



Asset Allocation Approach

for



National Christian
FOUNDATION®

September 2017

Executive Summary

NCF AND PRIME BUCHHOLZ RELATIONSHIP

The National Christian Foundation hired Prime Buchholz in 2014 to provide investment advice for its pools. Our firm was founded in 1988 and is headquartered in Portsmouth, NH, with additional offices in Boston and Atlanta. The firm is independent and works primarily with endowments and foundations. Prime Buchholz serves nearly 300 clients whose total assets are approximately \$50 billion. Since the beginning of this relationship, we have sought to streamline the investments in the pools while diversifying the portfolios in line with each pool's asset allocation targets.

- *Domestic equity* – We implemented a core low-cost index approach intended to capitalize on the efficient nature of large cap equity markets. We trimmed the number of domestic equity managers from three to two, with an active small/mid cap manager as a complement to indexed large cap equity.
- *International equity* – We added a low-cost index manager to developed markets investments, while adding an active emerging markets manager. We increased the number of managers from two to four, and added active international equity and emerging markets managers.
- *Flexible capital* – We diversified the holdings, added two managers, and liquidated one manager.
- *Real assets* – We introduced a diversified low-cost manager in balanced growth, balanced income, and moderate income pools as the core of the segment, and added an active real estate manager. Within the fixed income pool, we introduced a passive TIPS manager.
- *Fixed income* – We added low-cost index domestic fixed income investments as a complement to active managers and an active global bond manager for diversification. The cash targets in the pools are 10% to aid liquidity for donors.

OUR ASSET ALLOCATION APPROACH

We take a measured approach to asset allocation for our clients. This approach has developed over time in response to longer-term trends and themes we have identified—as opposed to reacting to shorter-term events. Our view of the effects various asset classes can have on performance and volatility has evolved from a focus on the benefits of diversification to the roles each asset class plays in protecting a portfolio against specific macroeconomic risks. To implement our asset allocation philosophy, we have developed a process that involves several steps.

We seek to determine which asset classes are appropriate for each client to consider, depending on the unique situation of each client, including return objectives and time horizons. Asset classes considered include: domestic and international equity, private equity, real estate, natural resources, commodities, TIPS, U.S. Treasury, international government, and high quality bonds.

Next, we attempt to determine the role that each asset class plays in meeting the client's goals. We believe risks to an investment program are best managed by creating portfolios that include asset classes that typically react in different ways to the state of the economy, such as unemployment, interest rates, and elections. Equity investments are the growth engine of the portfolio, while other types of investments are intended to mitigate fluctuations in the portfolio's value.

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We continue to believe a hedge fund allocation is an important part of a diversified portfolio. Hedge funds are able to employ different investment strategies than traditional asset classes because of their expanded tool set, including the use of shorting, leverage, and derivatives. Hedge funds also have the flexibility to invest across asset classes and throughout the capital structure, while traditional mutual funds may be limited by their investment mandate.

After determining the appropriate asset classes, we evaluate the relationship of asset classes to each other to seek the highest return for each level of risk. Our research team evaluates different quantitative approaches, and we have found the mean-variance optimization (MVO) approach to be the most well-established. The MVO approach seeks to determine the asset class weights that provide the highest potential return for a given level of risk, as measured by standard deviation (volatility).

Before recommending asset allocation targets, we compare the results of various asset allocation mixes to help determine which mix should best fulfill each client's unique needs consistent with their desired level of risk. Liquidity needs are important determinants in creating an optimal asset allocation strategy.

After the optimal asset allocation targets have been met, we regularly monitor the portfolio so clients may rebalance the portfolio to stay in line with its guidelines. In the face of a fundamental change in the client's circumstances, or a structural shift in the financial markets, we will re-evaluate our asset allocation recommendations.

A summary of our steps is listed below.

Step	Action
1	Determine which asset classes are appropriate for each client to consider.
2	Determine the role that each asset class plays in meeting the client's long-term goals.
3	Establish a reasonable, long-term relationship for each asset class versus its history as well as its relationship to other asset classes.
4	Measure the expected return of various portfolio mixes, using a mean-variance calculation.
5	Rebalance the portfolio back to a neutral policy allocation in the absence of fundamental change.

The Prime Buchholz Asset Allocation Approach

STEP 1: DETERMINE WHICH ASSET CLASSES ARE APPROPRIATE FOR EACH CLIENT TO CONSIDER.

Asset classes are chosen by working with each client to develop a thorough understanding of the unique characteristics of each investor, including the following:

- Return goals
- Liquidity constraints
- Liabilities
- Time horizon
- Tolerance for short-term deviations in market value
- Restrictions/covenants

STEP 2: DETERMINE THE ROLE THAT EACH ASSET CLASS PLAYS IN MEETING THE CLIENT'S LONG-TERM GOALS.

We believe macro risks to an investment program are best hedged by thoughtfully creating a structure that includes asset classes that react in different ways to these factors.

A consistent and disciplined approach to maintaining the policy portfolio has the potential to dramatically increase the probability of the investment program's long-term success.

Real Growth

- Global equity and private equity

Inflation Hedge

- Real estate, natural resources, commodities, and TIPS

Dollar Hedge

- Un-hedged international government bonds

Deflation Hedge

- U.S. Treasuries/high quality non-callable bonds

Flexible Capital

- Absolute return
- Hedged equity

The Prime Buchholz Asset Allocation Approach

STEP 3: ESTABLISH A REASONABLE, LONG-TERM RELATIONSHIP FOR EACH ASSET CLASS VERSUS ITS HISTORY AS WELL AS ITS RELATIONSHIP TO OTHER ASSET CLASSES.

When developing the asset allocation mix for the portfolio, a key decision is determining which quantitative approach should be applied to create a portfolio with the highest probability of meeting these goals. The mean-variance optimization (MVO) approach to strategic asset allocation is one of the most well-established practices used today. Based on modern portfolio theory, MVO determines the asset class weights that provide the highest expected return for a given level of risk, as measured by standard deviation. Setting appropriate capital market assumptions is an important component of the MVO process.

We believe that one of the first steps in building assumptions should be to define an asset class. It is important for selected asset classes to have ample size and characteristics able to drive a unique risk-return profile. There should be limited overlap between the security characteristics and return drivers, to help ensure the asset classes are mutually exclusive. Chosen asset classes benefit from or provide protection against specific macroeconomic factors. This aligns with our philosophy of building portfolios that provide for growth while insulating from economic risks and limiting correlations among risk exposures. Asset classes should represent opportunities investors can access and prudently implement in a well-diversified portfolio.

STEP 4: MEASURE THE EXPECTED RETURN OF VARIOUS PORTFOLIO MIXES, USING A MEAN-VARIANCE CALCULATION.

When developing portfolio recommendations for clients, we prepare customized asset allocation models designed to meet the unique objectives and requirements of each client.

Based on MVO and our internally developed capital market inputs, we employ quantitative modeling of various asset allocation mixes to assist in determining which mix will best fulfill each client's unique needs, consistent with their desired level of risk. Our modeling measures the impact of asset allocation and the spending needs on fund growth and allows clients to plan for future spending needs. The timing and amount of a client's spending needs, in conjunction with any special provisions or restrictions, are important determinants in creating an optimal asset allocation strategy.

We measure how both risk and return in the portfolio are allocated—not simply how the assets are allocated. We also assess how the various models have historically reacted to periods of stress. This output creates a framework for decisions to be made from both a return and risk standpoint.

The modeling process and the discussions regarding the output leads to the setting of the policy portfolio, which represents the long-term asset mix that we believe has the highest probability of meeting the institution's long-term goals given its risk tolerance. The policy portfolio, while dynamic over the long term, should be insulated from insights about the direction of the markets or the valuation level of any asset class to protect against potentially costly market timing mistakes.

The Prime Buchholz Asset Allocation Approach

STEP 5: REBALANCE THE PORTFOLIO BACK TO A NEUTRAL POLICY ALLOCATION IN THE ABSENCE OF FUNDAMENTAL CHANGE.

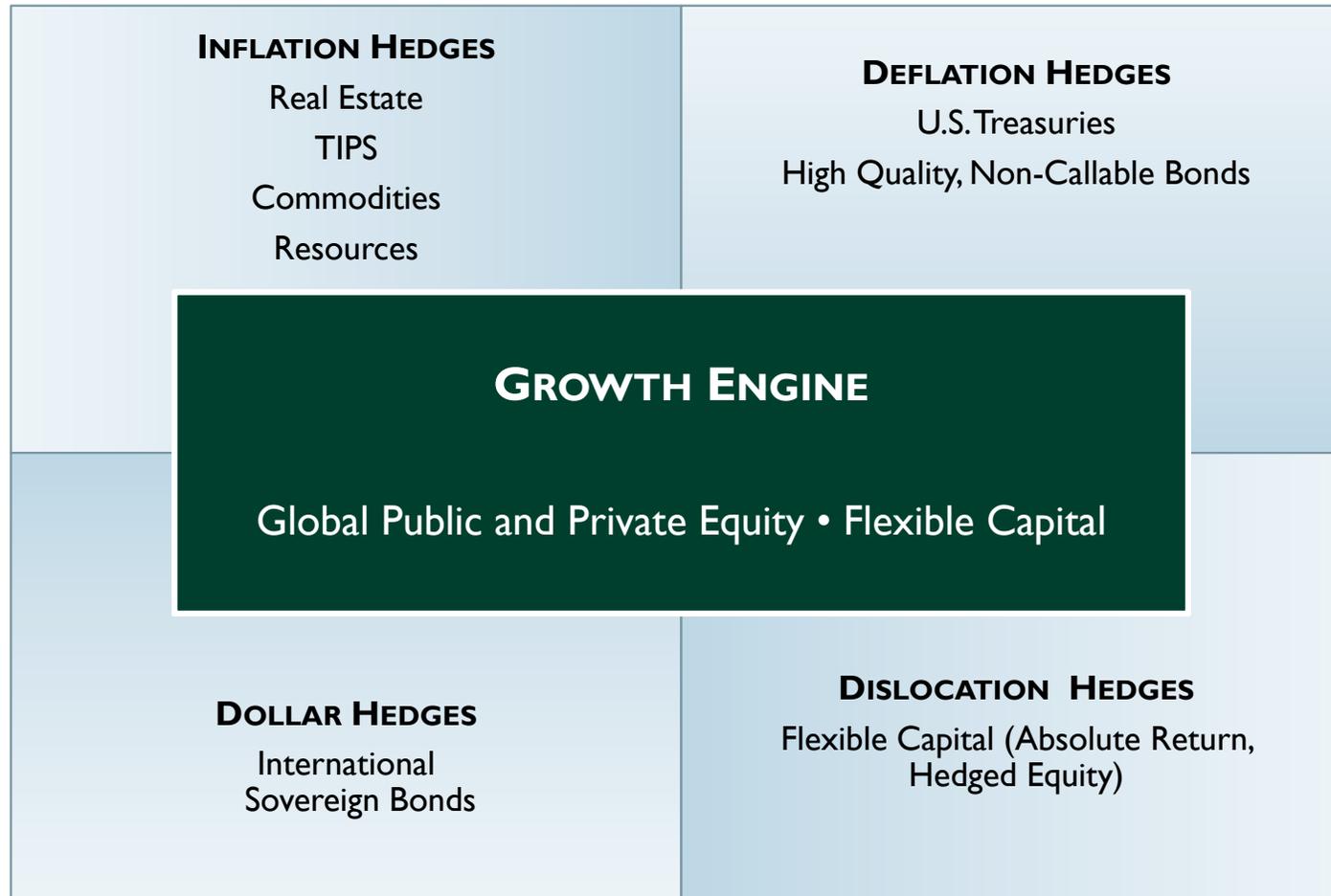
Rebalancing the portfolio within policy ranges (when market movement or cash flows provide the opportunity) is a key element of the asset allocation process. The discipline of rebalancing obliges an investor to sell high and buy low when the investor's emotions might dictate otherwise.

The asset classes included in a diversified investment program may change as the financial markets evolve. Therefore, the policy portfolio can change strategically. However, in striving to protect against potentially costly market timing mistakes, policy adjustments should be driven by changes to the needs of the institution or significant developments in the marketplace—not simply based on current valuations.

Policy target ranges built into the client's investment policy statement allow clients to take advantage of favorable markets while maintaining the discipline of rebalancing the portfolio within a predetermined range of the policy targets. On an annual basis, we believe it is sound practice for investment committees to perform a thorough review of the investment program, including return goals, risk tolerance, spending rates, restrictions/covenants, timing of liquidity needs, portfolio construction, and implementation, as well as capital market assumptions.

Philosophy of an Investment Program

Build the growth engine, but seek to protect it with hedges.



Important: Hedges are not a predictor of events ... but they may serve as a protector against extreme negative events.

NCF Asset Allocation Targets by Pool

Asset allocation guidelines were established at the beginning of our relationship with the National Christian Foundation. The targets are intended to achieve each pool's long-term return expectations while minimizing risk. They are monitored by Prime Buchholz and the Foundation's management team.

			Growth Pool (70% Equity)	Balanced Growth Pool (50% Equity)	Balanced Income Pool (35% Equity)	Moderate Income Pool (25% Equity)	Fixed Income Pool
Equity-Like	Equity	<i>Domestic Public Equity</i>	35.0	25.0	17.5	12.5	0.0
		<i>Non-U.S. Developed Equity</i>	22.0	15.0	11.0	7.5	0.0
		<i>Emerging Markets Equity</i>	13.0	10.0	6.5	5.0	0.0
	Flexible Capital	<i>Long/Short and Absolute Return</i>	5.0	15.0	15.0	20.0	7.5
	Real Assets	<i>Natural Resources (Public & Private)</i>	0.0	2.5	5.0	2.5	0.0
<i>Real Estate (Public & Private)</i>		5.0	5.0	5.0	2.5	0.0	
<i>U.S TIPS</i>		0.0	2.5	2.5	5.0	5.0	
Bond-Like	Credit	<i>Core Bond</i>	2.5	8.0	13.5	18.0	37.5
	Deflation/Dollar Hedge	<i>Sovereign Debt</i>	7.5	7.0	14.0	17.0	40.0
	Liquidity	<i>Cash (T-bills)</i>	10.0	10.0	10.0	10.0	10.0
	Total:		100.0	100.0	100.0	100.0	100.0

Statistical Output (%)	Growth Pool (70% Equity)	Balanced Growth Pool (50% Equity)	Balanced Income Pool (35% Equity)	Moderate Income Pool (25% Equity)	Fixed Income Pool
Expected Real Return (Arithmetic)	5.2	4.7	4.1	3.7	1.6
Expected Standard Deviation	14.9	12.4	9.8	8.2	5.9
Expected Real Return (Geometric)	4.2	4.0	3.6	3.4	1.5
Sharpe Ratio	0.35	0.38	0.42	0.45	0.28
Historical Real Return (Arithmetic)	6.8	6.7	6.2	6.0	4.1
Historical Standard Deviation	13.3	10.8	8.5	6.9	5.4
Historical Real Return (Geometric)	6.0	6.2	5.9	5.8	3.9

Notes: Expected return/risk using 10-15 year Prime Buchholz asset class assumptions.

Historical data based on index returns from January 1, 1988 through December 31, 2015.

Assumptions*

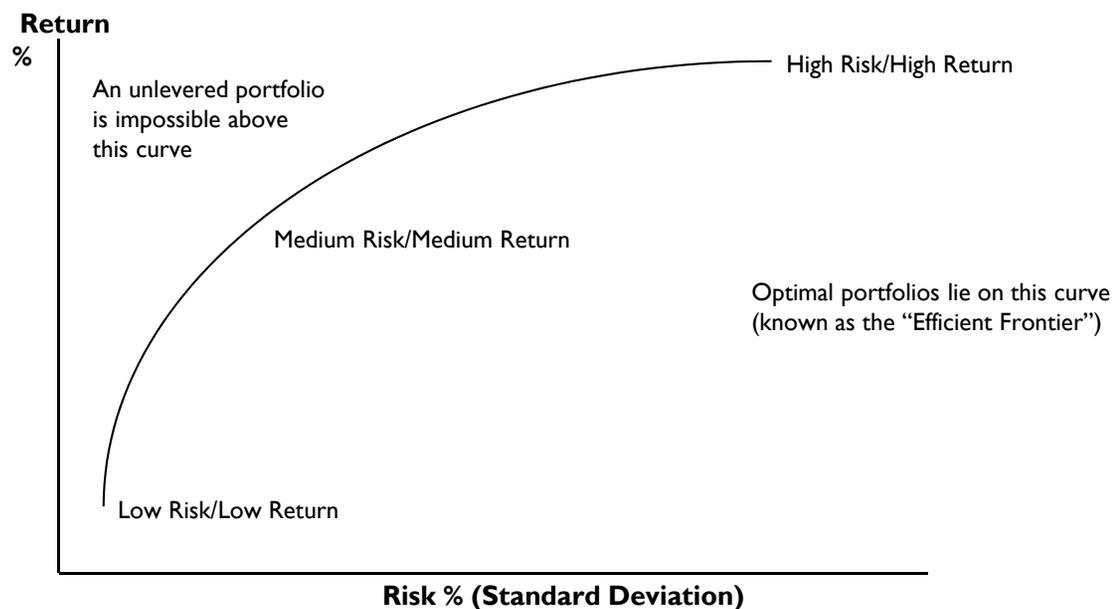
Risk Factor/Purpose	Asset Class	Long-Term			Liquidity		
		Expected Real Return (Arithmetic)	Expected SD	Expected Real Return (Geometric)	Full (daily, mo.)	Semi (qtrly, annual)	Illiquid (>1 Yr)
Equity	Domestic Public Equity	6.0%	18.0%	4.5%	x		
	Non-U.S. Developed Equity	6.0%	20.0%	4.2%	x		
	Emerging Markets Equity	8.0%	26.0%	5.0%	x		
	Global Private Equity	9.8%	28.0%	6.3%			x
Flexible Capital	Long/Short and Absolute Return	4.8%	10.0%	4.3%		x	
Real Assets	Natural Resources (Private)	9.8%	30.0%	5.9%			x
	Natural Resources (Public)	6.8%	22.0%	4.6%	x		
	Commodities	5.0%	20.0%	3.2%	x		
	Real Estate (Private)	7.8%	26.0%	4.7%			x
	Real Estate (Public)	6.3%	22.0%	4.0%	x		
	U.S. TIPS	0.5%	5.0%	0.4%	x		
Credit	Core Bond	1.5%	6.5%	1.3%	x		
	Long Gov/Corp	2.0%	11.0%	1.4%	x		
	High Yield	4.5%	11.0%	3.9%	x		
	Municipal Bonds	1.0%	7.5%	0.7%	x		
Sovereign Debt	U.S. Treasuries (long-term) - 5+ years	1.3%	10.0%	0.8%	x		
	Non-US Government Bonds	1.3%	10.0%	0.8%	x		
	Emerging Markets Debt	2.8%	12.0%	2.1%	x		
Liquidity	Cash (T-bills)	0.0%	2.0%	0.0%	x		

Inflation Indicators			
Implied Inflation (10-Year Treasury/TIPS Spread)	1.6%	as of 11/30/2015	(Bloomberg)
Long-Term U.S. Inflation Average	2.9%	1926 – 2015	

* Assumptions are designed to be appropriate over a 10-15 year period, reviewed annually in the context of interest rates, inflation, and premiums.

Glossary

- **Annualized Return** is the geometric average return, which is annualized based on historical data. This is the return that, when compounded over the time period analyzed, will equal the actual cumulative wealth achieved during this time period.
- The **Arithmetic Mean Return** is an average of the sub-period returns, calculated by summing the sub-period returns and dividing by the number of sub-periods.
- **Beta** defined as the measure of an asset's risk in relation to the market (for example, the S&P 500) or to an alternative benchmark. According to asset pricing theory, beta represents the type of risk, systematic risk, that cannot be diversified away. When using beta, there are a number of issues that you need to be aware of: (1) betas may change through time; (2) betas may be different depending on the direction of the market (i.e. betas may be greater for down moves in the market rather than up moves); (3) the estimated beta will be biased if the security does not frequently trade; (4) the beta is not necessarily a complete measure of risk (you may need multiple betas). Also, note that the beta is a measure of co-movement (patterns of positive correlation of returns), not volatility. It is possible for a security to have a zero beta and higher volatility than the market.
- **Correlation** is the statistical measure of the degree to which the movements of two variables are related.
- The **Efficient Frontier** is a line created from the risk-reward graph, comprised of optimal portfolios.



Sources: Bloomberg,

Glossary (cont'd.)

- The **Geometric Mean Return**, also called the time-weighted rate of return, is a measure of the compound rate of growth of the initial portfolio market value during the evaluation period, assuming that all cash distributions are reinvested in the portfolio. It is computed by taking the geometric average of the portfolio subperiod returns.
- The **Optimal Portfolio** is defined as an efficient portfolio most preferred by an investor because its risk/reward characteristics approximate the investor's utility function. A portfolio that maximizes an investor's preferences with respect to return and risk.
- The **Risk-Free Rate of Return** is a theoretical rate of return of an investment with zero risk. The risk-free rate represents the interest an investor would expect from an absolutely risk-free investment over a specified period of time.
- **Semi-Variance Below the Mean** uses the mean return as the target return. The Semi-Standard Deviation is simply the square-root of the semi-variance. Semi-variance characterizes the downside risk of a distribution and focuses on the portion of risk that is below (to the left of) the mean or a specific target. For example, if your target return is 4%, the semi-variance describes the variance of the data points below (to the left of) the specified target return of 4%. The semi-variance (standard deviation) is always lower than the total variance (standard deviation) of the distribution.
- **Standard Deviation** is the square root of the Variance. The most widely used measurement of variation about a mean and, for many purposes, a proxy for risk.
- **Sharpe Ratio** measures the efficiency, or excess return per unit of volatility, of a manager's returns. The Sharpe Ratio evaluates managers' performance on a volatility-adjusted basis. It is a portfolio's Annualized Return less the Annualized Risk-Free Rate (the excess return), divided by the portfolio's Annualized Standard Deviation.
- **Variance** is a measure of the volatility of return and is computed as an average squared deviation of return from the mean value of the return.

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