NORTHERN TRUST

CAPITAL MARKET ASSUMPTIONS

FIVE-YEAR OUTLOOK: 2018 EDITION

Every year, Northern Trust's Capital Market Assumptions Working Group develops forward-looking, historically aware forecasts for global economic activity and financial market returns that drive our five-year asset class return expectations and inform our asset allocation decisions.

All of this comes together in the form of our long-term strategic asset class allocation suggestions, which are used by institutional and individual investors worldwide.

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CAPITAL MARKET ASSUMPTIONS

Although we had a year of strong risk asset returns and some increase in global interest rates, many of the factors supporting the financial markets remain unchanged from last year. We expect continued economic growth, controlled inflation and accommodative monetary policy to result in good-but-not-great risk asset returns and low-but-mostly-positive fixed income returns.

Here's what you need to know about the forces shaping the economic and market landscape during the next five years.

Against this backdrop, six key themes have emerged from our global five-year outlook. Many of these themes are a continuation from last year's, updated to capture the shifting, subtle nuances that took place in the past year. With this in mind, our Capital Market Assumptions team expects:

1. **MILD GROWTH MYOPIA** — Subdued economic cycles and a strengthened financial system are supportive of higher risk-asset valuations.

2. **STUCKFLATION** — Low and durable structural inflation has altered both monetary policymaking and investor behaviors.

3. **PASS/FAIL MONETARISM** — Without a template for policy normalization, central banks' efforts can't be graded — other than that they must not fail.

4. **TECHNOLOGY SLOWZONE** — Technology has been pulled into the orbit of government interference, but will remain a constructive economic force.

5. **GLOBAL (RE)POSITIONING SYSTEM** — The irreversible fade of legacy multilateral institutions is creating as many investment opportunities as risks.

6. **EXECUTIVE POWER DRIVE** — Investors are accepting leaders who challenge political norms in order to favorably tilt the economic landscape.

2018 ASSET CLASS OUTLOOK

This year's broad themes identify the trends we see affecting the markets and economy over the next five years — and they also underlie our asset class outlooks.

Our single-digit growth expectations for equities are based, in part, on the modest growth outlook articulated in our *Mild Growth Myopia* theme. And our structural expectation for *Stuckflation* reflects our belief that profit margins will remain elevated in developed markets. In fixed income, our *Mild Growth Myopia, Stuckflation* and *Pass/Fail Monetarism* themes set the stage for our forecasting short-term rates to move only modestly higher over our five-year horizon.

Equities

Global equity returns will remain below long-term averages, but higher than current valuations suggest.

Fixed Income

Mild growth and Stuckflation will keep interest rates low and yield curves flat globally.

Real Assets

Real assets will perform in line with equities while providing diversification to portfolios.

Alternatives

Private equity and hedge funds continue to add value by enhancing risk-adjusted portfolio returns.

EQUITIES FORECAST

Global equity returns will be below long-term historical averages, but higher than what current valuations would suggest.

Developed Markets

Developed market equities will provide annualized returns in the mid-single digit range over the next five years. Valuations, while still elevated, actually retreated this past year as per-share earnings grew faster than equity prices. We don't expect a tailwind from valuations during the next five years, but we don't expect a material headwind either. Ongoing but slow economic growth, per our *Mild Growth Myopia* theme, will provide modest support to revenues while share repurchases and *Stuckflation* will continue to support earnings. Our developed market total return forecast is 6.0%, driven primarily by our expectation for 4.2% revenue growth and a 2.4% dividend yield. Valuations bring that back by 0.9%. Our expectation for continued share repurchases means we expect developed markets to see positive profit translation of 0.2%.

6.0%

DEVELOPED MARKET EQUITIES TOTAL RETURN FORECAST

Emerging Markets

Emerging market equities' valuations are below historical levels and continue to represent a longer-term buying opportunity. Higher growth, which should persist, and lower valuations should benefit emerging market equities. But emerging markets are notorious share issuers, and will see a -2.2% profit translation as a result. The 6.9% revenue growth we're projecting, combined with a 1.1% boost from valuations and a 2.4% dividend yield, will allow for a 2.3% return premium over developed market equities.

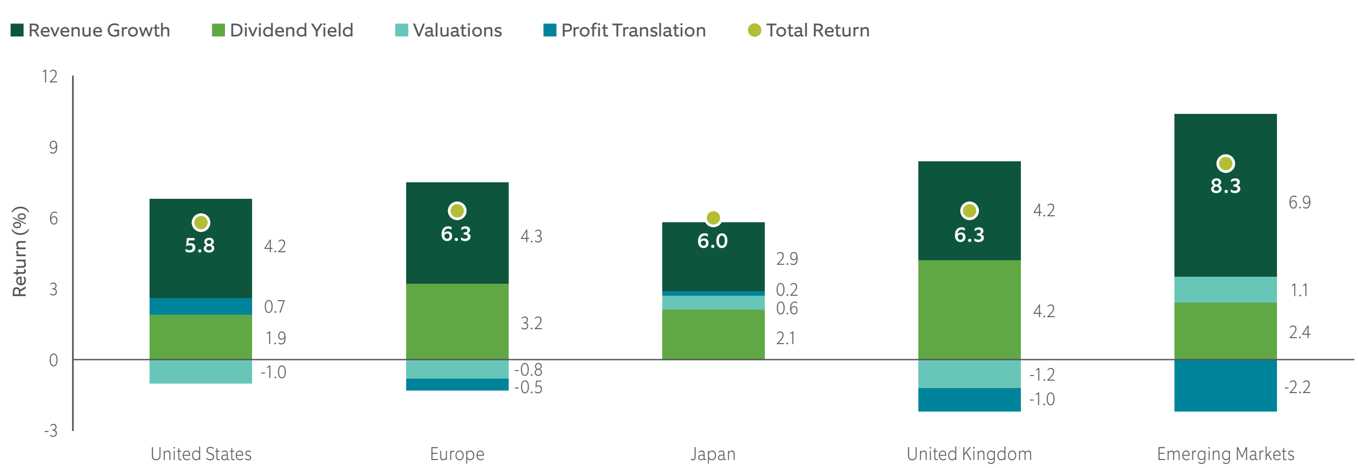
Our developed and emerging market equity forecasts both are slightly below last year's expectations.

8.3%

EMERGING MARKET EQUITIES TOTAL RETURN FORECAST

EQUITY BUILDING BLOCKS: REGIONAL DETAILS

We expect a small valuation contraction across most developed markets.



Source: Northern Trust Global Asset Allocation.

FIXED INCOME FORECAST

The end of the 36-year bull market does not mean the start of the next bear market. Interest rates will remain low.

Interest Rates

Interest rates over the next five years will remain below investor expectations, driven by continued *Stuckflation*. With long-term interest rates anchored, the current U.S. Federal Reserve rate hike cycle will end earlier and at a lower level than is priced into the markets. Also controlling short-term U.S. rates is the ongoing accommodation from other major central banks in response to low inflation. The result will be a nearly flat U.S. yield curve and a very small shift upward in other yield curves around the world. The chart below details our five-year-forward interest-rate forecasts (vs. market expectations) for the sovereign debt of the United States, Europe (proxied by Germany), Japan and the United Kingdom. The United States should continue to have higher rates across the curve than most developed markets (except Australia), while Japan will remain stuck very close to 0%.

2.8%

INTEREST RATE FORECAST FOR U.S. 10-YEAR TREASURY

Credit Markets

Credit spreads — both investment grade and high yield — will settle in at slightly higher levels than the lows seen during the current cycle. The impact of credit on total return is most noticeable in high yield. We're forecasting credit losses (in the form of defaults) to take 2.2% off global high yield total returns. The ongoing economic expansion and still-low debt servicing costs continue to provide a foundation. We anticipate slightly higher fixed income returns than we did last year — supported by higher starting point yields, continued central bank accommodation and steady credit spreads.

4.6%

EXPECTED ANNUALIZED RETURN FOR GLOBAL HIGH YIELD

GLOBAL INTEREST RATES: FIVE-YEAR-FORWARD FORECASTS

We expect interest rates to remain low globally, anchored by persistent low inflation.

	3-Month		10-Year	
Country	Northern Trust	Market	Northern Trust	Market
United States	2.4%	3.0%	2.8%	3.0%
Europe (Germany)	0.3%	0.4%	1.0%	1.2%
Japan	0.0%	0.0%	0.3%	0.5%
United Kingdom	1.3%	1.4%	1.8%	2.0%
Canada	1.8%	2.3%	2.3%	2.3%
Australia	2.8%	2.9%	3.3%	3.1%

Source: Northern Trust Global Asset Allocation, Bloomberg.

REAL ASSETS FORECAST

Real asset returns will be mostly in line with equities, providing diversification through different "flavors" of market risk.

Natural Resources

We believe an equity-based approach to natural resources is a better way to gain commodity exposure. Historically speaking, it has materially and persistently outperformed a futures-based approach. Natural resource returns outpaced the broader global equity universe over the last year, but continue to trail significantly over the past 10 years. Ongoing global economic growth and better calibration between supply and demand will allow recent outperformance to persist, leading to our total return forecast of 7.2%.

7.2%

NATURAL RESOURCES TOTAL RETURN FORECAST

Global Real Estate

Global real estate will be supported by its exposures to term (interest rate) and credit risk, both of which we expect to be positive influences on the asset class. But negative investor sentiment remains as the real estate market is forced to respond to the more digitally based economy. These are issues we have flagged before, but they remain a drag on demand. As such, we continue to adjust downward (by 0.5%) our quantitatively driven return forecast, leading to our 6.0% return expectation.

6.0%

GLOBAL REAL ESTATE TOTAL RETURN FORECAST

Global Listed Infrastructure

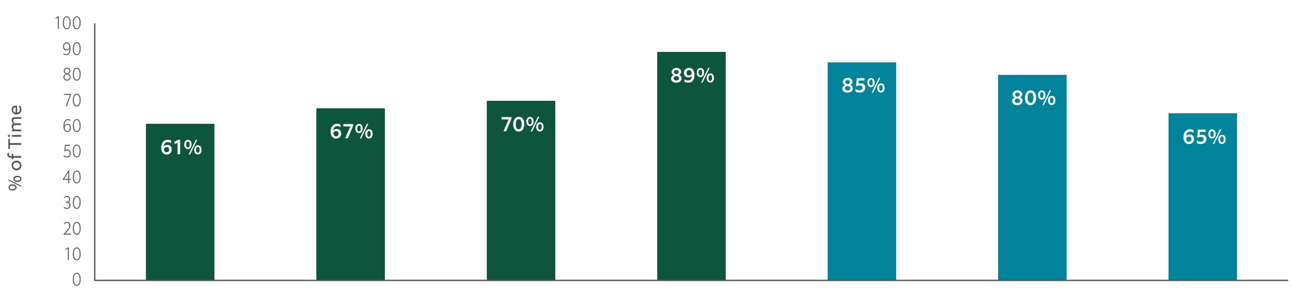
Global listed infrastructure can serve as a lower-risk (but also slightly lower-return) alternative to global real estate for income generation. The public-to-private transfer of infrastructure projects has created new opportunities for investors. We made no adjustments to the quantitative baseline, expecting a 5.4% total return.

5.4%

GLOBAL LISTED INFRASTRUCTURE TOTAL RETURN FORECAST

REAL RETURNS

Natural resources and listed infrastructure do a better job of covering inflation during periods of high inflation.



During:	Fixed Income	Global Equities	TIPS	Futures-based Commodities	Natural Resources	Global Listed Infrastructure	Global Real Estate
High Inflation*	4.2%	7.6%	7.3%	16.3%	23.6%	15.3%	9.6%
Normal Inflation	4.5%	8.9%	4.1%	-4.5%	4.2%	9.5%	10.9%

Source: Northern Trust Global Asset Allocation, Bloomberg. Data from 12/31/2001 to 3/31/2018. * High inflation (above 2.98%) is the 75th percentile of data during the data range. Normal inflation is below 2.98%.

ALTERNATIVES FORECAST

Alternative assets — private equity and hedge funds — will continue to add value to investor portfolios by enhancing risk-adjusted portfolio returns through nontraditional means.

Private Equity

Investors recently have questioned expected private equity return premiums, given higher valuations and increased asset flows to private equity funds. Higher private market valuations over the past few years have been mostly — but not completely — in lockstep with higher public market valuations. Increased asset flows are finding increased opportunities as companies stay private longer. With more opportunities offsetting slightly higher valuations and increased investor interest, we maintained our 2.0% premium. Applied to our 6.0% global equity return forecast, we come to an 8.0% return forecast for private equity.

8.0%

PRIVATE EQUITY RETURN FORECAST

Hedge Funds

The primary benefit of hedge fund strategies is the ability to provide nontraditional and uncorrelated return premiums to the traditional portfolio. This generally is done by producing alpha — returns not explained by the investment portfolio's risk exposure. Alpha has been shrinking over the past 25 years. Our 4.3% hedge fund return expectation assumes this low average alpha (0.4%) and lower expected risk exposures (3.9%), based on our risk factor model. But we recognize the dispersion across individual strategies. Manager selection is paramount.

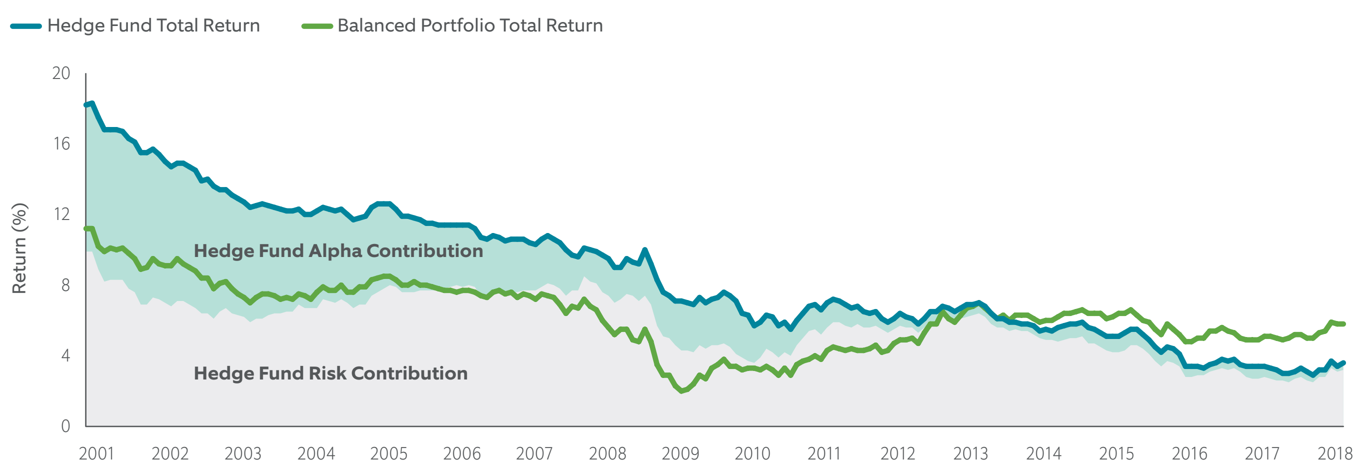
The chart below shows rolling 10-year hedge fund returns bifurcated between the risk (grey area) and alpha contribution (green area) — all based on the model described above. The hedge fund risk contribution has been fairly steady — though slowly declining — over time, largely tracking a balanced portfolio (50% global equities/50% global fixed income).

4.3%

HEDGE FUND RETURN FORECAST

INCREASING RISK RELIANCE

Alpha generation of the average hedge fund has been slipping over time, but varies significantly by manager.



Source: Northern Trust Global Asset Allocation, Northern Trust Portfolio Construction Desk, Bloomberg. Data from 12/31/2000 to 3/31/2018.

DETAILED FIVE-YEAR ASSET CLASS RETURN FORECASTS

All Returns in % Annualized				5-Year Return Forecasts by CMA Year						5-Year Actual Return
		Asset Class	Proxy Index	2018	2017	2016	2015	2014	2013	
Fixed Income	United States	Cash	3-Month U.S. T-Bill	2.2	1.7	0.5	1.5	0.9	0.5	0.5
		Inflation Linked	BBG BarCap U.S. TIPS	2.9	3.0	2.5	2.5	3.0	2.7	1.7
		Investment Grade	BBG BarCap U.S. Aggregate	3.6	3.2	3.0	3.0	3.0	2.8	2.3
		High Yield	BBG BarCap U.S. High Yield	4.9	4.8	5.3	5.6	5.6	6.1	5.5
		Municipal	BBG BarCap Municipal	3.2	3.2	2.8	3.5	4.0	3.0	3.5
	Europe	Cash	3-Month German Bunds	-0.3	-0.2	-0.5	0.0	0.4	1.0	-0.4
		Inflation Linked	BBG BarCap Euro Inflation Linked	1.2	1.5	1.4	1.8	2.8	3.2	3.9
		Investment Grade	BBG BarCap Euro Aggregate	1.8	1.5	1.4	2.0	2.8	3.0	3.6
	Japan	Cash	3-Month JGB	0.0	-0.1	-0.3	0.0	0.1	0.1	-0.1
		Inflation Linked	BBG BarCap Inflation Linked JGB	0.5	0.8	0.8	1.2	1.5	0.6	0.8
		Investment Grade	BBG BarCap Japanese Aggregate	0.5	0.7	0.5	1.0	1.2	0.8	2.2
	U.K.	Cash	3-Month Gilts	0.9	0.5	0.3	1.5	1.3	0.6	0.4
		Inflation Linked	BBG BarCap Inflation Linked Gilt	1.7	1.6	2.0	2.6	3.0	3.2	8.2
		Investment Grade	BBG BarCap Sterling Aggregate	2.5	2.5	2.6	3.0	3.7	3.5	5.4
	Canada	Cash	3-Month Canada T-Bill	1.6	1.3	0.7	1.5	1.3	1.5	0.8
		Inflation Linked	FTSE TMX Real Return Bond	2.3	2.5	2.5	2.5	3.2	3.2	4.0
		Investment Grade	FTSE TMX Universe	2.9	2.5	2.6	2.7	3.4	3.5	3.5
		High Yield	ML Canadian High Yield	4.5	4.5	5.0	5.6	5.6	6.1	6.1
	Aus.	Cash	3-Month Australia Gov't Bond	2.5	2.4	2.0	2.2	2.8	3.3	2.1
		Investment Grade	BBG BarCap Australian Composite	3.5	3.2	3.3	3.5	4.0	3.6	4.3
	Global	Global Aggregate	BBG BarCap Global Aggregate	2.7	2.2	2.1	2.5	2.7	2.6	3.3
		Global High Yield	BBG BarCap Global High Yield	4.6	4.5	5.3	5.8	5.8	6.5	5.9
		Emerging Market Debt	JP Morgan GBI-EM Diversified	5.8	5.3	5.5	6.5	6.0	7.0	6.1
Equities	Developed Markets	United States	MSCI United States	5.8	5.9	4.8	5.6	6.6	7.1	13.4
		Europe	MSCI Europe ex U.K.	6.3	7.2	5.3	6.8	8.2	7.8	10.8
		Japan	MSCI Japan	6.0	6.0	5.6	6.2	6.6	5.8	10.1
		United Kingdom	MSCI United Kingdom	6.3	6.6	5.9	7.0	8.6	8.4	7.9
		Canada	MSCI Canada	5.5	6.0	6.0	6.9	7.1	7.6	9.6
		Australia	MSCI Australia	7.7	7.7	8.0	8.1	9.1	9.4	9.8
		Developed Markets	MSCI World	6.0	6.4	5.4	6.1	7.2	7.4	11.7
	Emerg. Markets	Asia	MSCI EM Asia	8.8	8.9	8.0	8.5	10.0	9.9	9.6
		Latin America	MSCI EM Latin America	6.5	6.9	5.6	5.7	7.0	10.6	7.5
		EMEA	MSCI EM EMEA	7.5	7.3	6.0	6.5	7.9	10.4	4.9
		Emerging Markets	MSCI Emerging Markets	8.3	8.4	7.3	7.8	9.0	10.1	8.8
	Global	Global Equities	MSCI All Country World	6.2	6.9	5.8	6.5	7.4	7.7	11.4
Real		Natural Resources	S&P Global Natural Resources	7.2	7.4	6.9	7.0	7.0	7.2	5.0
		Listed Real Estate	MSCI ACWI IMI Core Real Estate	6.0	6.1	6.3	6.9	8.0	8.0	7.3
		Listed Infrastructure	S&P Global Infrastructure	5.4	5.8	5.6	6.2	7.0	7.5	8.0
Alts		Private Equity	Cambridge Global Private Equity	8.0	8.4	7.4	8.6	9.2	9.6	N/A
		Hedge Funds	HFRI Fund Weighted Comp	4.3	4.4	3.4	4.4	4.3	4.4	4.6

Forecasts listed here represent total return forecasts for primary asset classes, annualized using geometric averages. Forecast returns are based on estimates and reflect subjective judgments and assumptions. They are not necessarily indicative of future performance, which could differ substantially.

Five-year actual returns are listed in local currency (with the exception of real assets, which are in USD) and annualized for the five-year period ending 6/30/2018.

ABOUT NORTHERN TRUST

Whatever Your Greater, We Can Help You Achieve It

For more than a century, Northern Trust has worked hard building our legacy of outstanding service, expertise and integrity. Founded in Chicago in 1889, Northern Trust has offices in the United States in 19 states and Washington, D.C., 23 international locations in Canada, Europe, the Middle East and the Asia-Pacific region, and 18,300 employees globally. We serve the world's most-sophisticated clients — from sovereign wealth funds and the wealthiest individuals and families, to the most-successful hedge funds and corporate brands.

Our guiding principles not only survived but thrived during the Great Depression, two world wars and the 2008 financial crisis. We burnished our reputation as a global leader delivering innovative investment management, asset and fund administration, fiduciary and banking solutions enabled by sophisticated, leading technology. And through it all, we continually laid a solid, forward-looking foundation on which future generations can continue growing and achieving greater.

As of June 30, 2018, Northern Trust Corporation had:

- $10.7 trillion in assets under custody/administration
- $8.1 trillion in assets under custody
- $1.1 trillion in assets under management
- $135 billion in banking assets

Explore Our Full Five-Year Outlook

Explore our long-term asset class return expectations and forecasts at **capitalmarketassumptions.com.** Visit today to:

- Gain valuable insights from our investment experts
- Get exclusive access to our full research paper
- Explore our detailed return/risk and correlation matrix

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