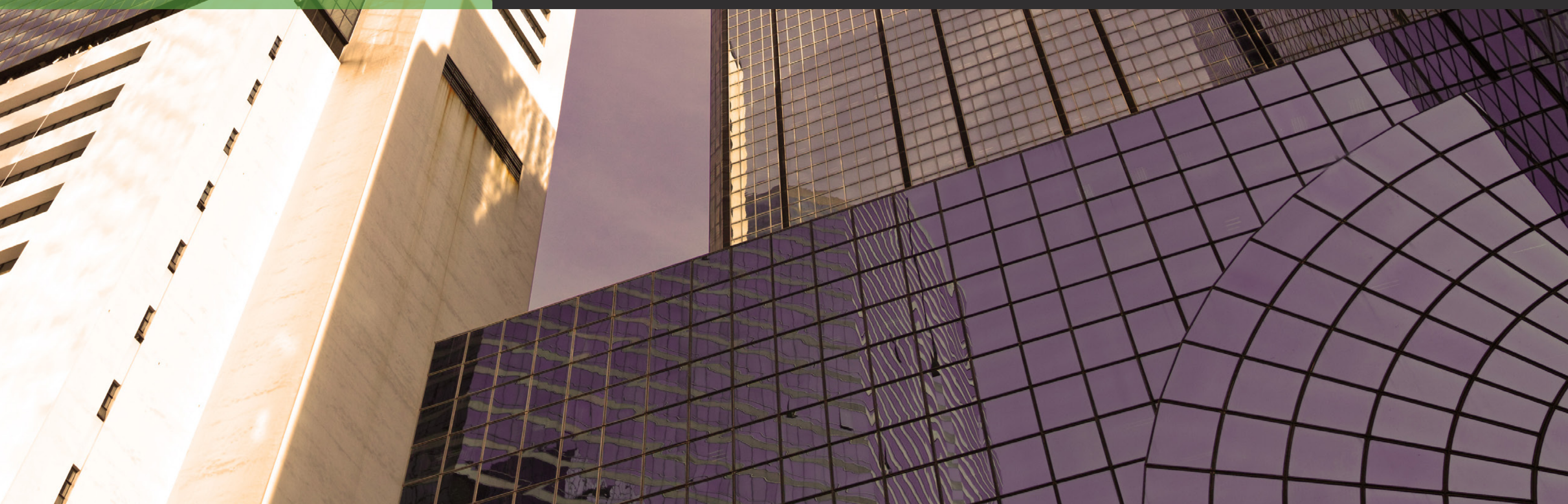
Bitterroot
CAPITAL ADVISORS

WHITEPAPER

7-Year Strategic Asset Class Forecast Methodology

October 2022



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Introduction

BCA aims to deliver unconditional investment advice that maximizes long-term, net-of-fee returns for clients, taking into account each client's particular goals and tolerance for risk.

We aim to construct optimal portfolios that maximize return while minimizing risk and achieve this by combining a broad set of asset and sub-asset classes.

Research has consistently determined that combining asset classes rather than individual securities is the best way to maximize returns across every level of risk.

Therefore, the first step in our methodology is to identify a broad set of diversified asset and sub-asset classes to serve as the building blocks for portfolio construction (see table below).

Asset Class	Description
Cash/Cash Equivalent	Cash or 3-Mos Treasury Bills
Public Equities (Stocks)	
US Large Cap	US companies with market capitalization > $10 Billion
US Small Cap	US companies with market capitalization < $2 Billion
International Developed	Intl. companies based in developed markets (mainly large cap)
Emerging Markets	Intl. companies based in developing markets (mainly large cap)
Fixed Income	
Govt. Bonds (Dev. Markets)	Treasury and agency bonds (US + Intl.)
Municipal Bonds	Bonds issued by municipalities (US)
Corporate Bonds	Bonds issued by corporations (US + Intl.)
Emerging Markets Bonds	Bonds issued by EM Gov'ts. or corporations (can be issued in local currency or USD)
Alternatives	
Long/Short Hedge Funds	Hedging market risk by betting on certain stocks (long) while betting against others (short)
Opportunistic Credit Funds	Distressed and relative value credit
Global Macro	Directional bets on interest rates, currencies, and equities
Non-Traditional	Assets completely uncorrelated to equities and bonds
Private Investments	Equity and debt investments in private companies
Private Real Estate	Investments in income-producing real estate properties

In evaluating these asset classes, we consider the following:

- Each asset class's historical behavior in different economic scenarios as evidenced by historical return and volatility statistics
- Each asset class's correlation with other asset classes (i.e. – did asset class A move in the same direction as asset class B)
- Most importantly – we forecast expected future returns and risk for each of these asset classes as expected macroeconomic conditions may differ significantly from past periods.

The remainder of this whitepaper describes the methodology used in forecasting asset class returns over a seven-year time frame ("BCA Strategic Outlook"). We believe a seven-year outlook is appropriate as it historically has captured on average a full business cycle. Our approach for forecasting returns consists of a building block approach – i.e. – decomposing the sources of return into various building blocks. For most of the asset classes, the primary building blocks are a) current cash flow yields, b) expected cash flow growth and c) expected valuation vs. current valuation.

We believe this building block framework offers the following advantages:

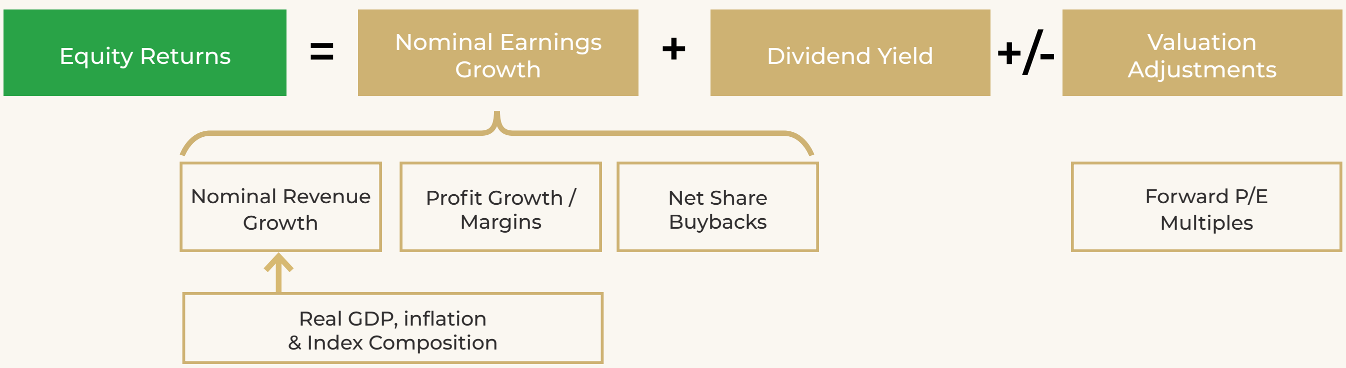
- We can independently assess how certain variables such as macroeconomic growth can affect different asset classes such as equities, fixed income, real estate, and private investments (private equity and private credit)
- Additionally, we can independently reflect on expected vs. current valuations by looking at historical changes in valuation associated with each asset class

Ultimately, forecasting expected returns as well as expected volatility across asset classes is the key determinant in assessing the attractiveness of various asset classes. We update our return forecasts quarterly, and potentially more frequently during periods of economic or market volatility, to reflect any changes in macroeconomic or geopolitical considerations which may influence our views.

Asset Class Forecast Methodology

In forecasting asset class performance over the seven-year period, we utilize a building-block approach to developing the returns forecast. These approaches are depicted below.

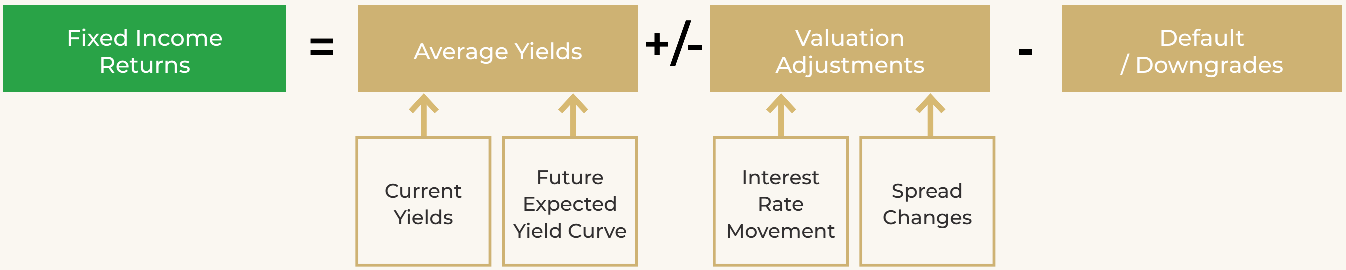
Building Blocks for Equities



Key assumptions include real GDP, inflation, index composition and historical linkage of public companies' revenues to GDP and, finally, profit margin potential based on business cycle analysis.

Additionally, we examine historical revenue and earnings growth rates, analyzing macro characteristics taking place during that time period. Our approach does not explicitly factor in changes in currency exchange rates.

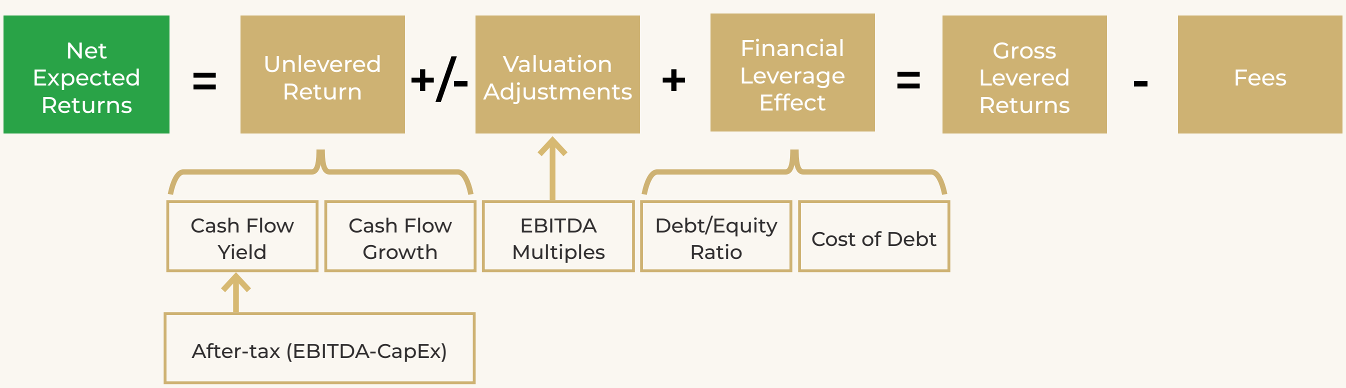
Building Blocks for Fixed Income



Our forecast first looks at average yields considering both current yields and expected future yields based on future yield curves. We then apply valuation adjustments based on a) interest rate movement risk, b) valuation adjustments from movement in spreads.

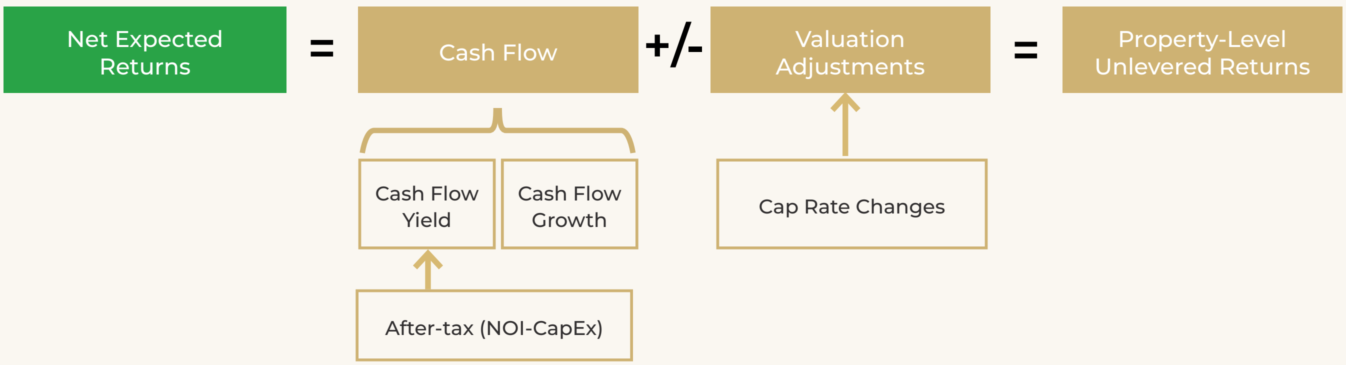
Finally, we then forecast default / downgrades. Again, we do not explicitly factor in changes in currency rates.

Building Blocks for Private Equity



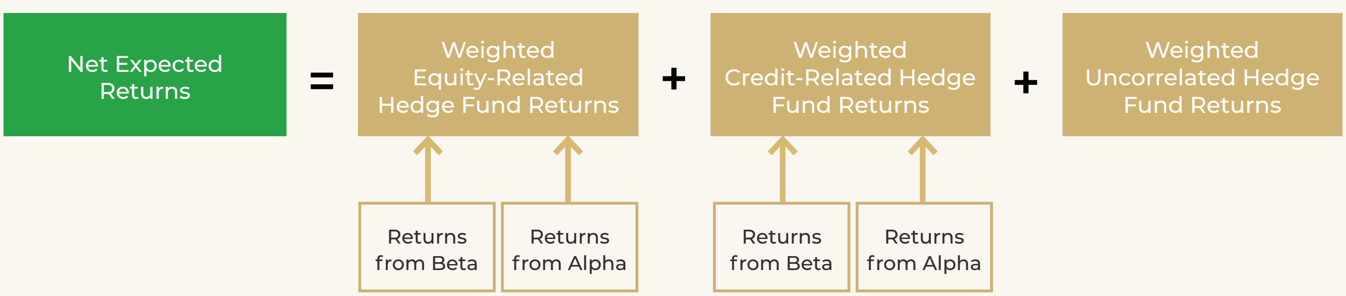
Our forecast first considers sources of unlevered returns such as after-tax underlying cash flow (EBITDA-capex) yield and cash flow growth. Additionally, we consider valuation adjustments to account for potential changes in valuation multiples over the forecast period. We then account for financial leverage utilized by private equity firms to derive levered returns. Finally, we subtract estimated fees to derive net nominal expected returns.

Building Blocks for Private Real Estate



Our forecast first considers sources of cash flow returns such as after-tax underlying cash flow (net operating income - capex) yield and cash flow growth. Our initial valuation assumptions are based on current blended capitalization rates across property types nationally. Additionally, we consider valuation adjustments in the form of cap-rate changes over the forecast period. Our forecasted returns are at the property-level and are calculated on an unlevered basis.

Building Blocks for Hedge Fund Returns



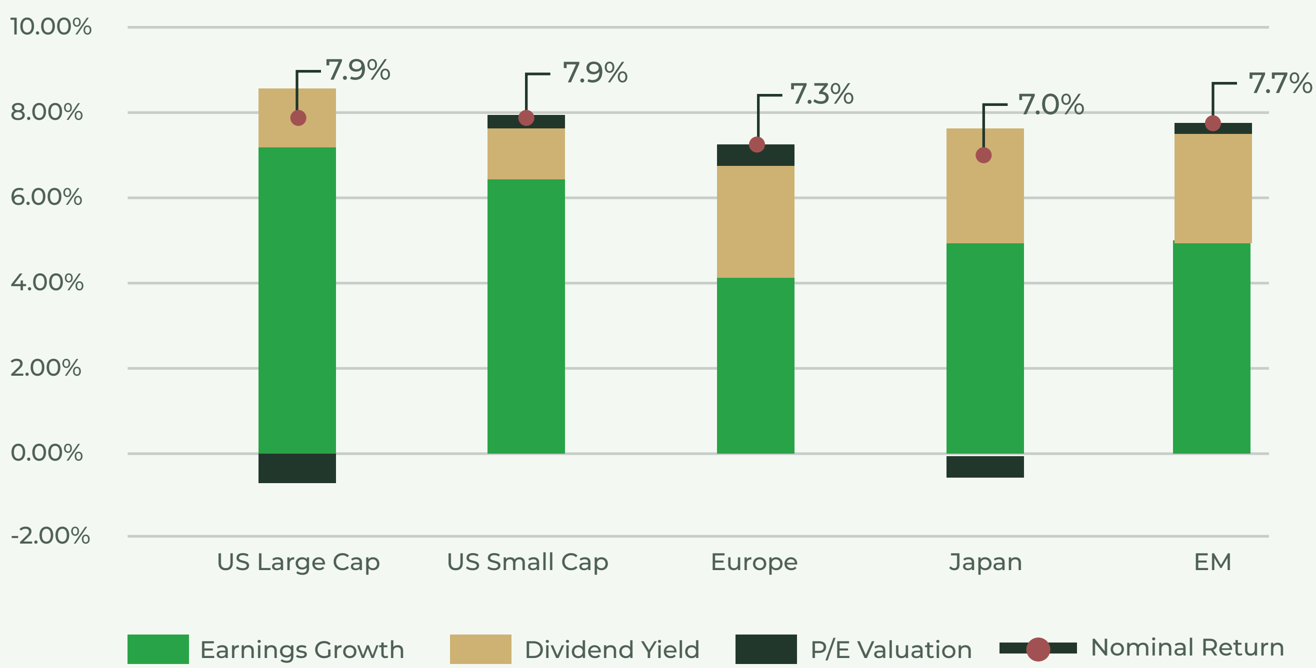
In forecasting hedge fund returns, we first decompose the industry into equity-related, credit-related, and uncorrelated hedge fund strategies. We then attempt to quantify the systemic beta-related returns for both the equity and credit-related hedge funds. Finally, we estimate manager alpha for both equity and credit-related strategies to derive total return estimates for the equity and credit-oriented hedge funds. We also assume a 5.0% annual return for uncorrelated hedge funds. Finally, we weight the three types of funds equally in forecasting a composite hedge fund industry return.

Asset Class Forecast – Sources of Return

Included below are our 7-year asset class forecasts across equities, fixed income and alternatives. We attempt to break out the sources of return across the various asset classes.

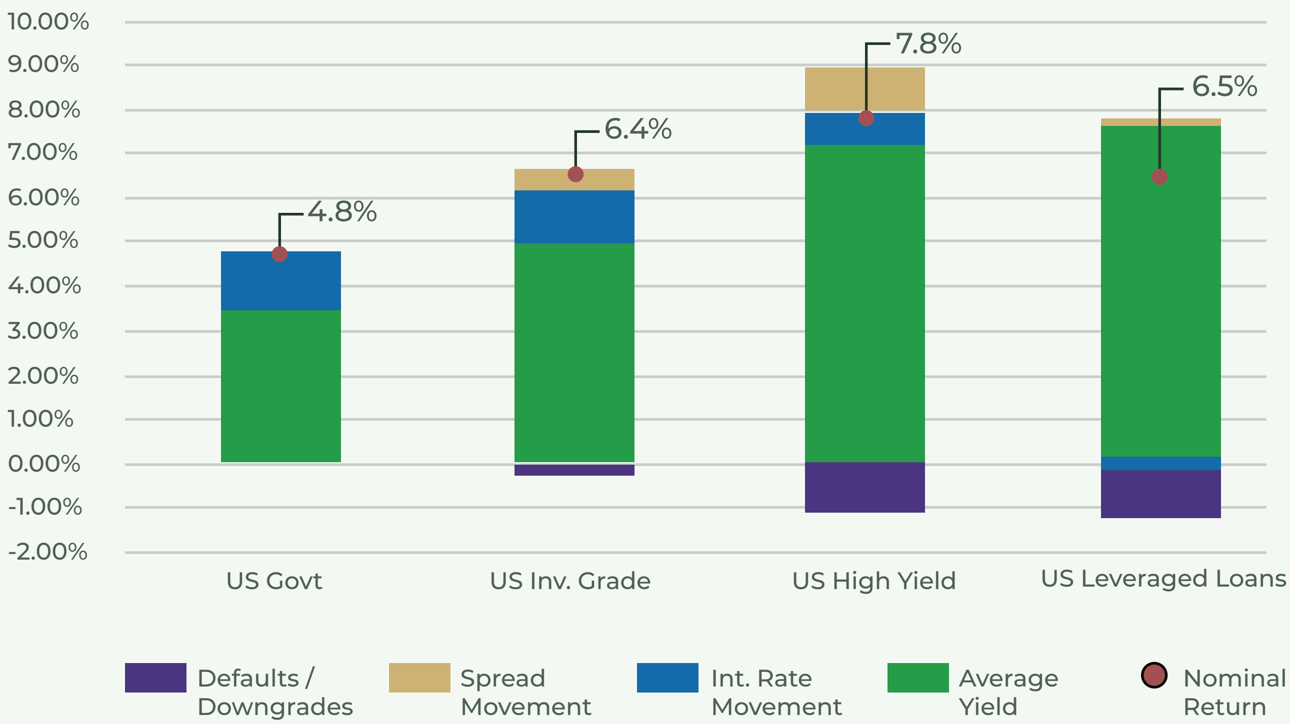
As seen below, we forecast that the majority of equity returns will be driven by relatively strong earnings growth in the US and a combination of slower earnings growth but higher dividend yields in international markets.

Public Equities – Forecasted 7-year Annual Nominal Returns

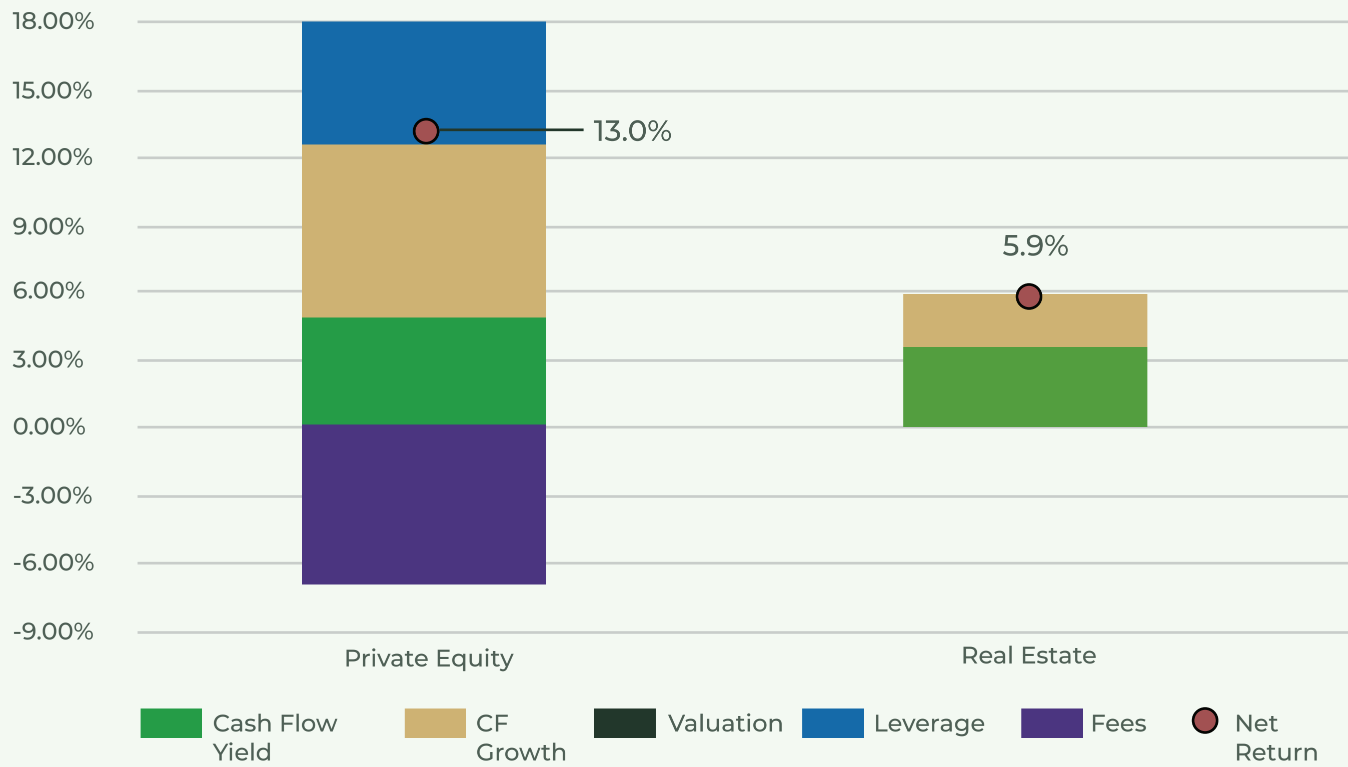


In terms of fixed income, the bulk of the return will be driven by average yields over the forecast period (which are benefitting from a relatively high starting base yield). Treasuries and investment grade corporate bonds should be benefit from interest rate movements as we expect rates to be lower at the end of the forecast period vs. present levels. Additionally, we expect spreads to compress across corporate bonds from current levels.

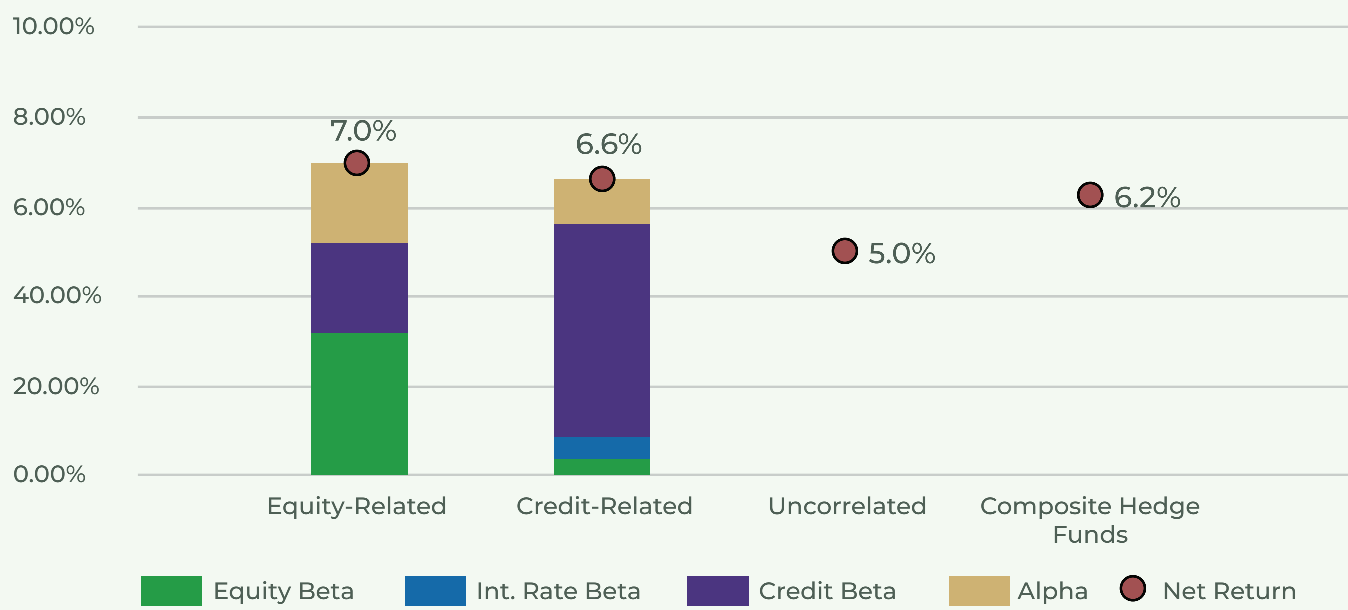
Fixed Income – Forecasted Annual 7-Yr. Nominal Returns



Forecasted Nominal Private Equity and Unlevered Real Estate Returns



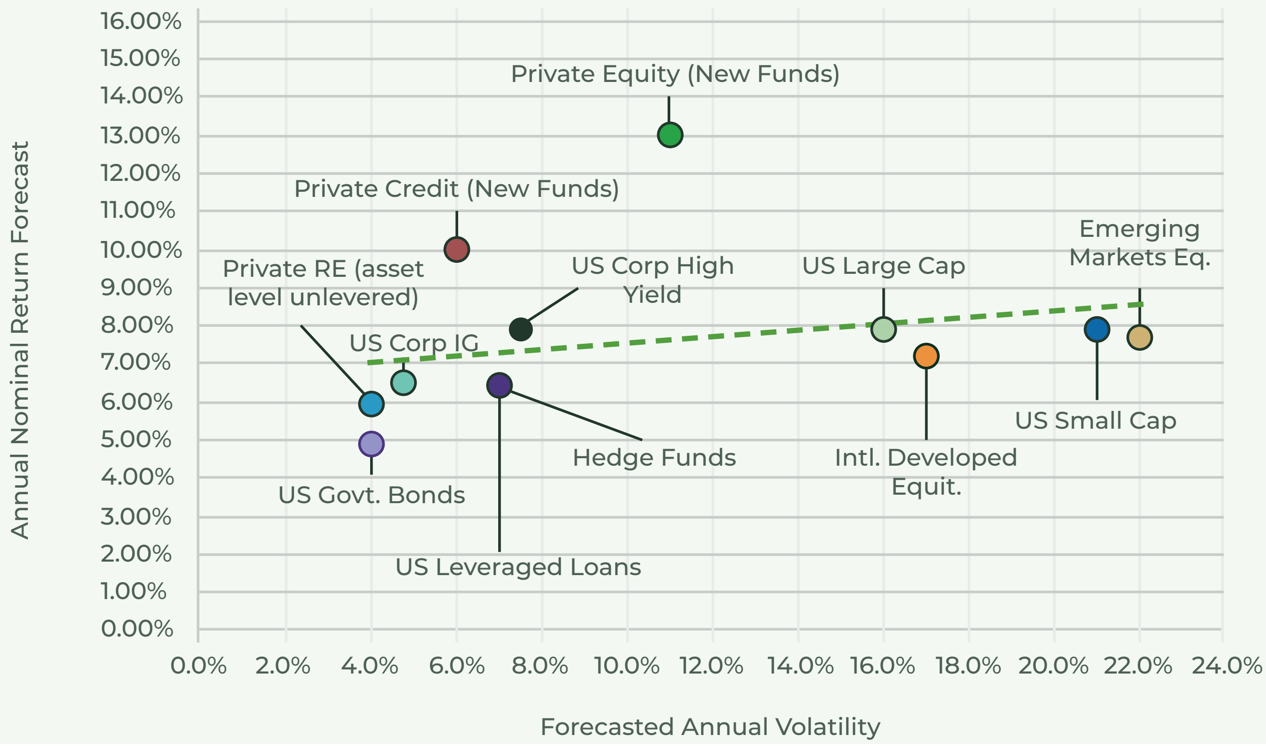
Forecasted Nominal Hedge Fund Returns



APPENDIX A

Asset Classes – Expected Returns & Volatility (BCA Strategic Outlook - Next Seven Years)

Asset Classes: Return and Risk – BCA 7-Year Forecast



Note: Private Equity, Private Credit and Private Real Estate Volatility annualized based on quarterly figures whereas other asset classes are based on monthly returns

APPENDIX B

Asset and Sub-Asset Classes – Historical Returns and Volatility

Historical Returns and Volatility Across Asset Classes (in USD)								
	Annuals Returns Across				Annual Volatility Across			
	Nov 2015 – Oct. 2022	Nov 2008 – Oct 2015	Nov 2001 – Oct. 2008	Nov 1997 – Oct. 2022	Nov 2015 – Oct. 2022	Nov 2008 – Oct 2015	Nov 2001 – Oct. 2008	Nov 1997 – Oct. 2022
Equities								
US Large Cap (S&P 500)	10.7%	13.2%	0.0%	7.9%	16.2%	14.7%	14.6%	15.8%
Small Cap (Russell 2000)	8.3%	13.2%	4.6%	7.3%	21.5%	19.4%	19.1%	20.8%
Int'l. Developed (MSCI EAFE)	2.5%	8.3%	4.0%	4.6%	15.5%	18.3%	17.3%	16.9%
Emerging Markets (MSCI EM)	2.4%	8.4%	14.2%	5.6%	17.0%	20.9%	20.0%	22.9%
World Stocks (MSCI All Country)	7.2%	10.6%	2.5%	6.4%	15.5%	16.1%	16.2%	16.0%
Fixed Income								
US Govt. Bonds	0.0%	3.7%	4.7%	3.6%	4.6%	4.0%	4.7%	4.5%
US Corporate IG	1.2%	8.8%	2.3%	4.6%	6.8%	5.2%	6.2%	5.8%
US High Yield	4.1%	13.2%	3.7%	5.9%	8.4%	8.7%	10.2%	9.3%
US Leveraged Loans	3.8%	8.7%	1.4%	4.5%	6.5%	6.2%	6.9%	6.3%
Barclays AGG Index	0.3%	5.2%	4.0%	3.9%	4.4%	3.1%	3.7%	3.7%
FTSE World Gov't. Bond	-1.4%	2.7%	6.9%	2.8%	6.5%	6.5%	7.1%	6.7%
Alternatives & Private Assets								
Hedge Funds *	3.4%	3.6%	3.7%	5.0%	4.7%	9.1%	8.3%	5.9%
Private Equity (US)**	17.2%	12.2%	13.7%	14.3%	9.7%	10.2%	11.1%	11.0%
Venture Capital (US)**	17.5%	11.8%	-1.0%	13.9%	14.2%	9.2%	12.3%	24.0%
Real Estate – Private (NCREIF)**	8.6%	5.9%	12.0%	9.4%	2.9%	7.1%	2.5%	4.5%

* Average of HFRX Global and HFRI Fund Weighted Composite indexes.
** Volatility statistics are annualized based upon quarterly data rather than monthly for other asset classes.

Sources: Bloomberg, Cambridge Associates

APPENDIX C

Historical Correlation Matrix Across Sub-Asset Classes (25-year period)

Correlation Matrix														
Asset Class	US Large Cap	US Small Cap	Global Stocks	Intl. Dev. Stocks	EM Stocks	US Govt. Bonds	US Corp Bonds	US High Yield Bonds	US Leveraged Loans	EM USD Bonds	EM Local Currency Bonds	Private Equity	Private Real Estate	Alternatives
US Large Cap	1.00	0.88	0.96	0.84	0.74	-0.23	0.32	0.65	0.48	0.49	0.57	0.80	0.17	0.60
US Small Cap	0.88	1.00	0.86	0.78	0.73	-0.37	0.15	0.66	0.50	0.44	0.50	0.82	0.08	0.64
Global Stocks	0.96	0.86	1.00	0.96	0.90	-0.25	0.42	0.77	0.58	0.65	0.70	0.80	0.13	0.71
Intl. Dev. Stocks	0.84	0.78	0.96	1.00	0.86	-0.26	0.33	0.68	0.52	0.59	0.73	0.80	0.13	0.68
EM Stocks	0.74	0.73	0.90	0.86	1.00	-0.23	0.34	0.71	0.51	0.64	0.81	0.70	-0.02	0.70
US Govt. Bonds	-0.23	-0.37	-0.25	-0.26	-0.23	1.00	0.60	-0.19	-0.36	0.25	0.08	-0.20	-0.30	-0.13
US Corp Bonds	0.32	0.15	0.42	0.33	0.34	0.60	1.00	0.54	0.33	0.69	0.56	-0.05	-0.08	0.24
US High Yield Bonds	0.65	0.66	0.77	0.68	0.71	-0.19	0.54	1.00	0.78	0.67	0.62	0.65	-0.08	0.60
US Leveraged Loans	0.48	0.50	0.58	0.52	0.51	-0.36	0.33	0.78	1.00	0.41	0.37	0.70	-0.04	0.64
EM USD Bonds	049	0.44	0.65	0.59	0.64	0.25	0.69	0.67	0.41	1.00	0.82	0.47	-0.06	0.58
EM Local Curr. Bonds	0.57	0.50	0.70	0.73	0.81	0.08	0.56	0.62	0.37	0.82	1.00	0.43	-0.10	0.54
Private Equity	0.80	0.82	0.80	0.80	0.70	-0.20	-0.05	0.65	0.70	0.47	0.43	1.00	0.53	NA
Private Real Estate	0.17	0.08	0.13	0.13	-0.02	-0.30	-0.08	-0.08	-0.04	-0.06	-0.10	0.53	1.00	0.41
Alterna-tives	0.60	0.64	0.71	0.68	0.70	-0.13	0.24	0.60	0.64	0.58	0.54	NA	0.41	1.00

Sources: Bloomberg, AlternativeSoft