NEPC 2022 INVESTMENT OUTLOOK

KEY MARKET THEMES AND ASSET CLASS ASSUMPTIONS

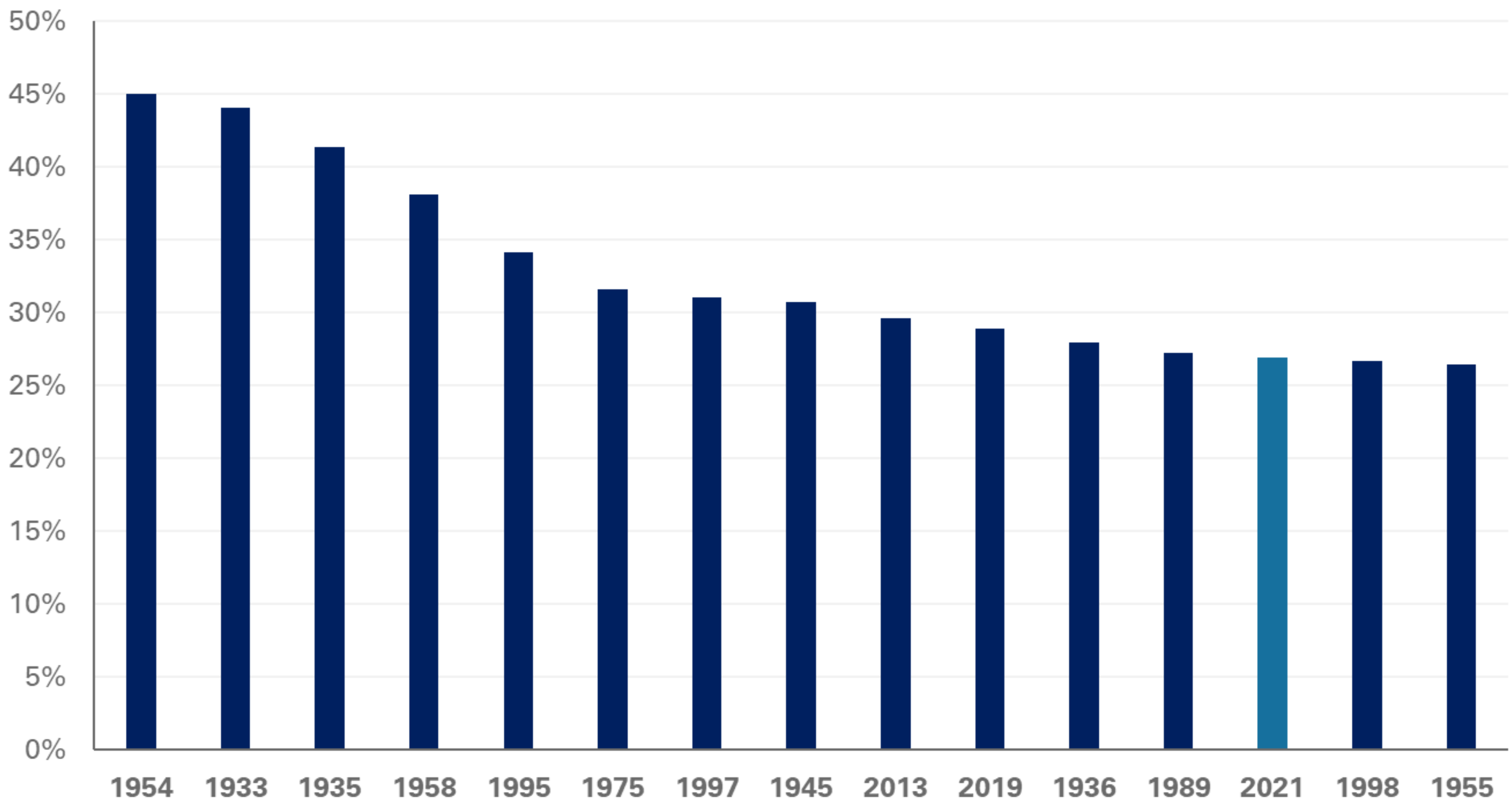
FEBRUARY 2022

NEPC Research

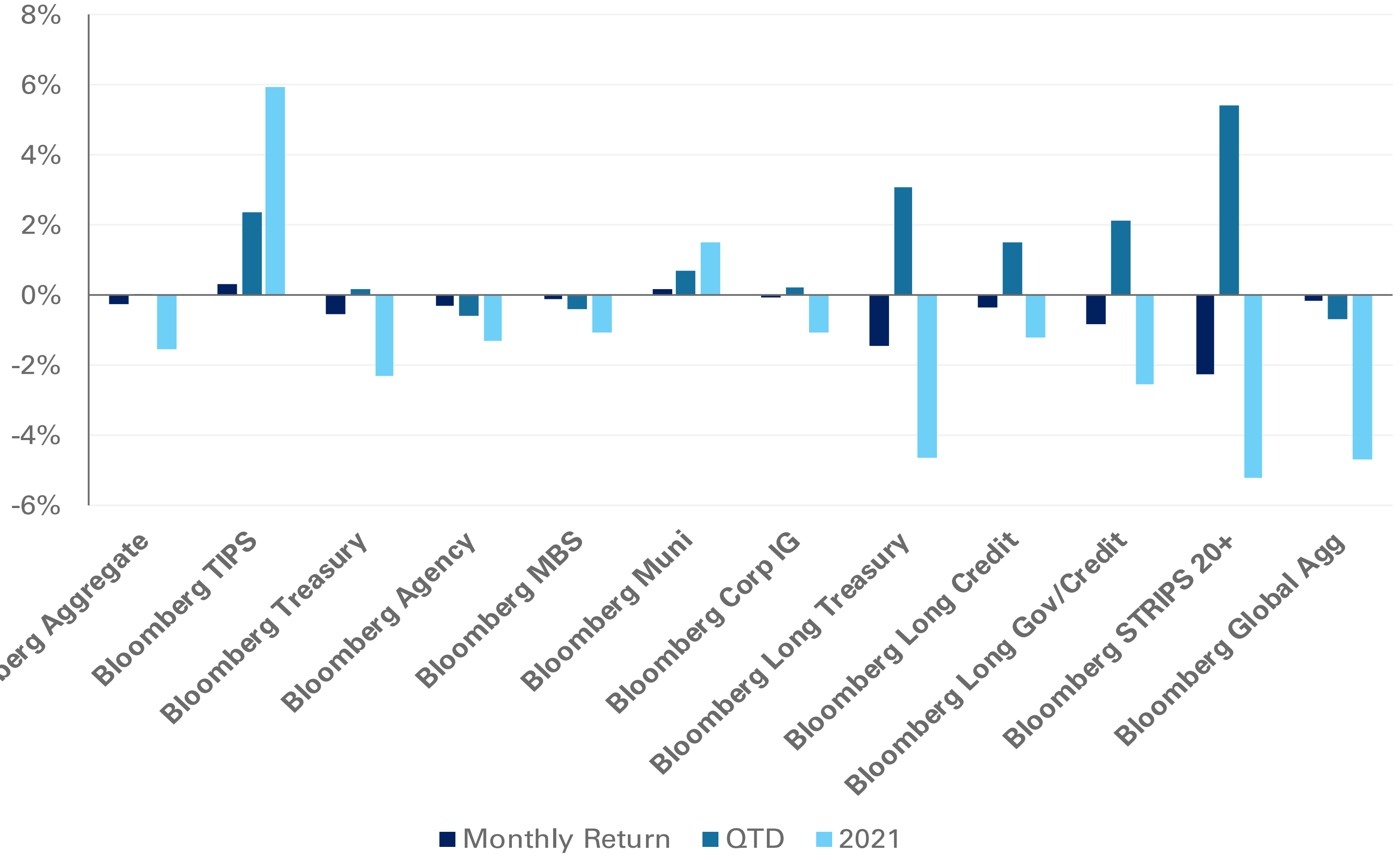
2021 RECAP

2021 EQUITY RETURNS WERE HISTORICALLY HIGH

TOP 15 S&P 500 ANNUAL RETURNS

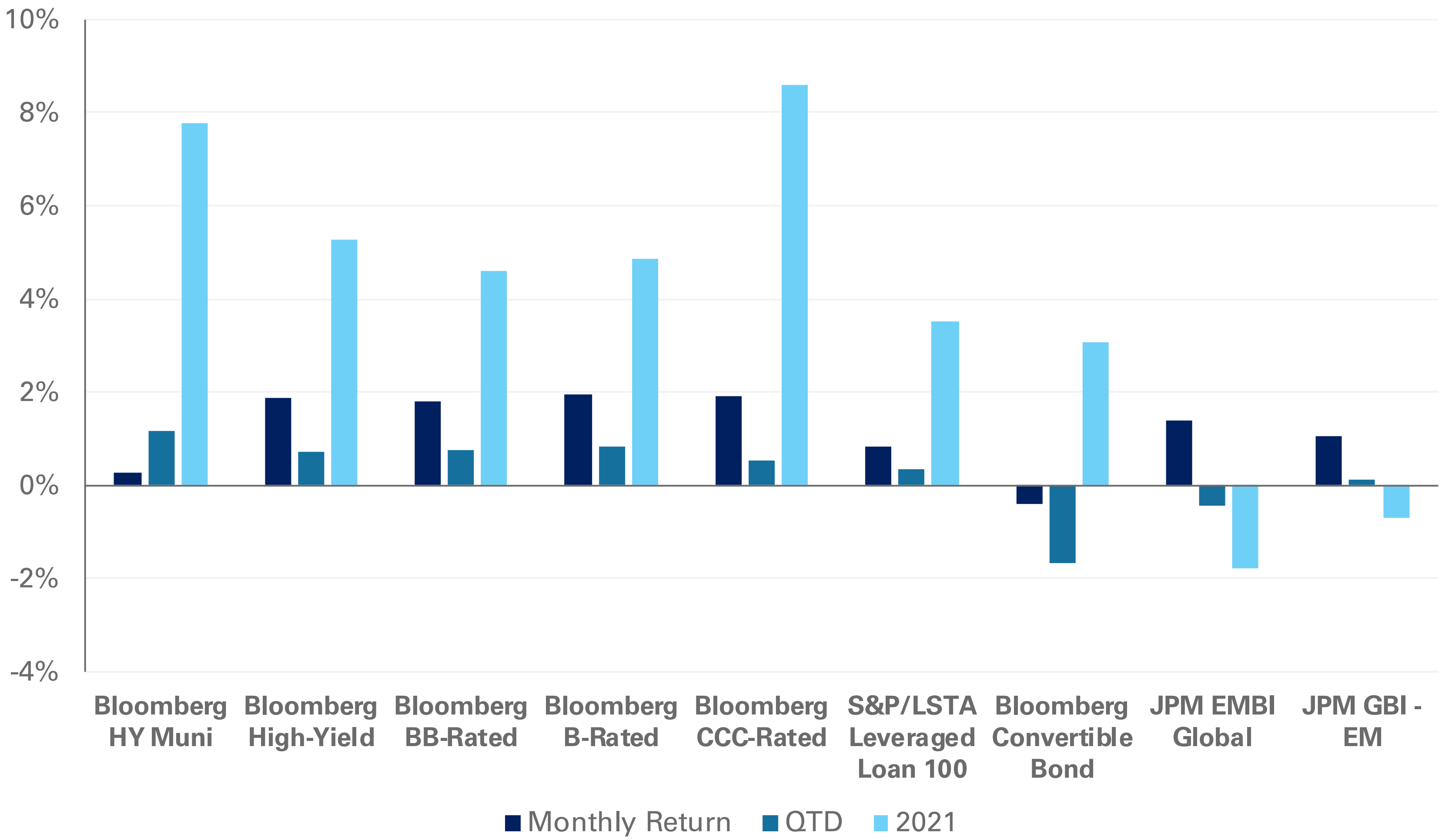


SAFE-HAVEN FIXED INCOME PERFORMANCE



Source: Bloomberg, FactSet

RETURN-SEEKING CREDIT INDEX PERFORMANCE

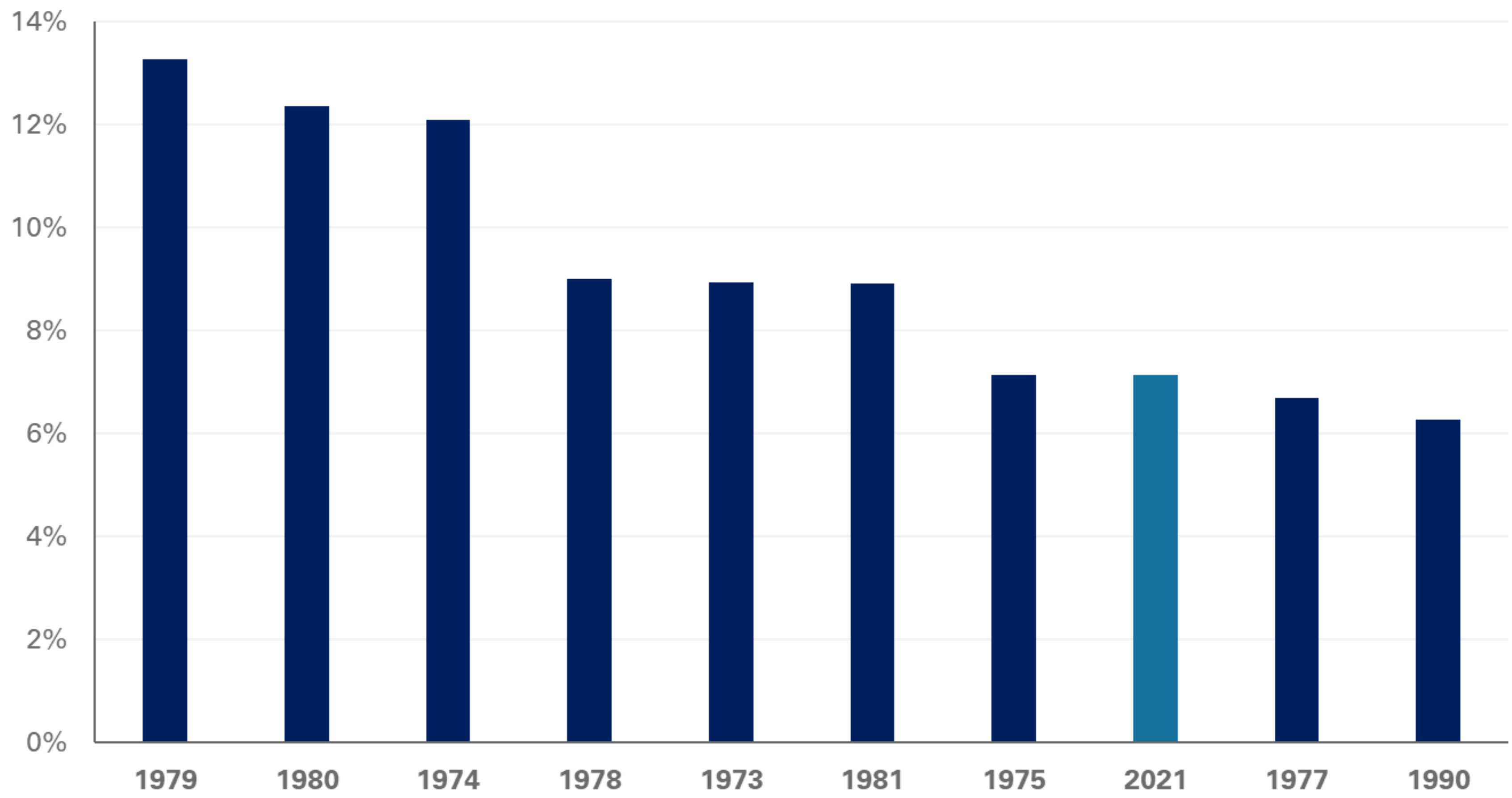


Source: Bloomberg, S&P, JPM, FactSet

NEPC

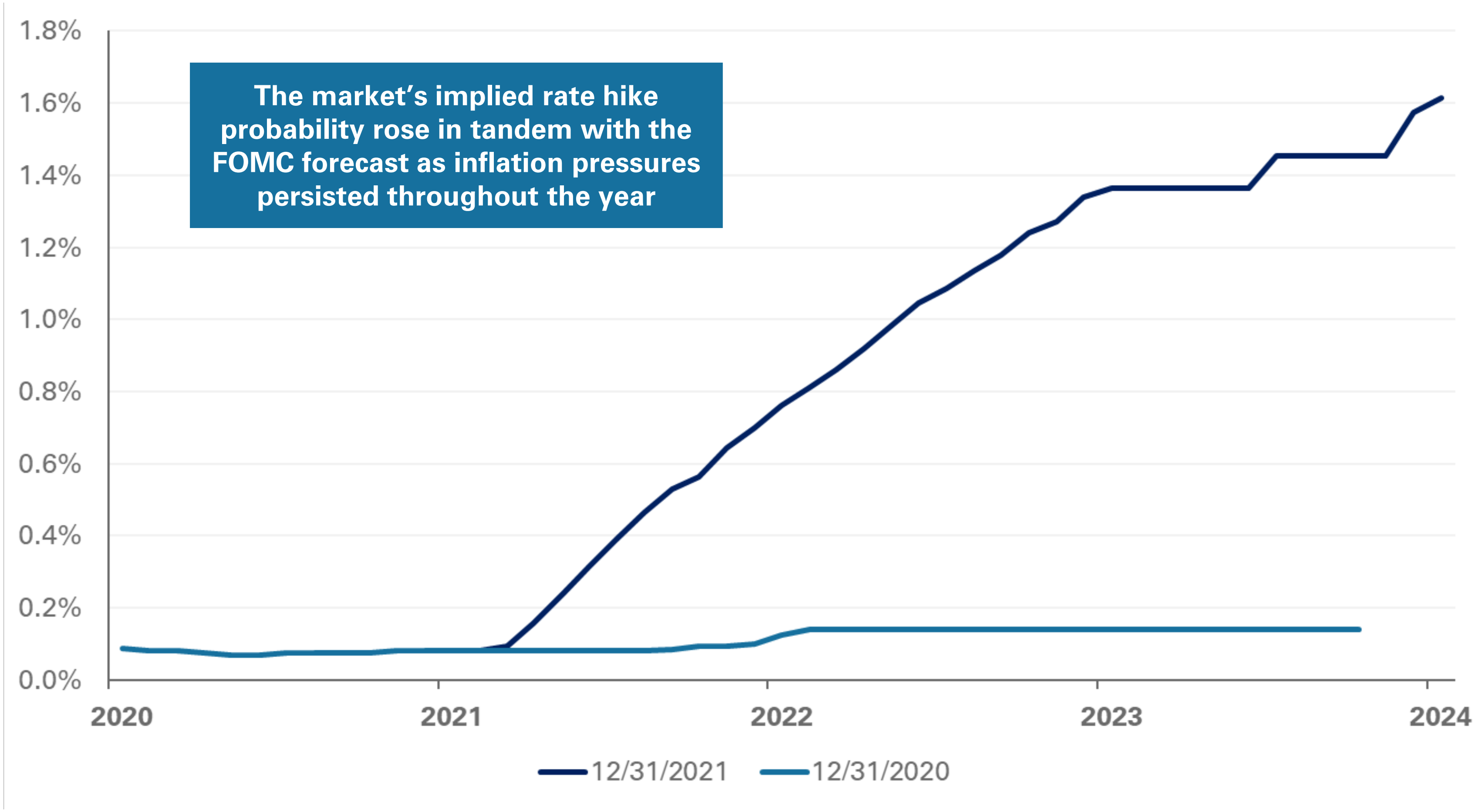
INFLATION ROSE AT HIGHEST LEVEL SINCE 1981

TOP 10 ANNUAL U.S. CPI-U CHANGES



AT LEAST TWO RATE HIKES PRICED IN FOR 2022

FEDERAL FUNDS FUTURES



2022 KEY MARKET THEMES AND ASSET ALLOCATION OUTLOOK

NEPC KEY MARKET THEMES

- **Key Market Themes influence global markets and may remain relevant for an extended period with significant implications for capital markets**
- **Themes can be disrupted and incite outsized market volatility**
- **The introduction of a theme looks to identify the unique implications for asset allocation and portfolio implementation**
- **The conclusion of a theme alters market dynamics and NEPC's outlook**

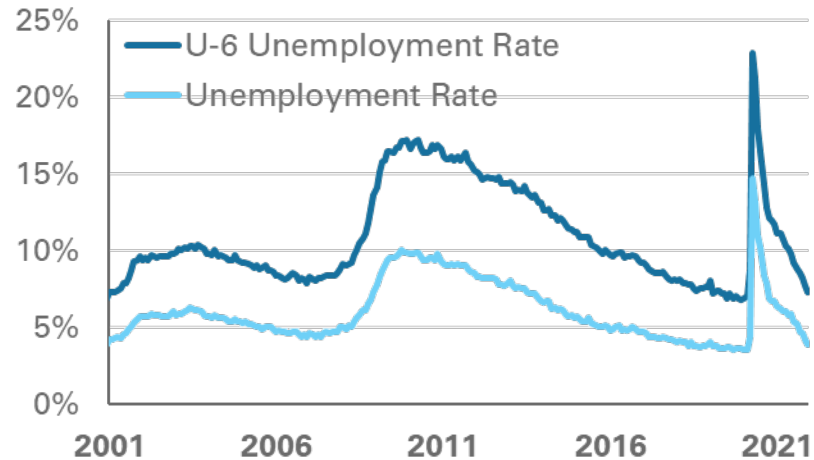
NEPC CURRENTLY HAS FOUR KEY MARKET THEMES:

1. **Economic Crossroads**
2. **Permanent Interventions**
3. **Globalization Backlash**
4. **China Transitions**

CONCLUSION OF A KEY MARKET THEME

VIRUS TRAJECTORY

- **The Virus Trajectory theme sought to identify how the path of the COVID-19 pandemic and global economic activity would interact**
  - The core of the theme assessed the impact and scope of virus containment efforts relative to economic and capital market disruption
  - The distribution of COVID-19 vaccines shortened the timeline of the theme
- **The improvement in economic data, labor markets, and risk assets highlights the diminishing impact of Virus Trajectory on capital markets**



Sources: U.S. Department of Labor, OECD, FactSet

ASSESSING THE KEY MARKET THEMES

AS OF 12/31/21

Economic Crossroads

Change in Status: -

DORMANT | FADED | **NEUTRAL** | PREVALENT | DOMINANT

- Diminishing policy support and higher levels of inflation/growth are driving a transition from Fed policy as the dominant input for capital markets to economic fundamentals
- This transition will dramatically influence the pricing of risk premia across capital markets and the economic outcome may track a wide regime spectrum

Permanent Interventions

Change in Status: *Prevalent to Faded*

DORMANT | **FADED** | NEUTRAL | PREVALENT | DOMINANT

- Permanent Interventions enhances investor sentiment but is cyclically fading as monetary policy shifts to a less accommodative stance
- The Federal Reserve has begun tapering asset purchases and recent commentary suggests rate liftoff may happen sooner than anticipated given the economic and inflation backdrop

Globalization Backlash

Change in Status: *Prevalent to Neutral*

DORMANT | FADED | **NEUTRAL** | PREVALENT | DOMINANT

- The importance of this theme may increase as supply-chain disruptions and inflationary pressures strain the electorate and geopolitical relationships
- The world will likely be faced with an amplified wealth divide given economic and labor market conditions, which has historically driven more volatile political outcomes

China Transitions

Change in Status: -

DORMANT | FADED | NEUTRAL | **PREVALENT** | DOMINANT

- The “regulatory reset” highlights the potential for economic and capital market volatility on the country’s long transition path
- While in-line with the longer-term economic goals, these regulations have negatively impacted market sentiment; creating a tail-risk for market and economic contagion

ECONOMIC CROSSROADS

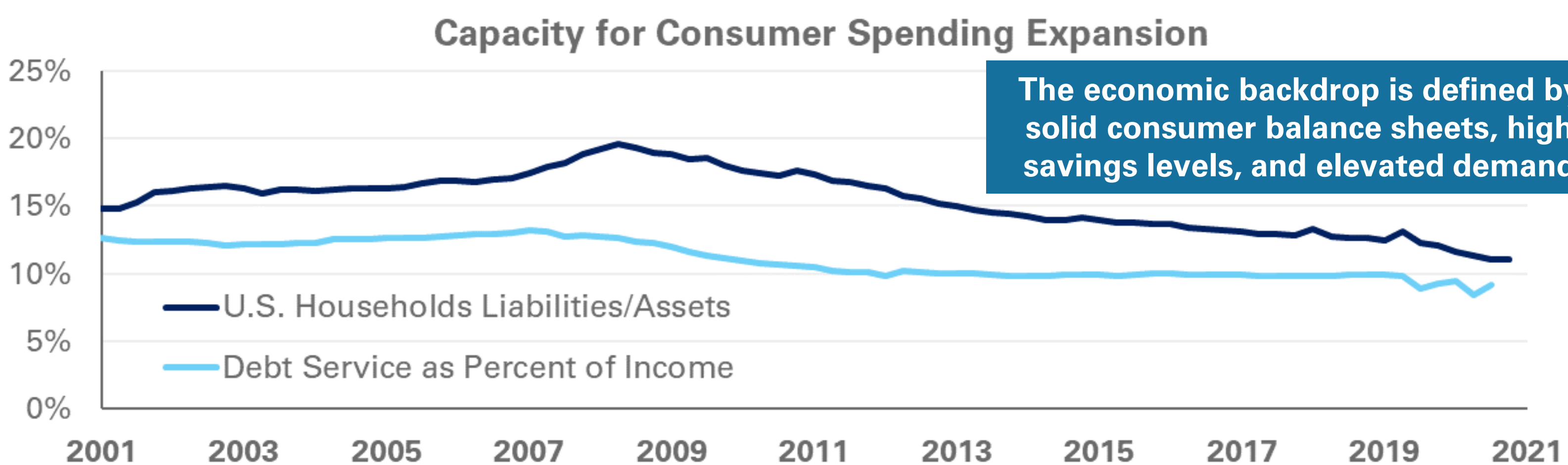
DEFINING THE THEME

- **Central bank activity and monetary policy have been the driving force behind economic and market momentum since the 2008 Financial Crisis**
- **Market sentiment and asset pricing have derived from central bank support and abundant liquidity instead of economic fundamentals**
- **The pendulum is swinging from Fed policy as the dominant input for capital markets to growth and inflation forces driving market dynamics**
  - Transition is occurring due to both diminishing policy support (and potential tightening) with higher levels of inflation and growth
  - Moving across this spectrum from Fed Policy to economic fundamentals will dramatically influence the pricing of risk premia across capital markets

ECONOMIC CROSSROADS

DEFINING THE THEME

- **The pandemic was a watershed moment – the extraordinary levels of stimulus reset the trajectory of the U.S. economy**
  - Unprecedented stimulus engineered a reboot of the system and the economy skipped the slow rebuild of the recovery phase that follows a recession
- **The astonishing stimulus levels have incited a powerful upward trend in U.S. economic growth and inflation forces**
  - The U.S. economy is now positioned to potentially move beyond the secular stagnation of the last decade



Sources: Federal Reserve System, FactSet

NEPC DYNAMIC ASSET ALLOCATION OUTLOOK

- We remain broadly **favorable to global equity** given the robust economic backdrop and encourage adding value exposure to US large-cap equities
- Fixed income returns are likely to be modest but we encourage maintaining **adequate portfolio liquidity with safe-haven exposure**
- We **continue to prefer private real assets** but we are constructive on public infrastructure and natural resources due to the potential for elevated inflation

ASSET CLASS	DYNAMIC TILT	COMMENTS
Public Equity	*Favorable*	Look to reduce lower quality credit exposure and consider shifting exposure equally to U.S. large-cap equity and safe-haven fixed income
Public Credit	*Unfavorable*	
Public Real Assets	*Neutral*	
Safe-Haven Fixed Income	*Unfavorable*	

REDUCE | UNFAVORABLE | NEUTRAL | FAVORABLE | ADD

2022 ASSET CLASS ASSUMPTIONS

ASSET CLASS ASSUMPTIONS

DEVELOPMENT

- **Assumptions are published for over 70 asset classes**
  - NEPC publishes return forecasts for 10-year and 30-year periods
- **Market data as of 12/31/2021**
  - Assumptions are developed with NEPC valuations models and rely on a building block approach
- **The 10-year return outlook is intended to support strategic asset allocation analysis**
- **30-year return assumptions are used for actuarial inputs and long-term planning**

Asset Allocation Process

1. Finalize list of new asset classes
2. Calculate asset class volatility and correlation assumptions
3. Set model terminal values, growth, and inflation inputs
4. Model data updated at quarter-end
5. Review model outputs and produce asset class return assumptions
6. Assumptions released on the 15th calendar day after quarter-end

ASSET CLASS BUILDING BLOCKS

METHODOLOGY

- **Asset models reflect current and forecasted market data to inform expected returns**
- **Systematic inputs are paired with a long-term trend to terminal values**
- **Model inputs are aggregated to capture key return drivers for each asset class**
- **Building block inputs will differ across asset class categories**

CORE ASSET CLASS RETURN ASSUMPTIONS

	Asset Class	12/31/21 10-Year Return	12/31/20 10-Year Return	Delta
	Cash	1.5%	0.8%	+0.7%
	U.S. Inflation	2.4%	2.0%	+0.4%
Equity	U.S. Large-Cap Equity	4.3%	5.4%	-1.1%
Equity	Non-U.S. Developed Equity	5.2%	5.9%	-0.7%
Equity	Emerging Market Equity	8.3%	7.5%	+0.8%
Equity	Global Equity*	5.4%	6.2%	-0.8%
Equity	Private Equity*	9.0%	9.3%	-0.3%
Fixed Income	U.S. Treasury Bond	1.5%	0.9%	+0.6%
Fixed Income	U.S. Aggregate Bond*	2.0%	1.4%	+0.6%
Fixed Income	U.S. TIPS	1.4%	1.0%	+0.4%
Fixed Income	U.S. High Yield Corporate Bond	3.2%	2.9%	+0.3%
Fixed Income	Private Debt*	6.6%	6.1%	+0.5%
Real Assets	Commodity Futures	0.4%	0.9%	-0.5%
Real Assets	U.S. REIT	4.5%	5.5%	-1.0%
Real Assets	Gold	3.3%	2.9%	+0.4%
Real Assets	Real Estate - Core	4.7%	4.4%	+0.3%
Real Assets	Private Real Assets - Infrastructure	5.3%	5.4%	-0.1%
Multi-Asset	60% S&P 500 & 40% U.S. Aggregate	3.7%	4.1%	-0.4%
Multi-Asset	60% MSCI ACWI & 40% U.S. Agg.	4.4%	4.6%	-0.2%
Multi-Asset	Hedge Fund*	4.2%	4.0%	+0.2%

*Calculated as a blend of other asset classes

INFLATION ASSUMPTIONS
OVERVIEW

- **Inflation is a key building block to develop asset class assumptions**
- **Inflation assumptions are model-driven and informed by multiple inputs for both the U.S. and global assets**
  - Includes forecasts from international organizations (e.g. IMF), local consumer and producer price indices, global interest rate curves, and break-even inflation expectations
- **NEPC's U.S. expectations reflect stickier inflation over the near-term, but more muted inflation pressures over the long-term**
  - We anticipate continued volatility among inflation measures as market-based inflation expectations diverge from current consumer inflation metrics

Region	10-Year Inflation Assumption	30-Year Inflation Assumption
United States	2.4%	2.6%

MPERS ASSET ALLOCATION ASSUMPTIONS

2022 MPERS ASSET ALLOCATION ASSUMPTIONS

Asset Allocation	60/40	Policy	20% Leverage
Global Equity	60.0%	40.0%	48.0%
Private Equity		10.0%	12.0%
Total Equity Beta	**60%**	**50%**	**60%**
TIPS		5.0%	6.0%
Core Bonds	40.0%	10.0%	12.0%
Long Govt/Credit		7.5%	9.0%
Private Debt		7.5%	9.0%
Total Rates and Credit Beta	**40%**	**30%**	**36%**
Private Real Assets		10.0%	12.0%
Core Real Estate		10.0%	12.0%
Total Real Asset Beta		**20%**	**24%**
US Leverage Cost		0.0%	-20.0%
Total Cash		**0%**	**-20%**

Expected Return (10 year)	**4.39%**	**5.67%**	**6.29%**
Standard Deviation	**11.01%**	**12.34%**	**14.80%**
Sharpe Ratio (10 year)	**0.27**	**0.34**	**0.33**

MPERS' MIXES: 2021 VS. 2022 ASSUMPTIONS

	Asset Allocation		
Asset Class	**60/40**	**Policy**	**20% Leverage**
Global Equity	60.0%	40.0%	48.0%
Private Equity		10.0%	12.0%
Total Equity Beta	**60%**	**50%**	**60%**
TIPS		5.0%	6.0%
Core Bonds	40.0%	10.0%	12.0%
Long Govt/Credit		7.5%	9.0%
Private Debt		7.5%	9.0%
Total Rates & Credit Beta	**40%**	**30%**	**36%**
Private Real Assets		10.0%	12.0%
Core Real Estate		10.0%	12.0%
Total Real Asset Beta		**20%**	**24%**
US Leverage Cost		0.0%	-20%
Total Cash		**0%**	**-20%**

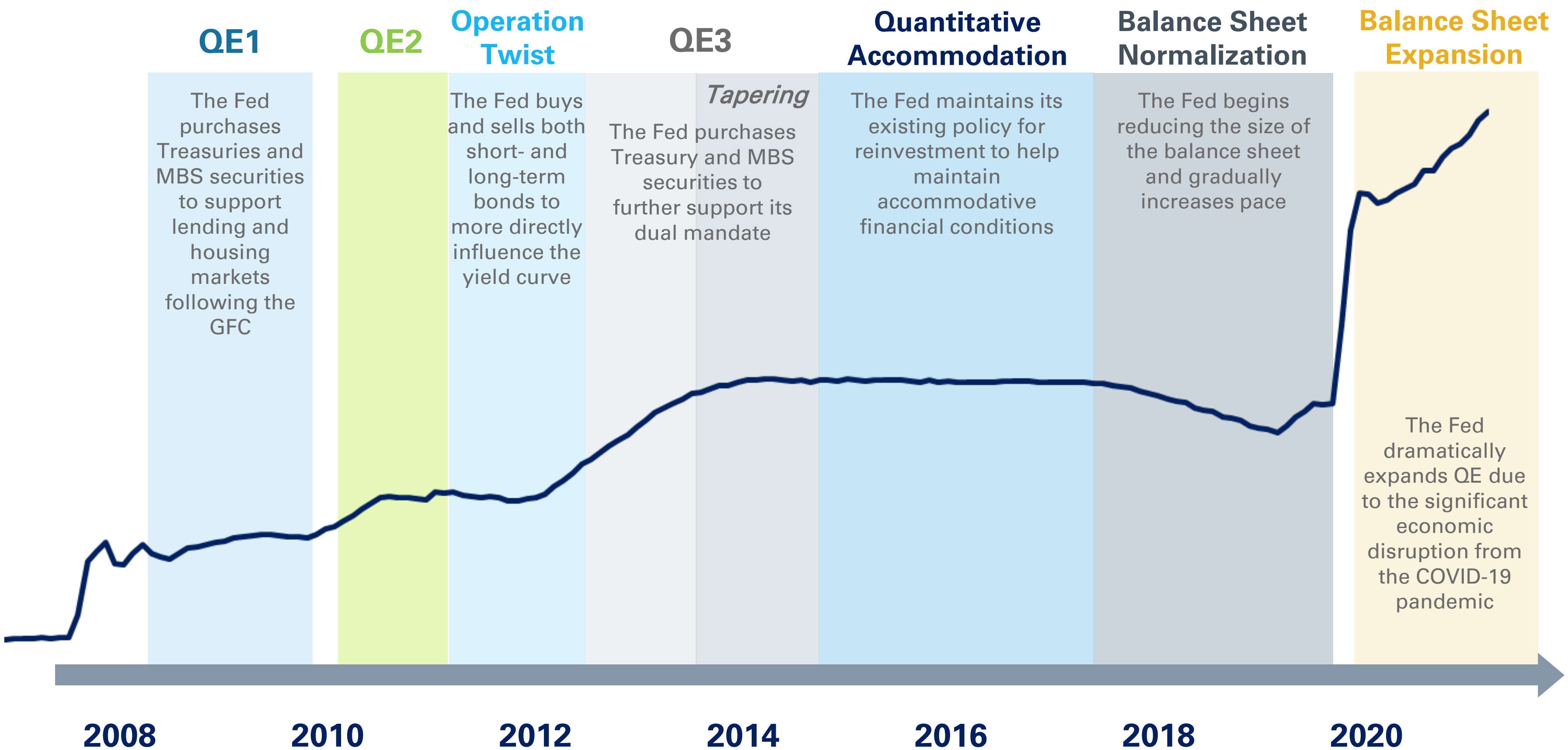
10 Year Return Assumptions			
Asset Class	**2021**	**2022**	**Delta**
Global Equity	6.0%	5.4%	-0.6%
Private Equity	9.3%	9.0%	-0.3%
TIPS	1.0%	1.4%	+0.4%
Core Bonds	1.4%	2.0%	+0.6%
Long Govt/Credit	1.7%	2.2%	+0.5%
Private Debt	6.1%	6.6%	+0.5%
Private Real Assets	6.7%	6.2%	-0.5%
Core Real Estate	4.4%	4.7%	+0.3%
US Leverage Cost	1.2%	1.9%	+ 0.7%

	2021			2022		
	60/40	**Policy**	**20% Leverage**	**60/40**	**Policy**	**20% Leverage**
Expected Return (10 Yr)	4.5%	5.8%	6.6%	4.4%	5.7%	6.3%
Standard Deviation	10.6%	12.1%	14.5%	11.0%	12.3%	14.8%
Sharpe Ratio (10 Yr)	0.35	0.41	0.40	0.27	0.34	0.33

APPENDIX

HISTORY OF FOMC OPEN MARKET OPERATIONS

FEDERAL RESERVE BALANCE SHEET



Notes: Blue line reflects total asset size of the Federal Reserve
Sources: Federal Reserve, FactSet, NEPC

NEPC PUBLIC MARKET EQUITY OUTLOOK

- We remain broadly **favorable to global equity** given the robust economic backdrop and encourage adding value exposure to US large-cap equities
- **The public market strategic view** represents a neutral exposure to US and an overweight to Emerging Markets relative to the MSCI ACWI IMI
- **Implementation Outlook:** Preference for active global equity implementation over US and EAFE and we encourage active small-cap within region mandates

SUB-ASSET CLASS	DYNAMIC TILT	COMMENTS
U.S. Large-Cap	*Favorable*	Look to add value exposure to U.S. large-cap equity to mitigate the portfolio impact of inflation normalizing above market expectations, while also maintaining a total portfolio bias to equity exposure
U.S. Small-Cap	*Favorable*	
EAFE Large-Cap	*Neutral*	
EAFE Small-Cap	*Favorable*	
EM Large-Cap	*Neutral*	
EM Small-Cap	*Favorable*	

REDUCE | UNFAVORABLE | NEUTRAL | FAVORABLE | ADD

NEPC PUBLIC MARKET CREDIT OUTLOOK

- **Credit spreads are near cyclical lows**, particularly in the lower-quality space, and can continue to grind lower with strong economic growth signals
- **The strategic view for return-seeking credit** encourages a more diversified exposure with the use of high yield, levered loans and emerging market debt
- **Implementation Outlook:** We remain constructive on multi-sector credit, CLO (equity/mezzanine), and private credit for return-seeking credit allocations

SUB-ASSET CLASS	DYNAMIC TILT	COMMENTS
U.S. IG Corporate	*Neutral*	Look to reduce lower quality credit exposure and consider shifting exposure equally to U.S. equity and safe-haven fixed income
U.S. High Yield	*Reduce*	
Structured Credit	*Neutral*	
Levered Loans	*Unfavorable*	
Emerging Market Debt	*Unfavorable*	

REDUCE | UNFAVORABLE | NEUTRAL | FAVORABLE | ADD

NEPC SAFE-HAVEN FIXED INCOME OUTLOOK

Real yields are negative and interest rates may rise more quickly with "stickier" inflation levels and faster than expected Fed policy tightening

The strategic safe-haven view reinforces the need for safe-haven fixed income to be a liquidity source for the portfolio in periods of market stress

Implementation of safe-haven exposure is a reflection of investor risk tolerance and sized to support portfolio downside protection needs

SUB-ASSET CLASS	DYNAMIC TILT	COMMENTS
U.S. Treasury	*Neutral*	Look to tilt safe-haven fixed income exposure to a 75% Treasury and 25% U.S. TIPS split It is vital to maintain minimum portfolio liquidity levels with the use of safe-haven fixed income exposure
U.S. TIPS	*Reduce*	
Municipal Bonds	*Neutral*	
Non-US Govt. Bonds	*Reduce*	
Global IL Bonds	*Reduce*	
Cash	*Unfavorable*	

REDUCE | UNFAVORABLE | NEUTRAL | FAVORABLE | ADD

10-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	**12/31/2021**	**12/31/2020**	**Delta**
U.S. Large-Cap Equity	4.3%	5.4%	-1.1%
U.S. Small/Mid-Cap Equity	5.6%	5.7%	-0.1%
Non-U.S. Developed Equity	5.2%	5.9%	-0.7%
Non-U.S. Developed Equity (USD Hedge)	5.4%	6.1%	-0.7%
Non-U.S. Developed Small-Cap Equity	5.9%	6.1%	-0.2%
Emerging Market Equity	8.3%	7.5%	+0.8%
Emerging Market Small-Cap Equity	7.6%	8.1%	-0.5%
Hedge Fund - Equity	4.1%	4.0%	+0.1%
Private Equity - Buyout	7.3%	7.6%	-0.3%
Private Equity - Growth	8.6%	8.9%	-0.3%
Private Equity - Early Stage Venture	10.0%	10.4%	-0.4%
Private Equity - Secondary	6.8%	7.1%	-0.3%
Non-U.S. Private Equity	10.3%	10.7%	-0.4%
China Equity	8.8%	7.0%	+1.8%
U.S. Microcap Equity	6.5%	6.6%	-0.1%
Global Equity*	5.4%	6.2%	-0.8%
Private Equity*	9.0%	9.3%	-0.3%

*Calculated as a blend of other asset classes

10-YEAR RETURN FORECASTS

SAFE-HAVEN FIXED INCOME

Geometric Expected Return			
Asset Class	**12/31/2021**	**12/31/2020**	**Delta**
Cash	1.5%	0.8%	+0.7%
U.S. TIPS	1.4%	1.0%	+0.4%
U.S. Treasury Bond	1.5%	0.9%	+0.6%
U.S. Corporate Bond	2.8%	2.2%	+0.6%
U.S. Corporate Bond - AAA	2.2%	1.5%	+0.7%
U.S. Corporate Bond - AA	2.2%	1.6%	+0.6%
U.S. Corporate Bond - A	2.6%	1.9%	+0.7%
U.S. Corporate Bond - BBB	3.1%	2.5%	+0.6%
U.S. Mortgage-Backed Securities	1.8%	1.2%	+0.6%
U.S. Securitized Bond	2.3%	1.8%	+0.5%
U.S. Collateralized Loan Obligation	3.1%	2.3%	+0.8%
U.S. Municipal Bond	1.6%	2.0%	-0.4%
U.S. Municipal Bond (1-10 Year)	1.2%	1.1%	+0.1%
U.S. Taxable Municipal Bond	2.7%	2.5%	+0.2%

10-YEAR RETURN FORECASTS
SAFE-HAVEN FIXED INCOME

Geometric Expected Return			
Asset Class	**12/31/2021**	**12/31/2020**	**Delta**
Non-US Government Bond	1.1%	0.6%	+0.5%
Non-US Government Bond (USD Hedge)	1.3%	0.8%	+0.5%
Non-US Inflation-Linked Bond (USD Hedge)	0.7%	0.1%	+0.6%
U.S. Short-Term TIPS (1-3 Year)	1.2%	1.1%	+0.1%
U.S. Short-Term Treasury Bond (1-3 Year)	1.4%	1.0%	+0.4%
U.S. Short-Term Corporate Bond (1-3 Year)	2.3%	1.8%	+0.5%
U.S. Intermediate-Term TIPS (3-10 Year)	1.5%	1.0%	+0.5%
U.S. Intermediate-Term Treasury Bond (3-10 Year)	1.6%	0.9%	+0.7%
U.S. Intermediate-Term Corporate Bond (3-10 Year)	3.0%	2.3%	+0.7%
U.S. Long-Term Treasury Bond (10-30 Year)	1.4%	0.7%	+0.7%
U.S. Long-Term TIPS (10-30 Year)	1.3%	1.0%	+0.3%
U.S. Long-Term Corporate Bond (10-30 Year)	2.8%	2.3%	+0.5%
20+ Year U.S. Treasury STRIPS	1.0%	0.4%	+0.6%
10 Year U.S. Treasury Bond	1.8%	0.9%	+0.9%
10 Year Non-U.S. Government Bond (USD Hedge)	0.3%	-0.1%	+0.4%
U.S. Aggregate Bond*	2.0%	1.4%	+0.6%

*Calculated as a blend of other asset classes

10-YEAR RETURN FORECASTS

RETURN-SEEKING CREDIT

Geometric Expected Return			
Asset Class	**12/31/2021**	**12/31/2020**	**Delta**
U.S. High Yield Corporate Bond	3.2%	2.9%	+0.3%
U.S. Corporate Bond - BB	4.0%	3.9%	+0.1%
U.S. Corporate Bond - B	3.6%	3.0%	+0.6%
U.S. Corporate Bond - CCC/Below	-3.8%	-3.4%	-0.4%
U.S. Short-Term High Yield Corp Bond (1-3 Year)	2.3%	2.5%	-0.2%
U.S. Leveraged Loan	4.7%	3.9%	+0.8%
Emerging Market External Debt	4.1%	3.0%	+1.1%
Emerging Market Local Currency Debt	5.7%	5.0%	+0.7%
U.S. High Yield Securitized Bond	3.4%	2.3%	+1.1%
U.S. High Yield Collateralized Loan Obligation	5.5%	4.6%	+0.9%
U.S. High Yield Municipal Bond	2.1%	2.8%	-0.7%
Hedge Fund - Credit	4.2%	3.9%	+0.3%
Private Debt - Credit Opportunities	6.5%	6.2%	+0.3%
Private Debt - Distressed	7.2%	7.2%	-
Private Debt - Direct Lending	6.2%	5.4%	+0.8%
Private Debt*	6.6%	6.1%	+0.5%

*Calculated as a blend of other asset classes

10-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	**12/31/2021**	**12/31/2020**	**Delta**
Commodity Futures	0.4%	0.9%	-0.5%
Midstream Energy	6.7%	7.4%	-0.7%
U.S. REIT	4.5%	5.5%	-1.0%
Global Infrastructure Equity	5.6%	5.9%	-0.3%
Global Natural Resources Equity	5.5%	6.7%	-1.2%
Gold	3.3%	2.9%	+0.4%
Real Estate - Core	4.7%	4.4%	+0.3%
Real Estate - Non-Core	5.9%	5.5%	+0.4%
Private Debt - Real Estate	4.6%	4.1%	+0.5%
Private Real Assets - Natural Resources	7.1%	8.0%	-0.9%
Private Real Assets - Infrastructure	5.3%	5.4%	-0.1%

30-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	**12/31/2021**	**12/31/2020**	**Delta**
U.S. Large-Cap Equity	6.1%	6.3%	-0.2%
U.S. Small/Mid-Cap Equity	6.6%	6.6%	-
Non-U.S. Developed Equity	6.2%	6.5%	-0.3%
Non-U.S. Developed Equity (USD Hedge)	6.4%	6.7%	-0.3%
Non-U.S. Developed Small-Cap Equity	6.8%	6.8%	-
Emerging Market Equity	8.7%	8.4%	+0.3%
Emerging Market Small-Cap Equity	8.7%	8.6%	+0.1%
Hedge Fund - Equity	5.2%	5.0%	+0.2%
Private Equity - Buyout	8.5%	8.5%	-
Private Equity - Growth	9.7%	9.8%	-0.1%
Private Equity - Early Stage Venture	10.7%	10.7%	-
Private Equity - Secondary	7.9%	8.0%	-0.1%
Non-U.S. Private Equity	10.7%	10.7%	-
China Equity	8.8%	7.8%	+1.0%
U.S. Microcap Equity	7.5%	7.4%	+0.1%
Global Equity*	6.8%	7.0%	-0.2%
Private Equity*	10.0%	10.1%	-0.1%

*Calculated as a blend of other asset classes

30-YEAR RETURN FORECASTS

SAFE-HAVEN FIXED INCOME

Geometric Expected Return			
Asset Class	**12/31/2021**	**12/31/2020**	**Delta**
Cash	2.3%	1.9%	+0.4%
U.S. TIPS	2.6%	2.1%	+0.5%
U.S. Treasury Bond	2.5%	2.0%	+0.5%
U.S. Corporate Bond	4.2%	3.7%	+0.5%
U.S. Corporate Bond - AAA	3.3%	2.8%	+0.5%
U.S. Corporate Bond - AA	3.4%	2.9%	+0.5%
U.S. Corporate Bond - A	3.8%	3.3%	+0.5%
U.S. Corporate Bond - BBB	4.4%	3.9%	+0.5%
U.S. Mortgage-Backed Securities	2.8%	2.3%	+0.5%
U.S. Securitized Bond	3.6%	3.1%	+0.5%
U.S. Collateralized Loan Obligation	4.0%	3.3%	+0.7%
U.S. Municipal Bond	2.5%	2.3%	+0.2%
U.S. Municipal Bond (1-10 Year)	2.3%	1.9%	+0.4%
U.S. Taxable Municipal Bond	4.3%	3.9%	+0.4%

30-YEAR RETURN FORECASTS

SAFE-HAVEN FIXED INCOME

Geometric Expected Return			
Asset Class	**12/31/2021**	**12/31/2020**	**Delta**
Non-US Government Bond	1.9%	1.7%	+0.2%
Non-US Government Bond (USD Hedge)	2.2%	1.9%	+0.3%
Non-US Inflation-Linked Bond (USD Hedge)	1.4%	1.1%	+0.3%
U.S. Short-Term TIPS (1-3 Year)	2.4%	2.0%	+0.4%
U.S. Short-Term Treasury Bond (1-3 Year)	2.4%	2.0%	+0.4%
U.S. Short-Term Corporate Bond (1-3 Year)	3.4%	3.7%	-0.3%
U.S. Intermediate-Term TIPS (3-10 Year)	2.8%	2.1%	+0.7%
U.S. Intermediate-Term Treasury Bond (3-10 Year)	2.7%	2.1%	+0.6%
U.S. Intermediate-Term Corporate Bond (3-10 Year)	4.4%	3.8%	+0.6%
U.S. Long-Term Treasury Bond (10-30 Year)	2.4%	1.9%	+0.5%
U.S. Long-Term TIPS (10-30 Year)	2.3%	2.0%	+0.3%
U.S. Long-Term Corporate Bond (10-30 Year)	4.2%	3.8%	+0.4%
20+ Year U.S. Treasury STRIPS	2.1%	1.7%	+0.4%
10 Year U.S. Treasury Bond	3.0%	2.3%	+0.7%
10 Year Non-U.S. Government Bond (USD Hedge)	1.4%	1.1%	+0.3%
U.S. Aggregate Bond*	3.1%	2.7%	+0.4%

*Calculated as a blend of other asset classes

30-YEAR RETURN FORECASTS

RETURN-SEEKING CREDIT

Geometric Expected Return			
Asset Class	**12/31/2021**	**12/31/2020**	**Delta**
U.S. High Yield Corporate Bond	5.4%	5.0%	+0.4%
U.S. Corporate Bond - BB	6.0%	5.6%	+0.4%
U.S. Corporate Bond - B	5.4%	4.9%	+0.5%
U.S. Corporate Bond - CCC/Below	-0.6%	-0.8%	+0.2%
U.S. Short-Term High Yield Corp Bond (1-3 Year)	3.7%	3.5%	+0.2%
U.S. Leveraged Loan	5.6%	4.8%	+0.8%
Emerging Market External Debt	5.1%	4.5%	+0.6%
Emerging Market Local Currency Debt	5.3%	5.1%	+0.2%
U.S. High Yield Securitized Bond	5.4%	4.5%	+0.9%
U.S. High Yield Collateralized Loan Obligation	6.4%	5.7%	+0.7%
U.S. High Yield Municipal Bond	3.9%	3.9%	-
Hedge Fund - Credit	5.7%	5.3%	+0.4%
Private Debt - Credit Opportunities	7.4%	7.0%	+0.4%
Private Debt - Distressed	8.2%	7.8%	+0.4%
Private Debt - Direct Lending	7.8%	7.4%	+0.4%
Private Debt*	7.9%	7.5%	+0.4%

*Calculated as a blend of other asset classes

30-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	**12/31/2021**	**12/31/2020**	**Delta**
Commodity Futures	3.3%	3.3%	-
Midstream Energy	6.7%	7.3%	-0.6%
U.S. REIT	6.3%	6.7%	-0.4%
Global Infrastructure Equity	6.3%	6.6%	-0.3%
Global Natural Resources Equity	6.7%	7.0%	-0.3%
Gold	4.0%	3.7%	+0.3%
Real Estate - Core	5.6%	5.6%	-
Real Estate - Non-Core	6.9%	7.0%	-0.1%
Private Debt - Real Estate	5.4%	5.2%	+0.2%
Private Real Assets - Natural Resources	8.2%	8.5%	-0.3%
Private Real Assets - Infrastructure	6.6%	6.6%	-

PRIVATE MARKETS COMPOSITES

PUBLIC MARKET BETA INPUTS FOR PRIVATE MARKETS

PRIVATE EQUITY

Buyout: 25% U.S. Large Cap, 75% U.S. Small/Mid Cap

Secondary: 25% U.S. Large Cap, 75% U.S. Small/Mid Cap

Growth: 50% U.S. Small/Mid Cap, 50% U.S. Microcap

Early Stage Venture: 25% U.S. Small/Mid Cap, 75% U.S. Microcap

Non-U.S.: 70% International Small Cap, 30% Emerging Small Cap

Composite: 34% Buyout, 34% Growth, 15 % Non-U.S., 8.5% Secondary, 8.5% Early Venture

PRIVATE DEBT

Direct Lending: 100% Bank Loans

Distressed: 20% U.S. Small/Mid Cap, 60% U.S. High Yield, 20% Bank Loans

Credit Opportunities: 34% U.S. SMID Cap, 33% U.S. High Yield, 33% Bank Loans

Composite: 50% Direct Lending, 25% Credit Opportunities, 25% Distressed

PRIVATE REAL ASSETS

Energy: 30% Comm., 35% Midstream, 35% Public Resource Equity

Infra/Land: 30% Commodities, 70% Public Infrastructure

Private Real Estate Debt: 50% CMBS, 50% Real Estate - Core

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Past performance is no guarantee of future results.

The goal of this report is to provide a basis for substantiating asset allocation recommendations. The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.

Information on market indices was provided by sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.

All investments carry some level of risk. Diversification and other asset allocation techniques do not ensure profit or protect against losses.

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