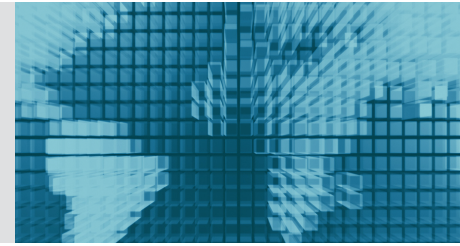


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Machine Learning meets ESG

How computing power can extract alpha from complex ESG data

Key Takeaways:

- Investors are increasingly searching for strategies which identify good performing ESG companies and which generate financial value from them too.
- Machine learning can identify patterns in ESG data that are likely to lead to financial outperformance. Meanwhile, smart beta techniques minimize volatility and increase diversification.
- The expectation is for returns that beat the benchmark over the long-term, but with significantly lower drawdown. This profile fits well with active and core equity portfolios.

ESG investing is attracting investors from across the investment spectrum.

But ESG investors are becoming more demanding and want their investments to provide good returns as well as meet their ESG objectives. Some investors seek funds that focus solely on long-term ESG trends, while others gravitate towards managers who integrate ESG risk into traditional equity portfolios.

The creation of real, demonstrable value is also now possible through an innovative strategy which allies machine learning to smart beta investment.

Machine learning can analyse unlimited ESG variables and uncover sources of alpha. Smart beta, meanwhile, is rules-based and is designed to enhance returns and not just controlling risk compared to the market cap weighted benchmarks. This powerful combination potentially offers investors significant alpha versus equity benchmarks, while reducing the inherent volatility of equity indices.

Time to fast-forward the ESG narrative

Some ESG strategies do not fully meet the needs of investors. The negative exclusion approach, for instance, which keeps controversial activities out of the portfolio, is attractive to investors but only partly satisfies their needs.

Equally, the many best-in-class strategies assess a large number of indicators and typically create portfolios with a high



Carmine de Franco

Head of Fundamental Research

Ossiam

aggregate ESG score. The key factors which lead to superior performance are lost as companies with different ESG strengths are combined in a single portfolio.

As a result, portfolios created from ratings systems tend, at best, to match broad equity benchmarks. Few, if any, can claim to create the necessary alpha to consistently outperform benchmarks.

Investors are increasingly searching for strategies which identify good performing ESG companies and which generate financial value from them too.

It's time to move the ESG proposition on.

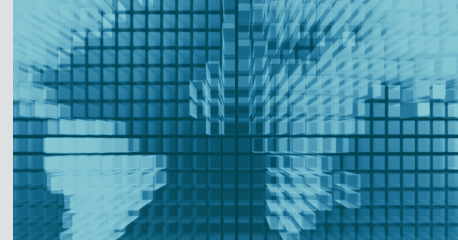
The quest for ESG alpha

"There is unquestionably alpha in ESG data, the key to finding it is to better exploit the huge datasets that now exist," says Carmine De Franco, Head of Fundamental Research at Ossiam, an affiliate of Natixis Investment Managers, which specialises in quantitative asset management.

The ability to meaningfully exploit this data is not easy given that there are around 150 ESG indicators for each

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company, with each indicator a specific answer to a specific ESG question. These questions include how independent the board is, how diverse the workforce, the company's environmental impact, the sustainability of its offices and factories, and so on.

Distinguishing the companies most likely to outperform depends on assessing these indicators company by company to uncover patterns between their ESG profiles and the likelihood to outperform their peers. Each company's performance must also be compared with every other company under consideration. This complex process is impossible using traditional techniques.

Among traditional techniques, the oldest and best known is the linear regression model. This model can, for instance, infer the likely financial performance of companies from macroeconomic indicators such as industrial growth, inflation, interest rates, labour indicators, GDP growth, and so on.

But linear regression delivers poor results when the number of predictors is large. Given that ESG indicators number 150 and are growing rapidly, the linear regression model has little chance of predicting where future alpha lies.

And that's where machine learning comes in.

The power of machines

The recent development of machine learning techniques is the result of greater availability of diversified databases, increased computational power and the success of companies such as Amazon and Google, which use machine learning to drive their business models.

A machine learning algorithm takes a large data set and hundreds (or thousands) of observable variables and finds strong, economically-sound relationships between these variables and financial data, adapting these relationships as the datasets evolve.

So how can machine learning drive an ESG strategy?

Ossiam's ESG strategy begins with a broad global benchmark of stocks, which it cleans up by removing companies that do not comply with state-of-the-art ESG policies. This cleansing process satisfies investors who do not want exposure to controversial business activities. So far, so simple.

The main value of the strategy, however, is derived from the machine learning algorithm which identifies predictable patterns in ESG data when the number of the variables is very high and the relationships between them extremely complex.

The "learning" element of machine learning is critical because ESG as an investment category is still very much in development. It is likely to evolve as investors increasingly expect more from their ESG investments and databases expand as companies release more data, either conviction or in response to regulation.

This means flexibility is essential. If the algorithm's rules are fixed, investors will miss evolutions in the ESG system and thus sacrifice returns. Today, many ESG variables are focused on environmental issues, but perhaps in a few years environmental issues will be well integrated into ESG strategies and social variables will have become more material to performance.

Outputs from machine learning

With such a powerful tool as machine learning, it is possible to be demanding about the output. Ossiam looks for only very strong trends from ESG variables that have clear links to expected under-performance or outperformance of companies versus the benchmark.

The algorithm might find, for instance, that governance incidents are a strong indicator of performance. The worst 33% of companies in terms of governance incidents have a strong tendency to underperform financially.

To explain further, the basic element of the algorithm is a panel of experts, as it is called in the machine learning

community. Each "expert" represents a pattern between one or several ESG variables and the likelihood of companies to outperform (or underperform) the benchmark. To use a simple example, an "expert" might say: "when the governance incidents variable for a company is below 33% of the overall investment universe, then the company is a risk". The elements considered by this expert are: the variable (governance incidents), the threshold (33%), the comparison set (the universe) and the output (risk).

This is just one of many possibly correlations, and these correlations are applied to all the companies in the dataset so that each company can be scored. The scores equate to forecasts of future performance and regularly change as machine learning takes place, leading to the unearthing and application of new correlations, and the adaptation of existing ones.

Smart beta reduces volatility

The machine learning process leads to a roster of good performing stocks, the worst polluting of which are then screened out to comply with investors' desire for a low carbon footprint.

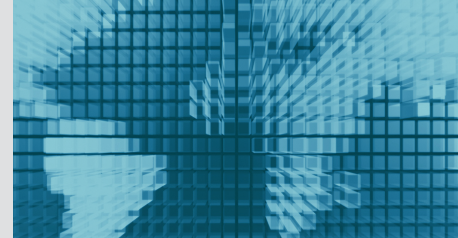
This leaves a portfolio of stocks which scores better than the benchmark from an ESG standpoint, has a higher probability of financial outperformance, has no controversial activities and a low carbon footprint.

The alpha boost provided by the machine learning process can add volatility and diversification risk to the portfolio, so another portfolio construction element is required to reduce this risk. This is where the smart beta – specifically minimum variance – is introduced. In essence, minimum variance aims to weight stocks to minimize the total portfolio's volatility while maintaining sufficient diversification.

With the minimum variance input, there is greater balance between stocks. On the one hand, machine learning creates alpha while, on the other hand, smart beta deals with risk. This leads to a more robust portfolio. "Even

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long-term investors worry about short term performance,” says De Franco. “The smart beta-machine learning combination helps them sleep at night.”

The expectation is for returns that beat the benchmark over the long-term, but with significantly lower drawdown.

Where is the fit within a broader portfolio?

Given the ESG exclusion approach and the carbon footprint reduction, the Ossiam strategy meets the requirements of many ESG investors.

Given its world equity focus, the strategy is also regarded by many investors as an essential component of their active

equities bucket. The strategy has a high tracking error (deviation from the index) and is therefore highly active. Given the focus on creating alpha and reducing overall portfolio risk, the strategy is a fit for either the active or core equities allocations.

In addition, even though it is an active strategy, it could also form part of a core or satellite allocation given its expected outperformance versus the benchmark.

A pioneering approach

Is this the first strategy seeking to find good performing ESG stocks? No. But Ossiam has a long history of ESG investing relative to the wider market. Is

this strategy pioneering in that it also seeks to pinpoint and extract alpha from ESG indicators? Most definitely.

By combining machine learning and smart beta, investors can finally get access to an alpha-seeking ESG strategy.

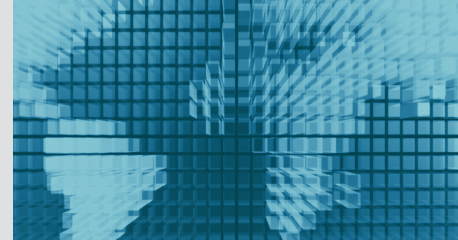
“It is intuitive to many investors that there is a strong link between ESG and long-term value, so a strategy that offers the best of both worlds is likely to be welcome,” De Franco adds.

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Ossiam

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French société anonyme governed by an executive board and a supervisory board with a share capital of 261 240 €
RCS Paris – 512 855 958
6 place de la Madeleine, 75008 Paris

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Limited liability company
Capital € 5 019 776 380,80
RCS Paris n°542 044 524
Regulated in France by the ACPR - Autorité de Contrôle Prudentiel et de Résolution
30, avenue Pierre Mendès-France
75013 Paris
www.natixis.com

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RCS Paris 453 952 681
Capital: €178 251 690
43 avenue Pierre Mendès-France
75013 Paris
www.im.natixis.com

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