- Committed capital is called from investors as investments are completed and as fees are generated
- Management fees are often calculated on committed capital, not invested capital
- A majority of capital is deployed during the first five years into leveraged buyouts with additional capital reserved for ongoing support of operational and growth initiatives
- Fees and slow deployment of capital often generates a negative return during the early years of a fund with higher returns in the later years as investments mature and capital is returned to investors following exits, forming a “j-curve”



This chart shows the amount of capital called and distributed each year on the left axis and shows the investor’s total invested capital, as a percentage of committed capital, in each year on the right axis. Private equity funds typically have large capital calls in the early years of the fund’s life and then make large distributions towards the end of the fund’s life as portfolio companies are sold. In this example we show a fund with a 1.85x multiple, a 15% IRR, and two one-year extensions.

Fund terms & fees

Industry Standard Fees

Management Fees	Typically 2% of committed capital
Performance Fees	Typically 20% of profits ("carried interest") after an 8% preferred return ("hurdle rate") is achieved for investors

Industry Standard Fund Terms

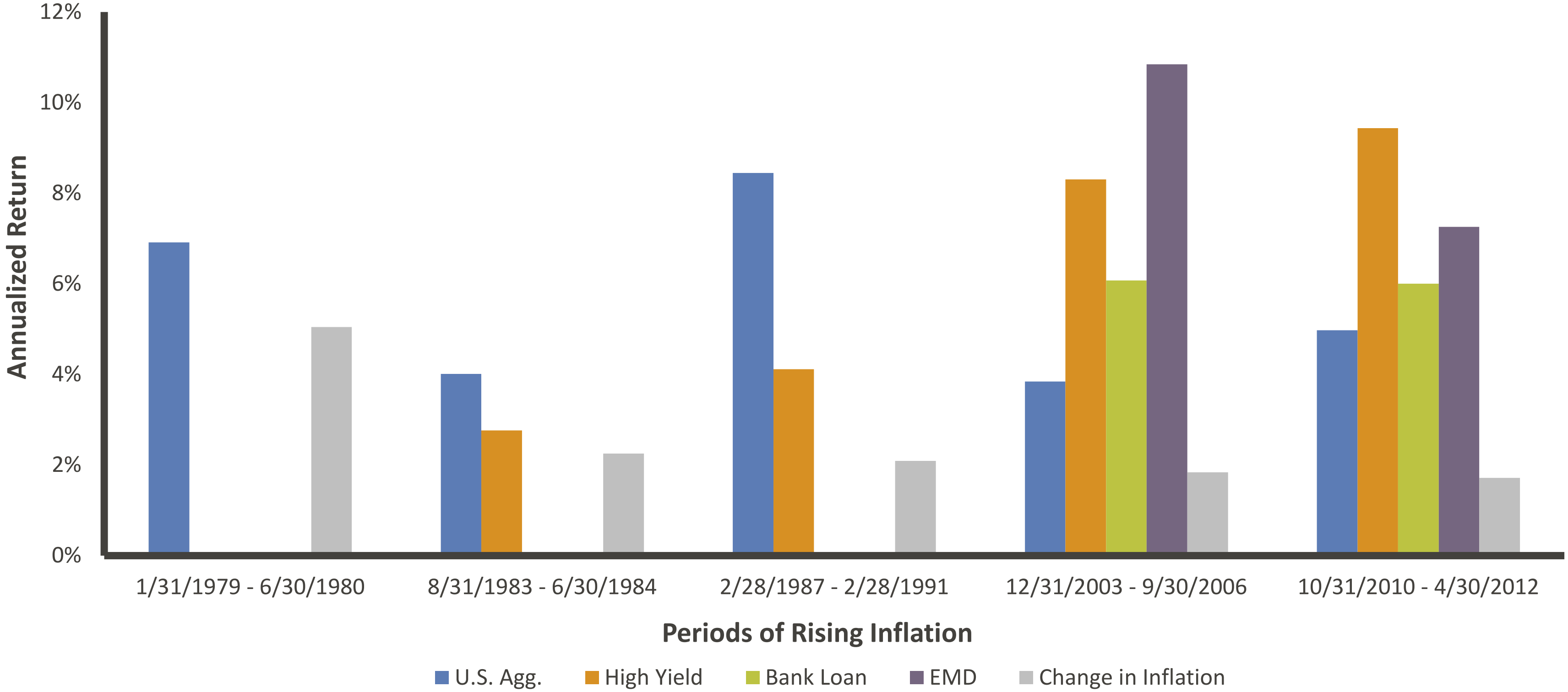
Target Fund Size	$500 Million
GP Commitment	$10 Million
Investment Period	5 Years
Term	10 Years + 2 one-year extensions
Management Fee	2%
GP Carry	20%
Preferred Return	8% hurdle rate

Inflation

- Overview
- Macro view
- Asset Class Expectations

Fixed income: below IG credit leads as inflation rises

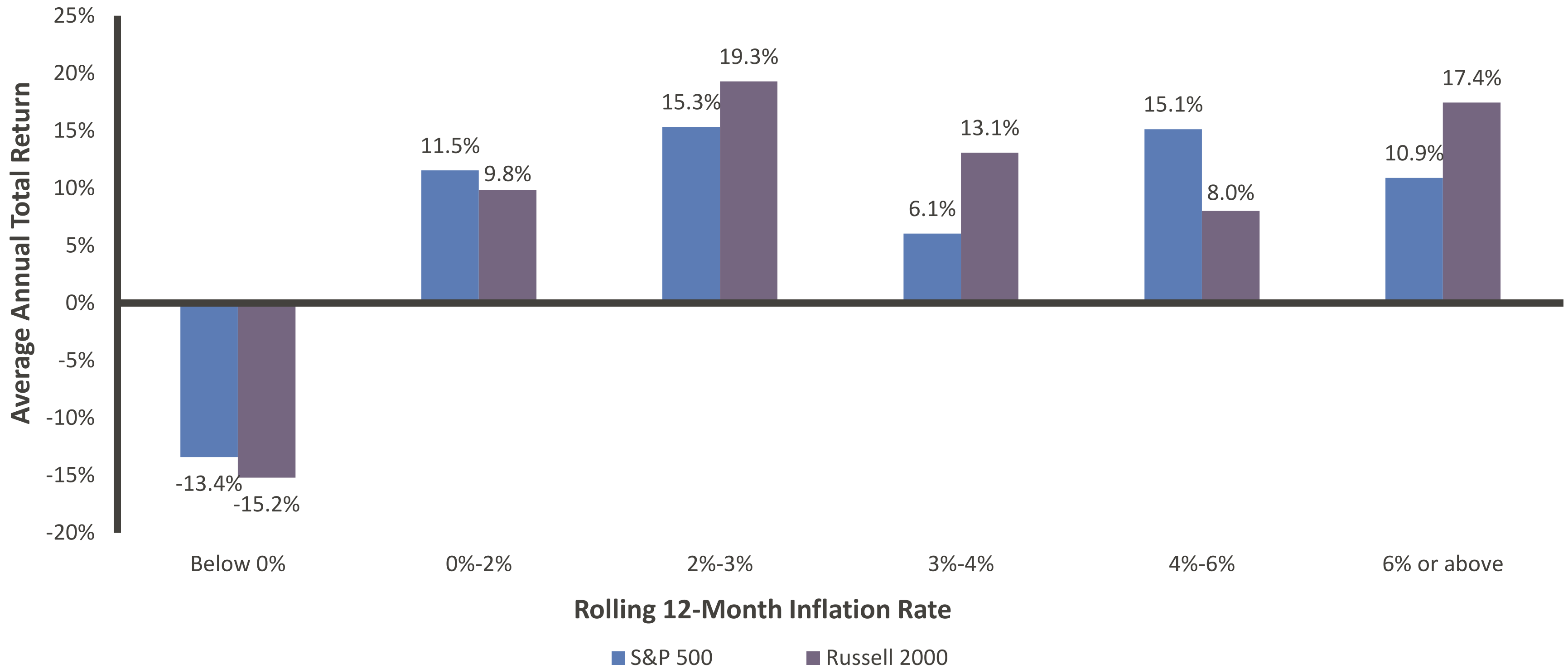
High yield, bank loans, and emerging markets debt tend to outperform investment grade bonds



Source: Bloomberg. Data is not available for some indices during earlier periods.

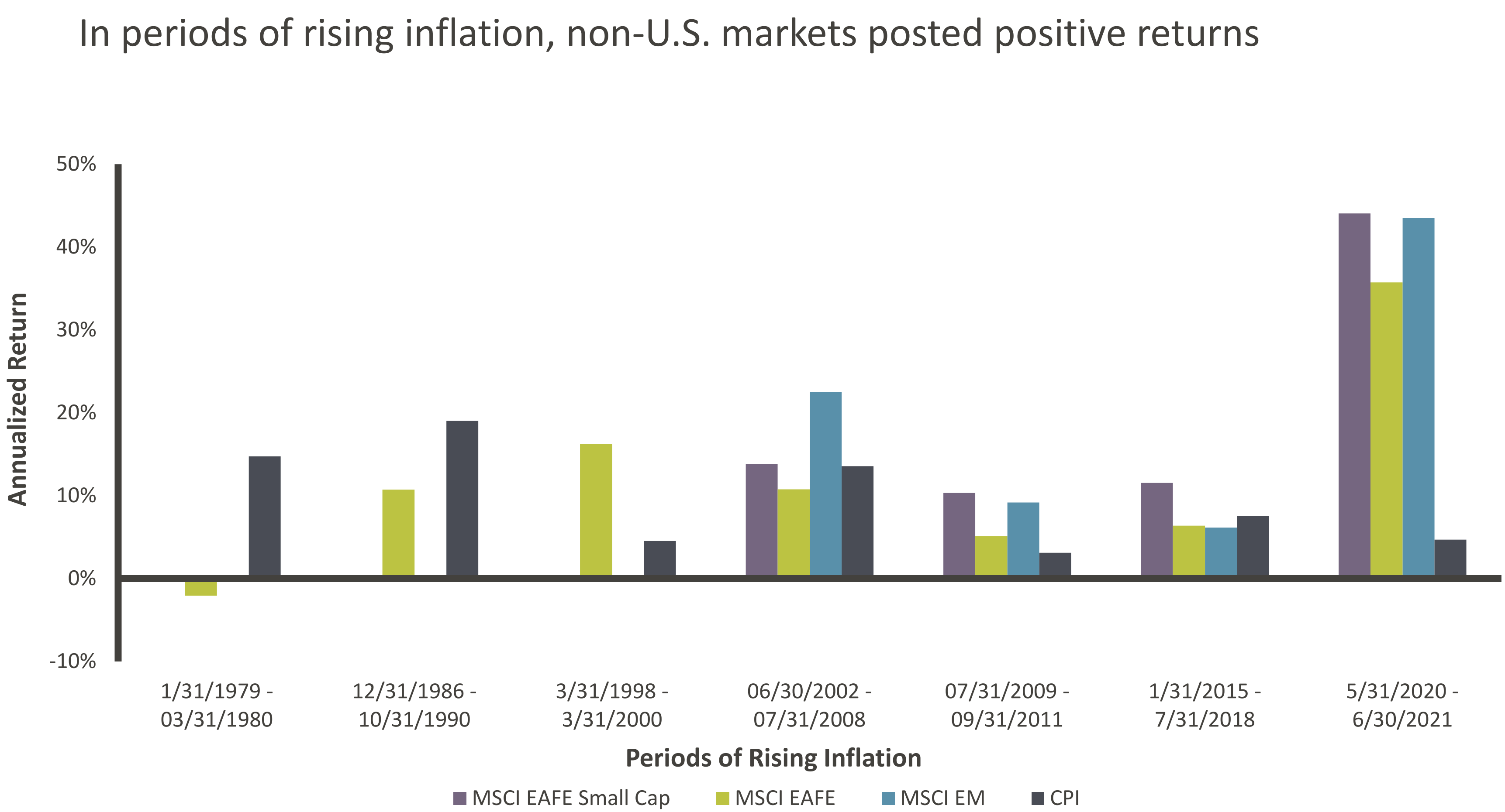
Equities tend to rise during periods of high inflation

Despite some investor fears surrounding the potential for sustained elevated price levels, equities have generally served as a hedge during periods of sustained inflation



Sources: Bloomberg & Federal Reserve CPI as of December 31, 2021; data ranges 1970–2021

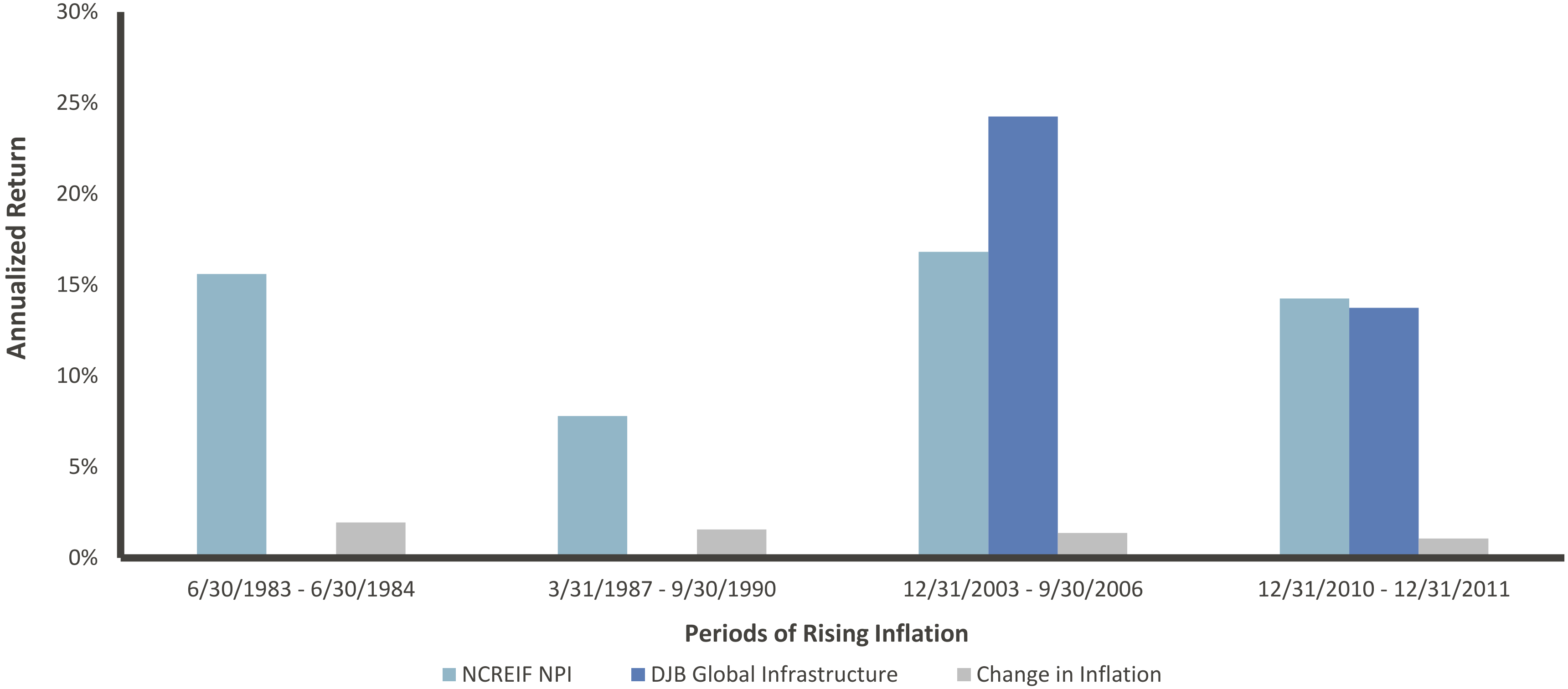
Inflation alone does not mean negative returns



Sources: Bloomberg and FRED as of December 31, 2021

Real assets tend to perform well as inflation rises

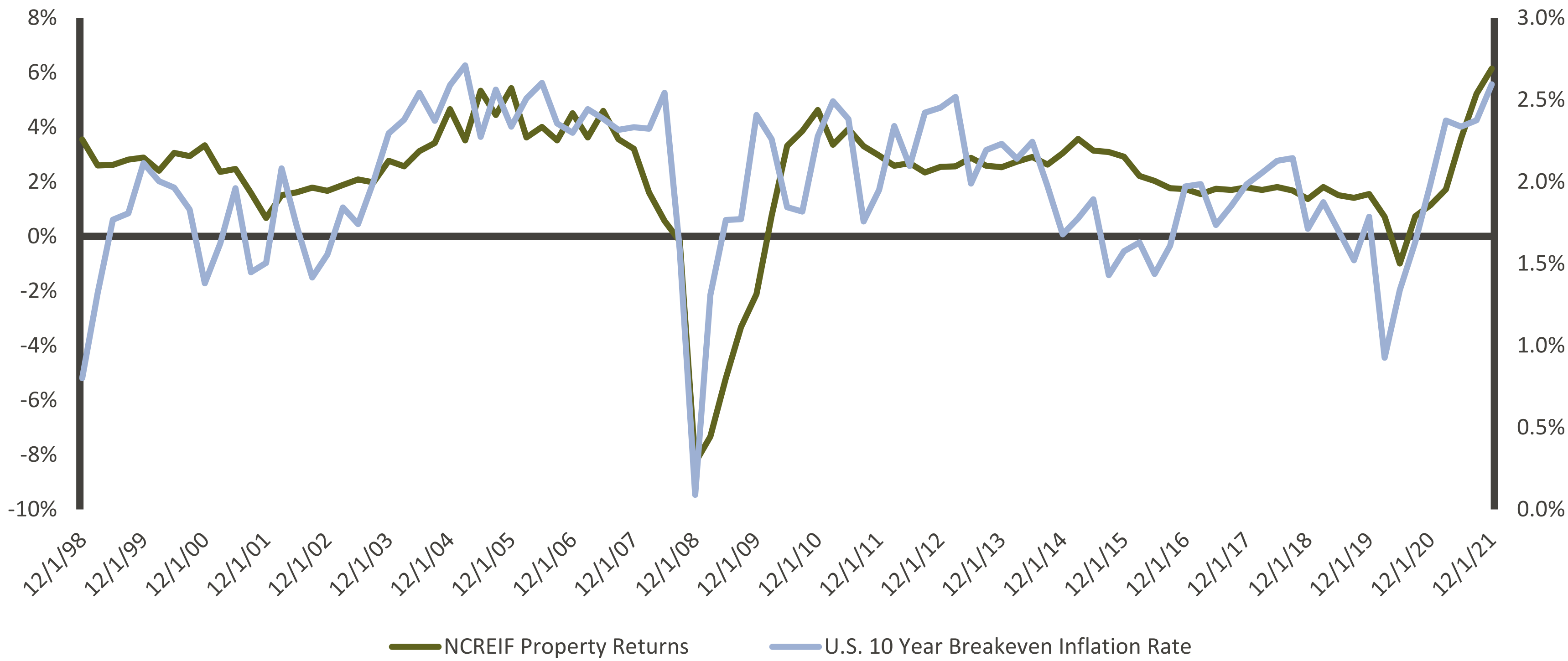
Real estate and infrastructure tend to generate strong returns in periods of rising inflation



Source: Bloomberg. Data is not available for some indices during earlier periods.

Real estate returns are correlated with inflation expectations

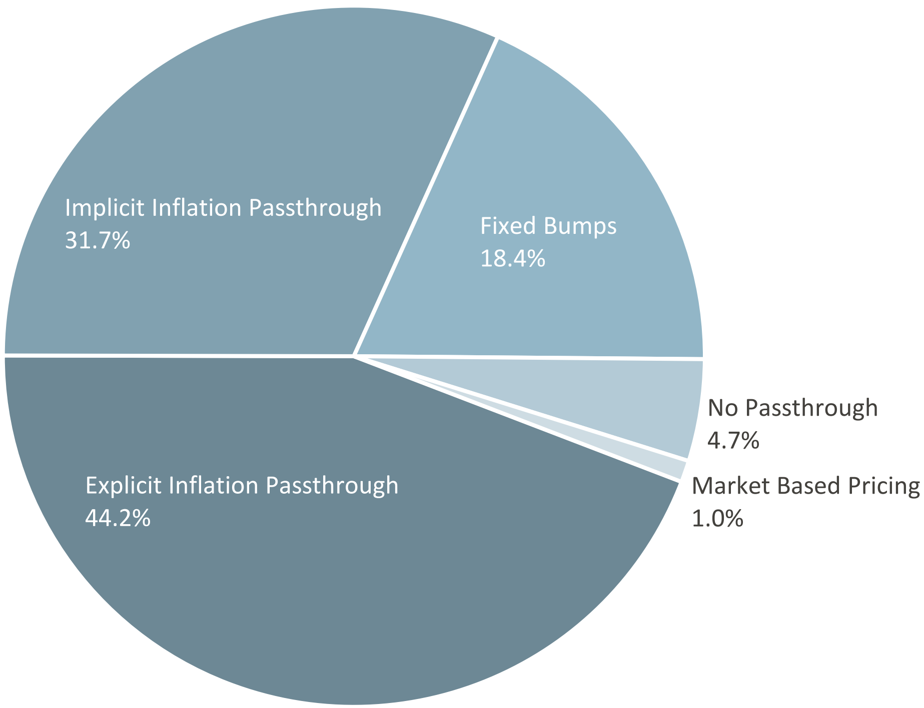
Inflation is typically passed on through higher rents, and higher construction costs can limit new supply and increase replacement costs, a key real estate valuation metric



Sources: Bloomberg as of December 31, 2021

Infrastructure has built-in inflation hedges

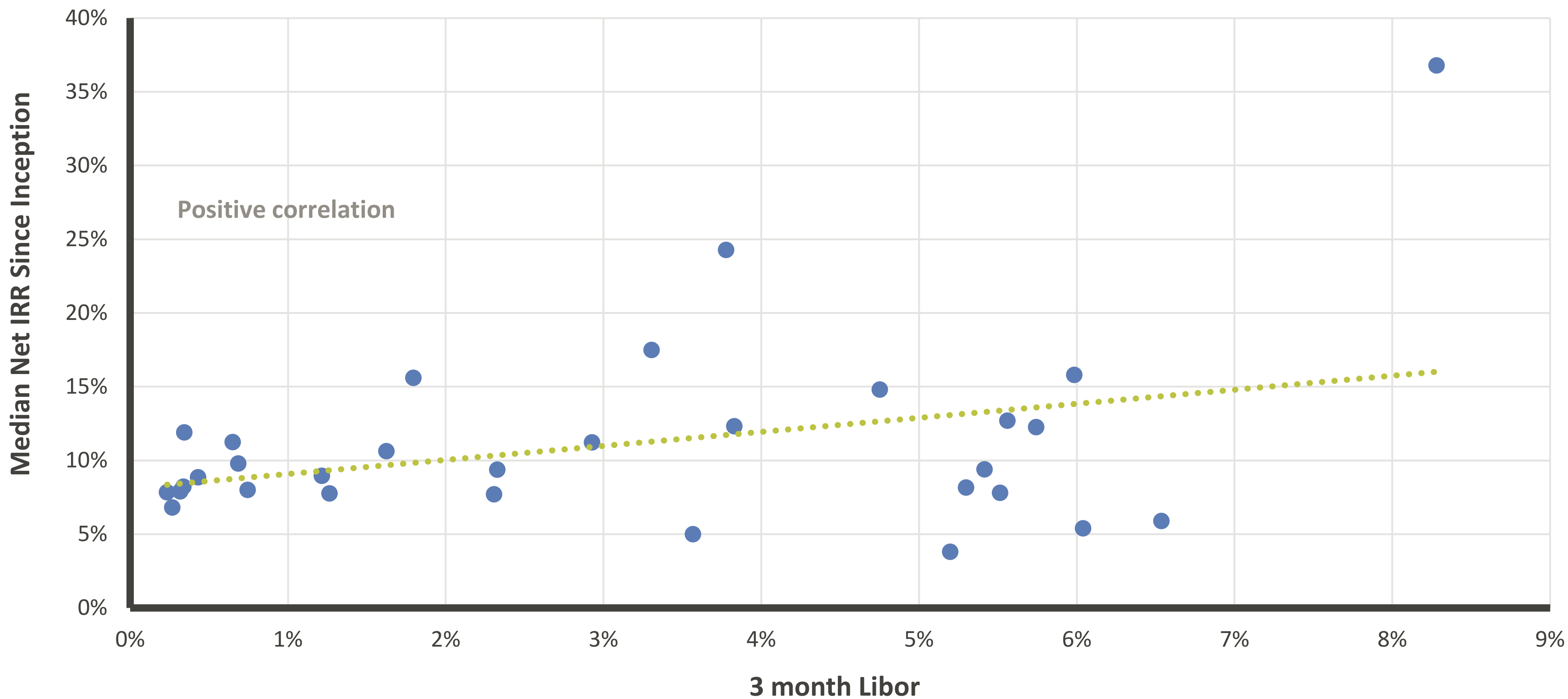
Nearly 95% of infrastructure assets, as measured by the DJB Listed Infrastructure Index, include some sort of pricing protection mechanism



Sources: Bloomberg, Factset, DWS

Private credit is correlated with floating rates

Historically, there has been a modestly positive correlation between private credit IRRs and LIBOR rates, which are positively correlated with inflation



Sources: Churchill, S&P LCD, Pitchbook

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