AlphaQuant
Engineered for Alpha

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SmartALPHA® Defensive Growth Index

Ten-Year Performance Review

Executive Summary

- The SmartALPHA® Defensive Growth Index was launched June 30, 2012. This strategy index is composed of 30 large-cap, equally-weighted stocks selected from non-cyclical sectors. The Index is rebalanced quarterly and is independently calculated by Dow/S&P.
- Over the 2012-2022 period, the Defensive Growth index generated a CAGR of 15.7% vs. 12.9% for the S&P 500 Index and 14.3% for the Russell 1000 Growth Index.
- The combination of steady growth and low downside volatility resulted in a beta of 0.79 and an annualized alpha of 5.5%, versus the S&P 500 Index. Remarkably, its downside capture was only 71% vs. 104% for the R1000G Index.
- Growth strategies tend to greatly overweight cyclical sectors such as technology and consumer stocks, as compared to the S&P 500. This increases their sensitivity to the business cycle and vulnerability to valuation bubbles.
- On the contrary, the Defensive Growth Index generates significant positive alpha by selecting non-cyclical stocks with favorable growth dynamics and limited downside risk, based on fundamentals.
- The Defensive Growth Index offers a distinct and complementary approach to traditional growth strategies. It may serve as the basis for growth exposure for more risk-sensitive investors, to balance more cyclical strategies, or to tilt a portfolio based on a view of the business cycle.

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Introduction

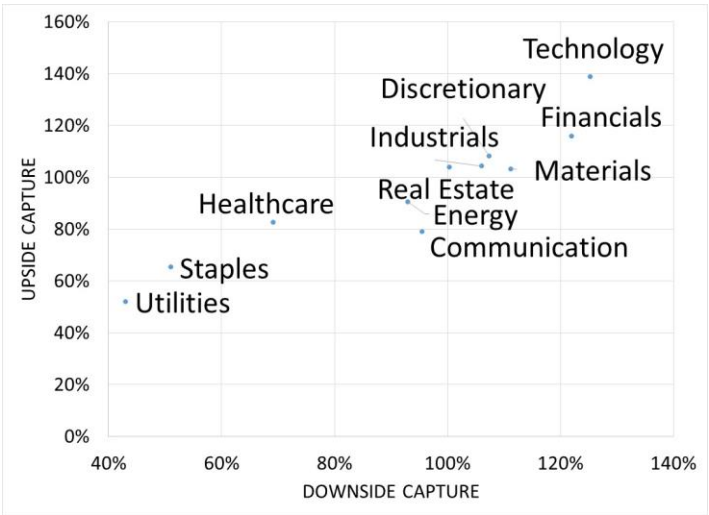
Traditionally, growth investing refers to an investment strategy that invests in companies expected to grow at an above-average rate compared to their industry or the broader market. Growth investors tend to emphasize historical and future earnings growth, potential profitability and share price performance.

Also typical of growth investing is the emphasis on innovative companies, proprietary technologies and unique products. As a result, growth strategies and funds tend to greatly overweight cyclical sectors such as technology and consumer stocks, as compared to the S&P 500

For example, the largest large-cap growth fund by assets – the Growth Fund of America (AGTHX) - had total exposure of 41% to the technology and the consumer discretionary sectors, as of 6/30/2022.

This overweight of cyclical sectors is a tailwind during the expansion phase of the business cycle; on the other hand, it also presents vulnerability to cyclical downturns. This downside risk may be exacerbated by the high market valuation that growth stocks tend to carry – particularly towards the end of the expansion phase. Thus, sensitivity to the corporate earnings cycle accompanied by valuation multiple compression may result in deep portfolio drawdowns.

Figure 2. Upside and Downside Capture by Sector



Source: FactSet, December 1989 - June 2022

Further, the concentration in a few mega cap stocks that has developed over the past few years has increased potential downside risk of growth strategies, particularly in those that have low tracking error.

As of July 2022, the top 10 stocks in the R1000 Growth ETF (IWF) represented about 46% of the market value of the overall index. The remaining 509 stocks accounted for the rest.

Figure 3. Top 10 Stocks – R1000 Growth ETF (IWF)

Company	Sector	(%)
Apple	Technology	12.44
Microsoft	Technology	10.37
Amazon	Discretionary	5.8
Tesla	Discretionary	3.62
Alphabet - A	Communication	3.13
Alphabet - C	Communication	2.88
Unitedhealth Group	Health Care	2.33
Nvidia	Technology	2.28
Visa	Technology	1.86
Mastercard	Technology	1.56

Source: FactSet

In summary, growth investing typically aims to generate capital appreciation by investing in companies with forecasted above-average future earnings growth. This generally results in biases towards more innovative and faster-growing economic sectors such as technology and consumer discretionary. However, the inherent cyclicality of these sectors combined with the growth stocks' high valuation multiples has historically resulted in sharp portfolio corrections and deep drawdowns.

Alpha Quant Models designed the Defensive Growth Index to overcome these limits and to offer a distinct and complementary approach to traditional growth strategies.

The Defensive Growth Index performance demonstrates that growth investing does not need to be characterized as "high risk, high reward." Comparable capital growth with lower downside risk may be achieved investing in growth stocks from non-cyclical sectors.

A Defensive Approach To Growth Investing

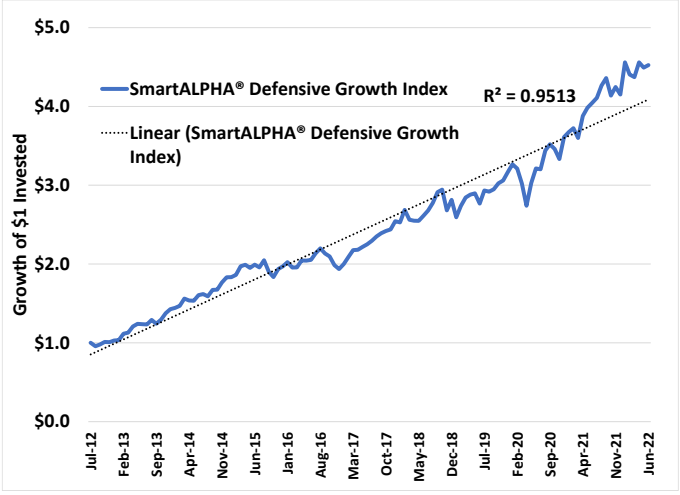
The Defensive Growth Strategy Index aims to target contemporaneously above market returns and lower volatility through a systematic process that selects defensive stocks with high expected alpha, based on a combination of fundamental factors.

Figure 5 depicts the selection process. The selection universe is comprised of liquid, large-cap U.S. stocks. Cyclical sectors: Energy, Financials, Materials, Industrials, Discretionary and Technology, are then screed out. The remaining stocks belong to non-cyclical or defensive sectors: Healthcare, Staples, Utilities and Telecoms. From this sub-universe, 30 stocks with the highest ranked combination of proprietary quality and growth factors are selected.

A proprietary algorithm that combines trends in return on invested capital (ROIC), analysts' earnings and sales revisions, and cash flow accruals supports the final selections. Practically speaking, the index is comprised of non-cyclical stocks with positive change in profitability, operating cash flows and future projected sales and EPS.

Figure 4 displays the consistent and steady growth pattern of $1 invested in the strategy since inception through June 30, 2022.

Figure 4. Cumulative Growth of $1



Source: FactSet, Alpha Quant Models

Figure 5. Investment Process Flow

Investment Universe
Investable U.S. Equity Universe

Macro Risk Selection
Defensive Sectors
Consumer Non-Cyclical
Healthcare | Telecom | Utilities

Fundamental Factor Screens
Earnings Growth, Cash Flows, ROIC

Sector Adjusted Ranking
Adjust rankings for dispersion within sectors

Defensive Growth Strategy Index

Figure 6. Defensive Growth Index Attributes

Focused portfolio of 30, equally-weighted stocks from non-cyclical sectors.
Driven by fundamentals, managed systematically. Annual rebalance, quarterly re-constitution.
Asymmetrical return pattern with strong downside protection and remarkable upside participation.
Aims to outperform the market over a full market cycle and to significantly outperform during bear markets and sharp drawdowns.

Index performance does not represent the returns of any advisory client and are presented without the deduction of advisory fees, trading costs, or other expenses. Please see additional disclosure on the last page.

Risk and Return Analysis

The Defensive Growth Strategy Index was launched June 30, 2012. Therefore, it has recently achieved a 10-year track record. This period provides a meaningful representative pattern of performance and volatility relative to broader market benchmarks and large cap growth peers.

Since inception through 7/30/2022, the Defensive Growth Index grew at a total annualized return of 15.7% vs. 14.3% for the Russell 1000 Growth Index and 13% for the Lipper Large Cap Growth average. Volatility, as measured by annualized standard deviation, was 13% - well below benchmarks and peers. The efficiency ratio for the Defensive Growth index was 1.21 vs 0.95 for the R1000G. Steady performance resulted in a low beta of 0.79 and a remarkable annualized alpha of 5.5%.

Importantly, with a downside capture of 71% and an upside capture of 91%, the Defensive Growth Index generates an asymmetrical return pattern with strong downside protection and remarkable upside participation, historically.

Figure 7. Portfolio Statistics vs. S&P 500

	S&P 500	Lipper LCG	R1000G	SmartALPHA® Defensive Growth Index
CAGR	12.9%	13.0%	14.3%	15.7%
Vol	13.6%	15.4%	15.1%	13.0%
R/Vol	0.947	0.840	0.950	1.206
Beta		1.06	1.06	0.79
Alpha		-0.7%	0.6%	5.5%
UP Capture		106%	109%	91%
DN Capture		107%	104%	71%
Tracking error		5.5%	4.3%	7.9%
Information Ratio		-0.13	0.15	0.70
Max Drawdown	-20%	-25%	-22%	-16%

Source: S&P/Dow, FactSet, 7/1/2012-6/30/2022

The Defensive Growth Index's distinct performance pattern is evident in a high tracking error of 7.9% and an active share of over 95% (versus the R1000 Growth ETF - IWF). This, of course, is the direct outcome of the index selection process that results in a concentrated, equally-weighted index of 30 stocks selected exclusively from non-cyclical sectors. Despite the high tracking error, the information ratio is 0.70, five times greater than the R1000 G Index (0.15).

Based on strong risk-adjusted returns, low correlation and minimum holdings' overlap with benchmarks and peers, the Defensive Growth Index offers a truly unique approach to growth which has delivered both capital appreciation and downside protection.

The Defensive Growth Index may also serve as the basis to be employed as a complement to traditional growth strategies given its sector diversifying properties and high tracking error.

A balanced simulation allocating 50% to the Russell 1000 Growth (as represented by IWF) and 50% to the Defensive Growth index is shown to illustrate this goal. This simple blend aims to offer sector diversification within the growth style and reduce downside volatility,

In this simulation, total return is increased by 90bps/year, beta is decreased to 0.89 from 1.06, and annualized alpha is increased from 0.6% to 3.9% as compared to IWF. The maximum drawdown is reduced to 16.9% vs. 28.3% for the IWF.

Figure 8. Portfolio Equity Allocation Example

	R1000 Growth ETF (IWF)	Defensive Growth Index	50% / 50%
CAGR	14.3%	15.7%	15.4%
Vol	15.1%	13.0%	13.3%
R/Vol	0.950	1.21	1.15
Beta	1.06	0.79	0.89
Alpha	0.6%	5.5%	3.9%
Max Dradown	-28.3%	-16.1%	-16.9%

Source: Alpha Quant Models, Portfolio Visualizer

Comparison With Other Defensive Strategies

Several "defensive" and "low-volatility" funds and ETFs have launched since the great financial crisis of 2007-2008. The proliferation of these products has been driven by investment firms' attempt to capture investors' flows by promising to deliver high returns with low volatility, in our view. In addition to strategies selecting low price volatility stocks or stocks with defensive qualities (i.e., dividend paying companies, low debt leverage, high profitability, etc.), there are also non-traditional defensive strategies that aim to deliver alpha by taking long and short positions or by using market timing to move in and out of different asset classes or sectors. The table below reports the performance and portfolio statistics for few selected strategies comparable to the SmartALPHA® Defensive Growth Index.

Figure 9. Performance Summary of Selected Defensive Strategies (Aug 2012 – Jun 2022, common period)

Metric	SmartALPHA® Defensive Growth Index	Invesco Defensive Equity ETF	AQR Large Cap Defensive Style	Invesco S&P 500 Low Volatility ETF	Guggenheim RBP Largecap Defensive	SPDR S&P 500 ETF Trust
Start Balance	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
End Balance	$44,981	$26,423	$32,757	$27,502	$23,806	$33,132
Annualized Return (CAGR)	16.4%	10.3%	12.7%	10.7%	9.1%	12.8%
Standard Deviation	13.0%	12.4%	12.2%	11.8%	13.4%	13.7%
Best Year	39.5%	28.0%	30.3%	27.6%	30.7%	32.3%
Worst Year	-5.5%	-12.9%	-18.3%	-8.7%	-22.6%	-20.0%
Maximum Drawdown	-16.1%	-21.1%	-19.0%	-21.4%	-23.1%	-20.0%
Sharpe Ratio	1.19	0.80	0.99	0.87	0.68	0.91
Sortino Ratio	2.05	1.24	1.58	1.38	0.97	1.41
Beta	0.79	0.81	0.85	0.70	0.92	1.00
Alpha (annualized)	5.8%	0.0%	1.6%	1.7%	-2.4%	0.0%
Tracking Error	7.7%	6.1%	4.0%	7.9%	4.6%	
Information Ratio	0.46	-0.42	-0.03	-0.26	-0.80	
Upside Capture Ratio (%)	94.8	77.7	87.5	71.4	82.8	100.0
Downside Capture Ratio (%)	68.7	79.7	80.3	65.5	96.0	100.0

Source: Alpha Quant Models, Portfolio Visualizer, All portfolio stats calculated vs. the S&P 500 ETF (SPY)

The SmartALPHA® Defensive Growth Index significantly out-performs all the other strategies both on an absolute basis and on a risk-adjusted basis. It's the only strategy to outperform the S&P 500 with a total returns of 16.4% versus 12.8% for SPY.

More importantly, while it doesn't display the lowest volatility, the downside risk metrics demonstrate its truly defensive behavior when it is most needed by investors. Perhaps the most notable performance statistic is the up/down capture with only 68% participation in down markets and 95% participation in up markets. This asymmetrical return pattern is the direct result of the index construction process which selects defensive stocks with high expected returns, based on fundamental factors. This combination of "low beta-high return" results in a strategy index that offers the potential for both long-term capital growth and downside cushioning during periods of sharp market declines.

APPENDIX: FACTOR REGRESSION ANALYSIS

We compare the Defensive Strategy Index with the R1000G Index and the Lipper Large Cap Growth average through established factor models. A large body of academic research reports that performance can be explained by factors. Factors may be thought of as stocks' relevant attributes to explain their risk and return. Certain factors have historically earned a long-term risk premium and represent exposure to systematic sources of risk. This statistical analysis helps answer important questions such as: What are the driving factors of the Defensive Growth Index performance? How distinct are those factors from broader market benchmarks and large cap growth peers? Figure 1A reports the results of this analysis.

The first sets of tables report the Fama-French factor model coefficients and t-stats. The Defensive Growth Index's significant negative loading on HML (value premium) indicates that its returns are correlated to growth stocks. More importantly, the positive and highly significant CMA factor indicates that the companies in the Index tends to have a conservative investment policy (disciplined capital spending) and this contributes to excess performance (alpha). The opposite is true for both the R1000G ETF and the Lipper LCG average: they display negative loadings on CMA which has subtracted from their returns. High profitability (RMW) is an important factor only for the R1000G.

The second sets of tables displays the AQR factors model output augmented by the credit and term spreads. A highly significant BAB ("bet-against-beta") factor is unique to the Defensive Growth Index. By design, this index selects non-cyclical stocks which have a lower sensitivity to the business cycle and a low stock beta. Also unique to the Defensive Growth Index is the negative and highly significant CDT (credit risk) coefficient – implying a better relative performance during periods of economic slowdowns and increasing credit risk. The opposite is true for IWF and the Lipper LCG Average: both hold higher beta stocks and CDT is not significant factor.

Figure 1A. Factor Analysis

Fama-French model: $R_a = R_{rf} + B_{mkt} \times (R_{mkt} - R_{rf}) + B_{smb} \times SMB + B_{hml} \times HML + B_{rmw} \times RMW + B_{cma} \times CMA + \alpha$

Defensive Growth Index			
Factors	coefficient	t-stat	p-value
Rm-Rf	0.81	16.722	0.000
SMB	-0.02	-0.183	0.855
HML	-0.29	-3.360	0.001
RMW	0.15	1.087	0.279
CMA	0.51	3.416	0.001
Ann. Alpha	3.60%	1.598	0.113

R1000G ETF (IWF)			
Factors	coefficient	t-stat	p-value
Rm-Rf	1.03	61.594	0.000
SMB	-0.12	-5.127	0.000
HML	-0.24	-8.526	0.000
RMW	0.10	3.359	0.001
CMA	-0.10	-1.878	0.063
Ann. Alpha	1.24%	2.253	0.026

Lipper LCG Average			
Factors	coefficient	t-stat	p-value
Rm-Rf	1.01	46.964	0.000
SMB	-0.09	-2.981	0.004
HML	-0.22	-8.534	0.000
RMW	-0.04	-0.724	0.471
CMA	-0.27	-7.664	0.000
Ann. Alpha	0.79%	1.037	0.302

AQR model + Term + Credit: Ra = $R_a = R_{rf} + B_{mkt} \times (R_{mkt} - R_{rf}) + B_{smb} \times SMB + B_{hml} \times HML + B_{bab} \times BAB + B_{qmj} \times QMJ + B_t \times TRM + B_c \times CDT + \alpha$

Defensive Growth Index			
Factors	coefficient	t-stat	p-value
Rm-Rf	1.00	13.036	0.000
SMB	-0.14	-1.679	0.096
HML	0.10	1.660	0.100
QMJ	0.02	0.283	0.778
BAB	0.31	4.208	0.000
TRM	0.21	2.864	0.005
CDT	-0.53	-4.472	0.000
Ann. Alpha	1.25%	0.571	0.569

R1000G ETF (IWF)			
Factors	coefficient	t-stat	p-value
Rm-Rf	1.06	40.860	0.000
SMB	-0.15	-3.659	0.000
HML	-0.33	-15.367	0.000
QMJ	0.00	0.133	0.894
BAB	-0.03	-0.769	0.443
TRM	0.02	1.050	0.296
CDT	0.02	0.352	0.726
Ann. Alpha	1.52%	2.153	0.033

Lipper LCG Average			
Factors	coefficient	t-stat	p-value
Rm-Rf	1.01	31.857	0.000
SMB	-0.13	-2.082	0.040
HML	-0.43	-11.681	0.000
QMJ	-0.11	-2.185	0.031
BAB	-0.04	-1.534	0.128
TRM	-0.05	-1.431	0.155
CDT	0.05	0.712	0.478
Ann. Alpha	1.38%	1.604	0.112

Source: Alpha Quant Models, Portfolio Visualizer

Methodology and Definitions

Results are based on multiple linear regression against monthly factor returns. Period is 07/31/2012-06/30/2022. 36-month rolling regressions. Robust regression: use Newey-West estimator to address auto-correlation and heteroscedasticity of residuals.

Ra	Asset return
Rrf	Risk free return
Bmkt	Market loading factor (exposure to market risk, different from CAPM beta)
Rmkt	Market return
Bsmb	Size loading factor (the level of exposure to size risk)
SMB	Small Minus Big: The size premium
Bhml	Value loading factor (the level of exposure to value risk)
HML	High Minus Low: The value premium
Bqmj	Quality loading factor
QMJ	Quality Minus Junk factor
Bbab	Bet Against Beta loading factor
BAB	Betting Against Beta factor
Bt	Term risk loading factor
TRM	Term Risk factor
Bc	Credit risk loading factor
CDT	Credit Risk factor
Alpha	Excess return over the benchmark
t-stat	t-stat is a ratio of the departure of an estimated parameter from its notional value and its standard error
p-value	p-value measures the statistical significance of the estimated parameter

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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