Q-ESG: Ativo's Unique Quantitative Approach to ESG

December 2021

ATIVO CAPITAL

Ativo has been exploring ways to incorporate ESG values into our investment process since 2011. Improvements in ESG data quality over the past several years have now made this possible, and we recently implemented "Q-ESG" in all Ativo strategies. Q-ESG is an enhanced version of our process that integrates new, proprietary ESG components into our multi-factor valuation model. In this paper, we provide an overview of Q-ESG and describe the extensive research and analysis that went into its development.

KEY POINTS

- Ativo's Q-ESG investment process constructs diversified portfolios tilted toward stocks with high ESG ratings. Q-ESG took more than two years to develop and represents a major milestone in our firm's 20-year history of active quantitative investing.

- Our research indicates that Q-ESG has the potential to generate attractive levels of long-term alpha. In backtests, Q-ESG increased the risk-adjusted returns of Ativo portfolios and outperformed a passive ESG benchmark.

- Differences in how vendors calculate ESG ratings make sourcing the right data critical to successful ESG investing. Ativo spent a considerable amount of time evaluating data providers, selecting two that provide timely, high-quality ESG ratings derived from complementary methodologies.

- Q-ESG is a very customized approach. Ativo built and tested a library of more than 2,500 factors and proprietary factor formulations in an effort to extract the maximum possible value from our data set. And because factors behave differently in different regions of the world, we constructed unique ESG components for each of our US, developed non-US, and emerging markets investment universes.

- Q-ESG is part of a broader ESG mindset at Ativo. We use active ownership strategies to effect positive change within corporations. In addition, Ativo supports our local and global communities in a variety of ways, including providing employees with paid time off for volunteer activities.

AN INTRODUCTION TO Q-ESG

Ativo recently enhanced our investment process by incorporating ESG as a new component in our multi-factor valuation model. We are implementing our enhanced process — "Q-ESG" — in all Ativo strategies. Our research shows that Q-ESG will allow investors to capture attractive levels of long-term alpha with a portfolio of high-scoring ESG companies.

A Goal of Providing a Win-Win for Investors

ESG has transitioned from a niche investment theme to a mainstream strategy in less than a decade. Sustainable investments represent more than one-third of global assets under management, up from approximately 20% in 2012.[1] Among US institutional investors, a 2021 survey[2] showed that nearly 50% of respondents were incorporating ESG into their decision-making process, more than double the percentage in 2013. Several reasons were cited for the adoption of ESG, led by fiduciary responsibility and the desire to align portfolios with organizational values.

The survey also found that approximately 40% of institutions that had not adopted ESG said its benefits were unproven or unclear. Ativo developed Q-ESG to address these concerns. Our objective was to provide an ESG strategy that did not make institutions feel like they had to choose between portfolio performance and responsible investing. As quantitative equity managers since 2001, we believed we could extract valuable, alpha-generating insights from ESG data.

THE Q-ESG EDGE

We believe these unique characteristics of Q-ESG distinguish it in the marketplace:

- Is a high-conviction approach implemented in all Ativo strategies; Q-ESG is not simply an ESG product offered alongside non-ESG products
- Capitalizes on Ativo's two decades of experience managing and analyzing vast amounts of data to extract value from it
- Incorporates the "best of the best " ESG factors from among the more than 2,500 ESG factors and customized factor formulations Ativo tested
- Tailors ESG factors by US, developed non-US, and emerging markets investment universes

Positive Backtest Results

The backtests we conducted on Q-ESG substantiated this view. Incorporating our new ESG components into our investment process enhanced the long-term, risk-adjusted returns of Ativo portfolios. Q-ESG portfolios provided better cumulative performance than original Ativo portfolios, and with a more consistent risk profile. They also provided better and more consistent annual performance. A comparison of Q-ESG to a passive ESG index showed similarly positive results.

As a welcome additional benefit, Q-ESG more closely aligns Ativo's values as an organization with the companies we invest in on behalf of our clients.

[1] Global Sustainable Investment Alliance, *Global Sustainable Investment Review 2020, Global Sustainable Investment Review 2014.*

[2] Callan. *2021 ESG Survey.*

The Weight of the Evidence

Q-ESG enhanced the return and risk characteristics of Ativo portfolios in the backtests we conducted.*

SEPTEMBER 30, 2013 – JULY 31, 2021

	Ativo Original US Equity	Ativo Q-ESG US Equity	Ativo Original International Developed	Ativo Q-ESG International Developed	Ativo Original International Emerging	Ativo Q-ESG International Emerging
Annualized Alpha	3.33%	3.42%	3.29%	4.48%	3.61%	4.16%
Annualized Risk	2.83%	2.51%	3.01%	4.10%	3.16%	2.73%
IR	1.18	1.36	1.09	1.09	1.14	1.52
Up Capture	1.10	1.09	1.05	1.07	1.01	1.03
Down Capture	0.96	0.93	0.88	0.84	0.87	0.86
Up / Down Capture Ratio	1.15	1.17	1.19	1.27	1.16	1.19

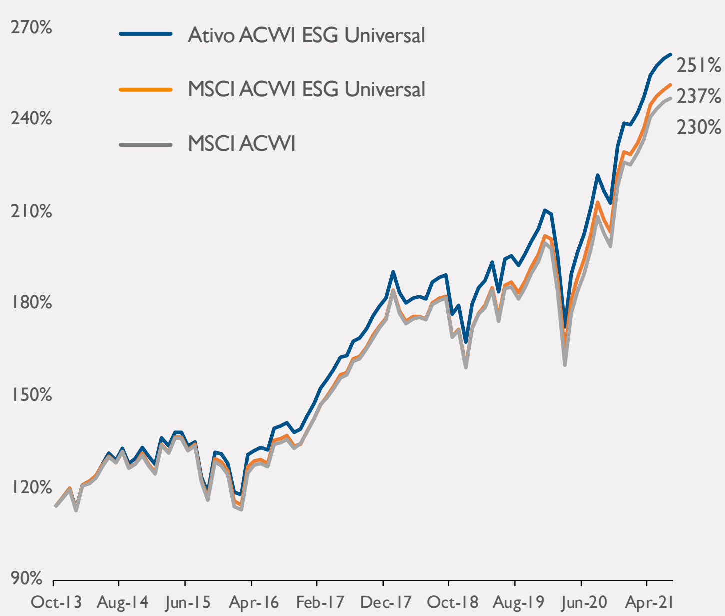
Source: Ativo, MSCI, Qontigo, FactSet. *Please review the end of this document for important disclosure information.

A Favorable Comparison to the MSCI ACWI and MSCI ACWI ESG Universal Index

We created an Ativo ACWI ESG Universal Index using MSCI's methodology for the MSCI Universal ESG Index but based on ESG scores produced by our proprietary ESG components. On a cumulative basis, the Ativo ACWI ESG Universal Index outperformed both the MSCI ACWI and the MSCI ACWI ESG Universal indexes, and with less risk. Ativo's index also outperformed in most calendar years.*

SEPTEMBER 30, 2013 – JULY 31, 2021

CUMULATIVE INDEX PERFORMANCE - GROSS RETURNS (USD) MSCI



ANNUALIZED PERFORMANCE	MSCI ACWI	MSCI ACWI ESG Universal	Ativo ACWI ESG Universal
Return	11.25%	11.62%	**12.46%**
Risk	13.50%	13.34%	**13.28%**
Sharpe Ratio	**0.83**	**0.87**	**0.94**

ANNUAL PERFORMANCE	MSCI ACWI	MSCI ACWI ESG Universal	Ativo ACWI ESG Universal
Partial 2013	7.44%	**7.80%**	7.79%
2014	4.82%	4.77%	**6.31%**
2015	-1.76%	**-1.23%**	-1.31%
2016	8.54%	7.79%	**9.62%**
2017	24.69%	24.80%	**25.82%**
2018	-8.90%	-8.84%	**-8.15%**
2019	27.39%	28.72%	**29.24%**
2020	16.95%	17.79%	**18.45%**
Partial 2021	13.40%	14.05%	**14.43%**

Source: Ativo, MSCI, Qontigo, FactSet. *Please review the end of this document for important disclosure information.

THE EVOLUTION OF ESG INVESTING AT ATIVO

We implemented Q-ESG in 2021; however, ESG is not new to Ativo. We had been exploring ways to incorporate ESG values into our investment process for a decade. Improvements in the quality of ESG data over the past several years are what made Q-ESG possible.

Initial ESG Research

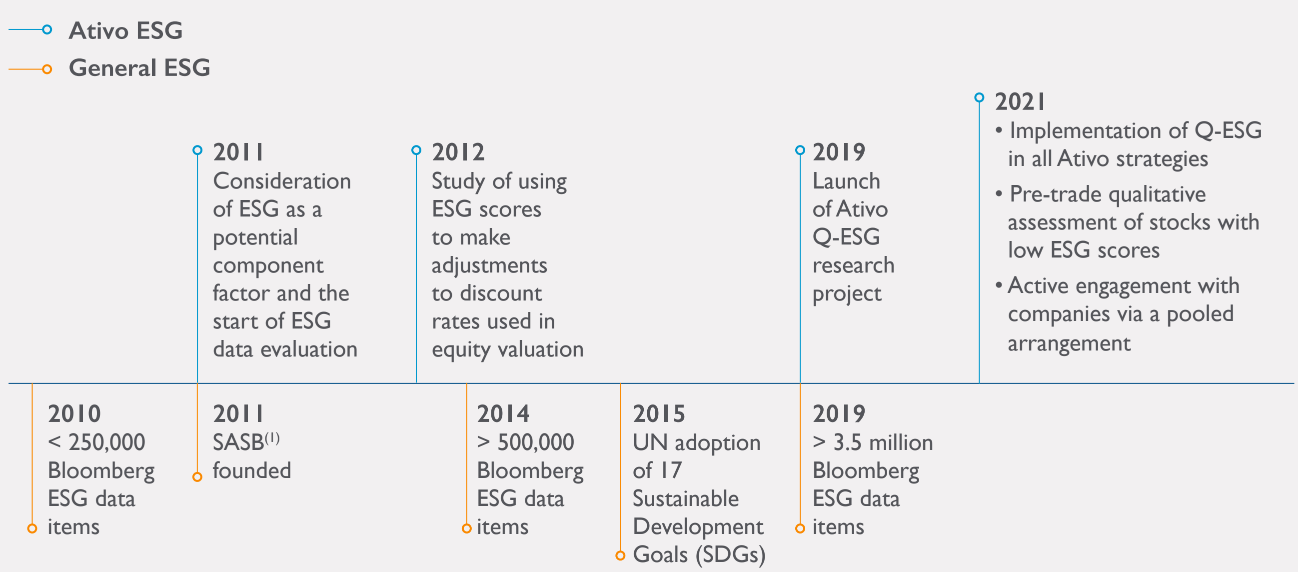
We took our first serious look at developing an ESG component back in 2011, when global assets in ESG strategies were just a fraction of what they are today. At that time, we were unable to determine if we could generate incremental alpha from ESG factors because the quality of the ESG data was insufficient for our purposes. As a global equity manager, the data did not provide enough geographic coverage, nor did it provide enough company coverage within geographic regions. As a quantitative manager, the history of the data that did exist was not long enough to provide an ample backtest period.

Prior to 2011, Ativo had been managing certain portfolios according to client-defined policy guidelines that limit investment in various companies and industries, such as tobacco and firearms. However, we never considered adopting an exclusionary approach to ESG more broadly in Ativo portfolios. We did not want to make ESG decisions on behalf of clients, especially since these types of wholesale exclusions can materially impact portfolio returns.

Evaluation of Discount Rate Adjustments

In 2012, additional research led us to study a technique in which we fine-tuned the discount rates used in our valuation process based on ESG data. More specifically, we assigned lower discount rates to stocks with high ESG scores and higher discount rates to stocks with low ESG scores. Our thesis was that with companies with high ESG scores should have below-average risk profiles and vice versa. This technique did not produce usable results. Portfolios ended up being biased toward low ESG stocks whose alpha was dependent on these "bad actors" improving their ESG profiles. Furthermore, data coverage remained an issue.

Ativo Q-ESG is the culmination of our long-standing commitment to sustainable investing.



(1) The Sustainability Accounting Standards Board (SASB) is a non-profit, independent standards board that is responsible for the due process, outcomes, and ratification of SASB Standards. SASB Standards are guidelines around the disclosure of financially material sustainability information by companies to investors.

Full ESG Integration With Q-ESG

By 2019, ESG data had matured to the point where we believed we could systematically extract value from it. There was better coverage of the small- and mid-cap universes and emerging markets. Language translation had also improved, so there was more information available on non-US stocks in general. We decided to revisit ESG, and our research led to the 2021 addition of ESG as its own independent component within our multi-factor model.

Ativo made another ESG-related process enhancement in 2021. Portfolio managers now receive an automatic warning from our trading platform when they try to initiate a position in a stock with a low ESG score. This prompts them to perform a qualitative assessment of the company's ESG rating to determine the reason for the low score, whether the score is likely to improve or deteriorate over time, and if the stock should be added to the portfolio.

AN OVERVIEW OF THE Q-ESG DEVELOPMENT PROCESS

Ativo spent more than two years developing Q-ESG. Our work encompassed three main phases: Data Sourcing, Factor Development, and Component Development. Each phase benefited from our expertise at managing large amounts of data and applying statistical tools to extract insights from the data.

The goal of our work was to integrate an ESG component into our investment process that would enhance the risk-adjusted performance of Ativo strategies. And because we knew that factors behave differently in different regions of the world, we wanted to construct a unique ESG component for each of our US, developed non-US, and emerging markets investment universes.

Ativo committed significant human and technological resources to the development of Q-ESG:

- **All of our portfolio managers and analysts were involved in the project, led by our CIO and Director of Research.** Two of our analysts have earned the CFA Institute Certificate in ESG Investing, a designation that is supported by the UN PRI.
- **We used advanced data management and analytical tools throughout the development process.** These tools included database management software, high-level programming languages, and regression and optimization platforms — some from third-party providers and some proprietary to Ativo.

Below is a summary of the Q-ESG development process, which is followed by a more detailed discussion of each phase of the project.

Q-ESG: A Three-Phase Development Process

1. DATA SOURCING

- **Vendor Selection**
  Research and select complementary ESG data vendors with global coverage and long data histories
- **Data Management**
  Onboard, re-engineer, and warehouse the data

2. FACTOR DEVELOPMENT

- **Factor Formulation**
  Create different formulations of the data vendor's ESG ratings
- **Factor Testing**
  Test over 2,500 ESG factors and factor formulations to identify the 10-15 most attractive for each universe

3. COMPONENT DEVELOPMENT

- **Component Construction**
  Build three, universe-specific ESG components, each including a subset of the 10-15 candidate factors
- **Integration Analysis**
  Assess the potential value-add of the ESG components based on model diversification benefits and simulated portfolio results

I. DATA SOURCING: Vendor Selection and Data Management

Vendor Selection

Ativo spent five months researching potential ESG data partners given the critically important nature of this decision. Our vetting process led us to select two complementary providers: one using a fundamental approach to developing its ESG ratings; the other relying on artificial intelligence and natural language processing (AI-NLP).[3] Together, they provide timely, high-quality information with excellent global coverage and the history we needed for backtesting.

Vastly Improved Data, But Still "Noisy"

ESG data has come a long way in the past 10 years. More companies are self-reporting more detailed information about their environmental performance, as well as their social and governance practices. There are now hundreds of ESG data vendors collecting information on thousands of companies worldwide. They augment self-reported information with information from company surveys and publicly available records, such as government databases and news reports. Some even use statistical models to develop estimates for unreported data based on averages for similar companies.

The maturation of ESG data made it possible for Ativo to develop Q-ESG. Nonetheless, sourcing the appropriate data was a major undertaking. Methodologies, ratings scales, and data quality vary widely across providers. The lack of standardized rules dictating how companies report ESG data injects further inconsistency and subjectivity into the process.

Because of the different approaches ESG data vendors take, it is not uncommon for a company to receive a high ESG score from one vendor and a low score from another. In fact, a 2020 study by the MIT Sloan School of Management and the University of Zurich found that correlations between composite ESG ratings from six different vendors averaged 0.54 and ranged from 0.38 to 0.71.[4] Several asset managers recently joined with MIT Sloan to solve the problem of what they deem "noisy and unreliable" ESG data across providers.[5]

The ESG Data Landscape

There are four main categories of ESG data vendors. Ativo selected one vendor from the fundamental category and one for the AI-NLP category.

Aggregators

Compile high-level data from numerous ESG vendors

Develop a composite ESG rating based on the individual vendors' ratings

Use a process analogous to creating consensus earnings estimates on stocks

Funadamental Providers

Use teams of analysts to gather data from a range of sources, including direct company engagement and publicly available sources

Assign ESG ratings based on a qualitative framework

Employ research methods used in traditional security analysis

AI-NLP: Artificial Intelligence and Natural Language Processing Providers

Scrape global news services on a daily basis

Tag the extracted information back to ESG categories for sentiment

Limit potential cognitive bias of human-led analysis

Specialists

Focus on specific areas of ESG, such as carbon emissions, human rights, or corporate governance

Have limited coverage, by definition

[3] Artificial intelligence encompasses the techniques used to teach computers to learn, reason, perceive, infer, communicate, and make decisions similar to, or better than, humans. Natural language processing is artificial intelligence that can interpret and respond to human language.
[4] Berg, F., J. Koelbel, and R. Rigobon. "Aggregate Confusion: The Divergence of ESG Ratings." 2020.
[5] *Institutional Investor,* "AQR and MFS Partner With MIT to Solve ESG Data Problem," October 27, 2021.

Ativo's Vendor Selection Process

We view the inconsistencies in ESG data as an opportunity rather than a problem. If the data were highly standardized, the ability to use it to generate alpha would diminish. We felt confident that once we understood how vendors built their data — from the raw inputs all the way up to the highest-level ratings — we could unlock the value embedded in it. We therefore spent a considerable amount of time analyzing vendor data to identify the right data partners for Q-ESG.

Below is a summary of our vendor selection process:

- **We started by eliminating vendors in the specialist and aggregator categories.** Specialists did not provide adequate coverage. Aggregators were not attractive to us because we did not want to pay for aggregation; we had the ability create our own high-level ESG scores from lower-level data.
- **We identified a group of eight fundamental and AI-NLP vendors that had not made significant changes to their collection methodologies.** For backtesting purposes, we needed to work with data sets that were consistent over time.
- **We developed a short list of five finalists:**
  In the fundamental category, we narrowed the field down to providers that not only had good recent coverage, but that had good coverage going back many years. Transparency was also important. We wanted the ability to re-engineer the data, so we needed to understand every aspect of a vendor's data collection and ratings methodology.

  In the AI-NLP category, we focused on vendors with translation capabilities to avoid country biases. Providers without translation capabilities are dependent on English-language sources. This limits their ability to collect ESG data in countries like Japan, China, and Brazil, where most of the news is reported in the local language.
- **We performed extensive due diligence on each finalist and selected two complementary vendors.** We analyzed the methodologies of the finalists, met with their research teams, and tested samples of their data. At the end of this process, we chose one fundamental vendor and one AI-NLP vendor. In combination, they provide coverage for most of the ACWI IMI Index, with weekly ESG data going back to January 2013 — the starting point at which the data had matured enough to conduct valid backtests on a global basis.

Ativo's Complementary ESG Data Vendors

We selected two ESG data partners with very different methodologies, laying the groundwork for a robust database to drive Q-ESG.

	VENDOR A	VENDOR B
Vendor Category	Fundamental	AI-NLP
Materiality Framework(1)	Proprietary	SASB
Approx. Number of Public Companies Rated	8,500	8,300
Approx. Number of ESG Factors Per Company	180	140
Frequency of Data	Weekly	Daily
Ratings Scale	0–10	0–100

(1) A materiality framework provides information about the degree to which ESG factors are important to the financial performance of companies in different industries.

Data Management

We used various techniques to onboard the data we received from our vendors, including improving the granularity of one vendor's composite ratings. By meticulously combining the data from the two vendors and making it more precise, we created a solid foundation for testing, and now running, our ESG factors and universe-specific components.

Database Development

We addressed all of the typical challenges associated with building a database infrastructure. For example, we had to make sure that all of the ESG data items were mapped to the right stocks. This sounds straightforward but is complicated by a host of issues, including our vendors' use of different security identifiers (CUSIP, ISIN, SEDOL, SEDOL history, etc.) and the fact that a stock's security identifier can change over time and be recycled.

We also re-engineered the composite ratings of our vendor that uses a 0 to 10 ratings scale, with ratings expressed out to just one decimal place. Because this scale is so compressed, many stocks in a large universe end up having the same composite rating. To minimize these "ties," we reconstructed the vendor's composite ratings from the ground up by averaging all of the underlying, root-level ratings that go in to each composite. This averaging process resulted in composite ratings that are expressed out to multiple decimal places — improved gradation that enhances the quality of the ratings.

Data Warehousing

Our proprietary database capabilities allow us to store, update, and analyze the massive amount of ESG data that drives Q-ESG. Initially, we were managing close to 1.5 million weekly data points that covered approximately 4,500 stocks since January 2013. By July 2021, that number had grown to nearly 3.0 million weekly data points as coverage expanded to approximately 9,000 stocks.

A More Precise Starting Point

We improved the quality of one of our vendor's composite ratings by re-engineering them to make them more differentiated.

Custom ESG Score = (E Score * E Weight) + (S Score * S Weight) + (G Score * G Weight)

	Before: Vendor Raw ESG Score	After: Ativo Custom ESG Score	Environmental Score	Environmental Weight	Social Score	Social Weight	Governance Score	Governance Weight
Stock 1	10.0	8.800	9.7	0.32	10.0	0.20	7.7	0.48
Stock 2	10.0	7.693	4.6	0.10	8.0	0.57	8.1	0.33
Stock 3	10.0	6.531	10.0	0.05	6.5	0.47	6.2	0.48
Stock 4	10.0	5.854	6.7	0.13	5.5	0.54	6.1	0.33

2. FACTOR DEVELOPMENT: Formulation and Testing

Factor Formulation

Ativo took a highly customized approach to factor development, with the goal of extracting as much value from our ESG database as possible. We formulated each of the more than 300 total ESG ratings factors provided by our vendors in different ways, creating a library of over 2,500 factors and factor formulations to test.

A Major Expansion of the Opportunity Set

We were not content to simply test the 300-plus factors in our database. We wanted to go further by seeing if we could make each of the factors more intelligent — i.e., tease out additional value from them. To accomplish this, we approached the database in two primary ways:

- **We normalized (i.e., adjusted) each of the factors to account for differences in a company's country, sector, and industry.** Just as financial accounting standards, practices, and regulatory enforcement vary around the world, so do ESG standards, practices, and enforcement. For example, European companies have been early adopters of, and leaders in, ESG reporting, along with engagement and resolution practices. Thus, a high ESG score for a UK stock is not directly comparable to a high ESG score for a US stock or a Chinese stock. The same is true for global sectors and industries. Evaluating the ESG ratings of an oil producer against those of a software developer is not particularly relevant. By creating normalized versions of the factors, we removed the country, sector, and industry biases that lead to apples-to-oranges comparisons.
- **We normalized each of the factors on size, as well as various momentum and sentiment measures.** Large companies generally have more resources than smaller companies to address and report on ESG issues. Consequently, ESG data vendors tend to assign higher ratings to large companies. Using revenue as a proxy for size, we eliminated this size bias.

  We also created momentum- and sentiment-based versions of the ESG factors. The momentum-based versions measure the change in a factor's score over various periods of time. The sentiment-based versions capture whether ESG news stories being reported on a company are overwhelmingly positive or negative.

A Large and Proprietary Opportunity Set

Ativo developed several different versions of each of the more than 300 ratings factors provided by our ESG data vendors to maximize the number of potential alpha factors we could test when building Q-ESG.

Raw Factors (320 Factors)	Neutralizations (960 Factors)	Normalizations (1,920 Factors)	Customizations (2,220 Factors)	Optimizations (2,560 Factors and Candidate Components)
Raw (Absolute) Factors Obtained	Raw Factors Are Neutralized by Discrete Variables	Raw Factors Are Normalized by Continuous Variables	Candidate Factors Are Customized	Raw, Neutralized, Normalized, and Customized Candidate Factors Are Optimized Into Candidate Components

An Asset to Capitalize on in the Future

Ativo's proprietary library of factors and factor formulations (collectively referred to as "factors" from here on) is an invaluable resource. ESG investing is dynamic and, at some point in the future, we will likely consider incorporating different factors into Q-ESG. When that time comes, Ativo will have many good options to choose from; we won't have to start from the beginning to research something new.

Factor Testing

We tested all 2,500-plus Ativo ESG factors in each of our three universes (US, developed non-US, and emerging markets) to arrive at 10-15 candidate factors for each universe. Our testing protocol was consistent with the parameters and diagnostics that Ativo has used successfully for years.

Stock Ranking to Measure Forecasting Ability

For each factor, we ranked the stocks in a particular universe based on their numerical scores for that factor. We then applied various diagnostic techniques to assess the strength and consistency of the factor's alpha signal — i.e., its ability to discriminate between stocks that would perform well in the future and those that would perform poorly. We conducted these tests over multiple time periods to evaluate each factor's efficacy in different environments.

As is typically the case, a vast number of factors were easy to eliminate. Nonetheless, by testing such a large number of factors, we were confident that we had spanned the information space and not overlooked any high-potential factors. In each universe, roughly 60 factors showed promise. After additional quantitative and qualitative analysis, we selected the 10-15 exhibiting the strongest, most consistent alpha signals — and that were also grounded in sound financial theory — for further testing in component construction, the next phase of our work.

Distinct Factors for Distinct Universes

We want to highlight the fact that the 10-15 candidate factors were unique to each universe — we had one finalist group for the US, another for developed non-US, and another for emerging markets. As investors in the global equity markets since 2001, we know from experience that a more targeted approach tends to produce higher and more consistent alpha. So from the start, we knew we would tailor the Q-ESG factors by universe, which meant that we needed to test them by universe.

Comprehensive Factor Testing

Using a suite of diagnostics, we evaluated the 2,500-plus factors across diverse time periods to identify those exhibiting the strongest, most consistent skill at forecasting individual stock returns.

Examples of Time Periods Tested
Ativo's Full Testing Interval: September 30, 2013 – July 31, 2021
Strong Market Periods / Weak Market Periods
Strong Growth Periods / Weak Growth Periods
Strong Large-Cap Periods / Weak Large-Cap Periods
Strong ESG Factor Periods / Weak ESG Factor Periods
Strong Ativo Model Periods / Weak Ativo Model Periods

Examples of Diagnostics Used
Information Coefficient / Volatility of Information Coefficient
Information Ratio
Absolute Returns of Stocks Ranked in the Top Two Deciles of the Universe
Return Spread Between Stocks Ranked in the Top and Bottom Deciles of the Universe
Batting Averages; Hit Ratios
Horizon Analysis
Turnover

3. COMPONENT DEVELOPMENT: Construction and Integration Analysis

Similar to ESG factor development, ESG component development leveraged the same proven methods that Ativo has used in the past to construct and integrate new components into our model.

Component Construction

We used optimization techniques, combined with our insights and judgment, to find the right mix of factors to include in our universe-specific ESG components. Ativo's significant computing power allowed us to evaluate every possible combination of the 10-15 candidates. Backtests indicate that our thorough approach resulted in ESG components with strong, consistent predictive ability independent of all other factor exposures.

Two Different Kinds of Optimization

We applied the following optimization methodologies to construct the ESG component for each universe:

- **We used brute force, which looked at every possible combination of factors at every possible weight.** Brute force identified the optimal ESG component for each of our backtesting intervals. Most importantly, it was helpful in identifying which factors to eliminate since we could see which ones were consistently being excluded from the optimal mix.

  The limitation of brute force is that is maximizes component performance *within* testing intervals. In other words, the perfect solution provided by brute force for one time period might look substantially different than the perfect solution it identifies for another time period.

- **We complemented brute force with intelligent design, which manages component performance *across* testing intervals.** We looked at the factors that were in each of the components produced by brute force in each of the testing periods. This became a key ingredient in the intelligent design process that we used to identify an ESG component that was not perfect in any one time period but consistently good in all time periods.

In selecting the final ESG component from all of the possibilities generated through the optimization process, we focused on those with: 1) the highest information coefficients, 2) the lowest volatility of information coefficients, 3) monotonic excess return profiles,[6] and 4) the highest absolute returns for the stocks in the top 20% of the distribution. As a long-only investment manager, Ativo was less interested in the performance of lower-ranked stocks.

Customized ESG Components

At the end of this process, we had constructed three proprietary, universe-specific ESG components, each including a subset of the 10-15 universe-specific candidate factors. The ESG factors in the US and developed non-US components have different weightings; the ESG factors in the emerging markets component are equal-weighted. In all three universes, we compared component performance using optimized and apriori equal-weighted factors. Equal-weighting worked well in emerging markets, so we selected this option to avoid overfitting the data.[7]

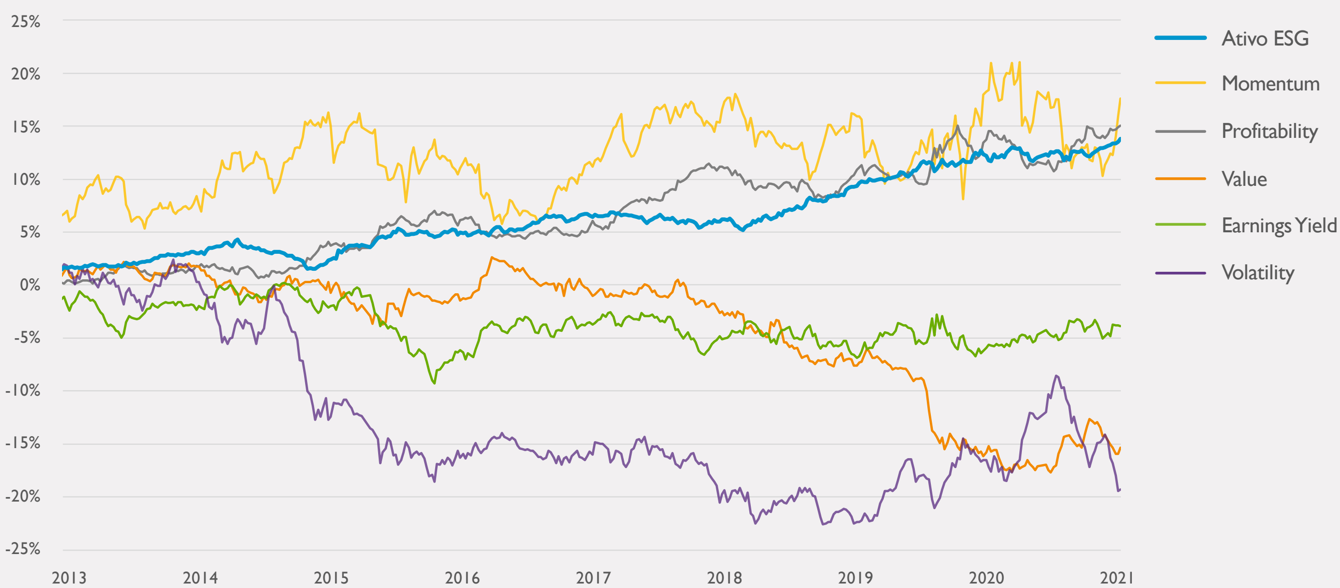
[6] A monotonic excess return profile, or distribution, means that excess returns are sequentially increasing as the distribution moves from the excess returns of lower-ranked stocks to the excess returns of higher-ranked stocks.

[7] Overfitting is a modeling error in statistics that occurs when a function is too closely aligned to a limited set of data points. As a result, the model is useful in reference only to its initial data set, and not to any other data sets.

Strong "Pure" Ativo ESG Component Performance

An analysis of the performance of our ESG components — independent of all other factor exposures — showed that, in aggregate, they produced strong, stable returns over time. They also performed well relative to traditional quantitative factors.

Ativo ESG Components Versus Commonly Employed Factors
Cumulative Performance: September 30, 2013 – July 31, 2021



Source: Ativo; Axioma. The factor performance shown above is for factor-mimicking portfolios (FMPs). The performance of the FMPs represents the returns to long-short portfolios with unit exposure to the factor in question and no exposure to any other factors in the factor set that most quantitative investors may consider. The benefit of tracking the performance of an FMP over that of a typical top-minus-bottom quintile portfolio is that an FMP does not have any incidental exposure to any other factors other than itself. Calculation methodology available upon request.

Component Integration Analysis

The final phase of our work provided strong evidence that each ESG component would be a valuable addition to our multi-factor model. Correlation analysis showed that the ESG components were a unique alpha source that would increase the diversification of our multi-factor model. Optimized backtests in a portfolio setting showed that the ESG components enhanced the return and risk characteristics of Ativo portfolios.

Correlation Analysis

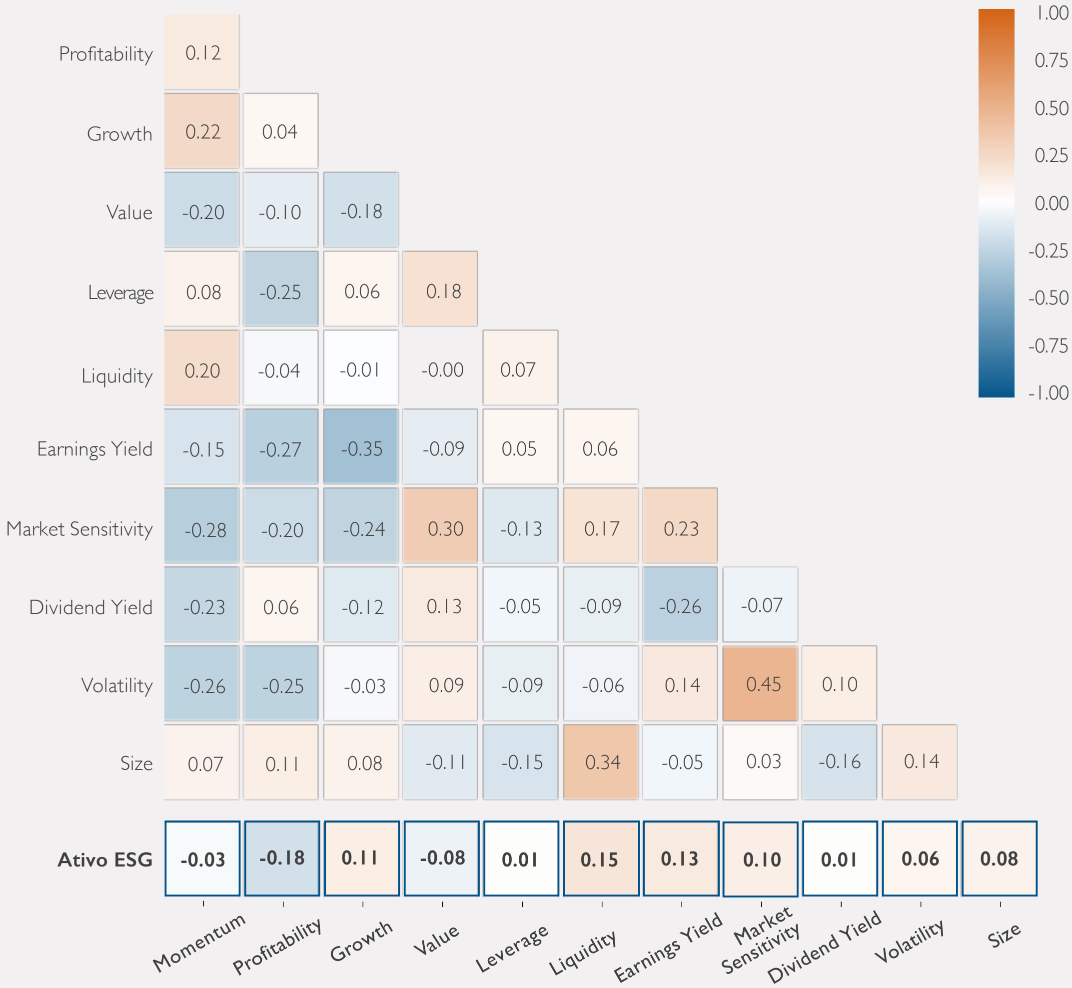
Once we had developed an ESG component for each universe that exhibited strong stock-ranking skill, we wanted to gain visibility into whether or not it would be additive to our model as a fifth component. If there were significant overlap between the performance of the ESG component and the model's other four components — Intrinsic Valuation, Low Volatility, Operating Momentum, and Price Momentum — then its value as an additional factor would be limited.

To assess the uniqueness of our ESG components, we ran a cross-sectional study that measured the correlation of their estimated returns to the returns of 11 traditional factor exposures, such as growth and value. These factors, which have relatively high correlations to Intrinsic Valuation, Low Volatility, Operating Momentum, and Price Momentum, served as a more comprehensive proxy for the four Ativo components.

The results of the study indicated that Ativo's proprietary ESG components would add new information to our model. The correlations between the ESG components' returns and the returns of the other factor exposures were extremely low across the board, ranging from -0.18 to +0.15.

A New, Independent Source of Return

The low correlation of our proprietary ESG components to traditional factor exposures suggests that we have integrated a differentiated alpha source into our model that will enhance the model's overall performance.



Source: Ativo; Axioma. Pearson correlation using weekly factor returns from 9-30-2013 through 7-31-2021; universe: MSCI ACWI.

Portfolio Backtests

The portfolio construction process can cause differences between model and portfolio performance. Portfolios can only own a subset of the model's most highly ranked stocks because of various constraints, such as the need to control active risk exposures and transaction costs. We therefore backtested optimized Ativo portfolios with and without the ESG components.

The results of our backtests showed that the ESG components enhanced the portfolios' risk-adjusted returns, as previously illustrated on page 3. In addition, our backtests showed that active regional, sector, and style exposures of Ativo Q-ESG portfolios remained directionally consistent with those of the original Ativo portfolios.

MONITORING, REPORTING, AND ONGOING RESEARCH

Monitoring and Reporting

We track the efficacy of the ESG factors daily, and we report on the performance of the ESG component to clients quarterly.

Ativo maintains a detailed chronological record of every raw ESG data item that we input into our model, as well as the scores of each ESG factor and each of the ESG components as a whole. This audit trail allows us to:

- **Monitor the performance of the ESG factors** on a daily basis to ensure they are working as intended, and that we proactively address any signs that a factor might be losing its efficacy.• **Attribute monthly and quarterly performance** at the factor and component level.
- **Create client reports** showing how stocks with the highest expected returns based on the scores produced by our ESG components performed versus relevant market benchmarks.
- **Validate all raw data inputs** for each stock prior to executing trades, providing qualitative oversight of our model-driven process.

Please note that ongoing due diligence applies to all of our model's factors and components, not just the ESG factors and components.

Ongoing Research

Ativo is still actively researching ESG, looking for new ways to deliver value to investors.

Our work has not stopped with the implementation of Q-ESG. We continue to follow developments in ESG investing, including new data vendors, progress on data standardization efforts, and the latest insights from industry and academic publications. As we immerse ourselves further into the ESG space, we continue to generate new ideas for testing.

A FIRM-WIDE COMMITMENT TO ESG

Ativo's commitment to responsible investing values extends beyond the implementation of Q-ESG. We use active ownership strategies to effect positive change within companies, and we strive as an organization to live ESG values internally.

Our active ownership strategies center on:

- **Direct engagement.** We engage with companies on high-priority ESG themes in collaboration with other institutional asset managers and investors.
- **Proxy Voting**. When clients delegate proxy-voting authority to Ativo, we incorporate accountability on ESG issues into our voting decisions with the guidance of an industry-leading proxy consultant.

At the organizational level, the desire to give back to our local and global communities is engrained in our culture. Everyone at Ativo receives one day of paid time off per month to devote to volunteer activities, and partners of the firm serve on civic and charitable boards. And as often as possible, Ativo makes annual donations to various charities, which are directed by both partners and employees. These contributions help support a wide range of social and environmental causes.

CONCLUSION

Q-ESG is an enhanced version of Ativo's investment process that represents the culmination of our long-standing commitment to ESG principles. Ultimately, it was the maturation of ESG data that made Q-ESG possible. Once the data provided the global coverage and history that we required, we launched an extensive research project to integrate proprietary ESG components into our multi-factor model.

Ativo took a creative, rigorous approach to developing Q-ESG — from re-engineering vendor data, to building and testing a library of more than 2,500 factors, to constructing universe-specific ESG components. Positive backtest results validated the efficacy of our approach, providing us with the conviction we needed to implement Q-ESG in all Ativo strategies. With Q-ESG, Ativo clients can not only invest in high-scoring ESG companies, they have the potential to capture attractive risk-adjusted returns relative to market benchmarks.

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DISCLOSURES

Past performance is not indicative of future results.

To the extent this document contains information about specific companies or securities including whether they are profitable or not, they are being provided as a means of illustrating our investment thesis.

Page 3 - The Weight of the Evidence Chart

The results shown do not represent the results of actual trading using client assets but were achieved by means of the retroactive application of an investment process that was designed with the benefit of hindsight, otherwise known as backtesting. Thus, the performance results noted above should not be considered indicative of the skill of the advisor or its investment professionals. The backtested performance was compiled after the end of the period depicted and does not represent the actual investment decisions of the advisor. These results do not reflect the effect of material economic and market factors on decision-making. In addition, backtested performance results do not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risks associated with actual investing.

The backtest uses the mean-variance optimization framework to maximize the expected active return and minimize active risk with respect to investment constraints. Each strategy uses its own set of expected returns and risk model. The backtest and the rebalance cycle is weekly. The data that formulates the expected returns and the risk model are point-in-time to reduce any look-ahead bias.

DISCLOSURES (continued)

Page 3 - A Favorable Comparison to the MSCI ACWI and MSCI ACWI ESG Universal Indexes

The results shown do not represent the results of actual trading using client assets but were achieved by means of the retroactive application of an investment process that was designed with the benefit of hindsight, otherwise known as backtesting. Thus, the performance results noted above should not be considered indicative of the skill of the advisor or its investment professionals. The backtested performance was compiled after the end of the period depicted and does not represent the actual investment decisions of the advisor. These results do not reflect the effect of material economic and market factors on decision-making. In addition, backtested performance results do not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risks associated with actual investing.

We followed the MSCI ESG Universal Indexes Methodology described at https://www.msci.com/eqb/methodology/meth_docs/MSCI_ESG_Universal_Indexes_Methodology_Dec2019.pdf. Specifically, in coming up with the weights at each rebalance cycle, all the securities from the eligible universe (MSCI ACWI index) are weighted by the product of their market capitalization weight in the MSCI ACWI Index and Ativo's ESG Score. The weights are then normalized to 100%. Additionally, constituent weights are capped at the issuer level at 5% to mitigate concentration risk. The MSCI ACWI ESG Universal index is rebalanced on a semi-annual basis, but the Ativo ESG Universal index presented is rebalanced on a monthly basis, as we believe Ativo's ESG score was faster-moving. We also completed quarterly and semi-annual rebalancing. The results were consistent and showed outperformance as compared to the MSCI ACWI ESG Universal Index.

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