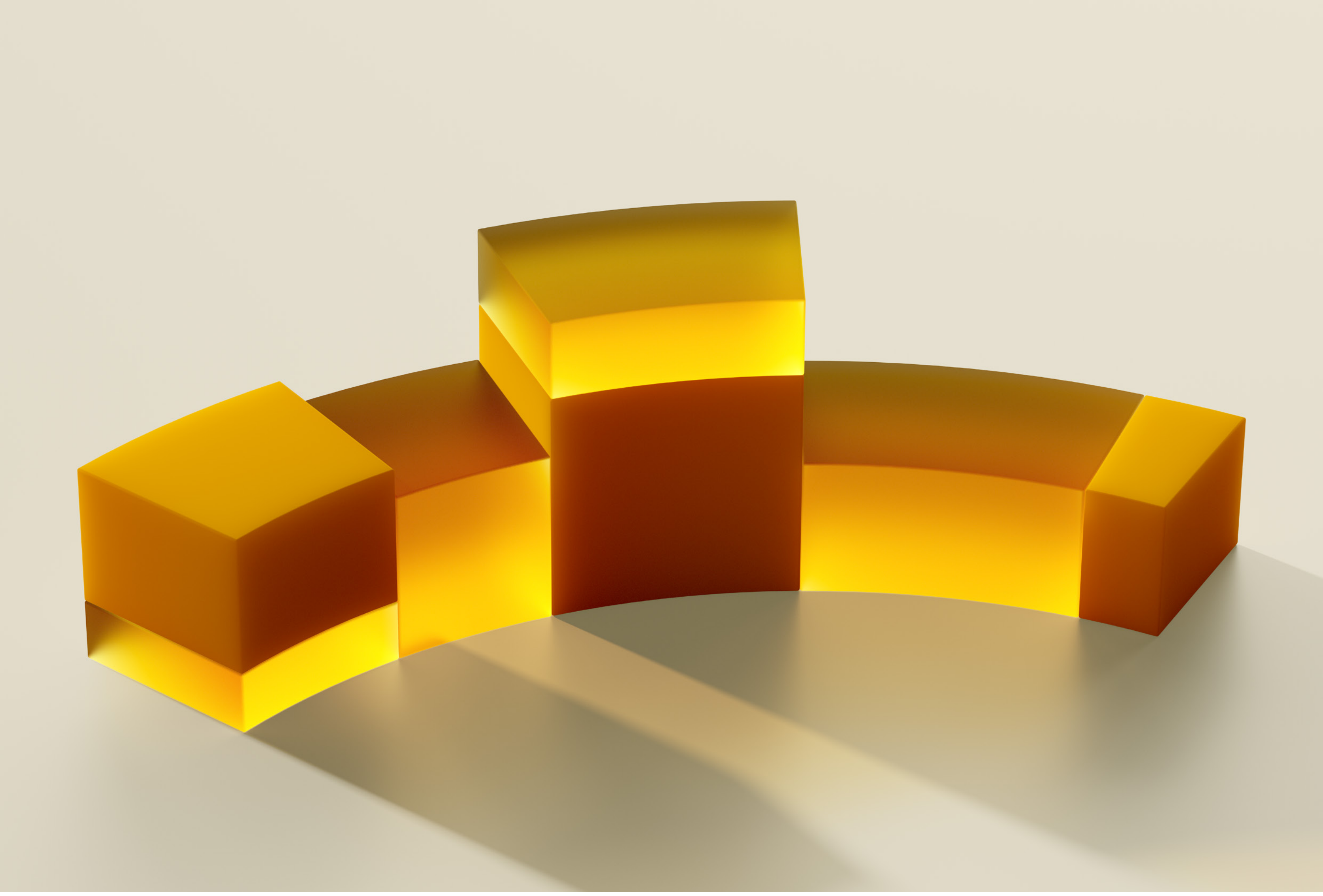


ESG integration at J.P. Morgan Asset Management

Building more resilient portfolios for the long term

April 1, 2022

For certain strategies that the adviser determines to be ESG integrated, the adviser integrates financially material environmental, social and governance (ESG) factors as part of the Fund's investment process (ESG Integration). ESG Integration is the systematic inclusion of ESG issues in investment analysis and investment decisions. ESG Integration is dependent upon the availability of sufficient ESG information for the applicable investment universe. In addition, in order for an actively managed strategy to be considered ESG integrated, the adviser requires: (1) portfolio management teams to consider proprietary research on the financial materiality of ESG issues on investments; (2) documentation of the adviser's research views and methodology throughout the investment process; and (3) appropriate monitoring of ESG considerations in ongoing risk management and portfolio monitoring. ESG determinations may not be conclusive and securities of companies/issuers may be purchased and retained, without limit, regardless of potential ESG impact. The impact of ESG Integration on performance is not specifically measurable as investment decisions are discretionary regardless of ESG considerations.

J.P.Morgan
ASSET MANAGEMENT

Contents

Introduction

J.P. Morgan Asset Management is the marketing name for the investment management businesses of JPMorgan Chase & Co. and its affiliates worldwide.

It is a leading investment manager of choice for institutions, financial intermediaries and individual investors, offering a broad range of core and alternative strategies, with investment professionals operating in every major world market providing investment expertise and insights to clients. J.P. Morgan Asset Management oversees more than USD 2.65 trillion in client assets under management globally as of December 31, 2021.

As an asset manager, we are guided by our duty to act in the best interests of our clients. That commitment means we consider the impact of decisions we make on behalf of our clients on their portfolios. We believe consideration of financially material environmental, social and governance (ESG) factors can be an important part of the investment process.

At J.P. Morgan Asset Management, we define ESG integration as the systematic inclusion of financially material ESG factors (including sustainability risks) as additional inputs into investment analysis and investment decision-making, where possible and appropriate. ESG factors encompass a wide range of issues including (but not limited to) climate risk, natural resource use, human capital management, diversity, business conduct, governance practices, shareholder rights and executive compensation, as they can impact negatively the value of an investment.

J.P. Morgan Asset Management considers financially material ESG factors when assessing an investee company's performance. ESG integration is used to support mitigating risk and can unlock opportunities in an investment portfolio. By considering financially material ESG factors, we believe that ESG integration can inform better long-term investment decision-making and can help build stronger portfolios for our clients.

Our processes for ESG integration for a variety of our asset classes are described later in this paper.

Active ownership is a key component of both our standard investment processes and our commitment to ESG integration. We use it not only to understand how companies and issuers consider issues related to ESG but also to try to influence their behavior and encourage best practices, for the purpose of enhancing returns for our clients. We define engagement as active interaction with investee companies or issuers, exercising our voice as a long-term investor through industry participation and proxy voting. Active ownership in the context of ESG integration allows us to manage ESG risks and to systematically incorporate insights gained from engagement into our investment decisions. For further details on our engagement processes, please see our Annual Investment Stewardship Report.

There are four key reasons why we believe consideration of financially material ESG factors may lead companies to perform better in the long run:

1) **Efficiency gains**: There is a large and growing body of academic evidence to suggest strong ESG performance serves to mitigate risk and enhance employee and structural efficiency. Empirical studies find a positive link between ESG factors and financial performance of companies, suggesting that the adoption of sustainable business practices by companies may sometimes be necessary to keep them from falling behind competitors.[1]

2) **Consumer sentiment**: Recently, there have been powerful shifts in consumer sentiment from firms with poor ESG ratings toward more responsible alternatives.

3) **Mitigation of regulatory risks**: ESG leaders are likely to be more insulated from the regulatory and transition risk associated with the transition to a net-zero economy; for example, the rise in carbon pricing.

4) **Capital costs:** Shifts in investor sentiment toward green-bond purchases will reduce the cost of capital for issuers. Research from MSCI found that companies averaging high ESG scores experienced lower costs of capital compared to companies with poor ESG scores in both developed and emerging markets during a four-year study period. The cost of equity and debt followed the same relationship.[2]

[1] Gunnar Friede, Timo Busch and Alexander Bassen, "ESG and financial performance: Aggregated evidence from more than 2,000 empirical studies," Journal of Sustainable Finance & Investment, 5:4 (2015), 210-233.

[2] MSCI, "ESG and the Cost of Capital" (2020) https://www.msci.com/www/blog-posts/esg-and-the-cost-of-capital/01726513589

Introduction continued

The practice of integrating financially material ESG factors into investment processes aims to strengthen risk management and may contribute to long-term financial returns. Consequently, we believe ESG integration can help deliver enhanced risk-adjusted returns over the long run. It is important to note that the materiality of ESG factors varies depending on the time horizons under consideration, as well as specific regional or macroeconomic influences. We believe it is important to align the consideration of ESG factors to the specific investment style, such that the integration of ESG information contributes to investment performance.

As a global active manager using a variety of investment styles, we integrate financially material ESG factors into the investment process of an investment group in a manner consistent with the underlying strategy, from the purely quantitative to those based on a combination of fundamental research and qualitative judgments.

We define investment groups as investment teams that share a common investment process and ESG integration approach.[3] Because of the variety of actively managed investment strategies, types of investments and investment processes, financially material ESG factors will differ across investment groups, and we do not mandate that each investment group implement ESG integration in the same way. Instead, we apply key metrics that focus on the robustness of the ESG integration process to determine if an investment group can be considered as ESG integrated by J.P. Morgan Asset Management. We use a process-focused 10-metric scoring framework to validate the approach applied by the investment groups.

We also offer a growing range of products designed for clients that want to go beyond standard ESG integration and invest in products with more defined ESG characteristics or objectives. Nevertheless, we can make no assurance that the integration or security selection methodology used by our portfolio managers and analysts will align with the individual beliefs or values of a particular client, nor that ESG integration will apply to every security in a client's portfolio.

It is important to note that for the ESG integration process to be satisfied, we require the following:

1) Portfolio management teams to consider proprietary research on the financial materiality of ESG issues to the strategy's investments, and to conduct corporate engagements where possible.
2) Documentation of the advisor's research views and methodology throughout the investment process.
3) Appropriate monitoring of ESG considerations in ongoing risk management and portfolio monitoring.

Please note: ESG determinations may not be conclusive. Securities of companies or issuers may be purchased and retained, without limit, by the investment manager regardless of their potential ESG impact. The effect of ESG integration on a financial product's performance is not specifically measurable as investment decisions are discretionary regardless of ESG considerations. Unless stated otherwise in a financial product's documentation, and included within its investment objective and investment policy, ESG integration does not change a product's investment objective or constrain the investment manager's investable universe. Nor does ESG integration imply that a product is marketed or authorized as an ESG product in any jurisdiction where such authorization is required. In addition, there is no indication that an ESG or impact-focused investment strategy or any exclusionary screens will be adopted by a financial product.

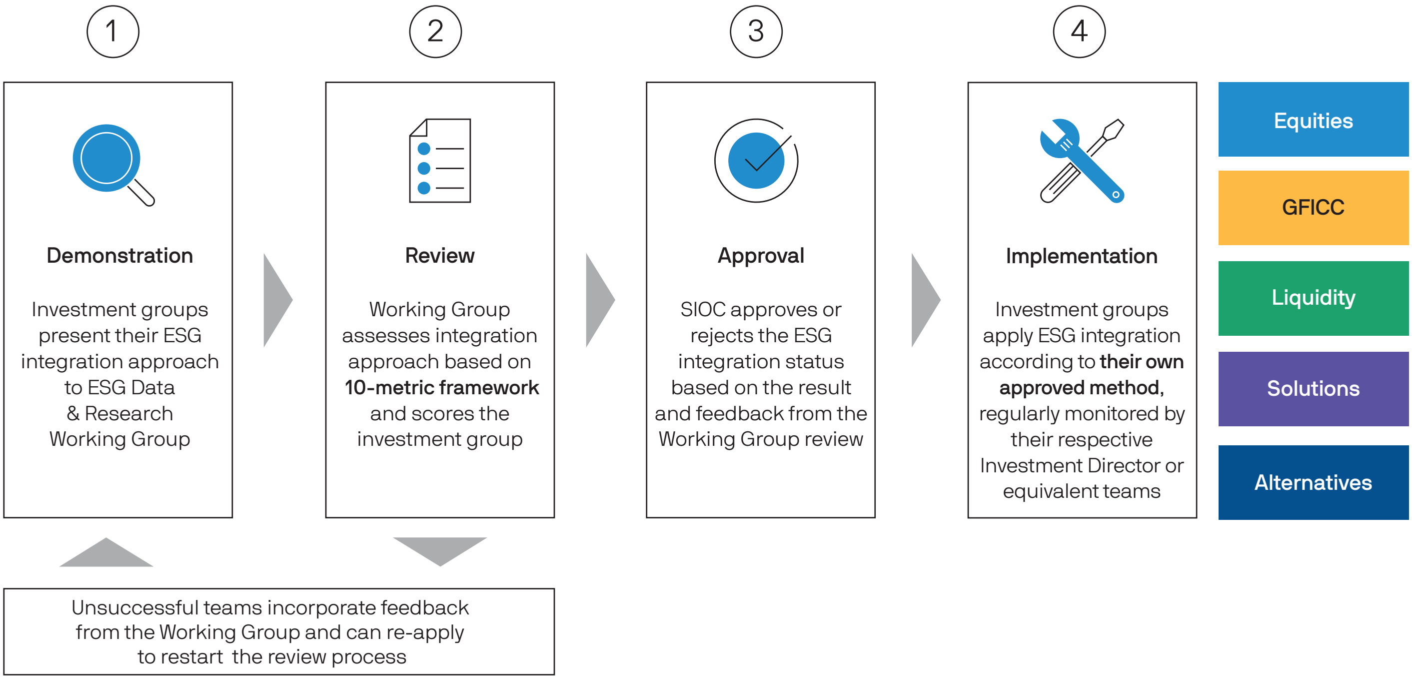
The assessment of environmental, social and governance information and events requires subjective judgments, which may include consideration of third-party data that may be incomplete or inaccurate. There can be no guarantee we will correctly assess such impact.

[3] For further details on strategies that are ESG integrated, please reach out to the respective sales contact for each region.

Our ESG integration process

The following describes J.P. Morgan Asset Management's current process for determining whether an investment group has integrated ESG into its investment processes.

ESG integration validation process at J.P. Morgan Asset Management



Source: J.P. Morgan Asset Management, as of December 31, 2021. For illustrative purposes only.

Our ESG Data and Research Working Group vets and reviews the ESG integration approach of each investment group. The Working Group is chaired by the Global Head of Sustainable Investing, Jennifer Wu, and its members are senior portfolio managers, research analysts and investment stewardship specialists. The Working Group's review is used to form recommendations that the Sustainable Investing team submit to the Sustainable Investing Oversight Committee (SIOC), which is responsible for approving or rejecting the ESG-integrated status of each investment group.

This committee was established in 2021 as part of a comprehensive review of our sustainable investing governance practices, with a particular emphasis on structures for oversight of investment stewardship and ESG integration. Voting members of SIOC include the Chief Investment Officers (CIOs) of all applicable asset classes, thereby gaining oversight and assuming responsibility for the integration of sustainability risk related to the investment decision process.

The ESG Data and Research Working Group, alongside the Sustainable Investing team, has developed a 10-metric framework to evaluate ESG integration progress at each critical step of a typical investment process. Investment groups are required to present their ESG integration approach to the Working Group.

Our process for determining which investment groups are ESG integrated has continued to evolve and improve with the development of the framework (see next page). To receive ESG-integrated status under our current methodology, the investment groups must receive an aggregate score of at least 30 points out of a total of 50 and, for each metric, receive at least a 2 on a scale of 1 to 5. If the investment group does not meet this threshold, the Working Group will discuss the improvements required before it can reapply at a later stage. For those that are successful, the score and feedback are used to form a recommendation that the Sustainable Investing team submits to SIOC for formal approval of the ESG-integrated status.

Our ESG integration process continued

J.P. Morgan Asset Management 10-metric framework for ESG integration

	Metrics	Sub questions
Research and Investment Management	1. Research analyst/ investment due diligence	• Is ESG integration an integral part of the research or investment due diligence process? • Are analysts engaging on issues related to ESG with companies and leveraging ESG information for analysis?
	2. Consideration at portfolio management/ investment decision level	• Is ESG fundamental to the investment decision-making process? • Do ESG factors lead to a reweighting of the portfolio? • Do the portfolio managers and/or investment committee override or add insights to analysts' ESG analysis?
	3. Breadth of third-party ESG data	• Is independent, external or third-party data incorporated into ESG analysis? How is this data used? • Is the team relying on a single data source, or are different third-party data sources leveraged and used for verification?
	4. Level of proprietary research conducted	• How much in-house research has been conducted in conjunction with available third-party data? Is there a heavy reliance on external/third-party data? • Is there any evidence of ESG scores created by the team? • Where relevant, does the team meet with companies to engage on issues related to ESG?
	5. Company/sector coverage	• Has the team considered sector differences when integrating ESG and thought about ESG factors' materiality? • If so, how is the team implementing this?
Documentation	6. Documentation of integration methodology	• Is there documentation setting out how ESG is integrated? • Is there a specific methodology or a framework being leveraged, and has this been shared within the team?
	7. Documentation of proprietary data and research methods	• Is there any documentation of proprietary data and research? • Are there any case studies/examples that demonstrate this? • Is ongoing corporate engagement part of the process, and how is that documented, especially with respect to engagement activities on highlighted material ESG factors?
Monitoring	8. Risk management and oversight	• Is there clear assignment of roles and responsibilities in the ESG integration process to ensure risk management and oversight are in place? • What is the risk management process of ESG integration?
	9. Systematization	• Is the process implemented using a centralized system such as Spectrum™ so it can be leveraged by the entire investment engine? • Is the ESG integration information shared across the team, not just within a limited group of people?
	10. Ongoing monitoring and maintenance	• How does monitoring of ESG integration take place? • Is there a forum to discuss improvements to, and enhancements of, ESG integration?

Source: J.P. Morgan Asset Management Sustainable Investing Team and ESG Data and Research Working Group.

Our ESG integration process continued

Although the firm-wide ESG integration validation framework and development of supporting tools and analytics is led by specialists from the centralized Sustainable Investing team as well as the ESG Data and Research Working Group, the ownership of implementation and execution lies with investment teams. ESG determinations may not be conclusive, and securities of certain companies or issuers may be purchased, retained or sold by portfolio managers for reasons other than their ESG assessment.

Moreover, given the wide range of strategies, and the regional and sectoral diversity of our portfolio holdings, we emphasize that ESG integration does not mean investment in certain sectors or countries is prohibited. Importantly, systematic ESG integration should never result in sacrificing portfolio returns, making major changes to the investment process or taking into account immaterial ESG factors at the expense of ignoring other factors. Please refer to the asset class level sections in the following pages for details around how ESG integration works in practice at various asset classes.

The 10-metric framework not only offers guidance on how to evaluate a particular investment group but can also be used to measure how approaches have evolved and adapted over time.

In 2020, J.P. Morgan Asset Management received an A+ for its response on the Strategy and Governance module of the UN Principles for Responsible Investment (UNPRI) survey based on information provided for calendar year 2019. UNPRI are a set of voluntary and aspirational principles; signatories to the principles are required to report publicly on their responsible investment activities each year. ESG integration is an explicit factor in this assessment. The module is designed to provide information concerning each signatory's overarching approach to responsible investment, including governance, responsible investment policies, objectives and targets, the resources that are allocated to responsible investment and the incorporation of ESG issues into asset allocation.[4]

[4] The UNPRI survey includes modules that solicit information from signatories, including J.P. Morgan Asset Management, on various topics including strategy and governance. Information is self-reported by signatories, including J.P. Morgan Asset Management, and was not audited by any party, including J.P. Morgan Asset Management, independent public accounting firms or UNPRI. Information on the UNPRI 2020 form of strategy and governance module and assessment methodology is included in the following links:
https://dwtyzx6upklss.cloudfront.net/Uploads/q/c/a/02a._sg_cc_2020_80624.pdf
https://www.unpri.org/reporting-and-assessment/reporting-and-assessment-archive/6567.article
Please note that publication of the UNPRI 2021 reports have been delayed due to changes in the UNPRI Reporting & Assessment process. Until release of the 2021 reports, the 2020 UNPRI report is the latest available.

Resources we share across the firm

System

J.P. Morgan Spectrum™ (Spectrum™), launched in 2017, is J.P. Morgan Asset Management's common technology platform, built by combining our leading capabilities across the organization. The platform is designed to optimize internal communication by connecting sales, investment and client service functions.

The platform standardizes and enhances our extensive research, portfolio construction and risk management capabilities. Spectrum™ is a single centralized source for all critical data sets, which helps provide consistency of portfolio information throughout the full lifecycle.

The Spectrum™ platform strengthens J.P. Morgan Asset Management's investors' collaboration and accelerates the inclusion of our best ideas into solutions for our clients. It also supports investment decision-making with integrated analytics, providing the ability to view and manage risks across multiple disciplines, enabling us to build stronger portfolios.

Spectrum™ combines more than 35 operational oversight tools into an integrated suite with higher automation, integrated workflows and timely alerts. It also enables our client-facing specialists to deliver a high-quality client experience – from onboarding through to portfolio management and reporting.

ESG analysis and research are embedded in Spectrum™ and shared across investment teams where appropriate. Spectrum™ thereby enables greater collaboration, as expertise can be leveraged across the J.P. Morgan Asset Management platform, subject to information barriers. For example:

- **Qualitative Research Notes**: We share qualitative ESG assessments of companies on Spectrum™ via an application called "**Research Notes**." Investors, as well as the Sustainable Investing team, are able to record relevant ESG information arising from a company meeting or research, while specific environmental, social and governance issues can be flagged through a tagging facility to alert other system users. For example, a sector research analyst within Global Equities can view the ESG Research Notes of a company written by a Global Fixed Income, Currency and Commodities (GFICC) credit analyst, and vice versa. This allows investment professionals to access the latest information and exchange views. In addition, the engagement notes written by the investment stewardship specialists can be viewed by the Global Equities and GFICC investment teams. Where an ESG factor is deemed material, analysts and the Investment Stewardship Specialists are expected to identify and capture this through the engagement process and bring it to the attention of other users.

Illustration of Spectrum™ "Research Notes" dashboard

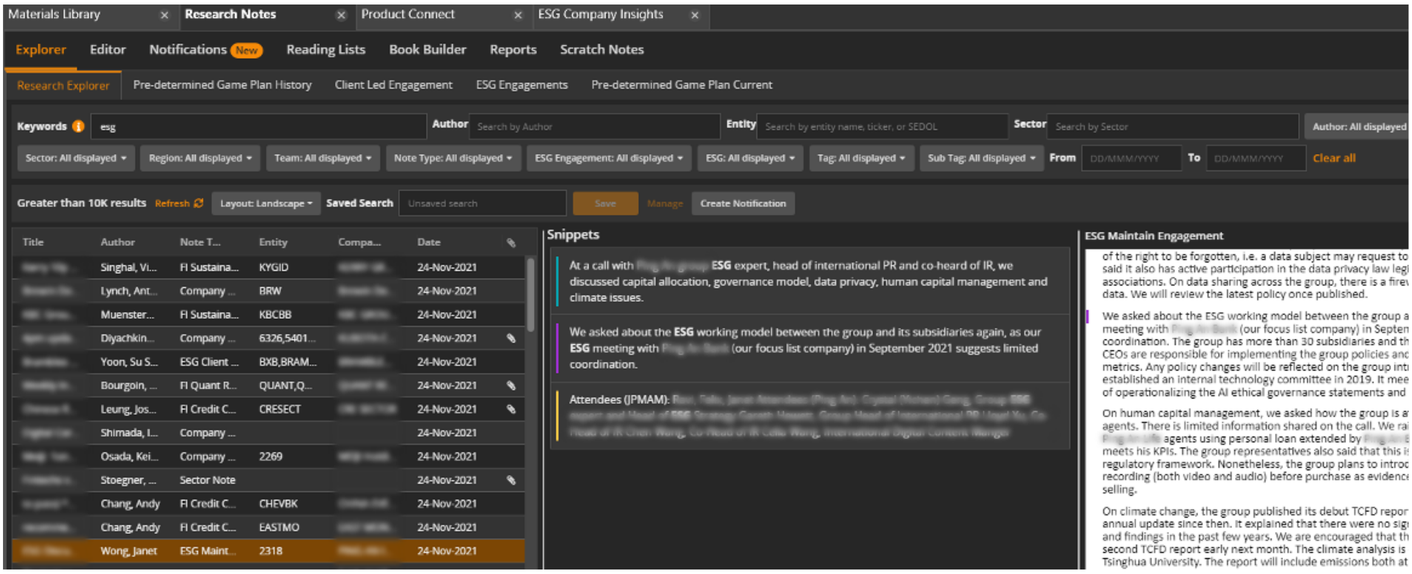


Image source: J.P. Morgan Asset Management Spectrum™.

Resources we share across the firm continued

- **Quantitative ESG data**: Another pivotal update within Spectrum™ was the addition of an application called **"ESG Company Insights."** Essentially, this is where, subject to any required information barriers, investment teams can view the J.P. Morgan Asset Management proprietary data-driven ESG score, as well as the underlying metrics from which the score is derived. Investors are also able to access a historical view of overall ESG scores over the last five years.

Illustration of Spectrum™ "ESG Company Insights" dashboard

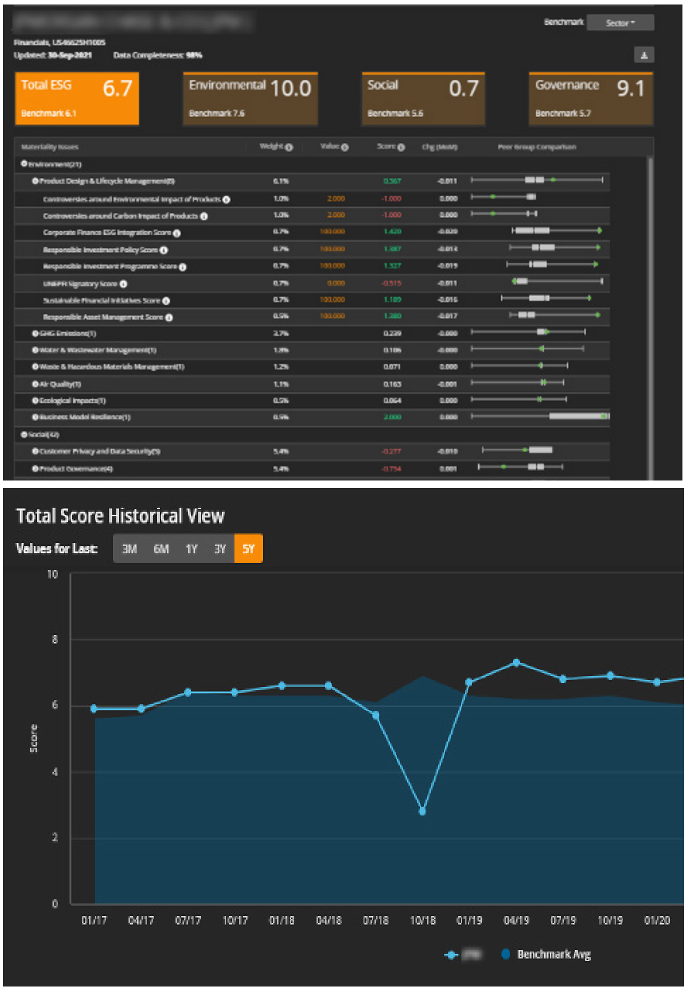


Image source: J.P. Morgan Asset Management Spectrum™.

- **Portfolio management systems**: Spectrum™ is also used as a portfolio management tool by many investment teams. Within the respective system, both the proprietary ESG assessment and third-party data are embedded so that the information can be referenced to inform investment decisions. For further details, please refer to individual asset class sections in the following pages.

People

J.P. Morgan Asset Management's approach to investing builds on our long heritage of active management and stewardship. A key strength of our investment process is our in-house research capabilities, on both a fundamental and quantitative basis.

- **Research capabilities of our investment teams**: ESG information is integrated systematically in actively managed strategies that are determined to be ESG integrated, leveraging the expertise of over 1,000 investors through proprietary research, engagement and portfolio construction. Subsequently, ESG factors are monitored on an ongoing basis for risk management purposes. In particular, J.P. Morgan Asset Management has over 300 experienced career research analysts – situated globally and organized by sector – whose knowledge and experience provide an invaluable research resource. They offer in-depth specialist analysis of companies within their particular sector and region.
- **Central Sustainable Investing team**: We have over 30 dedicated specialists supporting ESG integration from the perspectives of proprietary ESG and climate research, investment stewardship and products and solutions innovation. Over the last few years, our Sustainable Investing researchers have worked on the development of a proprietary, data-driven ESG scoring framework, which is designed to contribute to our understanding and application of a range of ESG information in our research and investment processes. The team is currently leading the implementation of the scoring framework and the further build-out of our analytical capabilities around climate change.

Resources we share across the firm continued

- **Dedicated Investment Stewardship team**: As of March 1, 2022, we have 13 investment stewardship specialists globally. They work in collaboration with our portfolio managers and research analysts to direct interactions with companies/issuers across our five investment stewardship priorities and the specific research frameworks used by each asset class. The firm-wide five investment stewardship priorities have been selected as the corporate engagement principles that we believe have universal applicability and will stand the test of time. They provide top-down, high-level guidance to our Investment Stewardship team and to investors in each asset class to help set engagement agendas and prioritize and manage engagements on a wide range of ESG issues. The priorities are: Governance, Strategy Alignment with the Long Term, Human Capital Management, Stakeholder Engagement and Climate Risk. More detail on the five priorities and how they are applied in practice can be found in our Annual Investment Stewardship report.

ESG data

To the extent that J.P. Morgan Asset Management uses third-party providers, the criteria and rating systems used by third-party providers can differ significantly. There is no standard ESG scoring system, and the methodology and conclusions reached by third-party providers may differ significantly from those that would be reached by other third-party providers or J.P. Morgan Asset Management. In addition, evaluations by third-party providers may be based on data sets and assumptions that may be insufficient, of poor quality or contain biased information.

To help improve the quality and availability of data and support ESG integration, over the past few years our investment teams have developed proprietary ESG insights and looked to integrate these into the investment process.

At the same time, the ongoing improvement in the quantity and quality of ESG-related data available to investors has enabled us to introduce the next generation of proprietary ESG data – a globally consistent, **data-driven ESG** scoring system that is being made available to our portfolio management and research analyst teams through Spectrum™. The aim of this internal tool is to support the investment team's quantitative ESG analysis and also to help inform qualitative assessments of individual companies.

Work on the proprietary scoring system has been completed, and we are currently at the stage of socializing it with investment teams ahead of targeting its more general implementation over the coming year. In addition, a combination of quantitative scoring and qualitative judgments will continue to be used during analyst assessments and portfolio construction. For most strategies, scores are not a definitive driver of investment decision-making, and portfolio managers may continue to hold low-scoring securities for reasons unrelated to their ESG profile.

Our **proprietary data-driven ESG score** assesses the extent to which companies face and manage financially material ESG risk and opportunities. This score is evolving from leveraging third-party ESG data to instead draw on granular, outcomes-focused data, making increased use of the significant increase in ESG disclosures and data available over recent years. Being developed in collaboration with the Sustainable Investing team's Data and Research group, the score also leverages our data science capabilities, such as machine learning, algorithms and natural language processing to enrich our understanding of ESG factors beyond corporate disclosures, at scale.[5]

- This ESG score capability aims to enhance our understanding of what ESG information is available for research and investment decision-making and provides a consistent view of the material ESG factors within each sector. This helps J.P. Morgan Asset Management to manage the associated risks and opportunities.

[5] With respect to J.P. Morgan Asset Management's proprietary system, while J.P. Morgan Asset Management looks to data inputs that it believes to be reliable, J.P. Morgan Asset Management cannot guarantee the accuracy or completeness of its proprietary system or third-party data. Under certain of J.P. Morgan Asset Management's investment processes, data inputs may include information self-reported by companies and third-party providers that may be based on criteria that differs significantly from the criteria used by J.P. Morgan Asset Management. In addition, the criteria used by third-party providers can differ significantly, and data can vary across providers and within the same industry for the same provider.

Resources we share across the firm continued

- The score draws on granular data. This includes a company's management of natural resources and environmental impacts, effectiveness of its human capital development programs, supply-chain risks, customer welfare and risk management. For example, we leverage company disclosures, third-party estimates of environmental impact, data science signals, which make use of our in-house natural language processing tool, ThemeBot, and alternative data sets provided by external vendors.[6] We use a number of different data providers to obtain as comprehensive and varied a set of information as possible with which to measure ESG aspects. We assess companies using a wide range of data inputs, combined with fundamental analysis. While we look to data inputs that we believe to be reliable, we cannot guarantee the accuracy of our proprietary system or third-party data.
- The score harnesses our expertise and experience in active asset management and ESG integration. For example, the weights we attach to different ESG issues reflect the insights of hundreds of sector analysts who have many years' experience identifying financially material ESG factors and who understand the specific challenges within different industries and regions.
- Our data science capabilities, such as machine learning algorithms and natural language processing, can generate useful insights by processing unstructured, alternative data to measure specific ESG issues and complement companies' self-reported and/or third-party ESG data.
- The score provides a comprehensive data solution that allows internal users to drill down into individual data points, such as greenhouse gas (GHG) emissions and supply chain-related metrics, in order to understand the specific risks and opportunities that companies face.

A trend that looks set to continue into 2022 is the increasing availability and quality of ESG data, which is supported by governments and regulatory bodies. Globally, more organizations and governments are encouraging or mandating compliance with recommendations laid out by the Task Force on Climate-related Financial Disclosures (TCFD). In addition, the recently created International Sustainability Standards Board (ISSB) aims to establish a common set of base guidelines for data disclosure on ESG issues.

However, corporate ESG disclosure remains a challenge. Companies across a wide sectoral and geographic spectrum are increasingly being scrutinized on data points such as Scope 3 GHG emissions and employee satisfaction ratings, as well as the lack of disclosure of these data points. In particular, emerging markets are an area where notable progress on disclosure is being made. This is why engagement is an important element of ESG integration at J.P. Morgan Asset Management, as we encourage more companies to disclose their ESG efforts. As visibility of companies' performance on key ESG indicators improves, it will become possible to make more informed and accurate forward-looking financial materiality assessments and investment decisions.

Ongoing monitoring: ESG integration as BAU

J.P. Morgan Asset Management undertakes ongoing monitoring to review the ESG integration work of investment groups – specifically, the application of sustainability risks and material ESG factors within their ESG-integrated strategies. Our Sustainability Risks Policy summarizes the integration of sustainability risks in the investment process. This forms part of an existing, regular investment review system.

[6] Where J.P. Morgan Asset Management uses the proprietary system, any changes to an algorithm or underlying assumptions may have unintended consequences, which could have an adverse effect on the performance of a strategy. Algorithms may not perform as intended for a variety of reasons, including, but not limited to, incorrect assumptions, changes in the market and changes to data inputs. In addition, the data sets that the proprietary system processes may be insufficient, of poor quality or contain biased information. Although J.P. Morgan Asset Management obtains data and information from third-party sources that it considers to be reliable, J.P. Morgan Asset Management does not guarantee the accuracy and/or completeness of any data or information provided by these sources.

Resources we share across the firm continued

For example, the Investment Director teams in Equity, Global Fixed Income, Currency & Commodities and Multi-Asset Solutions oversee performance and risk oversight of portfolio management. They do this to maintain discipline around investment objectives and process in the context of client objectives or fund guidelines, performance, risk position and ESG profile. The Investment Director teams monitor the relative ESG exposures of each strategy, looking at overarching trends and reviewing outliers. They oversee the level of integration from both a qualitative and quantitative angle. The qualitative angle would be captured through regular review meetings, typically once a quarter, with the portfolio managers, while quantitative factors would include measurable metrics on ESG items or exposure across the portfolios.

Any material findings from the ongoing monitoring process will be escalated to the CIOs of the relevant asset class using the existing investment oversight/escalation process. We have similar regular monitoring processes in Global Liquidity and Alternatives, which are tailored to the nature of their asset class. For more details, please see the relevant asset class sections in the following pages.

In addition, Asset Management (AM) Independent Risk is developing a framework to monitor the consideration of financially material ESG factors in the investment process of our active strategies. This process has the objective of identifying investment strategies with ESG factor scores that are materially different versus their benchmark and understanding the rationale for such differences. The analysis will be shared with AM Risk and AM CIOs on a quarterly basis. This process aims to increase the transparency of specific exposures or strategies with ESG ratios that may be inconsistent with the strategy's name, investment objective or disclosures. This process is not expected to limit an exposure identified as an outlier or to trigger changes in positions that would negatively impact portfolio returns.

Refining our process through review from multiple dimensions

Given the evolving nature of ESG data, technology and research capabilities, we encourage investment teams to continue to improve their ESG integration process. Our process was recently updated to require that the ESG Data and Research Working Group recertify the ESG integration approach of ESG-integrated investment groups against the consistent 10-metric framework specified on page 7 every 3 years. Following the introduction of these recertification reviews, the investment groups are asked to provide updates on any significant changes and to demonstrate the enhancements made since the previous vetting/review session – a process we started in 2021. The ESG Data and Research Working Group will verify the group has made the necessary improvements and is maintaining a good standard of integration practices while continuously seeking to enhance their process. Should the ESG Data and Research Working Group have any concerns or suggestions, these will be communicated to the respective investment groups and to the team in charge of ongoing monitoring for improvement. The feedback and outcome of the periodic review by the ESG Data and Research Working Group will be shared with SIOC for formal approval.

- In 2021, investment groups including Global Equities, GFICC and Global Liquidity were reviewed for recertification.
- Key changes that were presented as part of the recertification process included the extension of our 40-question ESG checklist. This is used by both Global Equities and GFICC.
  - The Global Equities team recently updated the checklist and related materiality frameworks, with the aim of enhancing them for the purposes of ongoing monitoring and targeted corporate engagement.
  - New questions around supply chain environmental risks, workforce diversity and disclosure on social and diversity issues have been added, as well as detailed guidance on to how analysts should think about responding to these questions.
  - The materiality element of the checklist, revised in collaboration with the Investment Stewardship team, helps to identify leaders and laggards in the key ESG issues for each sub-sector. This brings more depth to our ongoing ESG research and serves as helpful guidance for more focused ESG engagement with companies.
  - In addition, in 2021 the 40-question ESG checklist was implemented by GFICC for the corporate bond market, with some fixed-income-specific questions.

Global Equities

Research/due diligence

A key strength of our investment process is our in-house research, produced by over 100 fundamental and quantitative equity analysts. Our ESG views on specific companies are the product of proprietary research and one-on-one engagements with companies. We also draw on data from external providers. These ESG views are one of multiple informational inputs into the investment process, alongside data on traditional financial factors, and so are not the sole driver of decision-making.

Our research framework uses several internally developed processes to assess the ESG credentials of any business:

1) A 40-question ESG checklist applies the same detailed questions to more than 3,000 companies under coverage globally. The ESG checklist asks 12 questions specifically addressing environmental considerations, 14 on social and 14 on governance. Analysts across Equities and Fixed Income collaborate on the questionnaire, resulting in one set of responses on environmental and social matters as we believe these are consistent across the capital structure. The governance questions differ slightly by asset class. The checklist includes both negative and positive questions and a severity assessment. The checklist is not a "pass/fail" exercise but rather a tool to inform discussions between portfolio managers and fundamental analysts and our engagements with the companies we cover.

   In addition, analysts conduct deep-dive research into ESG topics identified as material to our investment process. Among the topics examined: flaring in U.S. oil fields, the environmental impact of fast fashion in Europe and corporate governance in insurance companies in Asia.

2) Our proprietary data-driven ESG score assesses the extent to which companies face and manage financially material ESG risks and opportunities. This score is evolving to draw on granular, outcomes-focused data, making full use of the significant increase in ESG disclosures and available data over recent years. For further details, please see the section on ESG data on page 11.

3) A fundamental materiality framework for 2,000+ companies was implemented in 2020 by our Emerging Markets and Asia Pacific team and in 2021 by many of our global equity teams. The basis of "materiality" is to identify the ESG issues that are most likely to have a material negative financial impact on a company were it to be mismanaged, or conversely, the material positive impact in the case of good management. Across each of 57 different sub-industries, material issues are identified by research analysts within our 100+ strong global network, who come together to share perspectives with their sector group peers. Every company receives a score from 1 (best) to 5 (worst) on each of the material issues identified.

   The implementation of this research framework has deepened our understanding of what best practices look like for sustainability, and we use this template to engage with companies. However, the score does not define or limit a team's investment options.

4) A strategic classification framework for 2,000+ companies. These classifications provide a rating (Premium, Quality, Trading and Structurally Challenged) for stocks, based on our judgment of the quality of the business. ESG is an explicit part of the rating process.

Portfolio construction

Although precise methodologies will vary, ESG information is considered throughout the investment process. All fundamental analysis, company meeting notes and quantitative metrics for ESG are housed in our portfolio management systems to help ensure full transparency and access for all analysts and portfolio managers. Portfolio managers have a daily view of their exposure to the risks and opportunities associated with ESG factors, which can also be customized depending on the nature of the portfolio.

While we do not explicitly exclude individual stocks on the grounds of ESG criteria (except for certain of our strategies such as those classified as article 8 or 9 under SFDR regulation or when specifically requested by clients or required by local legislation), ESG factors could influence our level of conviction and thus impact a stock's position size during portfolio construction. Our conviction is a function of the quality of the business and our understanding of the opportunity and the risks, which are informed by the research detailed above.

Global Equities continued

Engagement

Active engagement with companies has long been an integral part of our approach to investment and ESG. We use it not only to understand how companies consider issues related to ESG but also to try to influence their behavior and encourage best practices, for the purpose of enhancing returns for our clients. Engagement is a collaboration between portfolio managers, research analysts and the Investment Stewardship team. Each brings a different perspective to our interactions with companies across our five investment stewardship priorities and our research framework.

Alongside the top-down guidance provided by the five investment stewardship priorities, our bottom-up research framework captures the ESG insights of our investors through the research elements detailed in the previous section. Our investors often identify issues related to ESG through their day-to-day work and interaction with company management teams. In these instances, investors may choose to involve the Investment Stewardship team.

Methods of engagement typically include regular meetings, video conferences or email exchanges with senior executives and non-executive management. Proxy voting is also a valuable means of communication. Where our concerns are not adequately addressed by our initial engagement, we will consider an escalation of our approach using the various means at our disposal.

Decisions to escalate will always be made on a case-by-case basis. More formal approaches include private meetings with the chairman or other board members, formal letters to the chairman and board or collaborative action where we believe that working together across the industry and unifying our voice has a better chance of delivering real life outcomes (where permissible under local laws and regulations). Examples of this collaboration include Climate Action 100+ and the 30% Club.

Documentation and monitoring

Over 100 fundamental and quantitative equity analysts, over 100 equity portfolio managers and 13 investment stewardship specialists globally reflect the breadth and depth of J.P. Morgan Asset Management's research resources around ESG integration.

- Fundamental analysts are responsible for fundamental research (40-question ESG checklist, fundamental materiality framework and strategic classifications), while the Global Equity Quantitative Research team is responsible for the data-driven ESG score.
- Portfolio managers are responsible for making the final buy-sell decisions, portfolio construction and risk management.
- Investment stewardship specialists are responsible for leading on engagement, understanding regulatory developments and educating colleagues on best practices and industry developments.

All research and corporate engagement meeting notes are housed in our proprietary technology platform, Spectrum™, to ensure full transparency to our investors, where appropriate.

Spectrum™ Portfolio Management Toolkit (PM Toolkit) focuses on giving managers the power to perform analytics on their portfolio data, including all ESG research and data. Tools are available to show their portfolios against benchmarks, visualize various comparisons against indices and factor-based views using charting and graphs, give flexibility to slice the data across multiple dimensions and marry internal valuation data with market information. PM Toolkit also offers risk analytics and performance-based tools.

Spectrum™ Research Notes is the central repository for all of the qualitative data that is important to the investment process. All meeting notes, strategic classifications and company visit information are entered into Research Notes to facilitate the simple searching and sharing of this information throughout our portfolio management population. It supports analysts through structured note creation and a phone/iPad-based version and supports portfolio managers through a research storefront, full text search capability and real-time notifications of new research that may be of interest.

Global Equities continued

On a quarterly basis, the Investment Director teams conduct formal review meetings with each investment team. Portfolios are reviewed in the context of objectives, performance, risk positioning and ESG integration, and ESG characteristics are documented.

Formal review meetings are attended by the head of the relevant investment desk, portfolio managers and representatives from the Investment Director team, Risk Management and Portfolio Analysis Group.

The Investment Directors report directly into the Head of Equities, Paul Quinsee, and escalate any issues, including material negative ESG exposures, into the Equity Investment Operating Committee.

Global Fixed Income, Currency & Commodities (GFICC)

Research/due diligence

We use a disciplined and systematic process to evaluate and identify attractive investment opportunities through the analysis of fundamental, quantitative and technical investment factors. Proprietary research forms the foundation of our approach to ESG integration, with over 70 career research analysts dedicated to thoroughly analyzing every aspect of an investment, including ESG factors. As part of this in-depth fundamental research, credit analysts assess the impact of ESG risks and opportunities on issuers' current and future cash flows. If the analysis of ESG factors shows that they are material and relevant, analysts will reflect this view in their credit opinions.

Our proprietary research process incorporates inputs such as company regulatory filings, annual reports, company websites, direct communication with companies and government issuers, media, third-party research and proprietary J.P. Morgan Asset Management research. Other inputs include sell-side investment research and reports from industry groups. We have developed a proprietary materiality matrix, which highlights the key ESG-related risk factors across all fixed income markets. This tool serves to guide analysts' research efforts to the specific topics within each sector that have the most impact.

Our fixed income sector teams have developed proprietary quantitative ESG rating systems, which capture the nuances within their specific markets and align to their existing investment processes. These include a 40-question ESG checklist for the corporate bond market, country ESG rankings for both developed and emerging markets and systematic identification of ESG leaders and laggards in the securitized space.

These scoring frameworks serve as useful tools for aggregating the numerous ESG metrics for each issuer and allow for comparison across issuers in the universe. Importantly, the scores are applied to portfolios in a judgmental, not formulaic, fashion and they are accompanied by analysts' qualitative research. Please see the following pages for more information on each sector team's ESG frameworks.

Within Spectrum™, our centralized technology platform, analysts also have access to third-party ESG data for each issuer. This data is displayed in various ways to track individual environmental, social and governance scores, and to observe changes over time. This third-party data serves as a supplement to our analysts' views. Our analysts form their own opinions based on their research and judgment, and this is articulated in written research reports, which contain specific sections for ESG comments.

ESG analysis and research are visible on Spectrum™ and shared across all investment teams, including fixed income and equities, enabling greater collaboration and leverage across the J.P. Morgan Asset Management platform.

Portfolio construction

Investment decisions are informed by a combination of traditional credit metrics, our qualitative analysis of ESG-related factors and the signals generated from our quantitative ESG scoring frameworks. Portfolio managers regularly discuss ESG-related topics with analysts, both for individual issuers and thematically within sectors, to understand how ESG issues may impact risks to cash flows, relative value opportunities and an issuer's overall risk profile.

Where ESG factors are material and relevant, they can directly influence how portfolio managers position issuers versus benchmark. ESG evaluations may be differentiators for names within the same sector, as well as an overall risk assessment tool for top-down portfolio analysis. For example, when two names have similar relative value and similar credit fundamentals, ESG factors can help to differentiate positioning based on governance, environmental initiatives and/or social impact. ESG views may also have a bearing on where along the spread curve portfolio managers choose to invest; for instance, if there is more long-term ESG risk in a particular sector or an individual issuer, portfolio managers may opt to allocate in the shorter end of the spread curve. ESG factors are integrated into security selection decisions when research analysts believe they are relevant to cash flows.

Global Fixed Income, Currency & Commodities (GFICC) continued

Engagement

As bondholders, although we do not typically carry voting rights, we believe our role in providing financing to issuers means we have the ability to advocate for and influence positive change. As such, we engage on a wide range of ESG issues with a variety of market participants. Our large global scale and status within the asset management industry allow us significant representation across asset classes. We often conduct engagement in conjunction with members of the Investment Stewardship team; we also collaborate with our equity colleagues to engage with companies to which we have exposure in their bonds as well as their equity. We participate in thousands of meetings with issuers from across the fixed income investment universe (companies and countries) every year.

The C-suite relationships our research analysts have developed over their careers enable us to engage regularly with company management and representatives of government issuers on matters material to our credit assessment, including relevant ESG factors. We also regularly meet with originators of securitized products and regulators. During these engagements, research analysts raise issues identified as material and relevant, including ESG concerns, in an effort to positively influence issuers to adopt best practices.

We also aim to contribute to positive change by participating in industry forums and regularly consulting with third-party data providers. For instance, we have board representation on industry bodies, such as the Edison Electric Institute and the European Leveraged Finance Association. This allows us to encourage closer cooperation among issuers on key ESG initiatives and to advocate for better disclosure and transparency across the industry. We also scrutinize the data from third-party ESG data providers, working closely with them to improve their coverage of the fixed income universe, data accuracy and timeliness.

In the sovereign space, we recognize engagement is critical, but it can be more nuanced compared to the corporate market given the inherent politics involved. We seek to engage with the sovereign market in a variety of forms, including investing in sovereign debt to finance specific sustainable projects, meeting with government officials regularly to review progress on climate goals and participating in industry groups to collectively advocate for better disclosure and improved practices from state-owned companies.

The results of our ESG engagement are reflected in the research reports produced by analysts, and they feed back into the overall view of an issuer, thereby influencing investment decisions.

Documentation and monitoring

Qualitative analysis and quantitative metrics related to ESG are housed in our common technology platform, Spectrum™, to ensure full transparency and access for all investors. This documentation includes analysts' credit opinions, which have dedicated ESG sections, and meeting reports, for which we have built out the tagging and search functions to improve the ability to track our engagement practices. Research analysts are responsible for conducting fundamental ESG research, engaging with issuers and ongoing monitoring of the ESG opinions for each credit they cover. When green bonds come to market, research analysts also complete a questionnaire focused on the "green" aspect of the bond issuance; for instance, considering whether the bond splits out proceeds and what specific project the bond is supporting.

Quantitative ESG metrics, such as the J.P. Morgan Asset Management data-driven ESG score and data from third-party ESG providers, are accessible in our systems for all investors. Portfolio managers also have a daily view of their exposure to the risks associated with ESG factors in our proprietary portfolio management system, which can be customized depending on the nature of the portfolio, thereby aiding them in their portfolio construction and risk management responsibilities.

In addition to the in-depth, bottom-up research our analysts conduct into each bond, continual monitoring is required to understand the ongoing ESG profile of each portfolio. Our risk management team has developed periodic risk reports, sent directly to portfolio managers and accessible in our systems. This enables portfolio managers to monitor the ESG risks to which they are exposed and to identify potential outliers – issuers that stand out as having significantly better or worse ESG scores and practices than their peers.

The GFICC Investment Director team is responsible for performance and risk oversight of portfolio management to maintain discipline around investment objectives and process in the context of client objectives or fund guidelines, performance, risk position and ESG profile across all sectors. Where possible, the Investment Director teams monitor the relative ESG

Global Fixed Income, Currency & Commodities (GFICC) continued

exposures of each strategy, and oversee the level of integration from both qualitative and quantitative angles. The qualitative perspective is captured through discussions with the portfolio managers around the consideration of ESG factors at the quarterly review meetings. Quantitative factors, which include measurable metrics on ESG characteristics or exposure of the portfolios, are available in Spectrum™ and our portfolio management system.

Given the scale and diverse nature of fixed income markets, each of our sector teams takes a tailored approach to the ESG integration process discussed above.

- **Corporate credit**: For investment-grade and high-yield corporate issuers across both developed and emerging markets, relevant ESG risks are systematically considered as part of bottom-up fundamental analysis. Included in this fundamental research are the impacts to both current and future cash flows from ESG risks and opportunities. This process is guided by the 40-question ESG checklist, which was developed by our equity colleagues and recently implemented for fixed income. Research analysts and portfolio managers use this checklist to assess corporate entities across the capital structure and as an input to portfolio positioning. The checklist is completed for each company under the team's coverage and consists of 12 environmental questions, 14 social questions and 14 governance questions.

  Analysts across fixed income and equity collaborate on the questionnaire. This results in one set of responses on environmental and social matters, as we believe these are consistent across the capital structure, with governance questions differing slightly by asset class. The checklist includes both negative and positive questions and a severity assessment. Rather than a "pass/fail" exercise, the checklist is a tool to inform discussions between portfolio managers and research analysts, as well as to guide engagement with our investee companies. Examples of questions on the checklist include:

  – Does the company lack a credible/measurable strategy or plan to reduce greenhouse gas emissions?
  – Is the company poised to benefit as a result of its actions related to environmental considerations?
  – Does the company have unaddressed issues with labor relations?
  – Does the company engage in anti-competitive behavior and/or treat its customers unfairly?
  – Does the owner have a history of poor governance or of abusing minority shareholders?
  – Does the company have a history of aggressive issuance of secured/senior debt that disadvantages existing bondholders?

The illustration below depicts an example of the 40-question ESG checklist in Spectrum™.

Illustration of 40-question ESG checklist within Spectrum™

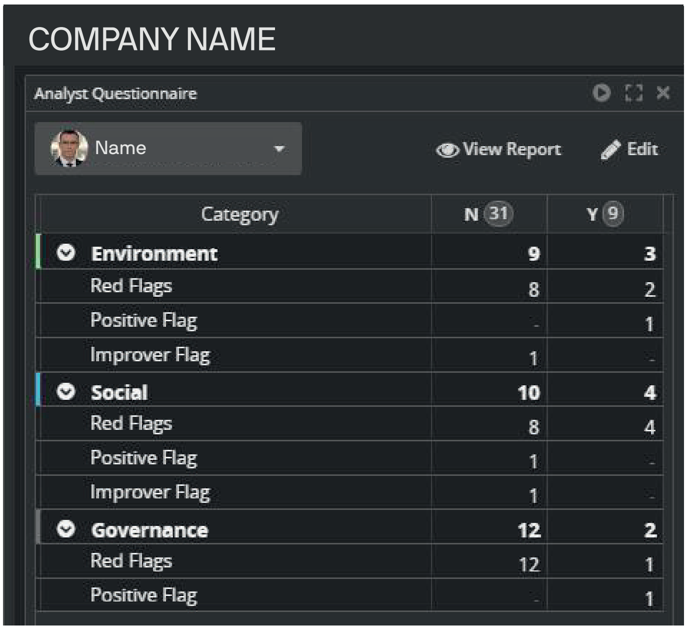


Image source: J.P. Morgan Asset Management Spectrum™.

Global Fixed Income, Currency & Commodities (GFICC) continued

- **Sovereign debt**: Our ESG integration process for sovereign debt is guided by a proprietary ESG scoring framework that results in a score for each sovereign issuer in both the developed market (DM) and emerging market (EM) universes. The score is the output of a number of metrics across each of the environmental, social and governance pillars (16 metrics for DM and 8 metrics for EM). We believe that a proprietary ESG score allows us to better understand data inputs and limitations, and to align our ESG approach with our existing investment processes. For both DM and EM, governance factors carry the largest weight in the overall score as they are the most empirically relevant for asset prices; philosophically, we also view good governance as a foundational pillar for positive ESG developments in the other two pillars. Outside of governance, environmental has a higher weight for EM while social has a higher weight for DM. This is driven by both fundamental reasons (developed countries generally have greater resources to solve climate change challenges, while emerging countries can be more vulnerable to environmental risks) and the way the proprietary ESG scores fit within our existing investment processes. Within each of the three pillars, we focus on two consistent themes: emissions management and climate risk and resource management for environmental; socio-economic and gender for social; regulatory environment and governance and corruption for governance. Within these themes, we use different metrics for DM and EM to reflect differences in data coverage and materiality. Importantly, comparing DM and EM sovereigns separately allows us to remove some income bias (i.e. richer countries tend to have higher ESG scores than poorer countries). We then supplement these ESG scores with a forward-looking qualitative assessment. The exhibit below depicts our sovereign ESG scoring framework.

J.P. Morgan Asset Management's Sovereign ESG scoring framework

Universe		Developed markets	Emerging markets
Environmental (15% weight DM, 20% weight EM)	**Emissions Management**	• Carbon emission per Energy (Global Carbon Project) • Energy Intensity per GDP (World Bank) • Renewables as % consumption (World Bank)	• CO_2 per capita (Emissions Database for Global Atmospheric Research)
	Climate Risk and Resource Management	• Notre Dame Global Adaptation Index (ND-GAIN) - Vulnerability • Climate Change Performance Index (Germanwatch) • Natural Resource Depletion (World Bank)	• ND-GAIN - Vulnerability
Social (25% weight DM, 15% weight EM)	**Socio-economic**	• Gini Index (World Bank) • Labor Force Participation (World Bank) • Human Development Index (United Nations Development Program (UNDP)) • Education as % of government spending (World Bank)	• Poverty (World Bank)
	Gender	• Female to Male Labor Force Participation Rate (World Bank)	• Gender Development Index (UNDP)
Governance (60% weight DM, 65% weight EM)	**Regulatory Environment**	• Ease of Doing Business (World Bank)	• Ease of Doing Business (World Bank)
	Governance and Corruption	• World Bank Governance • Transparency International Corruption • Debt to GDP (IMF, J.P. Morgan Asset Management) • Fiscal Balance (IMF, J.P. Morgan Asset Management)	• World Bank Governance • Transparency International Corruption • Short-term Political Index (J.P. Morgan Asset Management)

Source: J.P. Morgan Asset Management, as of August 2021.

Global Fixed Income, Currency & Commodities (GFICC) continued

- **Securitized**: We conduct bottom-up research on both the underlying collateral and the deal structure of securitized products. The analysis of the collateral focuses on the quality of the underlying receivables and the likelihood that future cash flow payments will ultimately be received. The primary focus of assessing the deal structure is the structural factors that can alter the payments flowing from the collateral to different tranches in the deal, to better understand each security's expected total return under different prepayment or expected loss scenarios.

  ESG factors are key components of both the collateral and structural analysis we perform, as they can have a notable impact on future cash flows. We have developed a proprietary materiality matrix that highlights the sources of the most material ESG risks by securitized sub-sector to guide and direct the efforts of our research analysts.

  In addition to our focus on proprietary fundamental research, we leverage the depth of our securitized team and alternative third-party data and research providers as a means of uncovering and understanding ESG risks across the securitized space, given the lack of dedicated ESG ratings from third-party providers for the securitized market. For instance, third-party data that provides the geographic concentration of underlying collateral can help to inform potential exposure to extreme weather events. Based on our assessment of the ESG factors, we systematically score securities in the universe as leader (+1), neutral (0) or laggard (-1) across each of the three environmental, social and governance pillars. Leaders are identified as those securities that meet pre-defined sustainability standards and contain a long-term plan; neutral securities are those that are adequate and meet industry standards; and laggards are those that detract from sustainability intentions and lack long-term vision. This scoring process incorporates considerations from across multiple dimensions including borrower and collateral; sponsor, originator and servicer; and deal and structure.

  In addition to this scoring framework, analysts include an ESG write-up for new issues as part of the credit process, stored in the Research Notes repository in Spectrum™. Quarterly credit reviews are undertaken across securitized assets, and ESG factors are reviewed and updated as part of these quarterly reviews.

- **Municipal bonds**: As a part of the credit research process, credit analysts integrate material ESG factors into their overall internal credit risk assessments, assigning obligor-level ESG indicators and documenting relevant and material ESG-related comments in the municipal credit database. From this database, credit analysts store and disseminate credit research reports that include the ESG factors and any material ESG-related comments. Portfolio managers incorporate the internal credit opinion, along with relative value assessments, into their investment decision to purchase, hold or sell a bond.

Global Liquidity

Research/due diligence

We use both top-down and bottom-up approaches to thoroughly analyze issuers, including ESG risks and opportunities that may affect issuers' current and future cash flows.

Proprietary, fundamental bottom-up credit analysis forms the foundation of our approach to ESG integration. We analyze companies across a range of inputs including company regulatory filings, annual reports, company websites, direct communication with issuers, media, third-party and proprietary research.

To complement and accompany the analysts' qualitative research, we have developed a proprietary materiality matrix across fixed income markets. This matrix serves to highlight ESG-related risk factors and focuses on key ESG-related factors within each sector. Proprietary quantitative ESG rating systems have also been developed to capture the nuances across specific fixed income markets. These include a 40-question ESG checklist for the corporate bond market, at both the ticker and specific bond level, country ESG rankings for developed markets and systematic identification of ESG leaders and laggards in the securitized market.

These ESG-related frameworks allow analysts to make informed decisions on the ESG profile of each issuer within its respective sectors. More detailed information on each sector team's ESG framework can be found in the GFICC section of this report on page 17.

In addition, the J.P. Morgan Asset Management proprietary data-driven ESG score being developed by the Sustainable Investing team, mentioned on page 11, provides further breadth of ESG data using proprietary methodology.

As a supplement to these proprietary tools, our common technology platform – Spectrum™ – displays third-party ESG data for each issuer, tracking individual environmental, social and governance scores and changes to those scores, over time.

Our analysts form opinions based on their independent research and judgment, and produce reports containing specific sections for ESG comments that are leveraged across different asset classes when appropriate. The analysts apply a fundamental credit rating to each issuer, and this rating, which can be adjusted based on ESG concerns, ultimately determines an issuer's maximum lines using Global Liquidity's credit guidelines. These guidelines set maximum tenors (duration) and exposures at both the platform level and within each fund and account.

For a more detailed review of the research/due diligence process, please refer to the *GFICC* section of this report, on page 17.

Portfolio construction

Portfolio managers use both proprietary ESG views and third-party ESG research to evaluate overall risk in Global Liquidity portfolios. Research analyst opinions are shared with portfolio managers through Spectrum™. Through this technology platform, portfolio managers can access the qualitative ESG-related factors as well as the proprietary and third-party ESG quantitative frameworks, all of which can play a factor in security selection decisions.

Portfolio managers regularly discuss ESG-related topics with the respective analysts to understand how ESG risks specifically affect an issuer's fundamental rating. When ESG factors are material and impact an issuer's rating, these factors will also determine how portfolio managers can manage exposure to an issuer from both duration (tenor) and absolute exposure across the Global Liquidity product line.

Portfolio managers allow for ESG opinions to be differentiators for names within the same sector, as well as an overall risk tool for top-down portfolio analysis. For example, when two names have similar fundamentals and relative value, ESG scores can help differentiate positioning based on good governance, environmental initiatives and/or social impact.

Our proprietary trading system shows third-party environmental, social and governance factor scores for each credit we are evaluating and calculates the impact to the portfolio ESG score. This allows portfolio managers to review similar trade opportunities (by yield and maturity) and integrate ESG factors into their security selection decision-making.

Global Liquidity continued

Engagement

As bondholders, we do not typically carry voting rights. However, as providers of financing, we have the ability to advocate for and influence positive change by actively engaging on a wide range of ESG issues with a variety of market participants.

Frequent collaborative meetings with company management teams or governmental issuer representatives help illuminate ESG risks and opportunities identified as material and relevant in an effort to positively influence issuers to adopt best practices. This information informs the overall ESG analysis within the proprietary fundamental 40-question analysis. The results of our ESG engagement are reflected in the research reports produced by analysts, and feed back into the overall view of an issuer. Portfolio managers work with research analysts to understand how engagement opportunities are impacting the overall view of a credit.

Below are a few key ways we engage with management teams and other stakeholders:

- Have board representation on industry bodies, where we encourage closer cooperation among issuers on key ESG initiatives.
- Work with rating agencies to promote better corporate behavior in certain sectors and encourage cooperation between legislators, issuers and other industry bodies.
- As previously stated, ESG integration is dependent on the availability of sufficient ESG information on investee issuers. Recognizing the existing limitations around ESG data quality and availability, we collaborate with data providers to encourage them to improve the overall coverage of the fixed-income universe with timely and accurate data.

The results of our ESG engagement are reflected in the issuer reports produced by research analysts, which in turn feed back into the investment process.

Documentation and monitoring

Roles and responsibilities around ESG integration within Global Liquidity are as follows:

- Research analysts are responsible for conducting fundamental ESG research, engaging with issuers and ongoing monitoring of the ESG opinions for each credit they cover. Research analysts are also responsible for assigning an overall security rating that has ESG inputs within the fundamental analysis.
- Portfolio managers own portfolio construction and investment decisions, aided by our systematic incorporation of research analysts' ESG views and third-party ESG scoring.
- Credit and Risk Administration owns the Global Liquidity risk matrix overlay and oversight of portfolios from an ESG risk perspective at both platform and individual fund levels.
- The Global Liquidity ESG Leadership team oversees Global Liquidity's continued progress on sustainability efforts including training, product development and thought leadership.

Qualitative analysis and quantitative metrics related to ESG are housed in our common technology platform, Spectrum™, to ensure full transparency and access for all investors. This documentation includes analysts' credit opinions, which have dedicated ESG sections, and meeting reports, for which we have built out the tagging and search functions to improve the ability to track our engagement practices. It also includes the J.P. Morgan Asset Management data-driven ESG score and data from third-party ESG providers, again accessible for all investors.

Vendor-provided and proprietary ESG metrics are available within Global Liquidity's trading systems. Portfolio strategy and positioning across multiple factors are evaluated at monthly investment reviews attended by the Global Liquidity Chief Investment Officer, Credit and Risk Administration, Research Analysts, Investment Managers, Finance, Independent Risk and Legal. This includes a review of ESG characteristics and trends across the Global Liquidity platform, and highlights the largest exposures to the highest- and lowest-rated issuers using MSCI ESG scores.

Asset Management Solutions
Multi-Asset Solutions

Research/due diligence

The Multi-Asset Solutions team designs and manages multi-asset portfolios, integrating the breadth and depth of investment talent within J.P. Morgan Asset Management, drawing on its proprietary quantitative and qualitative research capabilities, strategy and security selection, asset allocation and risk-focused portfolio management expertise.

For our ESG research in Multi-Asset Solutions, we leverage the following three teams:

- ESG research performed by our Multi-Asset Solutions Manager Research team.
- ESG research performed by our centralized Sustainable Investing team.
- ESG research performed by the research analysts of the corresponding asset classes.

Within the manager/strategy evaluation process, we focus on understanding how ESG considerations influence the capabilities of the underlying manager/strategy and the investment process. The emphasis is on understanding how ESG factors are considered and how the manager/strategy defines, evaluates and rationalizes inclusion of securities that may score poorly and/or contain perceived headline risk. Multi-Asset Solutions portfolio managers consider this information, among other variables, when reviewing managers/strategies within the overall portfolio construction process. At Investment Director quarterly meetings, ESG characteristics can be challenged and discussed.

Portfolio construction

Multi-Asset Solutions believes that financially material ESG factors may impact risk/return characteristics of the underlying managers/strategies in which we invest. Therefore, we look to understand if the underlying managers/strategies are adequately identifying and actively mitigating risks and seeking opportunities, where material to their investment process.

A considerable amount of the ESG analysis is done via the bottom-up process of the underlying managers/strategies, which are assessing materiality within their respective investment processes and determining ESG factors at the company or issuer level.

The manager/strategy selection process carried out by the Multi-Asset Solutions investment team combines manager research and portfolio construction:

- The Manager Research team looks to understand how ESG is considered within an underlying manager's/strategy's investment process, how it defines and mitigates material ESG risks and the investment rationales for the inclusion of securities that may score poorly and/or contain perceived headline risk.
- Multi-Asset Solutions portfolio managers then consider the ESG risks associated with the strategy run by an underlying manager along with other risks and benefits at the total portfolio level. Please note that portfolio managers use multiple criteria to decide which underlying funds to select, which also includes volatility, past performance, tracking error, expected return and Sharpe ratio. Although these particular risks are considered, the underlying funds and securities of issuers presenting such risks may be purchased and retained by portfolios, as exclusion may result in an unbalanced portfolio and suboptimal risk-adjusted returns over longer time horizons.

Engagement

Engagement functions are a collaboration between J.P. Morgan Asset Management portfolio managers, research analysts and the Investment Stewardship team. Each brings a different perspective to our interactions with companies across our five investment stewardship priorities and our research framework.

From a Multi-Asset Solutions perspective, we leverage our manager research team to engage with underlying investment teams to understand how ESG is considered. We incorporate ESG in our regular manager/strategy review process where we raise topical considerations, review ESG outliers from a third-party score perspective and conduct periodic deep-dive ESG reviews to cover enhancements to integration and the sustainable investing process.

The output from these reviews is then included within our Research Notes application in Spectrum™ and forms part of the dialogue between our Manager Research and Portfolio Management teams.

Asset Management Solutions continued
Multi-Asset Solutions

Documentation and monitoring

All our manager/strategy research is housed in our proprietary technology platform, Spectrum™, to ensure full transparency to our investors, where appropriate.

Spectrum™ Research Notes: Any engagement and analysis on existing and new managers is uploaded and incorporated into our research notes database, which is accessible to our investment teams for their review. We also look to cover any relevant material within our monthly investment team meetings.

On a quarterly basis, the Investment Director teams conduct formal review meetings with each investment team. Portfolios are reviewed in the context of objectives, performance, risk positioning and ESG integration. ESG integration is monitored through review of fund-level scores versus benchmark scores, evolution of scores and qualitative discussions with portfolio managers. The Investment Directors report directly to the Head of Asset Management Solutions, Jed Laskowitz, and escalate any issues to the Asset Management Solutions Investment Operating Committee.

Asset Management Solutions continued
Quantitative Solutions

Research/due diligence

- To integrate ESG considerations in factor-based strategies (long-only and long/short) and thematic, we rely on a third-party vendor to evaluate companies based on a quantitative ESG metric.
- Third-party vendor coverage for our full long/short universe is approximately 95%, with most in Europe and least in Asia, emerging markets and small cap, and is increasing over time. The result of the ESG evaluation provided by the third-party vendor is reflected in scores that are normalized by sector, but not by region. The scores range from 1-10 (10 being the best score), with most benchmarks' ESG score averaging around 5.

ESG integration is dependent on the availability of sufficient ESG information on relevant companies or issuers and the investment universe. We recognize the limitations around ESG data quality and availability.

Portfolio construction

- The Quantitative Solutions team implements ESG screening on its thematic strategies by excluding companies with the poorest ESG scores, first by reviewing them based on environmental, social and governance score. If a company is an outlier on two or more of these metrics, it is removed. If it is an outlier on only one metric and highly relevant to the theme, we evaluate and can invest; if not, we remove.
- Thematic investing strategies rely on the team's proprietary system and investment process for the identification of securities for inclusion that the adviser reflect certain themes. Because thematic investing involves qualitative and subjective analysis, there can be no assurance that the methodology used by, or determinations made by, the adviser will reflect specific themes or align with the beliefs or values of a particular investor.[7]
- As we invest using a quantitative investment process with no qualitative discretion, ESG factors are implemented on an automated basis. This results in an improvement of the portfolio score relative to the relevant benchmark or universe.
- Note that for Index Tracking strategies, we use full replication to invest in all holdings at the same weight as the index. This is to minimize tracking error. As a result, these strategies are not ESG integrated (unless ESG aspects are explicitly included in the index methodology).

[7] Thematic Investing Risk. The adviser's thematic investing strategies may perform differently compared to accounts that do not have such strategies. Thematic investing strategies rely on the adviser's proprietary system and investment process for the identification of securities for inclusion that reflect certain themes. An account's performance may suffer if such securities are not correctly identified or if the theme develops in an unexpected manner. Performance may also suffer if the securities included in the strategy do not benefit from the development of such themes. There is no guarantee that the adviser's investment process will reflect the theme exposures intended.

The criteria related to thematic investing strategies, including the exclusion of securities of companies in certain business activities or industries, may result in forgoing opportunities to buy certain securities when it might otherwise be advantageous to do so, or selling securities for thematic reasons when it might be otherwise disadvantageous for it to do so. As a result, thematic investing strategies may underperform strategies that invest in a broader array of investments. In addition, there is a risk that the companies identified by the adviser's investment process as reflecting a particular theme do not operate as expected to facilitate a particular goal. The adviser and its proprietary system assess companies by using a wide set of data inputs, which, for certain strategies, is combined with fundamental analysis. While the adviser looks to data inputs that it believes to be reliable, the adviser cannot guarantee the accuracy of its proprietary system or third party data. Under the adviser's investment process, data inputs may include information self-reported by companies and third-party providers that may be based on criteria that differs significantly from the criteria used by the adviser to evaluate relevance to a strategy's investment theme. In addition, the criteria used by third-party providers can differ significantly, and data can vary across providers and within the same industry for the same provider. Moreover, there are significant differences in interpretations of what it means for a company to be relevant to a particular theme. While the adviser believes its definitions are reasonable, the portfolio decisions it makes may differ with other investors' or advisers' views. Because thematic investing involves qualitative and subjective analysis, there can be no assurance that the methodology utilized by, or determinations made by, the adviser will align with the beliefs or values of a particular investor.

The ESG integration approach described above relates to the Quantitative Solutions investment strategy. Unless otherwise indicated in product-specific disclosures, the products following the aforementioned investment strategy do not promote environmental or social characteristics.

Asset Management Solutions continued
Quantitative Solutions

Engagement

- The Quantitative Solutions team manages portfolios that invest across large starting universes. As such, we rely on a third-party vendor, avoid investing in the worst-ranked names and do not proactively engage with companies as a team. However, the Investment Stewardship team does exercise its voting rights in line with the J.P. Morgan Asset Management Global Proxy Voting Guidelines. The Investment Stewardship team may engage with companies held in Quantitative Solutions' portfolios as part of its stewardship program.
- When there are significant proxy voting issues on companies without fundamental analyst coverage, the Investment Stewardship team will engage with the Quantitative Solutions portfolio managers. The two groups will evaluate proxy advisor recommendations, discuss the issues and come to a decision.

Documentation and monitoring

- For factor-based portfolios, the portfolio manager running the quantitative process is responsible for determining that exclusions are coded and reflected. Monitoring is conducted by Investment Directors.
- As we invest using a purely quantitative investment approach, our ESG integration process is documented in the code and in our procedures.
- The Investment Directors formally monitor ESG and it is discussed in our Quarterly Review meetings, which include the CIO. The Investment Directors would alert the portfolio manager team were there to be a significant drop in ESG scores. As our process is automated, this has not happened to date.

Alternatives
Macro Strategies

Research/due diligence

Our research process consists of an assessment of materiality and ESG scoring:

- **Assessment of materiality**: Our fundamental analysis of securities integrates ESG risks and opportunities both pre-trade and on an ongoing basis. We assess material ESG risks and opportunities using defined frameworks for corporates to ensure a robust and repeatable process. Our framework for corporates leverages the Sustainable Accounting Standards Board (SASB) ESG topics, while our framework for sovereigns leverages some of the ESG topics outlined in the UNPRI guide to sovereign debt investing. The portfolio managers have discretion to add further ESG topics they believe could be relevant to specific positions. Our materiality assessment draws on the managers' understanding of inherent ESG risks and opportunities across countries, sectors, industries and activities, and their knowledge of their sector of coverage and specific companies. We integrate proprietary, broker and ESG-specific third-party research and company disclosures into our assessment. The final analysis is documented for reference and to monitor exposures over time.
- **ESG scoring**: Third-party scores provide a complement to our own assessment of materiality and are an objective quantitative framework for the consideration of ESG credentials. We leverage ESG scoring and the associated analysis from MSCI, using the All Country World Index (ACWI) scores for equity and credit, and the country scores for sovereign debt, which feed into Spectrum™. Within Spectrum™, we can view our portfolios' aggregate ESG scores, the component parts and the scores for the broader universe. We also leverage the norm-based scoring assessment from ISS-ESG, referring to its red/amber/green flags. In addition, the proprietary J.P. Morgan Asset Management data-driven ESG score, being developed by the Sustainable Investing team, will provide further breadth of ESG data using our proprietary methodology in the future.

Portfolio construction

We integrate ESG analysis into our process to mitigate material potential negative risk scenarios as a result of ESG risks and to identify opportunities for securities with strong ESG characteristics. The consideration of potential ESG risks and opportunities can influence the decision to buy, disinvest or adjust position sizing in a particular security.

Engagement

To enhance our ESG analysis and ensure active ownership on behalf of our clients, the Macro Strategies team leverages the expert insights of the Investment Stewardship team, specifically relating to proxy voting and engagement activities. Further, we engage directly with companies on certain issues where we believe additional discussion may be materially beneficial.

Documentation and monitoring

Within macro strategies, all portfolio managers are responsible for conducting and documenting ESG research on all long exposures in single name equities, bond and FX. The team holds a dedicated fortnightly ESG meeting in which they review portfolio ESG scores and discuss any material ESG updates for the portfolio holdings. During these meetings, any changes in ESG scores or norm-based analysis are discussed, as well as ESG-related company updates arising from internal or third-party research and engagement, and any industry developments.

Alternatives continued

J.P. Morgan Alternative Asset Management (JPMAAM) Hedge Fund and Alternative Credit Solutions

Research/due diligence

J.P. Morgan Alternative Asset Management (JPMAAM) Hedge Fund and Alternative Credit Solutions believes that sustainability is a key factor in managing risks and identifying opportunities, and we have developed a holistic investment approach that reflects this belief. Our ESG framework primarily focuses on ESG integration in our manager due diligence process. Our proprietary framework for evaluating managers includes an extensive list of questions on ESG factors factors across 25 categories in relation to their operational and investment processes. We apply the full framework to every manager while recognizing the materiality of certain ESG risks and opportunities may vary by manager type, size and strategy. This comprehensive analysis informs our view of ESG-related risks and is an important part of our investment decision-making process.

Portfolio construction

We view good ESG practices as a tool to help mitigate potential risks and conflicts, and a pre-requisite to investing in a responsible way. ESG factors are taken into consideration as part of each decision to invest in a new manager, remain invested with an existing manager or terminate a manager. The ESG integration of our platform contributes to risk management and return across portfolios by (a) helping JPMAAM avoid hedge funds that are more likely to fail by identifying key structural risks and (b) influencing managers we do select to institute best practices that strengthen their business and protect their investors. Beyond identifying and mitigating potential sources of risk, our ESG integration process also helps us to identify outperformers and guides us toward additional sources of alpha.

Engagement

After evaluating managers on ESG factors throughout our due diligence process, we actively engage them on any identified financially material environmental, social or governance risks. We work closely with our managers to help them improve on ESG factors where we believe they are lacking, providing guidance and support to help them achieve best-in-class practices. We believe this improves a company's ability to operate successfully, both now and in the future, thereby enhancing the potential of our investment. JPMAAM prides itself on helping to drive ESG principles in the industry. The platform has helped many hedge fund managers to incorporate ESG factors into their businesses and investment processes. Notably, over 90% of managers on the JPMAAM platform already have or are actively drafting an ESG policy focused on investment and/or business practices, up from 10-15% at the start of 2018.

Documentation and monitoring

The ESG framework used for evaluating managers' business practices was approved by the JPMAAM Investment Committee (IC). It is led and implemented by JPMAAM's operational due diligence (ODD) team and is supported by the investment research analyst covering each manager. The ODD team is comprised of dedicated specialists who conduct a comprehensive assessment of risk controls, operations, financial statements, legal structures and documentation as part of initial due diligence and ongoing monitoring. They report to Brian Burke, Head of Risk Management and a member of the Investment Committee, who has the right to veto any investment due to risk and operational concerns, including those related to ESG.

On every occasion the IC meets to approve a new manager or review an existing one, the ESG evaluation is included in the materials to be considered for the committee's review. Any meaningful and material ESG risks identified at any stage of the investment process are flagged by the ODD team and escalated to the IC.

The proprietary ratings for each ESG factor are incorporated into our research database and all client reporting. This allows ratings to be effectively monitored by portfolio managers and investment directors at the manager and portfolio levels.

For more information on our approach to ESG Integration, please contact your J.P. Morgan Asset Management representative.

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