Diversification risks of Canadian hedge fund strategies

Author: **Dr. Gareth Witten**,
Executive-in-Residence, Global Risk Institute

GLOBAL RISK INSTITUTE

Large institutions have become increasingly disappointed with hedge funds. [1]

Institutional investors have been struggling to understand how alternative assets may fit into their portfolios, leaving them asking "Why Hedge Funds?" in a recent CFA publication [2]. According to the Editor,

> *"In hindsight, it is quite understandable that institutional investors are fleeing hedge funds, which provided neither the high returns nor the protection from downside risk that were promised to investors before the financial crisis"*

One plausible reason for equity, bonds, real estate and private assets performing relatively well following the global financial crisis, whereas cash and hedge fund assets have not, is that long-duration assets have benefitted tremendously from falling discount rates. Falling discount rates have increased the present value of long duration assets, however, not necessarily the cash flow of these assets. [3] The risk of the discount rate increasing too quickly could be severe for an institutional portfolio that consists of a combination of long-duration assets (say, some combination of stocks, bonds, real estate and private equity). A shift by institutions into shorter duration assets such as hedge funds may be a good tactic, but investors will need to carefully consider the risks of adding Canadian hedge fund strategies into a multi-asset portfolio because some of these strategies may not behave differently during the same market conditions. In this paper, we examine the strategies that minimize downside risk when traditional market indices decline, and the strategies that most uncorrelated to those broad market indices and other hedge fund strategies.

There are three additional points worth highlighting. Firstly, the term "hedge fund" does not refer to a homogenous asset class; hedge funds have very disparate strategies. Research [4] on US hedge funds have shown that about 20% of the cross-sectional dispersion of annual hedge fund returns can be attributed to strategy style. What this implies is that about a quarter of annual hedge fund returns can be explained by strategy, promoting the need for better classification schemes and/or due diligence processes. Secondly, diversification across hedge funds is no protection from hedge fund tail risk. We saw this during the global financial crisis. This is equivalent to diversifying into offshore equity when the general equity market at home experiences a significant decline. Thirdly, large institutions are asking whether hedge funds are simply a thinly veiled ploy to better structure performance fees in an industry where traditional mutual fund margins are under extreme pressure, partly because of the popularity of passive products.

Research has shown that Canadian hedge funds have performed better, on average, than European and US hedge funds. [5] However, given that discount rates are rising, which Canadian hedge fund strategies will provide enough diversification benefit relative to more traditional asset classes?

1 For an example: The Economist article, "A losing bet: Hedge Funds haven't delivered on their promise", May 7, 2016

2 Stephen J. Brown. "Why Hedge Funds ", Financial Analysi Journal, Vol 72 (6), November/December 2016.

3 CIO, "Now is the Time for Hedge Funds", August 10, 2016.

4 Stephen J. Brown and William N. Goetzmann. "Hedge funds with style", Journal of Portfolio Management, Winter 2003: 101 – 112.

5 Klein, P., Purdy, D., Schweigert, I., Vedrashko, A., "The Canadian Hedge Fund Industry: Performance and Market Timing", International Review of Finance, (2015). 15(3), pp. 283-320.

In this brief article we present results from an initial study that asks the following:

1. *Where is the value-add coming from for Canadian hedge funds? Have Canadian hedge funds provided investors with sufficient downside protection under different market conditions? The risk to an institution selecting a hedge fund strategy based on its long-term beta to a broad market index is that it does not reflect how a strategy protects the downside under various market conditions and within different market cycles.*

2. *How correlated are sources of alpha within the Canadian hedge fund universe? Do Canadian hedge fund strategies have exposure to the same broad underlying bets? The risk of not understanding the broad drivers/risk factors of various hedge fund strategies is investing in different hedge fund strategies with the same underlying bets?*

3. *How correlated are fund strategies within the Canadian hedge fund universe? How does a large institutional investor deal with highly correlated hedge fund styles? If there is more diversification in hedge fund strategies, then allocating capital to a hedge fund strategy may be a good challenge.*

DATA

We use monthly data from January 2003 to January 2018 provided by BullWealth. The definition of each strategy is given in the appendix (Appendix 1). The indices cover approximately 150 active funds (300 since inception). The strategy indices are created by equally weighting funds in each strategy and returns are net after-fee returns. In the analysis we used a rolling beta. The average one-year, two-year and three-year betas were significant for the data used. Note that the cross-sectional averaging creates a smoothing effect so that the index (strategy) series may not fully characterize the behaviour of individual funds or the full range of funds within a given category. It should also be noted that the smoothing effect may be further exacerbated by the selection biases in the return collection process. Going forward, we will use the following acronyms for each of the hedge fund strategies and indices. These include hedge fund strategies and market indices.

ACRONYMS FOR EACH OF THE HEDGE FUND STRATEGIES AND INDICES.

BW Canadian Hedge Fund Index	*CHFI*
BW Multistrategy Index	*MS Index*
BW Equity Market Neutral Index	*MN Index*
BW Fixed Income Index	*FI Index*
BW Event Driven Index	*ED Index*
BW Equity L/S Index	*L/S Equity*
MBW Equity Hedge Sub-Index	*Ehedge Index*
BW Equity Directional Sub-Index	*EquityD Index*
BW Global Macro Index	*Gmacro Index*
BW Managed Futures Index	*MF Index*
BW Canadian Hedge Fund Index ex-Equity Directional	*HFlexD Index*
S&P 500	*S&P 500*
S&P/TSX	*TSX*
MSCI World	*MSCI World*
MSCI Emerging	*MSCI Emerging*
CRB Commodity Index	*CRB Comm*
BoA Merrill Lynch Global Govt Bond Index	*BoAGGov*
BoA Merrill Lynch Global Corp Bond Index	*BoAGCorp*

Please note that the cross-sectional averaging creates a smoothing effect so that the index (strategy) series may not fully characterize the behaviour of individual funds or the full range of funds within a given category.

It should also be noted that the smoothing effect may be further exacerbated by the selection biases in the return collection process. **Going forward, we will use the following acronyms for each of the hedge fund strategies and indices.** These include hedge fund strategies and market indices.

Let’s examine each of the above questions.

WHERE DOES THE VALUE-ADD FOR CANADIAN HEDGE FUNDS COME FROM?

This question can be easily answered by computing the mean and variance of the sensitivity of each hedge fund strategy (beta) to a market index. The beta measure captures both the covariance and variance of each strategy with a general (relevant) market index. Previous research[6] reported that the correlation of the HFRI index and the S&P index was relatively stable since the global financial crisis and the beta (on a 2-year basis) was low (0.21). This contrasts with Canadian hedge funds where the average rolling 2-year correlations to the S&P/TSX Composite Index for this dataset is 0.85. Our analysis shows that a large part of the high beta comes from the variance term. When we examine the cross-sectional volatility across hedge fund styles (not including equity sub-indices) we find that the average 2-year rolling cross-sectional volatility declined over the data period. What this tells us is that there is, in aggregate, little variation between Canadian hedge fund styles and that the variation has declined over the period of the data. Table 1 shows the 1-year, 2-year and 3 year rolling betas relative to their respective general market index. Table 2 shows the standard deviation of exposures across betas.

6 *Ibid, "Why Hedge Funds. Financial Analysts Journal",*

Table 1. Hedge fund strategies and their exposures (betas) to equity or fixed interest benchmarks.
Note: Only the beta for the FI Index strategy is calculated relative to the FTSE TMX Universe Index

Average beta	CHFIMS	MS Index	MN Index	FI Index	ED Index	L/S Index	Ehedge Index	EquityD Index	Gmacro	MF Index	HFexD Index
12 Months	0.70	0.60	0.09	0.02	0.69	0.80	0.65	0.79	-0.08	0.06	0.50
24 Months	0.73	0.64	0.09	0.03	0.74	0.83	0.67	0.83	-0.11	0.01	0.51
36 Months	0.73	0.66	0.09	0.03	0.75	0.85	0.67	0.84	-0.12	0.00	0.51

Table 2. Hedge fund strategies and the standard deviation of exposures (betas) to equity or fixed interest benchmarks.
Note: Only the beta for the FI Index strategy is calculated relative to the FTSE TMX Universe Index

Std. dev. Beta	CHFI	MS Index	MN Index	FI Index	ED Index	L/S Index	Ehedge Index	EquityD Index	Gmacro	MF Index	HFexD Index
12 Months	0.35	0.68	0.52	1.20	0.51	0.30	0.39	0.36	1.20	1.20	0.45
24 Months	0.24	0.51	0.34	1.01	0.26	0.17	0.28	0.23	0.86	1.06	0.37
36 Months	0.18	0.42	0.29	0.79	0.20	0.12	0.21	0.17	0.70	0.91	0.31

THERE ARE A FEW THINGS TO OBSERVE FROM THE ANALYSIS:

- *The hedge fund FI strategy has low beta and is therefore not benchmarked to the FTSE TMX Universe Index. However, the variation of the beta is significant over short periods and declines over longer periods. This implies that despite the average beta being low, there is significant tilts towards the benchmark over short periods. Further analysis shows that the tilt towards the benchmark (higher beta) occurs when the general fixed interest market is negative (on a 12 month basis).*
- *Global Macro, Managed Futures and Market Neutral strategies are close to market neutrality. However, the variation of the betas is significant in Global Macro and Managed Future strategies. This makes sense, since we expect the Market Neutral funds to remain essentially market neutral, which they do, but Global Macro and Managed Futures strategies exhibit variation from neutrality. Further examination indicates that the Managed Futures and Global Macro strategy tend to tilt towards the market (higher beta) when the general equity market declines (over a 12-month period). This is not the case for Market Neutral strategies, which implies that these strategies remain market neutral during general equity market declines and rallies.*
- Long-short equity funds are less concerned with the condition of neutrality and has a beta closer to that of the equity market, which is expected. However, a surprising result is how high the betas were over the different time periods examined. This indicates that most of the Long/Short equity hedge funds were, on average, exposed to the general equity market.

Of all the major hedge fund strategies, the Market Neutral strategy seems like the most aligned to a pure alpha play. This is followed by the Managed Futures and Global Macro strategies, but this is only under certain conditions given the fact that its beta variation from neutrality is so high. The next question to ask is whether Canadian hedge funds provided investors with sufficient downside protection under different market conditions?

HAVE CANADIAN HEDGE FUNDS PROVIDED INVESTORS WITH SUFFICIENT DOWNSIDE PROTECTION?

We want to examine the protective properties of Canadian hedge funds when the underlying equity (or fixed interest) market reported negative returns. We do expect a priori that long-biased hedge funds will not reduce its beta during market declines, however, we do expect Market Neutral funds not to be impacted by market declines and for Managed Futures strategies to find some value in a declining market. Table 3 below shows the average beta, upside beta (beta when the relevant market index is positive), downside beta (beta when the relevant market index is negative).

The results show that Long/Short hedge funds have a high beta bias towards the general equity market in all markets. This also applies to the Equity Hedge Sub-index. We find that Multistrategy, Event Driven and Long/short hedge funds strategies exhibit an amplified beta in falling markets leaving these strategies riskier in bear (negative) markets. We also conclude from this brief analysis that Market Neutral, Global Macro and Managed Futures strategies provided the best protective properties over the period under investigation.

Table 3. Average betas of hedge fund strategies over 12 months in up and down markets.

Beta	CHFI	MS Index	MN Index	FI Index	ED Index	L/S Index	Ehedge Index	EquityD Index	Gmacro	MF Index	HFexD Index
Average	0.70	0.60	0.09	0.02	0.69	0.80	0.65	0.79	-0.08	0.06	0.50
Upside	0.64	0.43	0.03	0.01	0.65	0.78	0.64	0.78	-0.09	-0.21	0.44
Downside	0.71	0.62	0.09	-0.05	0.71	0.81	0.65	0.81	-0.11	0.07	0.50
Does this have protective properties?	NO	NO	YES	N/A	NO	NO	NO	NO	YES	YES	NO

WHERE DO THE RETURNS AND DIVERSIFICATION COME FROM?

In the previous section we have seen that, in general, hedge fund strategies in Canada have been true to their stated mandates. In this section, we continue to ask the following questions:

1. *How correlated are sources of alpha within the Canadian hedge fund universe? Do Canadian hedge fund strategies have exposure to the same underlying bets?*
2. *How correlated are fund strategies within the Canadian hedge fund universe? How does a large institutional investor deal with highly correlated hedge fund styles? If there is more diversification in hedge fund strategies, then allocating capital to a hedge fund strategy may become a challenge.*

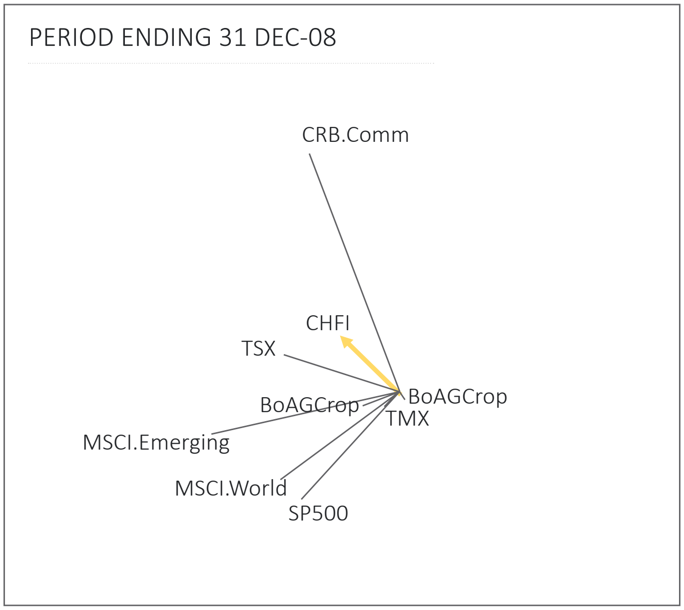
These are typical questions that should form the basis of any due diligence process of hedge funds. To address these questions, we investigate below using a visualization technique called biplots.[7]

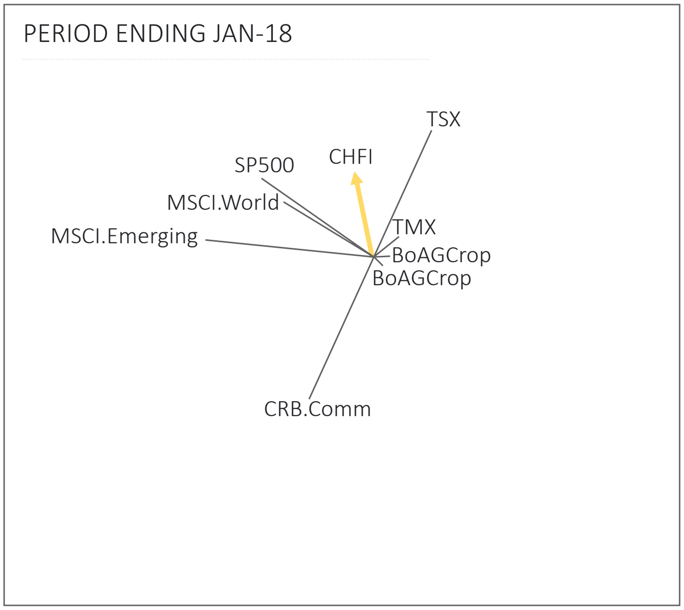
Firstly, let's provide some basics of how to interpret biplots: the angles are represented as the correlations and the lengths of the lines as the variance of the returns. What this means is that an angle of 90 degrees represents a correlation of 0, an angle of 180 degrees a correlation of-1 and an angle of 0 degrees a correlation of 1. This brief analysis was done over a rolling 12-month period using all the data. We used data from January 2003 till January 2018 (181 months).

7 *Gabriel, K.R., The biplot graphical display of matrices with application to principal component analysis, Biometrika, (1971). 58, 453–467.*

Figure 1. Biplot of data matrix over different time periods.

The length of the vector represents the variability of the strategy and the angle between them represents the correlation between strategies. The gold vector represents the BW Canadian Hedge Fund Index.



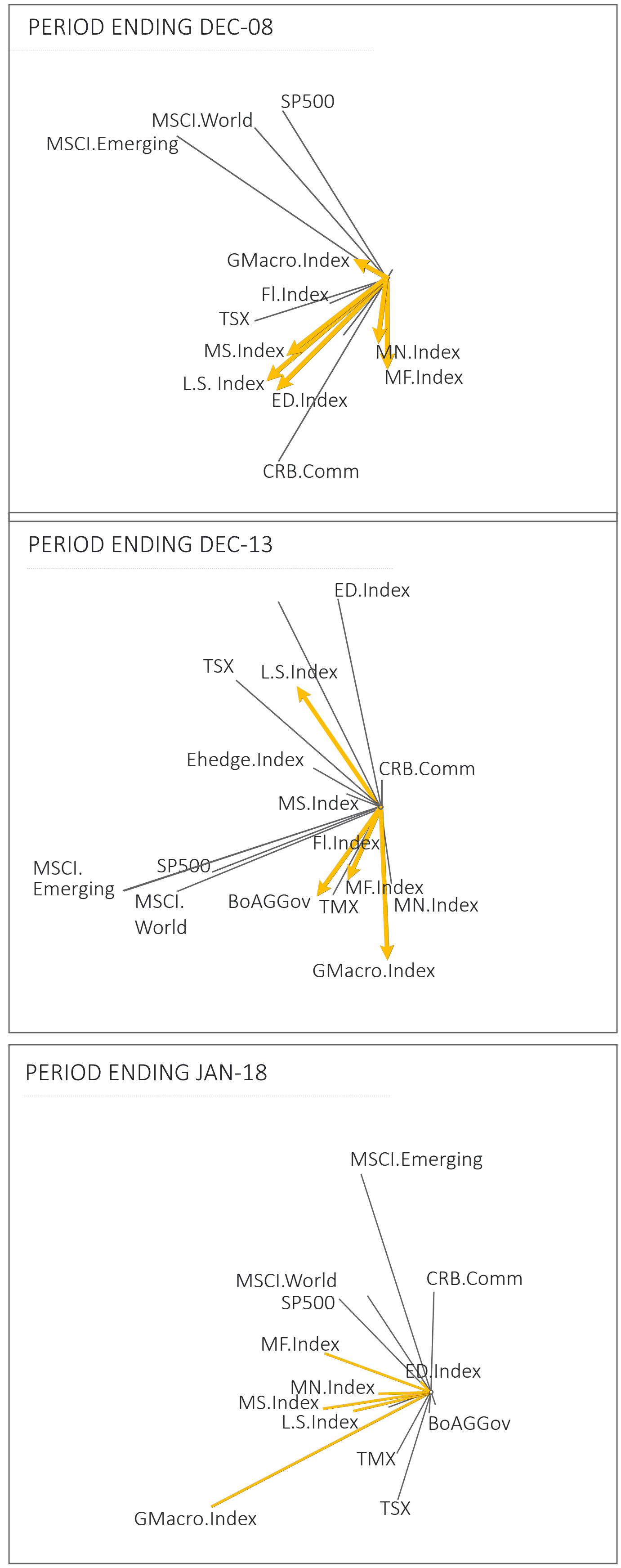


BW CANADIAN HEDGE FUND INDEX

More recently (past 12 months), we see that the broad hedge fund index was negatively corelated with the commodity index and somewhat positively correlated with the broad equity markets (both S&P 500 and TSX Index). What this tells us is that the aggregate hedge fund index had exposure to the general equity market over this period but negatively correlated to commodities. This is different from their aggregate exposure during the 2008 financial crisis where Canadian hedge funds, in aggregate, were correlated to the commodity index and general equity market index. Over both time periods the hedge fund index showed less variability than the general equity market index.

Figure 2. Biplot of data matrix over different time periods.

The length of the vector represents the variability of the strategy and the angle between them represents the correlation between strategies. The gold vectors represent some of the hedge fund strategies.



BW MULTISTRATEGY INDEX

During the global financial crisis this strategy was highly correlated with the Long/Short equity strategy and the general equity market index. This strategy maintained its exposure for the period ending December 2013 and over the past year (period ending January 2018). This implies a large exposure to the general equity market under different market conditions.

BW EQUITY MARKET NEUTRAL INDEX

This strategy provides no correlation to the general equity market index over all periods examined. As mentioned above, the Market Neutral strategy provides good protective properties relative to the general equity index during different market conditions.

BW FIXED INCOME INDEX

This market strategy does provide reasonable correlation with the general fixed interest market index.

BW EVENT DRIVEN INDEX

This strategy provides very little (if any) correlation to the Global Macro strategy. The strategy has mostly been correlated with the CRB Commodity Index over different market conditions, implying that these strategies are exposed to opportunities within commodities.

BW EQUITY L/S INDEX

The Long-Short index is strongly correlated with the general equity market index. Over different periods see saw that this strategy exhibited no correlation with the S&P 500 and the MSCI Emerging Market index.

BW GLOBAL MACRO INDEX.

Over the past 12 months, this strategy was not correlated with the Emerging Markets besides during the global financial crisis. The strategy is currently correlated with the Long/Short Equity Index strategy.

BW MANAGED FUTURES INDEX

This strategy has been strongly correlated with the Market Neutral index, which implies that the strategy provides good protective properties during market declines.

SUMMARY

We have asked several questions that would typically be asked by an institutional investor considering hedge funds in their portfolio during this part of the market cycle. Does Canadian hedge funds add-value and where does the source of this value-add arise? The analysis indicate that they do, relative to other broad hedge fund indices, but that a large part of their exposure comes from local equity market exposure. In particular, Long/Short hedge funds have a strong beta bias towards the general equity market in all markets. This also pertains to the Equity Hedge Sub-Index. A question institutional investors should be asking is whether the high beta to the general equity index justifies the fees paid to these managers.

Which hedge fund strategies exhibit protective properties during market declines? Here we saw that Market Neutral, Global Macro, Managed Futures strategies provided the best protective properties over the period under investigation. However, the Global Macro and Managed Futures strategies show a lot more variability from neutrality, which is to be expected. This variation from neutrality mostly occurs during market declines. The Market Neutral strategy seems like the most aligned to a pure alpha play. Furthermore, the Long/Short Equity strategies, Multistrategy and Event Driven strategies all exhibit amplified beta in falling markets leaving these strategies riskier in bear markets.

The visualisation tool, biplots, indicate that the Event Driven strategy typically exploit opportunities within commodities during different market conditions, which is different from other strategies that tend only to be exposed to commodities when they rally. We also saw that the Global Macro strategy does not tend to be an emerging market play but show wide variation towards and away from the general equity index. This strategy does not tend to bet on commodities.

Appendix 1:

DESCRIPTION OF HEDGE FUND INDICES

	INDEX NAME	STRATEGY	STRATEGY DESCRIPTION
BWHFHFI	BULLWEALTH Canadian Hedge Fund Index	The BULLWEALTH Canadian Hedge Fund Index, and the related sub-indices, are designed to provide a comprehensive overview of the Canadian hedge fund universe. They are based on a database of returns for over 300 distinct Canadian hedge funds.	
BWHFHFXD	BULLWEALTH Canadian Hedge Fund Index ex-Equity Directional	The BULLWEALTH Canadian Hedge Fund Index ex-Equity Directional aims to measure the performance of true hedge funds by removing the constituents that comprise the BULLWEALTH Canadian Equity Directional sub-index, which includes funds that may have limited short exposure or which pursue very little "hedging" of positions.	
BWHFMS	BWHF Multi-Strategy Index	Multi-Strategy	The constituents of the BULLWEALTH Canadian Multi-Strategy index employ two or more hedge fund strategies such as equity market neutral, fixed income arbitrage, convertible arbitrage etc.
BWHFMS	BWHF Equity Long/ Short Index	Equity Long/Short	The BULLWEALTH Canadian Equity Long/Short Index is comprised of two sub-indices: the BULLWEALTH Canadian Equity Hedge sub-index and the BULLWEALTH Canadian Equity Directional sub-index
BWHFEDIR	BWHF Equity Directional Sub-Index	Equity Directional	The BULLWEALTH Equity Directional sub-index contains funds that pursue equity long/short strategies that are typically long-biased with greater than 60% net long exposure and/or monthly volatility in excess of the S&P/TSX Composite Index. This sub-index also includes 130/30 type funds.
BWHFEH	BWHF Equity Hedge Sub-Index	Equity Hedge	The BULLWEALTH Canadian Equity Hedge sub-index contains funds that pursue equity long/short strategies that are typically less than 60% net long and/or exhibit less monthly volatility than the S&P/TSX Composite Index.
BWHFEMN	BWHF Equity Market Neutral Index	Equity Market Neutral	The BULLWEALTH Canadian Equity Market Neutral Index contains equity focused funds that employ an equity long/short strategy while keeping net exposure between-10% and +10%.
BWHFFI	BWHF Fixed Income Arbitrage Index	Fixed Income Arbitrage	The BULLWEALTH Canadian Fixed Income index constituents pursue long/ short fixed income based trading strategies in the governement, investment grade, high yield, and mortgage-backed fixed income markets.
BWHFED	BWHF Event Driven Index	Event Driven	Constituents in the BULLWEALTH Canadian Event Driven Index pursue event driven strategies such as merger arbitrage, distressed and special situations equity strategies.
BWHFMF	BWHF Managed Futures Index	Managed Futures	The BULLWEALTH Canadian Managed Futures index includes funds that trade futures and futures options, using systematic or discretionary trading strategies
BWHFGM	BWHF Global Macro index	Global Macro	The BULLWEALTH Canadian Global Macro index includes funds that pursue global macro strategies by trading fixed income, equity, currencies, commodities and other asset classes through, cash, option and futures markets.