

SmartALPHA® Defensive Equity Strategy Indexes

Executive Summary

- Reflecting the academic research on the low volatility effect, currently available low volatility products are mainly driven by statistical volatility – the standard deviation of stock price change over a defined period.
- However, price volatility is just a reflection of fundamental risk, which in turn has two main components, macro risk and company-specific risk. It is only by defining and quantifying these risks that a truly defensive equity strategy can be designed.
- Alpha Quant Models (AQM) developed defensive equity strategy indexes which combine top-down and bottom-up dimensions, providing greater opportunity in both risk management and potential excess returns relative to currently available low volatility products.
- The SmartALPHA® Defensive Indexes target contemporaneously high returns and low volatility through a systematic process that selects defensive stocks with high expected alpha.
- The approach is unique to statistical low volatility products. It is intuitive, rooted in fundamental analysis and economic theory, and generates an asymmetrical return pattern with strong downside protection while maintaining remarkable upside participation.
- Further, the SmartALPHA® indexes remain fully invested in liquid stocks at all times and do not employ any derivatives or other less-liquid instruments to achieve these goals.



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Introduction

In the aftermath of the 2008 financial crisis, scarred by huge portfolio losses, investors increasingly demanded investment vehicles that could offer protection in falling, volatile markets.

At the same time, numerous academic studies were published on the so-called “low volatility anomaly”: contrary to finance theory, over the long term, stocks with lower price volatility have out-performed stocks with high price volatility.

The low volatility effect is not new. Researchers Robert Haugen and James Heins in the 1970s wrote about this effect in a seminal paper.¹

As an outgrowth of the 2008 financial crisis, this anomaly was “rediscovered” and “productized.” A number of investment firms and ETF providers saw the opportunity to commercially exploit the low volatility anomaly and jumped onto the academic debate with papers and articles touting their own products. Since then, a number of “low vol” products have flooded the industry and raised several billion dollars in assets; investors have embraced the concept and low equity volatility is now a new asset class.

Reflecting the academic research, the existing low volatility strategies available today are mainly driven by statistical volatility – the standard deviation of stock price change over a defined period.

But, what’s the actual merit of these strategies? Is it sound to invest money in strategies that in essence select stocks based merely on their past price fluctuations?

Is there a more purposeful way to build low volatility, defensive strategies? AQM will review the current low volatility methodologies and products and propose a more logical and more effective approach: the SmartALPHA® Defensive Strategy Indexes.

Types of Low Volatility Strategies

Current low volatility strategies follow one of two methodologies: minimum variance optimization strategy or non-optimized low volatility strategy.

Figure 1 describes two representative low volatility index methodologies, the S&P Low Volatility Index and the MSCI Minimum Volatility Index.

Optimization-based Indexes are calculated by optimizing an existing equity index (such as the MSCI USA Index or the Russell 1000) using an estimated covariance matrix to produce a portfolio that has the lowest expected volatility for a given set of constraints. Thus, in optimized models, it is assumed that stocks have the same expected return and volatility and correlations are estimated using a risk model. These indexes lack transparency and, in an attempt to reduce tracking error, have significant exposures to non-defensive sectors and consequently, they may not provide strong downside protection.

FIGURE 1. Selected Low Volatility Methodologies

	S&P 500 Low Volatility Index	MSCI USA Min Volatility Index
Definition of Risk	Standard deviation of the daily price returns over the prior 12 months	Barra Covariance Model (variance and correlations)
Methodology	The 100 least volatile stocks in the S&P 500 are weighted inversely proportional to their volatility	Forecast volatility using minimum variance optimization
Constraints	None	Sector and risk-factor. Max holding size 1.5%
Assessment	Simple and transparent; good cushion in down markets, but limited upside	“Black Boxy”, benchmark sensitive; sector constraints limit downside protection

¹ Robert A. Haugen and A. James Heins, “Risk and the Rate of Return on Financial Assets: Some Old Wine in New Bottles.” Journal of Financial and Quantitative Analysis, Vol. 10, No. 5, December 1975.

Non-optimized models simply sort stocks on their past price volatility and select the least volatile ones. Each stock in the index is then weighted by the inverse of its volatility, so that the stocks with lower volatility receive the higher weights. These indexes are transparent and provide good downside protection, but they can become very concentrated in certain sectors, such as utilities, and may lack attractive participation in up markets.

Both methodologies are mainly driven by volatility of stock prices and do not target or maximize returns. As illustrated in the performance analysis section, these low volatility strategies have not proven to keep up with a rising market typically associated with economic rebounds and expansions. This lack of upside participation represents an investment risk as it may impair the investor's portfolio growth over the long run.

As we discuss later, at the end of the day, the real risk for an investor is not the short-term stock price fluctuations, but the inability to preserve and grow wealth over the investment horizon. This requires a strategy that provides downside protection without renouncing to long term growth.

The following will first highlight the difference between statistical and fundamental risk. Fundamental risk is then defined and separated into macro and firm-specific risks. Finally, the construction process employed by the SmartALPHA® Defensive Indexes is depicted followed by review their performance versus the overall market and other low volatility strategies.

A Myopic Definition of Risk

Low volatility strategies define risk merely as price volatility. Standard deviation is a measure of absolute volatility that shows how much an investment's return varies from its average return over time.

To understand the flaws of measuring risk with price volatility consider this example: suppose the price of a stock goes up 20 percent in one month, 10 percent the next, and 5 percent in the third month. The standard deviation would be 7.6 with a return of 38.6 percent. Compare this to a stock that declines 10 percent three months in a row. The standard deviation would be zero with a loss of 27 percent. An investor holding the falling stock might find consolation knowing that the loss was incurred completely "risk-free."²

In addition, protracted periods of low volatility in an individual security or entire asset class, do not portend continuous future stability.

Actually, the evidence tends to show that the opposite is true: extended periods of low volatility are followed by high volatility. One only needs to remember that the 2008 financial meltdown was preceded by one of the lowest market volatility readings in history but, as we all know, it ended up in tears.

Thus, a low standard deviation of returns over the measurement period may give investors in low volatility strategies only a false sense of security.

AQM believes that focusing only on statistical volatility is superficial as it confuses the cause (fundamental risk) with the effect (price volatility).

In fact, the true limitation of low volatility strategies is that they select stocks with no consideration to their economic characteristics despite extensive evidence that company-specific fundamentals (i.e., valuation, earnings persistence) are related to future stock risk and returns.

The price fluctuation of a company's stock- and therefore its volatility - is determined by the trading activity of investors who buy and sell shares according to their views and emotions.

But stocks are not just price charts or quotes on a monitor that change every second. Equity shares represent ownership in a company's business. Therefore, to understand the risks of a company's stock, analysis of the sector and industry the company operates in, its business model, its earnings persistence, its capacity to generate cash flows, and last but probably most important, its valuation should be integrated.

It is the interaction between the fundamentals and the market valuation that determines the future returns and risk of a stock, not its past price volatility.

Ultimately, if we accept that risk is not the same as volatility, we must also question any portfolio strategy that relies on this view.

² Adapted from: "Risk is Not The Same as Volatility", Michael Keppler, Die Bank, November 1990, No. 11.

The SmartALPHA® Defensive Strategy Indexes

Defining Risk

AQM believes that a low volatility, defensive equity strategy should not be governed by a mechanical application of statistical parameters like price volatility and correlations.

The starting point of a defensive strategy - like any equity strategy - should be the investor’s standpoint and goals. From the investor point of view there are three *distinct* yet *interrelated* risks:

1. Prolonged drawdowns (a bear market, typically related to the business cycle);
2. Sharp market drops (unexpected market events, shocks, black swans);
3. Inability to preserve and grow capital over the investment horizon. Over time, sudden losses and deep drawdowns may impair the ability to preserve and grow wealth.

It follows logically that a defensive equity strategy should aim to provide protection in down markets, while at the same time offering adequate upside participation. A defensive strategy that follows this approach may assist investors in reaching their ultimate goal of preserving and growing wealth over their investment horizon.

The second step is to define and quantify equity risk from a portfolio management standpoint with the objective of mitigating that risk. From a portfolio manager’s standpoint, stock price volatility (risk) is a manifestation of fundamental risk. In turn, fundamental risk has two main components: macro and company-specific risk.

Macro Risk

Macro risk is related to the overall economy and the business cycle, impacting all stocks. Specifically:

- a) The largest capital losses and drawdowns are typical associated with economic contractions and recessions.
- b) Unexpected and unpredictable events that affect the economy such as geopolitical events or a shock in the supply of basic commodities like oil.

Company-Specific Risk

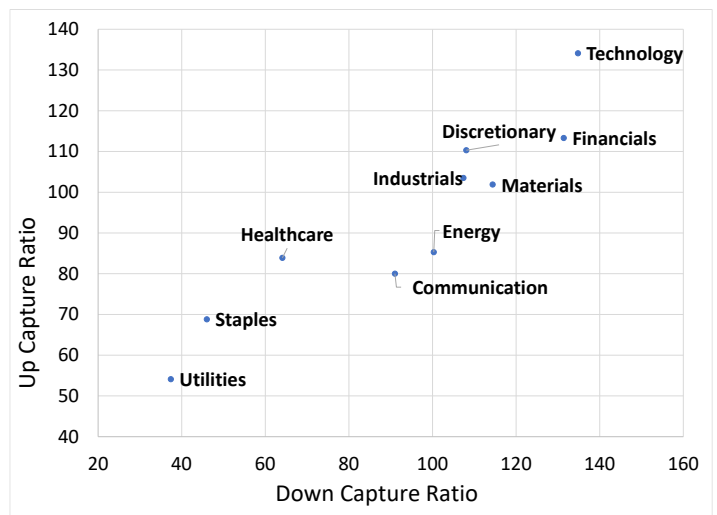
This risk is inherent to individual stocks and has three components:

1. Earnings Persistence: a decline in earnings power reduces the equity value;
2. Distress: high debt leverage constrains growth and may result in bankruptcy;
3. Valuation: stocks trading at high multiples are riskier and tend to underperform.

Sector Risk

The largest non-company specific determinant of equity volatility and returns is the sector in which a company operates. This makes intuitive sense as stocks belonging to the same sector will tend to be affected by the same economic, regulatory and technology forces. In addition, some sectors have similar sensitivity to the economic environment. For example, consumer staples and health care firms—two defensive sectors— are less dependent on the rate of economic growth than cyclical sectors such as industrials and consumer cyclicals. Defensive sectors display consistently low volatility and historically offered cushion during down markets (see Figure 2).

Figure 2. Up/Down Capture Ratio by Sector 1990-2020



Source: FactSet, Alpha Quant Models. As of 12/31/2020.

Business Cycle and Sectors Performance

Historically, non-cyclical, defensive sectors have consistently provided protection in down markets. This makes sense, as there is an economically intuitive link between the business cycle and the performance of cyclical and defensive sectors. During periods of economic expansion, cyclical stocks tend to perform best as their growth is leveraged to the economy. However, as the business cycle peaks and the economy starts to contract, defensive stocks offer downside protection due to their resilience and lower sensitivity to the business cycle. This relationship between the business cycle and the performance of cyclical and defensive sectors has been very consistent over the last several decades. Figure 3 reports the average monthly returns for each sector and for the Cyclical and Defensive equal-weighted groups for four distinct regimes based on the ISM.

Figure 3. Sector Returns by PMI Regime

REGIME	BELOW 50 & DECREASING	BELOW 50 & INCREASING	ABOVE 50 & INCREASING	ABOVE 50 & DECREASING
count	67	37	141	125
%	18.1%	10.0%	38.1%	33.8%
Technology	1.232	1.161	1.470	1.050
Financials	0.395	0.439	1.302	0.673
Discretionary	0.876	1.146	1.331	0.697
Materials	0.423	1.248	0.856	0.793
Industrials	0.650	0.487	1.047	0.950
Energy	0.218	-0.044	0.596	1.152
Healthcare	1.686	0.466	0.925	0.913
Staples	1.549	0.688	0.838	0.714
Utilities	0.472	-0.225	0.810	1.145
Communication	1.104	-0.028	0.688	0.547
Cyclicals	0.633	0.740	1.100	0.886
Defensive	1.236	0.310	0.858	0.924

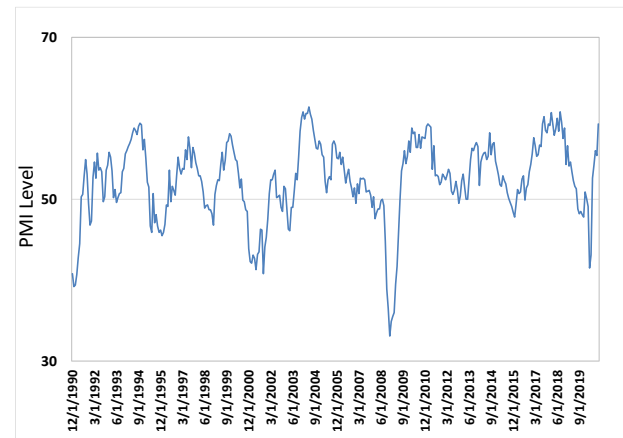
Source: FactSet, Alpha Quant Models. As of 12/31/2020.

The ISM measures manufacturing activity based on a monthly survey at purchasing managers at more than 300 manufacturing firms. An index of more than 50 indicates the economy is in expansion. A reading of 50 indicates no change and a reading below 50 suggests a contraction of the manufacturing sector. Four distinct regimes are created based on both the level and the directional change of the index to capture the typical phases of the business cycle: expansion (above 50 and increasing), contraction (above 50 and decreasing), recession (below 50 and decreasing), and recovery (below 50 and increasing). We then calculated the average sector returns by phase.

Figure 3 highlights the correlation between the business cycle’s strength and direction and the performance of cyclically sensitive and defensive sectors. For example, cyclical sectors such as Technology, Financials and Discretionary out-perform significantly during expansions (ISM above 50 and increasing). However, during contractions and recessions defensive sectors (particularly Healthcare and Staples) offer significant downside cushioning benefits.

It turns out that available low volatility products can be deconstructed as unintentional defensive sector strategies as their sector composition is dominated by utilities, staples and health care sectors. Supported by empirical evidence, AQM advocates an approach that selects stocks exclusively from defensive sectors as a more deliberate and economically sensible method to build a defensive strategy more resilient to economic recessions and less exposed to downside volatility.

Figure 4. ISM Manufacturing Index (PMI)



Source: FactSet Economic Data. As of 12/31/2020.

Bottom-Up Dimension: Firm-Level Risk

From a bottom-up standpoint, the SmartALPHA® stock selection process is designed to manage company-specific risks. AQM research shows that stocks with specific fundamental attributes such as low earnings quality, high debt leverage, and high valuation multiples historically have significantly underperformed the market averages.

Figure 5 illustrates this evidence over the 1990-2020 period. The charts report the compound returns of the top and bottom portfolio deciles. For example, the stocks in the bottom decile by free cash flow-to-debt ratio (companies with high level of debt and low liquidity) significantly underperformed companies with ample liquidity and low debt. Similarly, stocks in the top decile by sector-relative price-to-sales ratio underperformed significantly the cheapest portfolio decile. Analogous patterns are observable for high vs. low profitability (ROIC) and high vs. conservative investment spending policy (capex growth). The charts depict the economic and statistical significance of these factor returns and the consistency and magnitude of their top-bottom quintile return spreads.

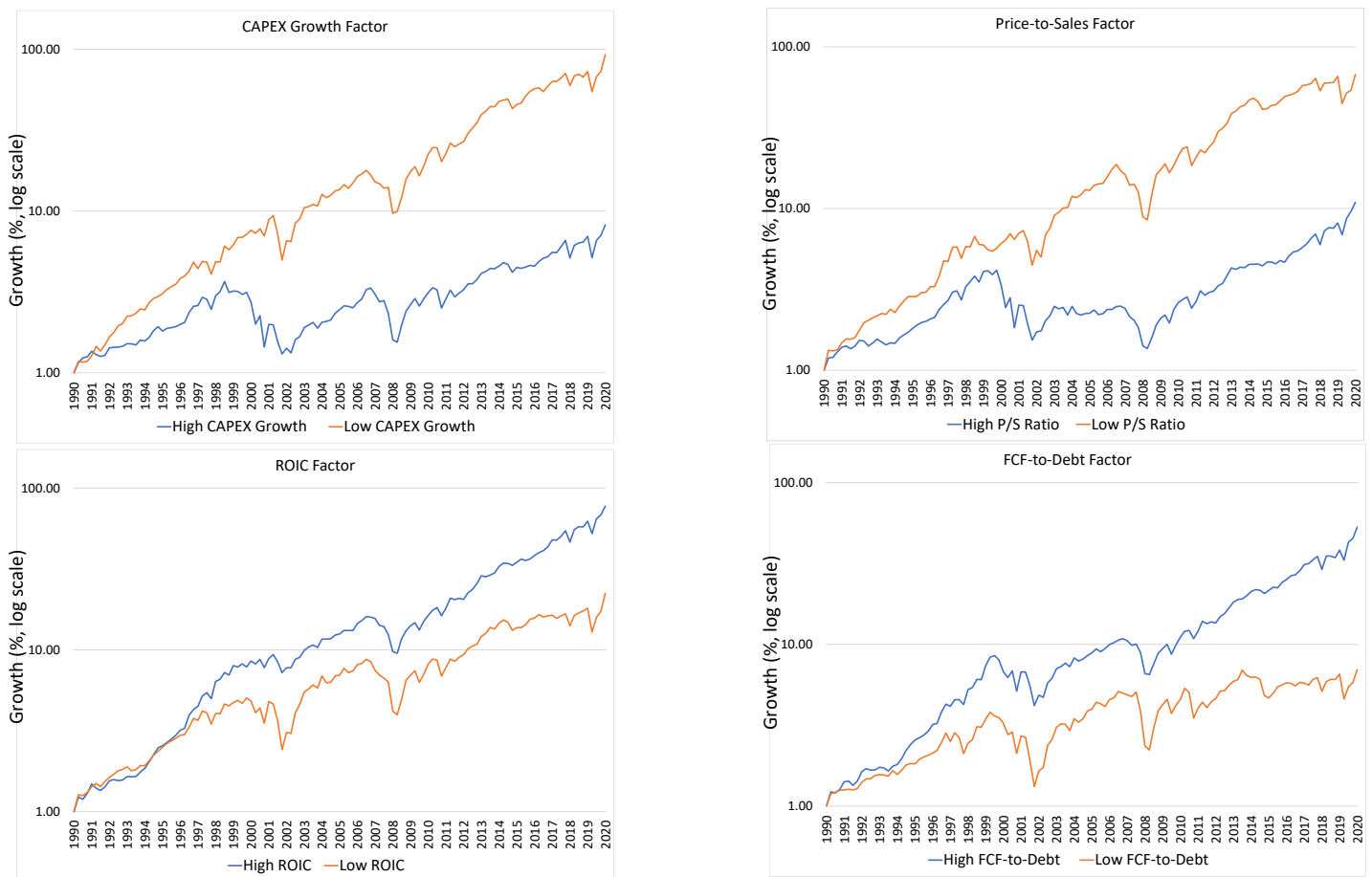
This empirical evidence and fundamental insight is leveraged into the construction process by selecting stocks based on fundamental and valuation factors that AQM’s research has found to be predictive of returns and risk.

The flow chart on the next page depicts the construction process of the SmartALPHA® Defensive Growth and Defensive Value Indexes. Starting from a universe of liquid, large- and mid-cap U.S. equities, the indexes are constructed exclusively from non-cyclical sectors (staples, health care, telecom and utilities).

Thirty stocks are then selected for each index based on quality and value factors that have displayed strong performance over several cycles and market conditions.

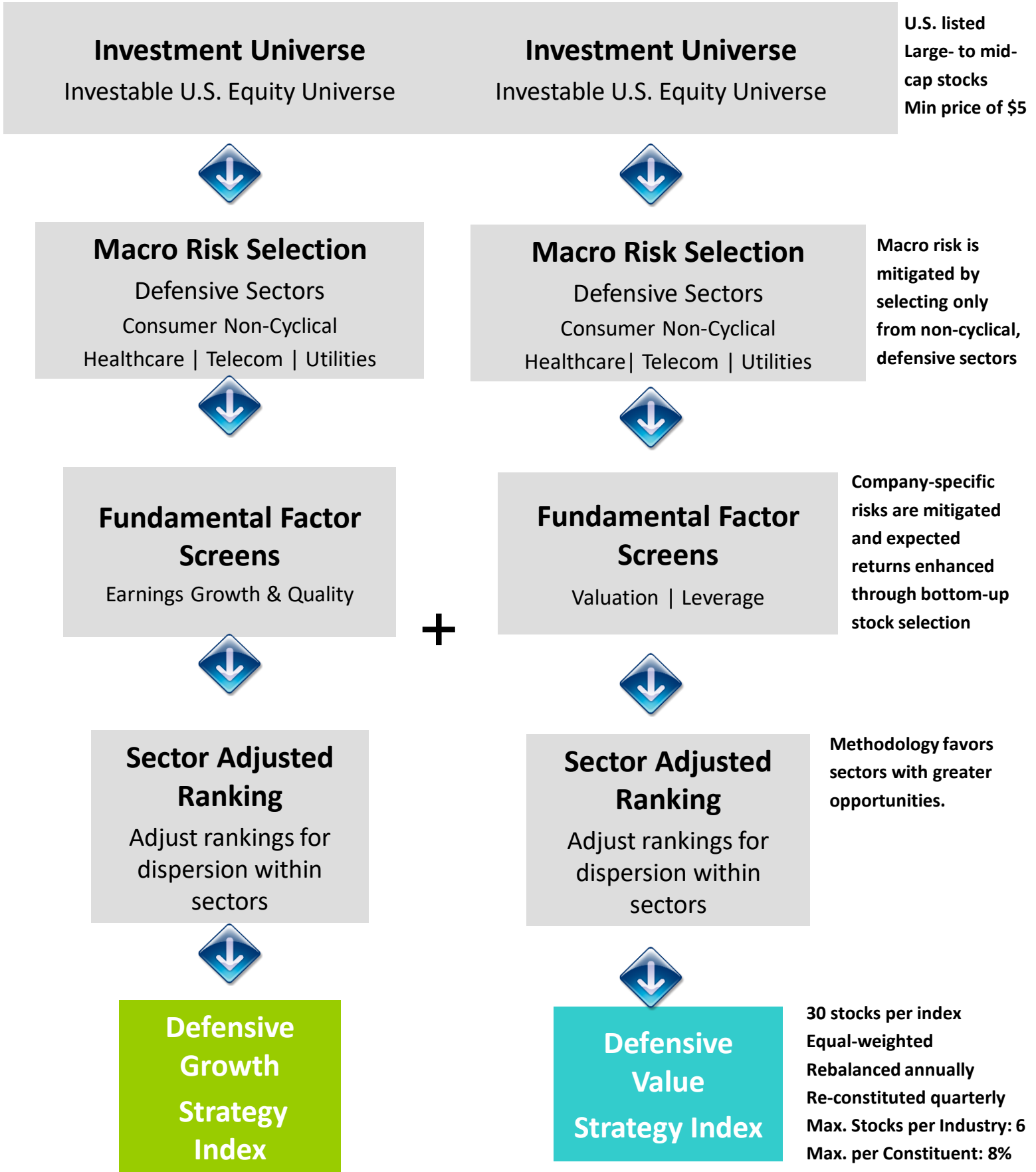
The methodology favors sectors with greater opportunity for higher returns (high factor dispersion). Each index includes 30 equal-weighted stocks. Indexes are reconstituted quarterly and rebalanced annually to equal-weighted. Portfolio constraints are a maximum of six stocks per industry and a maximum of 8% per constituent.

Figure 5. Top and Bottom Portfolio Deciles for Selected Alpha Factors (Growth Index – log scale)



Source: FactSet. As of 12/31/2020.

Figure 6. Investment Process



Risk and Return Analysis

Live Performance

This section reports the performance of the SmartALPHA® Defensive Indexes during their live history (7/1/2012-9/30/2020). Figure 5 compares the SmartALPHA® Defensive Indexes versus other selected available low volatility products and the overall market. Although the live period is relatively short, it encompasses a variety of market conditions including volatility spikes, market drops, and a sharp drawdown associated with the COVID-19 pandemic. Over this period, the SmartALPHA® Defensive Indexes have not only outperformed the other low volatility strategies but have also kept up with the S&P 500. Specifically, an equal-weighted blend of the Growth and Value indexes has generated an average compound return of 14.6% versus 11.3% for the S&P Low Volatility Index and 11.8% for the MSCI Minimum Volatility Index. The S&P 500 returned 13.9% over the same period. This is a remarkable achievement given that over this period we have been in a bull market supported by a positive economic backdrop and very accommodative monetary policy. These results are even more impressive given the recent market polarization and the dominance of technology stocks.

As an alternative view of the sensitivity of portfolio performance to different states of the market, AQM analyzed the variation in performance across the strategies in different market regimes.

In down markets - defined as months when the S&P 500 had a negative return - the Defensive Value and Defensive Growth indexes report average monthly returns of -2.45% and -2.51%, respectively versus -3.5% for the S&P 500.

The maximum drawdown of the SmartALPHA® Defensive indexes is also significantly better with a decline from peak to trough of only 12.7% for the Defensive Blend versus 19.6% for the S&P 500, 21.4% for the S&P 500 Low Volatility and 19.1% for the MSCI Minimum Volatility. The number of months to full recovery is only 2 months for the Defensive Blend versus 4 months for the S&P 500. The other two low volatility indexes were still below their preceding peak as of 09/30/2020. In up markets the Defensive Value and Defensive Growth indexes earned respectable average monthly returns of 2.29% and 2.64%, respectively, versus 2.8% for the S&P 500. This asymmetric behavior of the SmartALPHA® Defensive indexes in up and down markets, results in strong risk adjusted performance, and in the long-term, contributes substantially to capital growth.

Figure 5. Live Performance (7/1/2012 – 09/30/2020)

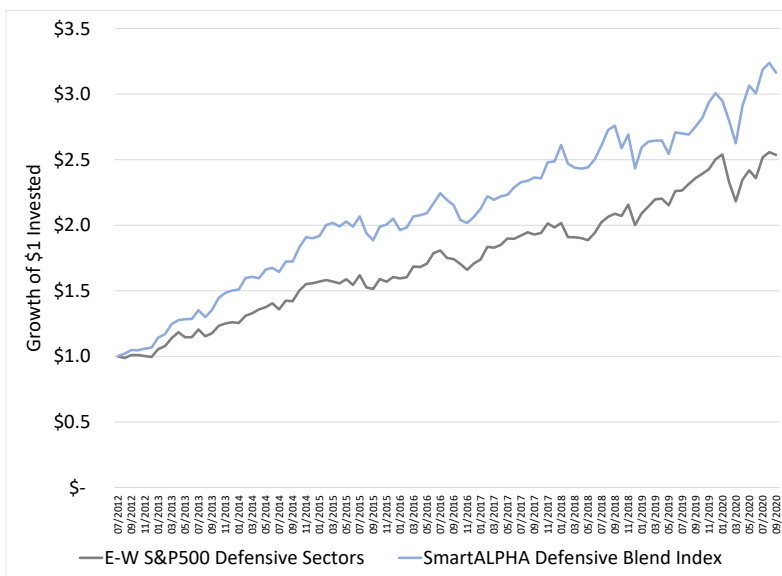
	SmartALPHA Defensive Value	SmartALPHA Defensive Growth	SmartALPHA Defensive Blend	S&P 500 Low Volatility	MSCI USA Minimum Volatility	S&P 500
Return	13.0	16.2	14.6	11.3	11.8	13.9
Std Dev	12.1	12.8	12.1	11.2	10.6	13.0
Sharpe Ratio	1.0	1.2	1.2	0.9	1.0	1.0
Tracking Error	8.0	7.3	6.9	7.5	5.9	0.0
Alpha	2.3	4.2	3.3	1.4	1.4	0.0
Beta	0.8	0.8	0.8	0.7	0.7	1.0
Information Ratio	-0.1	0.3	0.1	-0.3	-0.4	—
Max Drawdown Peak	10/1/2018	1/1/2020	1/1/2020	2/1/2020	2/1/2020	1/1/2020
Max Drawdown	-11.8	-16.1	-12.7	-21.4	-19.1	-19.6
Max Drawdown Recovery # of Periods	10.0	4.0	2.0	—	—	4.0
Down Capture Return	-2.45	-2.51	-2.48	-2.15	-2.25	-3.5
Up Capture Return	2.29	2.64	2.47	2.00	2.09	2.8

Sector Performance Analysis

Since the SmartALPHA® Defensive Indexes invest only in large-cap stocks from “defensive” sectors, it’s important to compare their performance to an appropriate benchmark made of stocks from the same sectors.

Figure 6 shows the performance of the SmartALPHA® Defensive Indexes Blend versus an equal-weighted composite of the three S&P 500 defensive sectors (Staples, Healthcare, Utilities).

Figure 6. Growth of \$1 Invested Since Inception Through 9/30/2020



Source: Alpha Quant Models, S&P/Dow, FactSet

The chart shows clearly the value added by the SmartALPHA® Defensive strategy above the typical performance of an equal-weighted portfolio made of defensive sectors. Since inception, the SmartALPHA® Defensive strategy generated a compounded annualized average return of 15.1% vs. 12.1% for the equal-weighted defensive sectors benchmark. This 300 basis points per annum of out-performance is in line with our historical portfolio backtests and is the direct result of our process which selects a sub-set of defensive stocks with attractive fundamental and valuation metrics.



Massimo Santicchia is a Co-Founder and Managing Member of Alpha Quant Models LLC. Massimo has over 20 years of investment experience including: CIO at Alpha Quant Advisors, CIO at Cypress Trust Company, and VP of Investment Strategy at S&P Investment Advisory Services LLC. His expertise encompasses fundamental, quantitative analysis, portfolio management and investment strategy development.

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