

# Alpha Architect Global Value Momentum Trend Index for Canada

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## INDEX OVERVIEW

The Alpha Architect Global Value Momentum Trend Index for Canada (the “Index” or “GVMTC Index”) is based on three factors: value, momentum and trend-following. Value is a strategy that focuses on the common stock of companies with low prices relative to fundamentals. Momentum is a strategy that focuses on the common stock of companies that have strong relative past performance. Trend-following is a risk management technique that advocates investing in market risk when the trend is positive and moving to lower risk assets when the trend is negative. The objectives of trend-following are to avoid down-trending markets and to minimize large losses.

Construction of the Alpha Architect Global Value Momentum Trend Index for Canada consists of the following six (6) Sub-indexes (“Alpha Architect Indexes”):

- Alpha Architect U.S. Quantitative Value Index (the “QV Index”)
- Alpha Architect International Quantitative Value Index (the “IQV Index”)
- Alpha Architect Canada Quantitative Value Index (the “CQV Index”)
- Alpha Architect U.S. Quantitative Momentum Index (the “QM Index”)
- Alpha Architect International Quantitative Momentum Index (the “IQM Index”)
- Alpha Architect Canada Quantitative Momentum Index (the “CQM Index”)

Within the Index, the Alpha Architect Sub-Indexes are given allocation weights via a risk-parity allocation procedure. In addition, the Index has a set of hedging rules that can shift the Index allocation from equity to bonds.

## INDEX METHODOLOGY

The Alpha Architect Sub-Indexes can be grouped into indexes that use value style and those that use momentum style. A “value” investment style emphasizes investing in securities that based on quantitative analysis are considered undervalued compared to other securities. A “momentum” investment style

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emphasizes investing in securities that recently have had better recent total return performance compared to other securities.

	<b>Canadian</b>	<b>U.S.</b>	<b>International</b>
<b>Value</b>	CQV Index	QV Index	IQV Index
<b>Momentum</b>	CQM Index	QM Index	IQM Index

A description of the methodology associated with each Alpha Architect Sub-Index is described below:

### ALPHA ARCHITECT U.S. QUANTITATIVE VALUE INDEX

The Index uses a 5-step, quantitative, rules-based methodology to identify a portfolio of approximately 40-50 undervalued U.S. equity securities with the potential for capital appreciation, as described below.

The Index Universe	QV	Construction of the QV Index begins with the universe of stocks that principally trade on a U.S. exchange. The universe of stocks is screened to eliminate all stocks whose market capitalization is below the 40 <sup>th</sup> percentile of the market capitalization of companies listed on the New York Stock Exchange (approximately \$2 billion as of December 31, 2017). Securities structured as real estate investment trusts, exchange-traded funds or American Depositary Receipts, stocks of financial firms and stocks of companies with less than eight years of financial data available are also eliminated. The resulting universe is expected to be composed primarily of highly liquid, mid- and large-cap stocks.
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Forensic Accounting Screens		The second stage of the QV Index construction incorporates proprietary models used to identify and exclude companies at risk for financial distress or financial statement manipulation. The models used by the Index Provider evaluate specific accounting metrics related to the use of accruals (the difference between net income and cash from operations) to identify accounting practices that may mask the poor quality of a company's cash flows. The models also use statistical techniques to identify companies with the highest likelihood of having previously manipulated their financial statements.
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Valuation Screens		The third stage of the QV Index construction employs a value-driven approach to identify the cheapest 10% of companies based on a proprietary value-centric metric similar to what is known as the "enterprise multiple", a firm's total enterprise value divided by earnings before interest and taxes. The companies not in the cheapest 10% are eliminated. The proprietary metric was developed based on an analysis of a variety of value-oriented measures, such as price-to-earnings, the enterprise multiple, free cash flow yield, gross profit yield and price-to-book.
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Quality Screens		The fourth stage of the QV Index construction seeks to identify which of the remaining companies has (i) a sustainable competitive advantage and (ii) a strong current financial position with operational momentum. A company's competitive advantage is identified using averages calculated over the past eight years for long-term free cash flow generation, long-term returns on capital, and long-term margin characteristics. The strength of a company's financial position and operational momentum are evaluated using metrics across three categories – current profitability, stability and recent
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operational improvements – to generate a simple score between 0 and 10 that can be used to compare companies to each other. These quality screens, along with a screen to eliminate companies not meeting certain liquidity thresholds, generally eliminate approximately 40% of the remaining potential QV Index constituents.

Portfolio Construction	At the time of each reconstitution of the QV Index, the QV Index constituents are equally-weighted. The QV Index is reconstituted quarterly in March, June, September and December.
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### ALPHA ARCHITECT INTERNATIONAL QUANTITATIVE VALUE INDEX

The Index uses a 5-step, quantitative, rules-based methodology to identify a portfolio of approximately 40–50 undervalued non-U.S. equity securities or their depositary receipts with the potential for capital appreciation, as described below.

The IQV Index Universe	Construction of the IQV Index begins with the universe of stocks that principally trade on developed non-U.S. markets securities exchanges in countries included in the MSCI EAFE Index. The universe of stocks is screened to eliminate all stocks whose market capitalization is below the 40 <sup>th</sup> percentile of the market capitalization of companies listed on the New York Stock Exchange (approximately \$2 billion as of December 31, 2017). Securities structured as real estate investment trusts or exchange-traded funds, stocks of financial firms and stocks of companies with less than 12 months of financial data available are also eliminated. The resulting universe is expected to be composed primarily of highly liquid, mid- and large-cap stocks.
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Forensic Accounting Screens	The second stage of the IQV Index construction incorporates proprietary models that evaluate specific accounting metrics related to the use of accruals (the difference between net income and cash from operations) to identify accounting practices that may mask the poor quality of a company's cash flows.
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Valuation Screens	The third stage of the IQV Index construction employs a value-driven approach to identify the cheapest 10% of companies based on a proprietary value-centric metric similar to what is known as the “enterprise multiple”, a firm's total enterprise value divided by earnings before interest and taxes. The companies not in the cheapest 10% are eliminated. The proprietary metric was developed based on an analysis of a variety of value-oriented measures, such as price-to-earnings, the enterprise multiple, free cash flow yield, gross profit yield and price-to-book.
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Quality Screens	The fourth stage of the IQV Index construction seeks to identify which of the remaining companies has a strong current financial position with operational momentum. The
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strength of a company's financial position and operational momentum are evaluated using metrics across three categories – current profitability, stability, and recent operational improvements – to generate a simple score between 0 and 10 that can be used to compare companies to each other. These quality screens, along with a screen to eliminate companies not meeting certain liquidity thresholds, generally eliminate approximately 40% of the remaining potential IQV Index constituents.

Portfolio Construction | At the time of each reconstitution of the IQV Index, the IQV Index constituents are equally-weighted. The IQV Index is reconstituted semi-annually in each May and November.

### ALPHA ARCHITECT CANADA QUANTITATIVE VALUE INDEX

The Index uses a 5-step, quantitative, rules-based methodology to identify a portfolio of approximately 10 undervalued Canadian equity securities or their depositary receipts with the potential for capital appreciation, as described below.

The CQV Index Universe | Construction of the CQV Index begins with the universe of stocks that principally trade on a Canadian exchange. The universe of stocks is screened to eliminate all stocks whose market capitalization is below the 40<sup>th</sup> percentile of the market capitalization of companies listed on the New York Stock Exchange (approximately \$2 billion as of December 31, 2017). Securities structured as real estate investment trusts or exchange-traded funds, stocks of financial firms and stocks of companies with less than 12 months of financial data available are also eliminated. The resulting universe is expected to be composed primarily of highly liquid, mid- and large-cap stocks.

Forensic Accounting Screens | The second stage of the CQV Index construction incorporates proprietary models that evaluate specific accounting metrics related to the use of accruals (the difference between net income and cash from operations) to identify accounting practices that may mask the poor quality of a company's cash flows.

Valuation Screens | The third stage of the CQV Index construction employs a value-driven approach to identify the cheapest 10% of companies based on a proprietary value-centric metric similar to what is known as the "enterprise multiple", a firm's total enterprise value divided by earnings before interest and taxes. The companies not in the cheapest 10% are eliminated. The proprietary metric was developed based on an analysis of a variety of value-oriented measures, such as price-to-earnings, the enterprise multiple, free cash flow yield, gross profit yield and price-to-book.

Quality Screens | The fourth stage of the CQV Index construction seeks to identify which of the remaining companies has a strong current financial position with operational momentum. The strength of a company's financial position and operational momentum are evaluated

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using metrics across three categories – current profitability, stability, and recent operational improvements – to generate a simple score between 0 and 10 that can be used to compare companies to each other. These quality screens, along with a screen to eliminate companies not meeting certain liquidity thresholds, generally eliminate approximately 40% of the remaining potential CQV Index constituents.

**Portfolio Construction** | At the time of each reconstitution of the CQV Index, the CQV Index constituents are equally-weighted. The CQV Index is reconstituted semi-annually in each May and November. The date of each subsequent reconstitution of the CQV Index is available on the Index Provider's website at [www.alphaarchitect.com/funds/contact](http://www.alphaarchitect.com/funds/contact) at least one week prior to such date.

## ALPHA ARCHITECT U.S. QUANTITATIVE MOMENTUM INDEX

The Index uses a 5-step, quantitative, rules-based methodology to identify a portfolio of approximately 40-50 U.S. equity securities with positive momentum, as described below. A “momentum” style of investing emphasizes investing in securities that have had higher recent total return performance compared to other securities.

**The QM Index Universe** | Construction of the QM Index begins with the universe of stocks that principally trade on a U.S. exchange. The universe of stocks is screened to eliminate all stocks whose market capitalization is below the 40<sup>th</sup> percentile of the market capitalization of companies listed on the New York Stock Exchange (approximately \$2 billion as of December 31, 2017). Securities structured as real estate investment trusts, exchange-traded funds or American Depositary Receipts and stocks of companies with less than 12 months of financial data available are also eliminated. The resulting universe is expected to be composed primarily of highly liquid, mid- and large-cap stocks.

**Generic Momentum Screen** | The second stage of the QM Index construction screens the universe of companies to identify the 10% with the highest cumulative return for the past 12 months, excluding the last (12<sup>th</sup>) month, and eliminates the rest of the universe.

**Quality of Momentum Screen** | The third stage of the QM Index construction employs a momentum quality screen to identify which of the remaining companies has experienced the most consistent positive returns, as opposed to short-lived success, during the 12-month period measured above. This screen measures the number of days during the 12-month period for which a company's returns were positive or negative. This quality screen, along with a screen to eliminate companies not meeting certain liquidity thresholds, generally eliminates approximately 50% of the remaining potential QM Index constituents.

**Seasonality** | To account for seasonal (i.e., quarter-end) effects on a company's performance, the QM Index is reconstituted quarterly in each February, May, August and November, one month ahead of each calendar quarter-end.

**Portfolio Construction** | At the time of each reconstitution of the QM Index, the QM Index constituents are equally-weighted. The date of each subsequent reconstitution of the QM Index is available on the Index Provider's website at [www.alphaarchitect.com/funds/contact](http://www.alphaarchitect.com/funds/contact) at least one week prior to such date.

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### ALPHA ARCHITECT INTERNATIONAL QUANTITATIVE MOMENTUM INDEX

The Index uses a 5-step, quantitative, rules-based methodology to identify a portfolio of approximately 40-50 non-U.S. equity securities with positive momentum, as described below. A “momentum” style of investing emphasizes investing in securities that have had higher recent total return performance compared to other securities.

The IQM Index Universe	Construction of the IQM Index begins with the universe of stocks that principally trade on developed non-U.S. markets securities exchanges in countries included in the MSCI EAFE Index. The universe of stocks is screened to eliminate all stocks whose market capitalization is below the 40 <sup>th</sup> percentile of the market capitalization of companies listed on the New York Stock Exchange (approximately \$2 billion as of December 31, 2017). Securities structured as real estate investment trusts or exchange-traded funds and stocks of companies with less than 12 months of financial data available are also eliminated. The resulting universe is expected to be composed primarily of highly liquid, mid- and large-cap stocks.
Generic Momentum Screen	The second stage of the IQM Index construction screens the universe of companies to identify the 10% with the highest cumulative return for the past 12 months, excluding the last (12 <sup>th</sup> ) month, and eliminates the rest of the universe.
Quality of Momentum Screen	The third stage of the IQM Index construction employs a momentum quality screen to identify which of the remaining companies has experienced the most consistent positive returns, as opposed to short-lived success during the 12-month period measured above. This screen measures the number of days during the 12-month period for which a company’s returns were positive or negative. This quality screen, along with a screen to eliminate companies not meeting certain liquidity thresholds, generally eliminates approximately 50% of the remaining potential IQM Index constituents.
Seasonality	To account for seasonal (i.e., quarter-end) effects on a company’s performance, the IQM Index is reconstituted quarterly in each March, June, September and December, one month ahead of each calendar quarter-end.
Portfolio Construction	At the time of each reconstitution of the IQM Index, the IQM Index constituents are equally-weighted. The date of each subsequent reconstitution of the IQM Index is available on the Index Provider’s website at <a href="http://www.alphaarchitect.com/funds/contact">www.alphaarchitect.com/funds/contact</a> at least one week prior to such date.

### ALPHA ARCHITECT CANADA QUANTITATIVE MOMENTUM INDEX

The Index uses a 5-step, quantitative, rules-based methodology to identify a portfolio of approximately 10 undervalued Canadian equity securities with positive momentum, as described below. A “momentum” style of investing emphasizes investing in securities that have had higher recent total return performance compared to other securities.

The CQM Index Universe	Construction of the CQM Index begins with the universe of stocks that principally trade on a Canadian exchange. The universe of stocks is screened to eliminate all stocks whose market capitalization is below the 40 <sup>th</sup> percentile of the market capitalization of companies listed on the New York Stock Exchange (approximately \$2 billion as of December 31, 2017). Securities structured as real estate investment trusts or exchange-traded funds, stocks of financial firms and stocks of companies with less than 12 months of financial data available are also eliminated. The resulting universe is expected to be composed primarily of highly liquid, mid- and large-cap stocks.
Generic Momentum	The second stage of the CQM Index construction screens the universe of companies to identify the 10% with the highest cumulative return for the past 12 months, excluding the last (12 <sup>th</sup> )

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Screen	month, and eliminates the rest of the universe.
Quality of Momentum Screen	The third stage of the CQM Index construction employs a momentum quality screen to identify which of the remaining companies has experienced the most consistent positive returns, as opposed to short-lived success during the 12-month period measured above. This screen measures the number of days during the 12-month period for which a company's returns were positive or negative. This quality screen, along with a screen to eliminate companies not meeting certain liquidity thresholds, generally eliminates approximately 50% of the remaining potential CQM Index constituents.
Seasonality	To account for seasonal (i.e., quarter-end) effects on a company's performance, the CQM Index is reconstituted quarterly in each March, June, September and December, one month ahead of each calendar quarter-end.
Portfolio Construction	At the time of each reconstitution of the CQM Index, the CQM Index constituents are equally-weighted. The date of each subsequent reconstitution of the CQM Index is available on the Index Provider's website at <a href="http://www.alphaarchitect.com/funds/contact">www.alphaarchitect.com/funds/contact</a> at least one week prior to such date.

## INDEX ALLOCATION METHODOLOGY

The Index is developed based primarily on a risk-parity approach, which focuses on an allocation of risk rather than an allocation of capital.<sup>1</sup> This means that the Index is allocated to each of the six Alpha Architect Sub-Indexes based on the three-year historical volatility of each of the Alpha Architect Sub-Indexes (QV, IQV, QM, and IQM volatility estimates are in USD terms; CQV and CQM are in CAD terms).

An explanation of the concept is outlined below:

Estimate the 3-year historical volatility (i.e., standard deviation) of the Alpha Architect Indexes, where,

- VOL\_QV\_INDEX = Volatility of the QV Index
- VOL\_IQV\_INDEX = Volatility of the IQV Index
- VOL\_CQV\_INDEX = Volatility of the CQV Index
- VOL\_QM\_INDEX = Volatility of the QM Index
- VOL\_IQM\_INDEX = Volatility of the IQM Index
- VOL\_CQM\_INDEX = Volatility of the CQM Index

Create a new variable, K, which is defined as one (1) divided by the sum of one (1) divided by the estimated volatilities from step 1.

Allocate to each Alpha Architect Index based on K, divided by the volatility of the Alpha Architect Index. For example, assume the following:

- VOL\_QV\_INDEX = 18%
- VOL\_IQV\_INDEX = 20%
- VOL\_CQV\_INDEX = 20%
- VOL\_QM\_INDEX = 20%
- VOL\_IQM\_INDEX = 25%
- VOL\_CQM\_INDEX = 25%

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<sup>1</sup> Clifford Asness, Andrea Frazzini, and Lasse Pedersen, 2012, "Leverage Aversion and Risk Parity," Financial Analysts Journal 68, pg. 47-59.

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$$K = 1 / (1/18 + 1/20 + 1/20 + 1/20 + 1/25 + 1/25) = .035$$

This would imply the following allocation weights:<sup>2</sup>

- WGT\_QV\_INDEX = .035 / 18% = 19.5%
- WGT\_IQV\_INDEX = .035 / 20% = 17.5%
- WGT\_CQV\_INDEX = .035 / 20% = 17.5%
- WGT\_QM\_INDEX = .035 / 20% = 17.5%
- WGT\_IQM\_INDEX = .035 / 25% = 14.0%
- WGT\_CQM\_INDEX = .035 / 25% = 14.0%

### INDEX HEDGING METHODOLOGY

To seek to avoid downtrending markets, the Index may hedge the value of its long portfolio by selling equity and buying Canadian treasury bills. The Index uses a mathematical modeling approach with respect to the use of hedging techniques, which are outlined below.

The Index hedges its U.S. portfolio by selling a portion of the U.S. equity portfolio when either one or both of two conditions are met. First, the Index hedges if the U.S. equity markets' total return (as measured by the S&P 500 Total Return Index) over a rolling twelve calendar month period is less than or equal to U.S. treasury bill returns over the same period. Second, the Index hedges when the U.S. equity markets' twelve month moving average exceeds current prices.

The Index hedges its international portfolio by selling a portion of the international equity portfolio when either one or both of two conditions are met. First, the Index hedges if the international equity markets' total return (as measured by the MSCI EAFE Total Return Index) over a rolling twelve calendar month period is less than or equal to U.S. treasury bill returns over the same period. Second, the Index hedges when the international equity markets' twelve month moving average exceeds current prices.

The Index hedges its Canadian portfolio by selling a portion of the Canadian equity portfolio when either one or both of two conditions are met. First, the Index hedges if the Canadian equity markets' total return (as measured by the S&P/TSX Capped Composite Total Return Index in CAD terms) over a rolling twelve calendar month period is less than or equal to U.S. treasury bill returns over the same period. Second, the Index hedges when the Canadian equity markets' twelve month moving average exceeds current prices.

In each case, there is a 50% weight to each rule. If both rules are triggered, then the applicable equity portion of the Index's portfolio is reduced to nil and 100% of that portion of the Index is allocated to Canadian treasury bills. If only one rule is triggered, then the applicable equity portion of the Index's portfolio is reduced by 50% and that portion of the Index is allocated to Canadian treasury bills. If neither rule is triggered, the applicable equity portion of the Index's portfolio is not reduced at all and none of that portion of the Index's portfolio is allocated to Canadian treasury bills.

### INDEX REBALANCE

For purposes of the Index, the allocation among the Alpha Architect Sub-Indexes is reconstituted annually during the first week of February in accordance with the risk-parity allocation methodology described above.

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<sup>2</sup> May not add up to 100% due to rounding.



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The Index's hedging calculations (and hedging related Index changes, if any) are conducted monthly. Hedging takes effect on the second trading day after the applicable month-end when the hedge is triggered either on or off. The Index's market hedge is not triggered on or off at any time other than at month end.