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BARCLAYS

Research
24 March 2020

Fundamental ESG Research

Introducing our integrated approach

Adding to our existing ESG offering, we introduce Barclays Fundamental ESG Research. This offers clients a multidimensional, cross-asset analysis of the ESG credentials of companies under coverage and whether markets are incorporating ESG attributes into security pricing. We also provide a primer on the complexities of ESG investing.

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** This author is a debt research analyst in the Fixed Income, Currencies and Commodities Research department and is neither an equity research analyst nor subject to all of the independence and disclosure standards applicable to analysts who produce debt research reports under U.S. FINRA Rule 2242.*

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Dear Client,

As we write, COVID-19 is posing an unprecedented threat to public health, changing the lives of millions of people across the world, reminding us of our exposure and vulnerability to pandemics which, despite incredible advancements in science and technology, we cannot fully control. We have written extensively on the economic shock and lower growth implications that COVID-19 will have on the global economy. The launch of Barclays ESG Fundamental Research is an opportunity to reflect on a different dimension: will COVID-19 accelerate the integration of sustainability concerns into our daily lives, creating a greater sense of urgency and responsibility toward everything from consumer behaviour to climate change, and fundamentally alter the nature of the investment process as a result?

Prior to the outbreak of COVID-19, finance was already at a tipping point, where the integration of sustainability concerns, typically categorised as environmental, social, and governance (ESG) factors, into the investment process, was becoming the norm. The acceleration of this trend, which began in Europe years ago, had been notable, and we expect it to accelerate even further in a post COVID-19 world. Once the pandemic has passed (as we hope and believe that it will), we expect investors to re-engage with financial risk, as they have done after every shock in modern history. What may be different this time, however, is that COVID-19 could have a profound impact on everything from the future of work, to supply-chain practices, the future of mobility, consumer behaviour, e-learning, tourism and more, accelerating the integration of sustainability concerns into investment decisions. Investors, companies and, by extension, our research offering, will need to adapt to this new reality.

The implications of this shift in paradigm are manifold. First, we can expect security prices increasingly to reflect investors' values, whereby the cost of capital to companies will adjust, not only to reflect risk and reward, but also investors' perceptions of the impact companies have on the environment and society. But the effects of ESG investing won't stop there. We expect a range of stakeholders, including investors and consumers, to put pressure on companies, regulators and legislators, to adjust their behavior to better reflect those values, which will have direct implications on cash flows and risk profiles.

This shift is fertile ground for fundamental investors. As your partner in this process, we welcome this change and stand ready to assist you by launching Barclays Fundamental ESG Research, our newest offering in the Barclays suite of sustainability research.

Fundamental ESG Research will apply an ESG lens to our security analysis process, assessing how ESG attributes affect financial risks and valuations. Our aim is to understand if markets are incorporating ESG attributes into security pricing and how they are doing it. As a starting point, we generate a set of Barclays ESG indicators derived from aggregated scores of leading ESG score providers. Barclays fundamental analysts then overlay these indicators with their in-depth knowledge of the industries and companies they cover to evaluate perceived ESG risk, and assess the impact of ESG considerations on security pricing. Through this process, as ever, we aim to surface investible ideas and help mitigate risks for our clients. Over the coming months, we hope to apply this new ESG framework to industries as diverse as Oil & Gas, Pharmaceuticals, Airlines and Autos, all of which are likely to experience fundamental shifts as COVID-19 unfolds.

Barclays' Fundamental ESG Research is a cross-asset initiative, reflecting the importance and broad applicability of sustainability. It complements our existing suite of sustainability research, notably from our Sustainable & Thematic investing team, which presents multi-decade, top-down trends such as Gen-Z, food waste, micromobility, plastic waste, tourism, global fashion and global beef consumption; and from our Systematic investing team, which has focused on the relationship between ESG ratings of issuers and the performance and valuation of their securities. I hope that these three pillars – Thematic, Fundamental and

Systematic – will give you, our clients, a holistic view of the ESG investment opportunities at hand. We look forward to engaging with you on this topic through a series of publications and events over the months and years to come.

Jeffrey Meli, Global Head of Research

Executive summary

ESG investing considers the environmental and social impact of a company's operations and actions, alongside financial considerations, as part of the investment process.

Dedicated ESG strategies have grown in popularity for several years and, prior to the outbreak of COVID-19, ESG investing was a "hot topic" as flows into dedicated ESG strategies morphed into a broad shift towards top-down ESG integration. We have identified an "aspiration gap" that implies trillions of dollars of AUM will become incrementally more ESG constrained in the coming years. Indeed, several of the largest Asset Managers in the world have made public statements to similar effect, causing others to sit up and take notice.

The outbreak of COVID-19 has up-ended short-term flows into all investment products and the urgency of ESG implementation is likely to take a back seat to measures designed to support the global economy for now. But while ESG implementation may be delayed, it is unlikely to be abandoned in the long run – and it may even accelerate in a post-COVID-19 world – given the long-term drivers:

- Societal and demographic shifts mean asset owners are demanding ESG integration.
- ESG factors are a potential source of alpha, over and above traditional analysis.
- Regulators and civil society are requiring more sustainable business models.

In this paper, we look at the growth of sustainable investing in recent years and the reasons behind it. We introduce the main strategies used to implement ESG investing and lay out how the three pillars of Barclays ESG Research – Thematic, Fundamental, Systematic – will support clients as they navigate their own ESG journey, including discussion of the practicalities of ESG investing. Finally, we highlight the existing work of our colleagues in Sustainable & Thematic Investing, who our driving our thematic offering, and in Quantitative Portfolio Strategy team, who are driving our systematic offering.

This report not only lays out our approach to Fundamental ESG Research, but explains how it will differ from our other ESG pillars by focusing on what the companies covered by our fundamental analysts are doing in key areas of ESG. Our "ESG research cycle" illustrates how most approaches to sustainable investing depend on external opinions, such as those from ESG score providers. In contrast, our Fundamental approach will provide new opinions and insights that can (and will) be compared to external opinions. Once we have established what companies are doing in practice, we will furnish our insights with investment opinions and thoughtful dialogue on how companies may evolve and the potential costs and risks that could emerge if they fail to adapt.

We look forward to providing our fundamental ESG insights as portfolio managers increasingly look to integrate sustainability into their investment process.

2020: A breakthrough year for ESG investing

In the 15 years since ESG (environmental, social and governance) was coined as a term by the UN Global Compact, ESG investment[1] has grown from a niche position to one that influences tens of trillions of dollars in assets under management[2]. It has expanded from being a bespoke corner of European equity investment to an overarching philosophy that increasingly influences all asset classes and geographies.

Assets under management within the ESG space grew 34% from 2016 to 2018 according to the Global Sustainable Investment Review. While there is significant debate as to what qualifies as ESG investment, there is no escaping the fact that ESG is dominating more and more conversations within the investment community. We see three main reasons for this:

1. Asset owners increasingly wish to align the investment decisions of asset managers with their own values. Demographic and social shifts have supported this trend – a 2018 survey from the US Trusts' Insights on Wealth and Worth found that 87% of high net worth millennials believe that a company's ESG track record is an important consideration when determining whether to make an investment.

2. There is evidence that ESG factors capture non-financial information that is material to financial performance and asset managers are increasingly aware of risks stemming from environmental and social issues. This also represents a potential source of alpha for active managers. The Barclays QPS team has been at the forefront of researching ESG as a source of excess returns and we highlight their work at the end of this report. Not all investors measure the benefits of sustainable investment in financial terms, but the potential to capture additional returns is a significant draw to the world of ESG for others. This is helping to broaden the appeal of ESG investing.

3. A growing number of regulations and voluntary codes of practise either require or encourage investment managers to report on ESG considerations. We believe these processes help increase awareness of ESG considerations and are pushing (or requiring) money managers to incorporate ESG into their investment processes.

Specialist funds have seen strong AUM growth in recent years

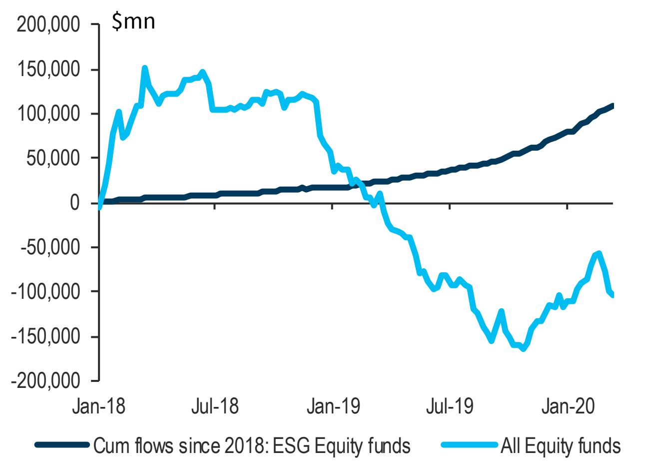
ESG investing began with ESG-labelled funds, and asset managers continue to launch new funds with explicit ESG constraints on their investments. These labels can be verified by third parties according to pre-defined criteria.

According to fund level data on Bloomberg, there are close to 2,000 ESG labelled funds with a total AUM of c.$600bn[3]. These funds are taking an increasing share of the overall market as shown in Figures 1 and 2, which track the growing importance of ESG-labelled funds in both credit and equity markets. Figure 1 shows that ESG-labelled equity funds saw steady inflows over the past two years, despite overall equity funds enduring large outflows since the beginning of 2019. In credit, Figure 2 shows that ESG-labelled funds now make up over 10% of €-denominated corporate bond mutual funds' AUM. Although ESG-labelled funds are much smaller small as a percentage of total mutual fund AUM in the US market, they still saw $1.35bn of inflows in 2019.

[1] We define ESG investing as the explicit consideration of environmental, social, and governance factors in an investment process. The term tends to be used interchangeably with responsible and sustainable investing.
[2] High-level figures produced by ESG think tanks tend to be large and loosely defined due a lack of agreement over what constitutes "ESG investing" and the inclusion of funds and firms with very "loose" ESG constraints.
[3] The large gap between this figure and the tens of trillions of AUM cited by ESG investing think tanks drives our skepticism towards how high-level commitments to ESG are being estimated. We have explored the specific case of ESG investing in credit in our report *Corporate ESG: The growth of an idea*.

FIGURE 1

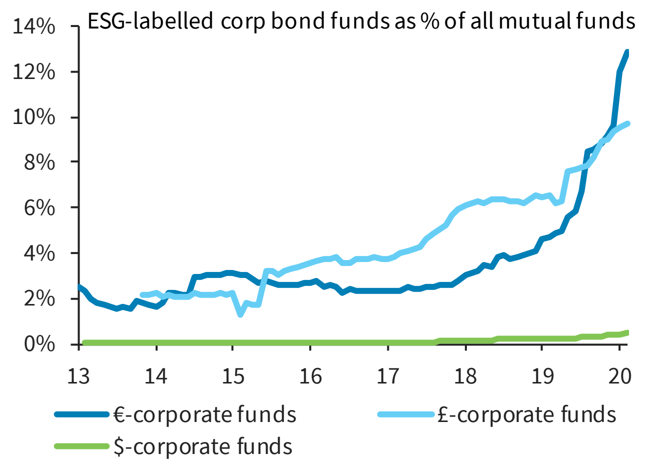
Inflows into ESG-labelled equity funds stand in stark contrast to the outflows from the wider equity market



Data as at 11 March 20. Source: EPFR, Barclays Research

FIGURE 2

ESG-labelled corporate bond funds are making up a greater share of all mutual funds, especially in Europe



Data as at end-Feb 20. Source: EPFR, Barclays Research

Institutional commitments

The growth of labelled ESG funds is impressive, but their AUM is still small relative to the size of bond and equity markets. This is likely to remain true as mutual funds are only a fraction of the global investor base. For example, based on EPFR data, we estimate that mutual funds hold only 10% of €-IG credit and 15% of the global equity market. Although the growth in the AUM of ESG funds is a visible form of adoption, it is only a fraction of the story when it comes to sustainable investing.

In our view, the most important driver of ESG adoption is the increasing number of actions taken by investment managers at a firm-wide level that have the potential to be applied to all existing AUM and not just specialist funds. An increasing number of investors have made high-level commitments to ESG, signing up to the UN Principles for Responsible Investment (PRI) or initiatives such as Climate Action 100+ and UNEP's Tobacco-Free Finance Pledge. Figure 3 shows the continued rapid growth in signatories to the UN PRI. Investors that have signed up to the PRIs have committed to six principles, the first of which is:

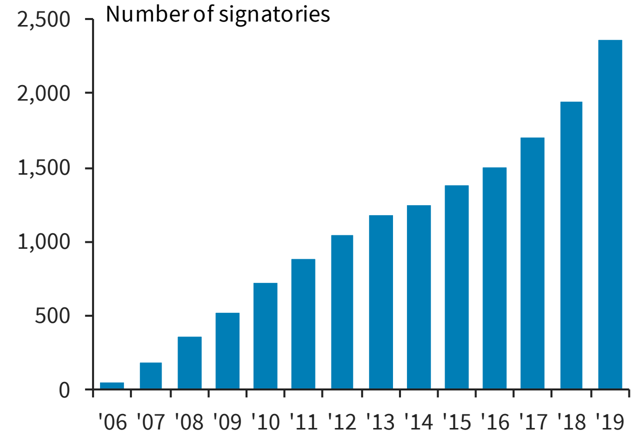
Principle 1: We will incorporate ESG issues into investment analysis and decision-making processes.

We believe there is a significant "aspiration gap" between the amount of AUM that falls under the umbrella of high-level commitments such as the PRIs and the *de facto* implication of ESG constraints on investment processes – analogous to the gap between the AUM of ESG-labelled funds and the tens of trillions of sustainable investment quoted by leading think tanks. Closing this gap should be the biggest driver of ESG adoption, in our view.

We think this gap could close significantly over the course of 2020. Signatories to the PRI must report annually on their responsible investment activities and on their progress in implementing the principles. In 2018, the PRI implemented a set of minimum requirements for existing and future asset owner and investment manager signatories. Signatories were given a two-year engagement period to meet these requirements, with failures resulting in delisting. According to the PRI, the first set of signatories who have failed to meet the imposed requirements could be delisted as soon as June 2020.

FIGURE 3

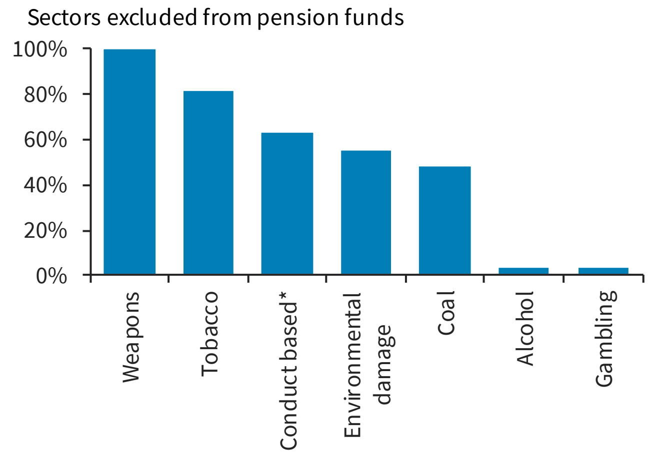
The number of UN PRI signatories has grown rapidly



Source: UN PRI

FIGURE 4

Sectors excluded from pension funds using negative screening



*Companies that break regulations on issues such as child labour and other human rights. Fund AUM taken as at most recent reporting data for each pension fund. Source: Company reports, Barclays Research

The minimum requirements of the PRI are that a firm must have: a responsible investment policy that covers at least 50% of total AUM; independent staff responsible for implementing that policy; senior-level commitment; and accountability mechanisms. The *Financial Times* reported that 50 signatories have been warned they are likely to be delisted at the end of 2020[4].

Given the breadth of the commitment under the PRI, setting up one or even a suite of ESG-labelled funds is unlikely to be sufficient for an asset manager to evidence adherence to the principles or to claim that their sustainable investment policies cover at least 50% of AUM.

Long term, we think that asset managers and owners will be pressed to embed ESG into all the money that they manage. Impetus will likely come from investor action groups and asset owners taking action to highlight those asset managers with questionable ESG policies.

ESG: A European export

European pension funds have been ESG investors for many years and are, in our view, the most long-standing investor base of this nature in Europe (*Corporate ESG: The growth of an idea*, 22 February 2019). According to Mercer's 2019 European Asset Allocation Survey, 55% of European pension schemes already consider ESG risks in their investment strategies. Of the largest 15 European pension funds, 10 constrain their investments using explicit ESG guidelines (and these 10 represent 87% of the surveyed AUM): in Figure 4, we show the sectors commonly excluded by these funds.

European pension funds increasingly require ESG policies from external asset managers, driving a "globalisation" of their investment values. This requirement is being exacerbated by regulations requiring funds in an increasing number of legal jurisdictions to report on ESG considerations. Although US pension funds and asset owners are not affected by similar regulations, US asset managers are increasingly aware that European investors require ESG integration and that mandates can be lost if they are unable to demonstrate the required knowledge and policies. Potential loss of business quickly elevates the importance of ESG to asset managers; in this way, investor perceptions and regulations in Europe have helped to propel ESG on to the global investing stage.

[4] *UN responsible investing body set to delist 50 groups next year*, 17 June 2019

UK pension funds lag behind their European peers, but this is rapidly changing due to new regulations that came into force in October 2019 requiring all UK pension funds to have policies on ESG, climate change, and stewardship as part of their investment principles. We believe that this regulation will push UK pension funds to think more about ESG and will encourage them to formalise and integrate ESG constraints into their investments.

Next steps

We believe that an increasing number of asset managers will choose to demonstrate their commitment to and understanding of sustainable investing by applying ESG policies at a firm level in a way that binds all or almost all funds under management. This would enable investors to meet UN PRI requirements, which are increasingly viewed as a standard for ESG-conscious asset owners and managers.

These commitments can be effected in many ways. For example, a large asset manager in France has announced that all of its actively managed funds will need to maintain an average ESG score that is higher than that of their benchmark indices. Some investors are choosing to exclude certain sectors from all investments, regardless of the fund, and others are moving mainstream funds to ESG-labelled benchmarks. We detail the techniques that investors are using to put their commitments into practice later in this report.

As more investors set ESG-policies and targets at the firm-wide level, thereby imposing ESG upon all their money under management, *de facto* ESG-driven AUM will rise rapidly. This, in turn, is likely to have meaningful implications for issuers and secondary markets.

Fundamental ESG Research: A different approach

ESG investing considers the environmental and social impact of a company's operations and actions, alongside financial considerations, as part of the investment process.

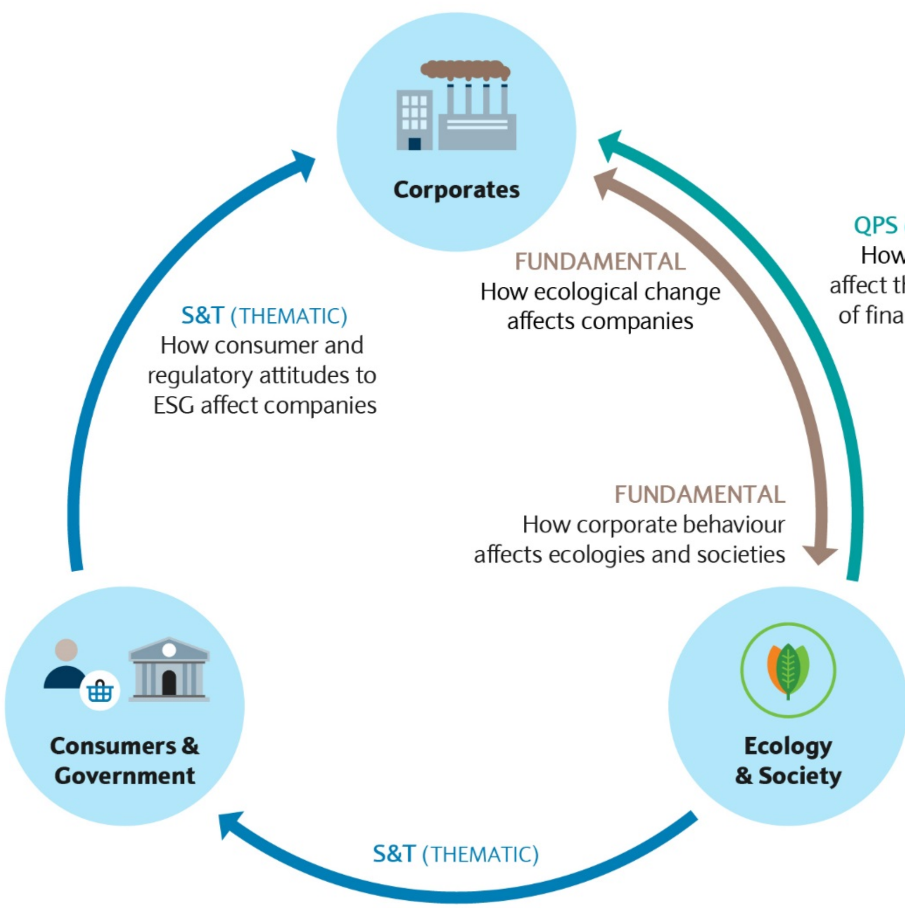
To assist investors in aligning their investment decisions with ESG considerations, Barclays Fundamental ESG Research aims to address the following questions:

- How do companies we cover affect the environment and societies that they operate in?
- How can investors measure and consider ESG factors in their investment process?

Figure 5 places Fundamental ESG Research in the context of a broader "ESG research cycle", which highlights different approaches to tackling ESG as an investment theme and how they are inter-related. While the boundaries between them are blurry, we use the ESG research cycle to contextualise our Fundamental ESG Research alongside the other two pillars of Barclays's ESG Research: our thematic research, led by our Sustainable and Thematic team and our systematic research, led by our Quantitative Portfolio Strategy team. As shown in the figure below, the three pillars of Barclays ESG Research feed into and inform each other and we expect these interlinkages to grow over time.

FIGURE 5

Corporate actions affect people and the world, which eventually feeds back to companies through various channels



Note: "S&T" is Barclays Sustainable & Thematic Investment. QPS is Barclays Quantitative Portfolio Strategy. Source: Barclays Research

Adding a fundamental approach

To complement the existing work of our colleagues in Quantitative Portfolio Strategy and Sustainable & Thematic Investing, Fundamental ESG Research will leverage the expertise of our analysts on the companies they cover by adding a focus on ESG. Barclays Fundamental ESG Research will also discuss how to construct portfolios that reflect investor attitudes toward ESG themes. In assessing how companies influence the environment and the societies they operate in, Fundamental ESG Research will also seek to identify where our opinions about a company's ESG credentials differ from those of leading ESG score providers.

We see two main advantages to this approach. First, we believe the fundamental ESG quality of a company is information that we can unearth through careful analysis, while the scoring or ranking of that information remains qualitative and controversial.

Second, it allows us to observe, measure, and comment on the price that financial markets place on ESG characteristics without expressing a moral opinion on whether that price is the "right" one. We will demur on taking a view of how investors should price environmental or social factors, leaving them to make their own decision. Rather, we will seek to discern what financial markets are (or are not) pricing, and whether the *relative* pricing of corporate ESG is aligned with our fundamental views on a company.

Fundamental ESG Research will also track the development of ESG investing in financial markets, including the flow of capital into these strategies and how it is being deployed, as well as innovation in ESG-linked investments via specialist funds, products and investment benchmarks. Combined with fundamental insights, this analysis will help asset managers to address the practical problems of how to identify issuers that align with their particular ESG aspirations and how to structure their portfolios and investments in a way that is consistent with the ESG goals of the ultimate asset owner.

Our approach in a financial context

We believe that understanding how ESG is likely to influence financial markets is a problem that is best broken into two parts. First, how is ESG investing changing the preferences of investors? Second, could some of the external costs of corporate activity, such as pollution or poor health and safety, eventually end up being on-balance-sheet costs for companies? In either case, understanding how companies are operating and the extent to which they are exposed to these factors is relevant for all investors, even those not focused on ESG.

Investor preference is challenging to track, although data on flows into ESG-labelled funds and our analysis of how institutional investors are applying top-down ESG constraints is one approach. Another approach is to try to quantify how ESG factors affect the performance and valuation of financial securities. Broadly, we categorise the second of these approaches to ESG analysis as addressing the following issue in our ESG cycle.

How ESG factors affect the performance of financial securities

In an early report, our Quantitative Portfolio Strategy team (under our Systematic ESG pillar) showed that in the past environmental and social factors were only mildly related to corporate bond returns[5]. The results suggested that the usefulness of ESG characteristics was limited to governance factors, at least in credit. This aligns with the limited amount of AUM that has been *de facto* ESG-constrained until very recently – with only modest investment amounts being ESG constrained, there is no reason to expect strong evidence of investor preference in the historical pricing of bonds (or stocks).

[5] *Sustainable investing and bond returns*

In a follow-up report, the QPS team found that the importance of environmental scores had risen in recent years. This may reflect the increasing rise of ESG constraints on investments, flagged in the prior section.[6]

Our QPS team are not the only group to have grappled with the usefulness of ESG scores in predicting asset returns. As well as a great deal of research, there are a growing number of data and signal providers, including a multitude of natural language processing approaches, that scrape media and corporate reports to extract signals on emerging ESG controversies. These algorithms and machine learning approaches need to be calibrated to a metric, which is usually the share price of a company. Hence, their work is analogous to the study by our QPS colleagues on corporate bond returns. Collectively, these studies seek to identify the ESG factors that best predict bond and stock performance.

The interaction of ESG data and asset returns can operate via either channel: by identifying factors that relate to investor preference; or by identifying ESG controversies that will land on balance sheet and income statements. For example, our QPS team showed that governance scores were predictive of credit returns, because companies with worse governance (G) scores are more likely to have their credit ratings downgraded. This implies that G scores contain information captured by that is fundamentally relevant to investors, even before taking into account ESG preferences. Over time, this information crystallises on the balance sheets of corporate borrowers, but it can be a long-term process.

Alternatively, it may be that, particularly as the AUM of ESG investing grows, ESG factors become embedded in the cost of capital as emergent investor preference drives a discount (or premium) in equity and credit valuations. This would cause the securities of names with weaker ESG characteristics to underperform. Evidence of this is growing in the most in-focus sectors, such as Tobacco and Energy. High frequency ESG data may be able to extract or predict movements in these discounts (premiums) that drive security performance. However, it is clear that all of these approaches rely on external ESG opinions, as they are not generating any ESG opinions or data of their own (at most, they are aggregating public data).

Further, we do not believe that quantitative methods based on price factors are sufficient to align a portfolio's ESG metrics with investor aspirations. Because they are calibrated to bond and stock performance, they are primed to maximise returns, albeit with an ESG tilt. But if markets rewarded the most ESG friendly companies with higher stock multiples and a lower cost of debt, while punishing those that are falling short, then ESG investment overlays would not be necessary. The existence of ESG investing as a movement is acknowledgement that capital markets fail to price the societal cost of corporate activities correctly.

In general, therefore, quantitative approaches should not be expected to tell us what impact companies are having on the world and what risks they are exposed to if new ESG factors begin to drive investor preference or to crystalise on balance sheets. Rather they track the importance of ESG factors *ex post*. This suggests that they are best used as an overlay or to form strategies to maximise returns after an ESG framework has been implemented.

How ecological change affects companies

This question is being increasingly asked by credit rating agencies (which are looking at ways to include ESG considerations in their credit evaluations) and is embedded into other areas of risk assessment, such as regulatory stress tests for insurers and banks. A growing number of institutions are asking fundamental and operational questions about how issues such as climate change and rising sea levels could create significant costs and business risks.

[6] *ESG investing in credit: A broader and deeper look*

The sectors most affected by these direct questions tend to be those that have physical assets at risk from the effects of climate change; but increasingly investors and regulators are also focusing on second order exposures. For example, the BoE recently asked insurance companies to measure their exposure to climate change.

How consumer and regulatory attitudes to ESG affect companies

For stocks, investor preference should affect PE multiples: appearing as a discount applied to stocks with poor ESG characteristics. However, ESG can also affect stock prices through earnings if ESG issues materialise on company's income statements. For example, if a heavily polluting company is fined by a local government or boycotted by consumers, then the external cost of that company's actions can end up as on-balance-sheet costs.

Our Sustainable & Thematic Investing group (Thematic ESG Research) has produced an expansive body of work focusing on consumer and regulatory preference, a channel through which ESG themes affect revenue growth and profitability. Evolving consumer preferences on topics such as flight shaming or mobile addiction require investors to imagine how the operating environment of companies will evolve due to ESG themes. This is particularly true where preferences are shaping product sales, investor action and/or regulatory action. Building on this, analysts can identify those companies best positioned to prosper (or fail) in light of these themes and what mitigating strategies they could adopt.

This is a broad approach to ESG, which looks 5-10 years into the future. Taking a long-term view is a blessing but can also be a limitation, as near-term volatility and market concerns can dominate long-term considerations as a driver of returns, at least for a period of time.

How corporate behaviour affect ecologies and societies

We think that all of the preceding questions are part of the ESG investing ecosphere. However, most of them are *ex-post* efforts to determine the companies, stocks, and bonds that will benefit from or be adversely affected by ESG trends. In contrast, we believe that Fundamental ESG Research is about *ex ante* identification of how well or poorly behaved companies are. This allows for an assessment of the risk that the external costs of a company's activities end up being pushed back onto their balance sheet, as real costs, or that they are reflected in the pricing of a company's debt and equity due to investor preferences.

Fundamental ESG Research complements our Thematic and Systematic ESG Research, filling a previous gap in the ESG research cycle between long-term themes and asset performance. Corporate actions affect the environment and the societies that they operate in: this will be the focus of Barclays Fundamental ESG Research. Alongside this, corporate ESG behaviour will, in some cases, feed into the performance of issuer securities through shifting investor preferences. Measuring how ESG factors drive security performance is the focus of our Systematic ESG Research. Alongside this, the effect of corporate actions on the environment and society will drive consumer and regulatory preferences, creating new rules and patterns of behaviour. Here, our Thematic ESG Research will continue to bring thoughts and insight. Eventually many of these themes are likely to feed back into the fundamental performance of the companies we cover, which completes the ESG research cycle.

Outside of, but related to, the ESG research cycle is the evolution of ESG in financial markets – and tracking this will be the other part of our Fundamental ESG Research offering. This will track investor preferences through the lens of flows into ESG investing and how ESG is being integrated into investment processes across regions, asset classes, and investor bases.

ESG investing: a practical guide

We believe that the methods by which investors are integrating ESG commitments into their investment decisions can be divided into three main strategies: negative screening; positive screening; and ESG securities. Most investors currently focus on one of these techniques as their main implementation strategy but we expect the prominence of all three to grow. On top of these three portfolio strategies, investors are also exploring the scope for corporate engagement, either bilaterally or through shareholder votes.

Below we outline and review each of these basic approaches, including the pros and cons. We also outline how Barclays Fundamental ESG Research will support investors that pursue these strategies in the context of our overall ESG philosophy.

Negative screening

Barclays Fundamental ESG Research will track the sectors and issuers most affected by negative screening and analyse the current and expected impact of investor divestment on asset valuations. We will also track evolving social and regulatory attitudes, to highlight sectors at risk of falling into the purview of negative screening, including analysis of how different sector definitions could affect which companies are affected.

Negative screening is the exclusion of specific sectors or companies, using a blacklist, and is the most commonly recognised method used for ESG integration. It can typically be split into two types: values-based exclusions, which target sectors or companies that operate in controversial business lines; and norms-based exclusions, targeting companies that fail to meet internationally accepted norms (e.g. the UN Global Compact principles). According to the 2018 Global Sustainable Investment Review, negative screening remains the most common approach to ESG investment, though the pace of adoption has slowed in recent years. Sectors commonly targeted by negative screening include: weapon manufacturers; tobacco; and adult entertainment (Figure 4).

ESG activism and investor pledges are expanding the scope of negative screening, leading to divestment from targeted sectors. For example, UNEP's Tobacco-Free Finance pledge has attracted 151 signatories with AUM of $8.1trn since it was published in September 2018. Additionally, many investors, after joining the Climate Action 100+ alliance, have announced plans to divest away from certain fossil fuel companies. For this reason, we believe that negative screening will remain an accompaniment to other types of ESG strategies, even if it is not an investor's sole approach to ESG implementation.

A key attraction of negative screening is that, once the exclusions have been prescribed, it is transparent, credible and relatively simple to implement. However, the process of creating a list of prohibited investments can still be fraught. For example, an investor committed to reducing their exposure to coal production and consumption would need to define what constitutes a "coal producer" because, in practise, there are very few companies whose business pertains solely to mining or burning coal.

In this example, the scope of the negative screen could be determined by targeting a certain percentage of revenues, for example by excluding companies for which more than 25% of revenues are coal-related. However, this could mean that some of the largest coal miners would not be excluded so long as their business lines are sufficiently diversified. If, instead, the definition of a "coal company" were based on the total tonnage of coal produced and/or burnt, then the largest coal producers would be excluded but small operations may not be, even if their primary business area is in producing coal. In either case there would still be the question of where to draw the line and how to manage exposure to companies very close to the line, i.e. is 24.9% an acceptable revenue split?

Positive screening

Barclays Fundamental ESG Research will seek to identify the impact that the companies we cover are having on the environment and the societies in which they operate. We will also track how our companies are being scored by independent ESG score providers and provide our opinions on whether we believe companies are being accurately assessed. We believe the value of this approach will grow as positively screened AUM increases.

Positive screening involves dynamically investing in companies with better ESG credentials. Usually this is done by regularly scoring or ranking companies based on certain ESG metrics and then skewing investments toward those companies that screen as higher "ESG quality". According to the 2018 Global Sustainable Investment Review, the AUM of funds managed that apply positive screening is currently much smaller than those using negative screening, but the pace of growth over the past two years has been much faster. We expect this to be the main growth area for ESG investing because it allows for more differentiation in ESG implementation and therefore is attractive to asset managers that want to distinguish themselves from peers on the basis of their ESG processes.

The key benefit of positive screening is that it allows for granular and nuanced investment decisions. It also allows investment to act as a catalyst for changing corporate behaviour to a greater degree than is facilitated by negative screening. Consider the extreme case in which all investors undertook negative screening and divested from a specific sector; that sector would eventually be held only by non ESG-constrained investors and there would be no incentive for companies in that sector to change their behaviour or activities. By creating incentives for companies to improve their ESG credentials, positive screening has the potential to lift corporate standards in a way that negative screening cannot.

However, positive screening is more difficult to implement than negative screening as it involves developing a mechanism for rating and ranking companies. There are two main ways this is done:

1. **Taking scores directly from ESG score providers**. There are a substantial number of ESG score providers, but the current market leaders are Sustainalytics and MSCI who have partnered with index providers to create ESG benchmarks in equities and fixed income. Score providers collect quantitative and qualitative data on companies under coverage on a variety of issues such as occupational health and safety and community relations. They use this data to score the company on each of these issues as well as on their overall ESG (and often E, S and G separately) credentials. We detail some of the challenges with using ESG scores in the next section.

2. **Investors create their own in-house scores**. In this case, investors are still likely to take data from ESG score providers or from ESG data providers such as Bloomberg and CDP, that collect ESG related data without attempting to create their own scores. Investors then use this data to create their own scores, applying in-house weightings to different categories depending on what they deem to be the most relevant ESG factors. The main downside to this method is the lack of external transparency.

We do not believe that the best solution is to create another ESG score

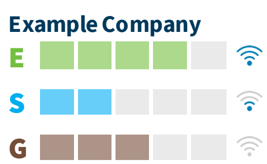
Our goal for Barclays Fundamental ESG Research is to leverage our analysts' knowledge of their coverage universe in the arena of ESG. Analysis of corporate behaviour is broadly factual while the scoring and ranking of these actions is often subjective and controversial. In our view, corporate behaviour is what matters. Generating a Barclays ESG score would run the risk that our ESG conversations end up being technical discussions on how scores are constructed rather than the fundamentals of how companies are operating.

Further, the majority of investors have adopted in-house scoring methods, meaning that a Barclays score in and of itself would be of questionable value, either as a measure of ESG quality or of how investors are likely to view companies from an ESG perspective. Instead, we frame our approach to positive screening under the following questions:

- What metrics are investors and/or score providers using to measure corporates?
- How are companies performing on those metrics, both now and going forward?

In this context, we believe we should aim to: observe the growth of ESG score providers, to identify those that are gaining traction with investors; understand how those score providers evaluate companies; and compare those scores with the insights of our fundamental analysts. In short, we see more value (to our clients) in being an ESG score aggregator and a qualitative commentator than another ESG score provider.

To achieve this, we have developed a method for averaging ESG scores across leading score providers and then disseminating the resulting averages into ESG indicators that reflect the aggregated opinions of leading ESG score providers. We believe indicators are a meaningful representation of how companies are viewed by ESG investors, based on the metrics that are important to investors. These indicators will contextualise the views of our fundamental research analysts by providing a market perspective (to the extent that a coherent one exists) against which our fundamental views can be compared.



Barclays ESG Indicators

For each company covered by a Barclays fundamental research analyst, we will (over time) generate a set of ESG indicators derived from aggregated scores of leading ESG score providers. An example set of indicators is shown to the left of this box.

Companies will be placed in cohorts from worst (one block) to best (five blocks) for each of the three ESG factors. This will represent market perceptions of a company's ESG credentials, as espoused by leading score providers. The icon to the right indicates how well aligned the various score providers are in their assessment of that company.

Full details of how we produce ESG indicators can be found in the technical document that was published alongside this report (see *Fundamental ESG Research: Technical reference document for ESG Indicators*, 24 March 2020).

ESG products and securities

Barclays Research will track issuance of and demand for all types of ESG securities, how the valuations of ESG securities and products differ from their non-ESG equivalents, as well as providing thoughts and analysis on which structures we believe are best aligned with the underlying ethos of ESG investment.

An increasingly popular approach to ESG investing is ESG securities or portfolio products, including ESG or low-carbon benchmarks. While the growth of green bond issuance has attracted attention, many different types of securities and products have been created:

- **ESG/low-carbon benchmarks:** Just as asset managers have raced to create ESG-labelled funds, index providers have created ESG versions of benchmark indices in an attempt to set the standard for ESG funds. Benchmarks have been created that exclude certain sectors, while others partner with ESG score providers to filter out companies with low ESG scores. In a similar vein, some index providers have created low-carbon indices that seek to minimise the carbon exposure of an existing benchmark and simultaneously keep its tracking error low versus the parent index.

- **ESG-labelled ETFs:** As the market for ESG investment opportunities has grown, so has the availability of ESG-labelled ETFs across both fixed income and equities. These typically track ESG/low-carbon versions of benchmark indices.

- **Green bonds and loans:** These instruments are designed to fund environmental projects. This means that green bonds do not have to be issued by "green" companies, so long as the proceeds are financing environmental projects. The coupons, interest and principle payments are not financed by the green projects themselves but are paid from the company's overall business operations.

- **Social and sustainability bonds:** These instruments are similar to green bonds in that the use of proceeds is restricted. For social bonds, the proceeds must be spent on social projects such as affordable basic infrastructure, access to essential services and socioeconomic advancement. The proceeds of sustainability bonds can be spent on both social and green projects.

- **Transition bonds:** Transition bonds are a relatively new concept and are designed to provide financing for companies that wish to transition to a greener business profile but do not currently have sufficient green projects to fund with a green bond. The proceeds can be spent on projects that are not "pure green" but that can still aid in transitioning towards a greener future. For example, these bonds could fund a utility replacing coal generation with natural gas.

- **ESG-linked bonds and loans:** Also referred to as SDG-linked or sustainability-linked, these bonds and loans have payment terms that vary depending on whether the borrower meets various sustainability performance targets. These quantitative targets create clear incentives for borrowers to improve their ESG credentials. Unlike green bonds, there is no restriction on the use of proceeds.

The key advantage of ESG products and securities for investors is that they outsource the ESG analysis to the company that issued the security, the party that structures the product, or some external verifier. Instead of developing their own ESG standards, the buyers of ESG products accept an external opinion as either credible or at the least a "market standard". This allows late adopters to increase the ESG quality of their investments quickly and in a quantifiable way (e.g. by allocating 10% of a portfolio to green bonds, or moving to a low carbon benchmark).

The key disadvantage of this approach today is that ESG standards remain formative. For now, company level disclosure is generally poor and inconsistent and there is little-to-no agreement on which factors should have the greatest weight in ESG considerations. The risk to investors is that the green-labelled products that they buy today subsequently fall short of future ESG standards. For example, early investors in green bonds may find that some of their legacy assets will fall short of emerging green-bond standards in the EU. At that point, these investors may face a tricky decision as to whether to hold or divest their formerly "green" securities. We will strive to keep investors informed of the shifts in regulatory and market standards and the potential implications for legacy securities.

Corporate engagement

Barclays Research analysts already track activist voting activity, noting how this is changing corporate behaviour and the effect this is likely to have on a business's financial profile. Thus, reporting on ESG activism is a natural extension of our existing fundamental research coverage. By focussing on how companies under coverage are performing against key ESG metrics, our fundamental research will highlight areas of weakness and opportunities for improvement at the company level.

Corporate engagement constitutes a shift from investors towards a more "active" form of ownership and can include having active dialogue with companies on ESG-related matters or exercising shareholder rights to influence their behaviour. The aim of this strategy is to encourage companies to improve on ESG issues, to ensure that management better understands the ESG concerns related to their business, and to push companies to disclose ESG-metrics according to certain market standards such as the SASB.

The advantage of this approach is that rather than relying on market-based signals such as the cost of capital, investors can have a direct impact on the future direction of a company by proposing and voting on ESG-related issues at shareholder meetings. Conducting regular dialogues between investors and corporate management and investor relations can help companies to understand and address the ESG issues that they face. It can be a very powerful tool for investors when they have a large stake in a company.

Corporate engagement can often involve collaborating with other investors or groups. This is especially useful for investors that do not have the scale and resources to engage alone in an effective manner, and for debt holders that do not have the right to vote in shareholder proposals. Collective action is being enabled by the emergence of groups and initiatives that have been established to target companies on certain issues. For example, Climate Action 100+ is an investor initiative set up in December 2017 to ensure that companies with the largest greenhouse gas emissions are taking the necessary action on climate change.

Although it is easy for investors to claim that they are actively engaging with companies on ESG issues, it is often more difficult to prove, making this approach more subject to challenge or controversy versus relatively clear-cut strategies such as portfolio reallocation. In order for corporate engagement to be effective, investors must have a clear and detailed plan of what they wish to achieve and ensure that the correct companies are being targeted. They should also have a policy for how to manage situations where the company is unwilling to engage with the investor's proposals.

Challenges around score providers and the creation of scores

Despite its appeal, there are many fundamental challenges to implementation of positive screening strategies. Specifically, there remain a large number of underlying issues in the collection, processing and representation of ESG data, primarily due to the lack of standards for corporate reporting (please refer to *Technical reference document for ESG Indicators*, 24 March 2020).

- **A majority of ESG "data" is generated by scraping public information** from the internet. Many data and score providers have very little interaction with the companies themselves, either in the original data gathering phase or in the data checking phase. For example, a number of ESG score providers share draft reports with companies under coverage but the response rate tends to be less than 50%.

- **Many of the data points are binary**, such as whether the company has committed to reducing emissions. There is less commitment to looking in detail at implementation and ascertaining whether targets are being realised. This means that much ESG data has a strong disclosure bias, i.e. companies with the most policies and commitments score better, even if the quality of those policies and commitments is poor.

- **Much underlying data that score providers gather is unverified**. Since most ESG data is collected through internet scraping, and because there is little to no standardisation of what and how companies should report ESG metrics, there are legitimate concerns over the quality of the data collected – including the risk of "green washing"[7]. A number of organisations such as the Sustainability Accounting Standards Board are attempting to set ESG reporting standards in order to address these issues. There are also a growing number of companies, such as Carbon Trust, that advise companies on how to calculate certain data points and provide assurances for published numbers. However, we believe we are still a way off from the market settling on a standard, and that standard then being adopted by a majority of companies.

- **The methods that score providers use to combine their data into overall scores are often complex.** This creates a challenge for investors seeking to understand how a company's score is related to its behaviour, as it is sometimes not clear how ESG data are aggregated into scores. Further, methodologies differ considerably between the different score providers, in terms of the data they choose to collect and the weight of each data point in a company's overall score. This means that correlations between scores from different providers is often very low.

- **Scores versus ranks**: Related to the previous point, some score providers create their scores in an absolute format (all companies can be compared against each other) whilst others create their scores in a relative format (where a company is scored versus its peers, but cannot be compared to a company in another sector).

In short, positive screening still has yet to resolve three core issues:

1. What to measure,
2. How to measure it, and
3. How to use those measurements.

Until there is agreement on what data needs to be measured, how to measure it, and how to report it, we are unlikely to see standardized reporting of ESG metrics by companies. That, in

[7] When companies or investors over-state their ESG credentials in an effort to present an image that does not accurately reflect the true quality of their actions and/or investments

turn, will constrain efforts to standardize the collection and processing of ESG data, and the production of clear, transparent, and understandable ESG scores (or ranks).

Further, there is no obvious metric by which to calibrate ESG scores. This is a key difference between ESG scores and the ratings of credit rating agencies; what conceptually does an ESG score of 50 mean? We note that it is possible to calibrate ESG factors based on relationships to past or future security returns, but it is not clear that this is what investors want. If "good" ESG companies consistently generated investment outperformance, then ESG would already be integral to portfolio construction and there would be no need for ESG overlays. The risk is that these approaches end up emphasising the ESG characteristics that are predictive of a company's financial performance, rather than the ESG characteristics that best represent the environmental and social impact corporates are having.

Barclays Sustainable & Thematic Investing

The Sustainable & Thematic Investing team within Barclays Equity Research focuses on identifying global thematic trends that could impact the business environment over the coming 5-10 years. This includes demographic change, emerging industries and technology, and evolving consumer behaviour – all of which have a sustainability flair to them given we believe ESG and thematic investment approaches will become increasingly intertwined. We see a number of advantages for investors in embracing a long-term time horizon and thus we outline below the team's research objectives & methodology, as well as its 2030 outlook for ESG/thematic investing.

Research objectives and methodology

The purpose of Sustainable & Thematic research is to highlight companies our sector analysts believe are well positioned and/or at risk from long-term structural trends. Strategically, the aim is to identify the potential new growth opportunities within sectors and how the companies under Barclays coverage are adapting.

1. **Investor Guidebook and sector implications:** To ensure the top down analysis is taken to the stock-level, the Sustainable & Thematic Investing team works closely with sector analysts across Europe and the United States. All Sustainable & Thematic Investing research publications have an Investor Guidebook section, in which the case is made for why action/investment is needed now and the potential ways for an investor to gain exposure to these long-term structural trends across both public and private companies. For each topic, the team looks across the value chain where possible, which means on average reports have contributions from at least 5-10 sector teams.

2. **ESG considerations:** To aid company engagement, reports also provide investors with key ESG considerations and questions for management. Research also indicates how the proposed investment addresses the United Nation's Sustainable Development Goals, given many ESG/Impact funds are typically structured in this way.

3. **Thematic data-sets & external experts:** To offer differentiated thematic insights, Sustainable & Thematic Investing publications often leverage the Barclays Research Data Science platform when developing proprietary datasets and/or external experts including academics, private companies and industry specialists.

2030 ESG/Thematic Roadmap: 150 trends

Given the growing relevance of ESG and thematic investing, the team's 2030 Thematic Roadmap provides our client base with a starting point for debate when investing for the next decade. Leveraging the expertise of Barclays sector analysts and our Research Data Science platform, the report identifies 150 trends that could potentially impact investment decisions as the portfolio of the future is constructed (see *Sustainable & Thematic Investing: 2030 Thematic Roadmap:150 Trends, 12 February 2020)*.

Many of the trends identified in Figure 6 will be impacted by ESG investing, either directly as the investment community considers the impact their investments are having on broader society and/or indirectly as companies adapt their business models to known mega-trends such as decarbonisation and climate change. This includes digital ethics and privacy, clean water and sanitation, sustainable food systems, obesity and social inequality.

ESG and thematic investing to become increasingly intertwined

To help illustrate the team's view, we outline below some of the latest research publications from our Sustainable & Thematic Investing team.

Global Fashion: Green is the new Black (15 January 2020): Global fashion's immense water-consuming, energy-exhausting and wasteful supply chain practices create environmental and social concern that we can no longer afford to ignore. Fast-fashion has exacerbated the problem with an estimated $500bn in value lost per year due to underutilisation and lack of recycling. With global fashion set to reach $3.3trn by 2030 (+5% CAGR), we believe that growing profitability risk, looming regulation, and increased public scrutiny create a clear incentive for the industry to radically transform its supply chain. We view 'sustainable fashion' as a clear business opportunity as the scale-up of experimental materials, emerging technologies and new business models (resale & rental) enable circularity.

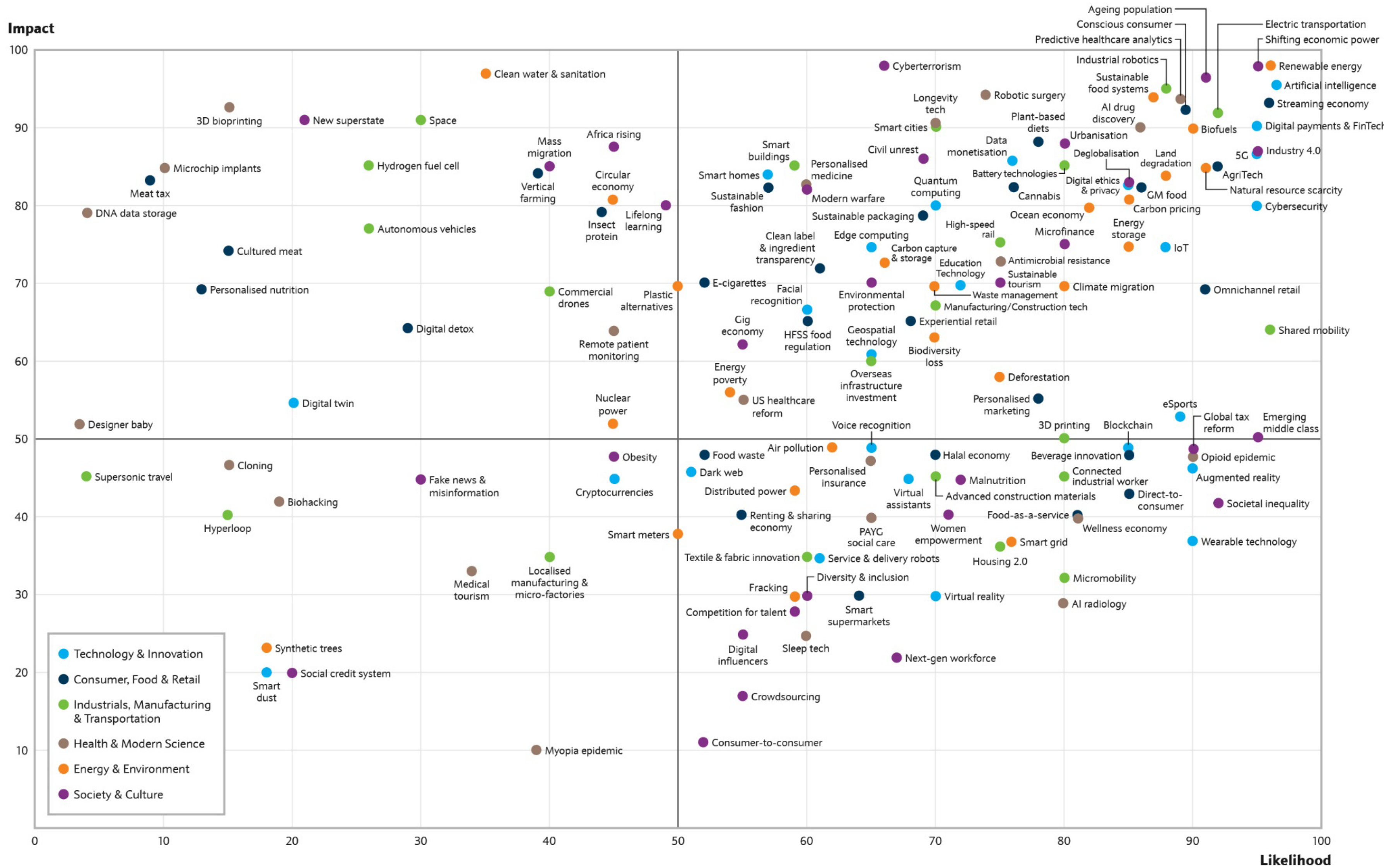
Plastic Waste: Don't lose your bottle (19 June 2019): The plastics industry is undergoing a revolution as it seeks to address the c160m metric tonnes of plastic waste which leaks into the natural environment or ends up in landfill each year, representing more than 55% of the total plastic waste produced (Geyer). We view PET plastic packaging – and in particular beverage bottles – as pivotal to this issue: it constitutes more than 10% of plastic waste. Heightened consumer awareness is forcing companies and governments to set ambitious recycling targets, but PET waste management will have to adapt in order for these targets to be met. To boost low collection rates and poor PET recycling yields, we view a Consumer Deposit Scheme as the policy instrument of choice, further supported by emerging technology. In this report, we argue PET should be viewed as an opportunity, with the demand likely to incentivize investment across the PET waste management value chain.

Education Technology: Out with the Old School (12 March 2019): Focusing primarily on the United Nation's Sustainable Development Goal to ensure inclusive and equitable education for all (SDG 4), we argue that global education is no longer fit for the 21st century. The World Bank has already warned of a global learning crisis, and as the modern learner demands new forms of education delivery, it has become more apparent that a one-size-fits-all approach no longer works. The industry is ripe for digital disruption and we believe education technology – EdTech – will play a large role. We believe EdTech is not only a multi-year investment opportunity driven by socio-economic need, but also one that has the potential to scale profitably given global education expenditure is expected to reach $10tn by 2030 (4% CAGR vs. EdTech 12%).

Food Waste: Ripe for Change (04 March 2019): Focusing primarily on the United Nation's Sustainable Development Goal to halve food waste by 2030 (SDG 12.3), we currently waste 1.3 billion tonnes of food per year, about one-third of all food produced for human consumption. This represents a loss of around $1 trillion dollars annually, a figure estimated to hit $1.5 trillion by 2030. We think food waste is a greatly overlooked driver of climate change, accounting for as much as 8% of global greenhouse emissions, and an area ripe for transformation. Our analysis leads us to the conclusion that a collaborative approach is necessary, with calls to action from key stakeholders: governments, consumers and industry. In this report, we highlight emerging innovation that we think can accelerate change such as shelf life extension, innovative packaging, AI and surplus food platforms.

FIGURE 6

Sustainable & Thematic Investing – 2030 Thematic Roadmap



Source: Barclays Research *Sustainable & Thematic Investing: 2030 Thematic Roadmap:150 trends (12 February 2020)*

QPS studies of ESG investing in credit markets

The Barclays Quantitative Portfolio Strategy (QPS) group has a broad mandate to provide our clients with innovative insights into all aspects of the investment process, across asset classes. Our research features a quantitative approach, based on rigorous empirical studies and models.

Rather than offer subjective views, we prefer to "let the data speak". We have helped clients address issues of asset allocation, benchmark customisation, choice of investment style, and risk budgeting. On a more practical level, we have advised investors on portfolio/index hedging and replication, issuer diversification and risk management. In recent years, we have studied systematic investing and investigated style factors according to the specificities of individual asset classes. As part of this effort, we publish quantitative scorecards that rank securities according to their relative attractiveness in the context of a thematic factor. Our research offering covers *FICC*, *Equity*, and *Analytics*[8]. Credit investors in particular have engaged with QPS for many years on issues of portfolio construction[9].

Over the past five years, we have been approached by many investors regarding the effect of ESG investing on portfolio performance. Money managers, for example, wondered whether an ideals-driven shift to integrate ESG principles in portfolio management might conflict with their fiduciary obligation to produce the best possible returns for clients. They valued the data-driven approach taken by the QPS team, and engaged us to study the effect of ESG investing on corporate bond valuation and performance.

For some of the most committed investors, the knowledge that their funds are being invested to support the values in which they believe is so important that they would accept a lower return on their investments. A much larger group would be happy to support these values, but only once they are convinced that there is limited negative return effect. Finally, if consideration of ESG principles can actually help to improve portfolio performance then it would be hard to justify any resistance to their adoption. The relationship between ESG characteristics and performance is therefore of primary importance.

We focused on the credit markets for several reasons. First, an increasingly large number of bond investors are interested in ESG investing. Second, the relationship between sustainability and portfolio performance had been much less actively researched in credit than in equity markets. Third, credit investing is dominated by institutional investors, including pension funds, which are leading the trend for sustainable returns; bonds represent a substantial percentage of their assets. Finally, corporate bonds are complex: they combine exposure to interest rates and credit spread, so allocations along both dimensions influence risk and performance. Unintended biases can therefore easily appear when overweighting one bond relative to another. To aid bond managers in evaluating the potential performance effect of integrating ESG data into their portfolio construction, we must carefully control any systematic risk exposures.

Our *first study* was published in 2015[10] and relied on ESG ratings provided by MSCI ESG Research applied to the US investment-grade corporate bond market from January 2007 to September 2015. We found that bonds with high ESG ratings had slightly lower spread, all else equal. We also found that bonds with high ESG ratings modestly outperformed their lower rated peers when controlling for systematic risk exposures including sector and quality allocations. This outperformance was not accompanied by an increase in relative valuation as indicated by historical ESG spread premia.

[8] QPS Analytics features Liquidity Cost Scores (LCS), which measure liquidity at the security level across a wide range of fixed income markets.
[9] Our books *Quantitative Management of Bond Portfolios*, Princeton University Press, 2007 and *Quantitative Management of Bond Portfolios*, Wiley, 2012 illustrate our historical work. Our book *A Decade of Duration Times Spread (DTS)*, Barclays, 2015 focuses on credit risk management.
[10] See *ESG Ratings And Performance Of Corporate Bonds*, Barclays Research, 2015.

Our 2015 report also investigated the effect of ESG constraints on index returns, using either negative or positive screening. The Bloomberg Barclays MSCI SRI US Corporate Index is an example of negative screening. This index excludes issuers flagged as non-SRI compliant, ie, companies involved in controversial business activities according to MSCI Business Involvement Screening Research (BISR). The Bloomberg Barclays MSCI US Corporate Sustainability Index is an example of positive screening, excluding issuers with low ESG ratings regardless of industry. On an unadjusted basis, both of these indices earned lower excess returns than the standard Bloomberg Barclays US Corporate Index over the study period. However, we found that a large part of this apparent underperformance could be explained by incidental differences in systematic risk exposures (durations, sector exposures, spread levels) rather than ESG effects. We therefore carried out a return attribution exercise to identify how much of the return of each index was due to its overall DTS exposure and to its asset allocation. The remaining component of return, that due to security selection, can be most closely identified with the effect of the ESG tilt. We found that this component of return was positive for the Sustainability index using positive screening based on ESG scores, and negative for the SRI index based on negative screening by industry.

We expanded this analysis of ESG investing in the US credit market in *our second report*, published in 2016[11]. We investigated in greater detail the approaches of two important providers of ESG ratings: MSCI and Sustainalytics, shining some light on how the numerous differences between their methodologies can lead to ratings divergence.

Our study showed that ESG characteristics are closely linked with credit ratings and bond spreads. As a result, a simplistic portfolio tilt towards higher ESG ratings is likely to lead to higher average credit quality, lower average spread, and hence a bias towards lower returns. To study the effect of an ESG tilt on portfolio performance, we therefore designed a carefully controlled experiment in which we formed tracking portfolios that matched index characteristics by sector, quality, DTS and duration with either a high-ESG or low-ESG tilt.

We found broadly similar results for the two providers: portfolios that match the key characteristics of the US IG Corporate Bond Index while implementing a positive ESG tilt outperformed equivalent portfolios with negative ESG tilts. The period covered started in 2009 and ended in April 2016 to make datasets and results comparable.

We found no evidence of a negative performance effect. We also did not find any evidence to suggest that this performance advantage was associated with high ESG bonds becoming expensive relative to peers and hence subject to the risk of reversal.

When applying separate tilts to individual Environment, Social and Governance pillar scores, we found a stronger positive effect for Governance and a weaker effect for the Social pillar. We also found a relationship between Governance scores and the frequency of credit rating downgrades.

Following strong investor interest, we expanded this analysis in a *report* published in 2018[12]. Market coverage was broadened to include the euro investment grade and the US high yield corporate bond markets, in addition to US investment grade. As in our previous report, we sourced issuer-level ESG scores from MSCI ESG Research and from Sustainalytics and mapped them to bond level data from Bloomberg Barclays indices. The main findings of this study are illustrated in Figure 7.

[11] See *ESG Investing In Credit Markets, B*arclays Research, 2016. A *simplified version of this 2016 report* was also made available to the public.
[12] See *ESG Investing In Credit: A Broader And Deeper Look*, Barclays Research 2018. A *simplified version of this 2018 report* was also made available to the public.

FIGURE 7

Portfolios of high ESG issuers have outperformed low ESG portfolios in the Euro IG, as well as in the US IG market

	US IG Market									Euro IG Market		
	Full Period: August 2009 to April 2018			Original Study Period: August 2009 to April 2016			Update Period: May 2016 to April 2018			Full Period: August 2009 to April 2018		
	Avg (bp/m)	StDev (bp/m)	I.R.	Avg (bp/m)	StDev (bp/m)	I.R.	Avg (bp/m)	StDev (bp/m)	I.R.	Avg (bp/m)	StDev (bp/m)	I.R.
IG Index Excess Return over Treasuries	17.0	97.5	0.6	14.7	107.1	0.5	25.2	52.0	1.7	16.3	87.0	0.7
Using MSCI ESG scores												
High - Low ESG	3.6	13.6	0.9	3.5	14.6	0.8	3.8	10.0	1.3	4.3	11.4	1.3
High - Low Env.	2.9	13.3	0.7	3.0	14.0	0.7	2.4	10.8	0.8	2.7	13.5	0.7
High - Low Soc.	-0.8	13.6	-0.2	-1.4	14.3	-0.3	1.5	10.7	0.5	1.8	10.2	0.6
High - Low Gov.	5.4	14.4	1.3	6.8	15.3	1.5	0.6	9.5	0.2	2.7	11.0	0.8
Using Sustainalytics ESG scores												
High - Low ESG	2.3	13.5	0.6	2.4	14.7	0.6	1.8	7.7	0.8	3.5	13.9	0.9
High - Low Env.	1.6	15.8	0.3	1.4	17.1	0.3	2.0	10.1	0.7	3.6	11.1	1.1
High - Low Soc.	0.4	14.5	0.1	0.3	16.1	0.1	0.8	6.6	0.4	2.4	12.1	0.7
High - Low Gov.	2.1	13.8	0.5	2.4	15.0	0.6	1.1	8.8	0.4	3.4	13.2	0.9

Note: Sustainalytics' Governance pillar measures governance of sustainability issues. Sustainalytics has a separate corporate governance rating that is not represented in this study. Source: Bloomberg Barclays Indices, MSCI ESG Research, Sustainalytics, Barclays Research

We found that tilting a credit portfolio in favour of high ESG bonds, while keeping all other risk characteristics unchanged, led to higher performance in all three markets considered. But while our earlier studies found that the Governance rating was most closely associated with performance, Environment has had the strongest effect in the most recent two years of our analysis in the US and, over the whole nine-year history in Europe. The Social pillar had little effect on portfolio returns.

We also investigated the extent to which the link between ESG pillar scores and performance varies across sectors and highlighted, for example, that strong governance is associated with higher returns in the banking sector while the Environment pillar is significant in most others.

Our studies revealed that some of the effects studied vary by geography. We found that the euro credit market has been pricing ESG attributes differently than the US market: high ESG bonds trade at persistently tighter spreads than low ESG peers in Europe, but not in the US. Our expanded analysis of the relationship between ESG ratings and bond attributes also revealed that European issuers tend to have higher ESG ratings than US issuers. Both of these observations indicate that, at least historically, ESG consciousness has been stronger in European financial markets than in the US.

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We, Anushka Challawala, Zoso Davies, Albert Desclée, Mathieu Dubois, Lev Dynkin, Charlotte Edwards, CFA, Jay Hyman, Emily Morrison, Katherine Ogundiya, Maggie O'Neal, Hiral Patel and Simon Polbennikov, hereby certify (1) that the views expressed in this research report accurately reflect our personal views about any or all of the subject securities or issuers referred to in this research report and (2) no part of our compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report.

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