REFINITIV® MARKETPSYCH ESG ANALYTICS

QUANTIFYING SUSTAINABILITY IN GLOBAL NEWS AND SOCIAL MEDIA

An LSEG Business

REFINITIV®

Contents

EXECUTIVE SUMMARY

In partnership with Refinitiv, MarketPsych launched an AI-based ESG feed covering 30,000+ companies and 252 countries and territories. The feed is derived from thousands of credible sources and tens of millions of news and social media authors point-in-time back to 1998. It provides a gauge of media perceptions of corporate and country-level ESG activities. The data is delivered in minutely, hourly and daily feeds. The data is granular, publishing scores on 200+ ESG themes and controversies minute-by-minute. It is used in quantitative, risk management, and research applications. Initial quantitative research found substantial global stock and equity index predictive power.

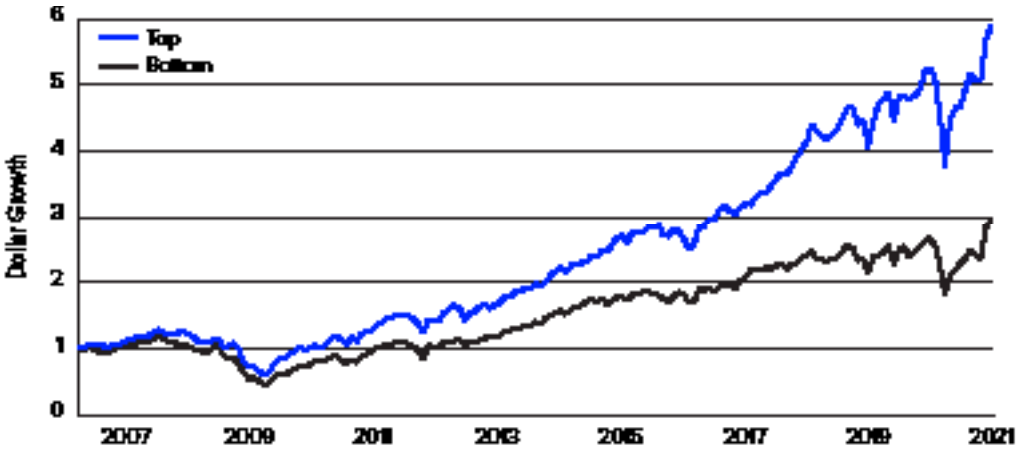
INTRODUCTION

"No one will protect what they don't care about, and no one will care about what they have never experienced."

David Attenborough

Articles about environmental changes, social impacts and governance quality saturate news and social media. To quickly see which companies and countries are behaving sustainably (or unsustainably), MarketPsych partnered with Refinitiv to create the multi-dimensional Refinitiv® MarketPsych ESG Analytics (RM-ESG). The software underlying the scores uses complex natural language processing (NLP) hosted on a carbon-neutral array of cloud servers to score environmental, social and governance-themed (ESG-themed) content in articles. It scores content that pertains to specific companies as well cities, regions and countries.

ESG scores are directly relevant for economic and social stakeholders. Below is an image from a quantitative finance study on this new dataset. Figure 1 demonstrates how the stock prices of companies in the S&P 500 with a very high level of Workplace Sentiment (top 5%) consistently outperform those with very low scores (bottom 5%).



S&P 500 companies; Equal-weight; Monthly rotation; Jan/2006 – Dec/2020; Spread: μ=4.4% (1.83); σ=9.0%

Figure 1. S&P 500 constituent stocks were ranked by their past-month RM-ESG WorkplaceSentiment score. The forward stock price performance of a portfolio of the top 5% and bottom 5% of stocks was calculated over the next month. This procedure was repeated monthly. The growth of $1 invested in each group was plotted from 2006 to 2020.

The above study is explained in more detail in the final section of this whitepaper.

Rather than scoring sustainability from a company's own reports and press releases, the RM-ESG feed provides an external perspective. In the study above, references to workplace sentiment come not from the company itself, but rather from social media and news reports. The NLP engines avoid corporate documents such as press releases, corporate websites and regulatory filings, instead opting for the outsider perspective of over 2 million articles and posts daily from tens of millions of authors in credible news sources, blogs and social media.

The RM-ESG NLP engine scores thousands of granular meanings in text, including references to specific types of intellectual property violations, management scandals, and ESG policy failures. Additionally, in contrast to other types of ESG data, articles are scored in real-time, delivering updates about ESG-impacting activities every 60 seconds. Media history is available back to 1998.

The RM-ESG data is delivered in **Core** and **Advanced** packages. The Core package consists of seventeen daily summary scores reflecting the longer-term average ESG ranking of a company or country. The Core package is constructed to complement the Core Refinitiv ESG dataset. The Advanced package consists of hundreds of minutely, hourly, and daily data time series reflecting media reports of ESG activities and controversies.

The data is unique in the following ways:

1. Wide coverage: 30,000+ companies and 252 countries and territories.
2. Long history: From 1998 to the present.
3. Multi-language sources: Arabic, Chinese, Dutch, English, French, German, Italian, Indonesian, Japanese, Korean, Portuguese, Spanish, Russian
4. External perspective: Detect greenwashing with objective view on ESG efforts.
5. Point-in-time: Company coverage point-in-time to January 1998 is quant-friendly.
6. AI-based: Machine learning NLP system for extracting complex ESG concepts.
7. Granular: More than one-hundred controversies and topics (Advanced only).
8. Real-time: Including 60-second, hourly, and daily updates (Advanced only).
9. Social and News: Distinct News (including a Headlines series), Social feeds and a combined feed (Advanced only).

Multiple use cases have emerged. Quantitative and discretionary investment funds use the RM-ESG data to guide asset allocation and manage risks. Corporate clients monitor market perceptions. Researchers investigate corporate initiatives and malfeasance. Regulators use the data to direct investigations. Governments monitor internal business and economic sentiment.

At the time of this writing, the natural language processing (NLP) engine provided by MarketPsych supports several Refinitiv products: the Refinitiv® MarketPsych Analytics (RMA), the StarMine® MarketPsych Media Sentiment model (MMS), the MarketPsych Data Refinitiv® Eikon App, and the Refinitiv MarketPsych ESG Analytics. Customers for the data reside in 25+ countries and represent investment funds, corporations, pension funds, government agencies, research firms, and universities. Over 55 academic papers, some published in top tier finance journals, have been written using MarketPsych's data products.

This white paper consists of five sections. The first section addresses MarketPsych's innovative approach to natural language processing. The second section describes scores construction. The third section explains available scores. The fourth section explains the feed format. The fifth section highlights quantitative research. Please refer to the RM-ESG User Guide to learn more about the structure and delivery of this multi-dimensional dataset. It is our hope that you find this document useful for understanding and working with the RM-ESG.

MARKETPSYCH NLP

"Sustainability can't be like some sort of a moral sacrifice or political dilemma or a philanthropical cause. It has to be a design challenge."

Bjarke Ingels

MarketPsych's NLP design is modular in approach so that technological advances in NLP can be seamlessly incorporated every three years during version update cycles. The software, at the time of this writing, is operating on NLP version 4. Modules built internally and from open source and professional providers are tuned, tested, and incorporated. The expertise MarketPsych has amassed in AI-based media NLP is a key organizational strength.

Multi-Dimensional Analysis

In human communication a broad range of nuanced emotions are expressed about a multiplicity of themes. Yet traditional natural language processing (NLP) yields limited information from text articles. Sentiment, relevance, and novelty are the most common dimensions quantified, and as a result traditional NLP techniques have a limited scope.

ESG impacts are often communicated in a sophisticated fashion – one that does not easily lend itself to traditional NLP analysis. For example, journalists typically describe an ESG theme (topic), report on its positive or negative impact (sentiment), use specific tones (urgency or uncertainty), explain a state of development (staging), describe the importance of the event (magnitude), convey its immediacy (urgency), and provoke specific emotions (emotive sentiments). MarketPsych's machine-based NLP embodies and quantifies such a human-level understanding of the elements of communication.

In addition to the dimensions listed above, MarketPsych's innovative AI-powered NLP engine weighs relationships between parts of speech, dependencies, tenses, perspective, author credibility, and thousands of modifiers. Thousands of ESG "meanings" are produced based upon these features. For example, the RM-ESG score for ManagementTrust is a measure of the balance of the media's expressions of trust and mistrust in a company's management team. A listing of the published RM-ESG scores appears later in this document as well as in the product User Guide.

Source Text

The RM-ESG are derived from an unparalleled collection of premium news, global Internet news coverage, and a broad range of global social media. In addition to English language sources, influential global business news sources are machine-translated and included. In the Advanced RM-ESG package, users may select and test news, social media, news headlines and a combined news plus social feed independently.

The RM-ESG social media feed consists of both MarketPsych and LexisNexis® social media content. LexisNexis' aggregated social media feed is derived from 4 million social media sites and is incorporated into the RM-ESG from 2009 to present. MarketPsych social media content comes from public social media sites from 1998 to present. In total, content from 2,000+ social media sites were included in the feed.

Using machine learning techniques, media sources and authors are classified according to their perspective and outlook. Tens of millions of bloggers, writers, and journalists with important and timely perspectives on ESG themes have been identified and incorporated into the feeds from the 2,000+ social sources. Furthermore, writers who have the characteristics of ideologues, promoters, robots, or spammers are removed from the feed both historically and in real-time.

The RM-ESG News scores are derived from live content delivered via the low-latency Reuters News Feed and two Reuters news archives: a Reuters-only one from 1998 to 2002 and one with Reuters and select third-party wires from 2003 to present. In addition, selected sources from the LexisNexis aggregated news feed which is derived from 50,000 Internet news sites and spans 2005 to present, are incorporated. MarketPsych acquired content from hundreds of financial news sites is also included. Press releases, corporate websites, promotional content and robot-generated content (robo news) are excluded from the feed to prevent low-value and nonobjective scores from entering the feed. Ultimately, 4,000+ news sources were deemed worthy of inclusion.

Figure 2 is a graphic displaying the time course of each broad content set's incorporation into the RM-ESG.

The RM-ESG thus cover the period 1998 through the present. From 1998 to 2005, non-U.S.-traded companies are lacking social media data and have relatively sparse news data.

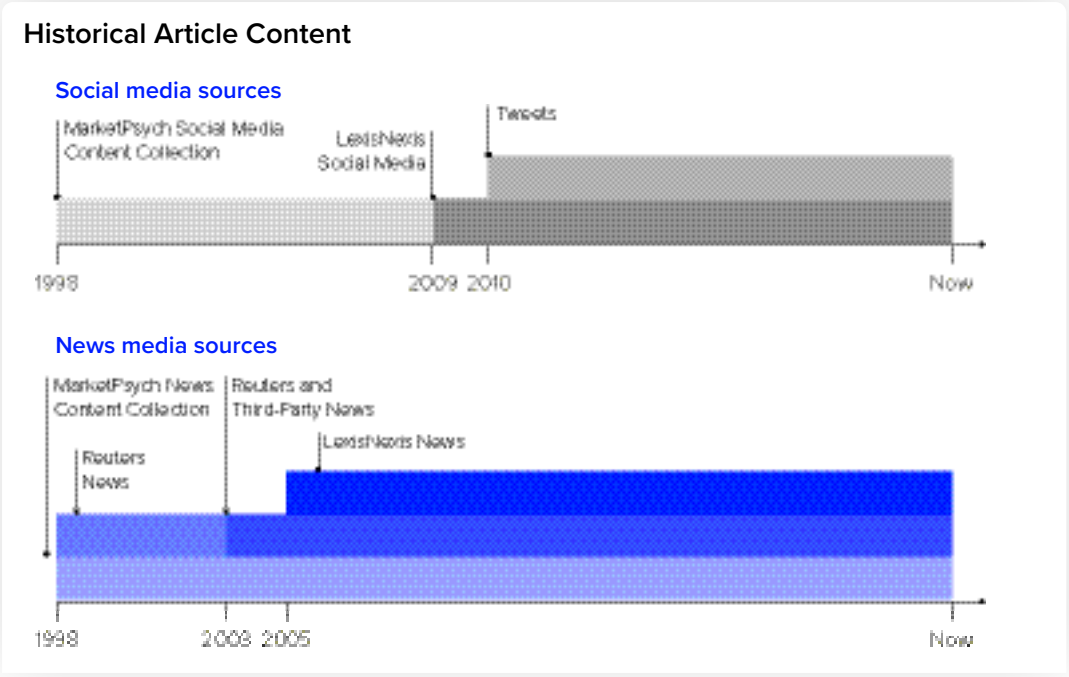


Figure 2. Timeline of text sources analyzed for the social and news media components of RM-ESG.

Source Templates

There are vast differences in communication styles between types of social media (tweets vs blogs) and news media (alerts vs research and analysis). To effectively work with these differences, MarketPsych constructed source-specific analytics for each major media type.

For example, compared to news, social media contains significant levels of sarcasm and irony, incomplete thoughts, misplaced or excessive punctuation, misspellings, nonstandard grammar and acronyms, case insensitivity and crude language. Additionally, in social media, many common words are used with colloquial meanings. Using a source-specific template, the exclamation, "Management crushed it!" is scored as a positive reference to the company's management team if in social media, while a traditional news-trained NLP engine may incorrectly score that phrase as negative.

Entity Identification

Most companies have multiple aliases in media articles. Consider that in news and social media entities such as IBM may be referred to as "IBM," "Big Blue," "$IBM,", "#IBM," "NYSE: IBM," "International Business Machines" and "International Business Machines Corporation" (among others). Additionally, international press may or may not use accent marks on location names such as Düsseldorf. In order to identify entities such as IBM and Düsseldorf that have multiple spellings or reference names, MarketPsych prepared a list of over 100,000 entity names. This list has been improved by human review, and it is updated monthly with emerging entities such as XPeng Motors and geographical locations such as South Sudan.

Linguistic Analysis Flow

When applied to text, MarketPsych's NLP generates over 4,000 ESG-related variables (ESGVars), each with the potential to be applied to a different entity and aggregated into an analytic. A few ESGVars are:

AnimalTestingPerform

AntiTrustViolate

BenefitsCorpExpand

PollutionHeal

Each ESGVar is then qualified by verb tense, where the suffix "_f" is future tense, "_p" is past tense, "_n" is present tense, and "_c" refers to conditional tense. An example is seen below:

AnimalTestingPerform_c: conditional tense references to animal testing (the company "might" perform such testing)

AntiTrustViolate_p: past-tense comments about violations of antitrust law (e.g., monopolistic behavior alleged)

BenefitsCorpExpand_f: future-tense references to expansions of corporate employee benefits (e.g., a workplace benefit is going to increase next quarter)

PollutionHeal_n: present-tense references to efforts to heal pollution damage (e.g., the company is cleaning up toxic soil.)

Sentence-level Example

Using the principles outlined above, below is a closer look at the MarketPsych NLP software analyzing this sentence:

"Amazon is going to significantly lengthen paternity leave."

The language analyzer performs the following sequence:

1. Maps the term "Amazon" to the company's unique identifer (AI pattern-matching redirects geographic references to the river and region if appropriate).
2. Identifies "paternity leave" as a *BenefitsCorp* word in the lexicon.
3. Identifies "going to" as a future-oriented word and assigns future tense to the phrase.
4. Identifies "lengthen" as an *Expand* word.
5. Multiplies "lengthen" by 2 due to the presence of the modifier word "significantly."
6. Associates "lengthen" (*Expand*) with "paternity leave" (*BenefitsCorp*) using dependency parsing.

The analysis algorithm will report:

Date	Time	assetCode	Ticker	ESGVar	Score
20200804	15:00.123	4295905494	AMZN	BenefitsCorpExpand_f	2

In the example above, 2 is the raw score produced for BenefitsCorpExpand_f attributed to Amazon.

SCORES CONSTRUCTION

"When one tugs at a single thing in nature, [one] finds it attached to the rest of the world."

John Muir

For each asset (company or country), the RM-ESG data feed is available in two packages. The Core package is a daily-updated summary of seventeen scores for each asset. Users comfortable with greater data complexity can subscribe to the more granular Advanced package which contains 111 and 163 scores in the Companies and Countries asset classes, respectively. ESGVars are utilized in the construction of both the Advanced and the Core scores.

How ESGVars are Aggregated into Scores

Buzz score

To construct the RM-ESG scores, first the absolute values of all u contributory ESGVars (v) for each asset a (which can refer to a company or country) observed at time τ within the time-window t are summed. This sum is the so-called *buzz*:

(1)
$$b_{t,a} = \sum_{u} \sum_{\tau \in t} |v_{\tau,a,u}|$$

Buzz is thus a proxy for the level of media chatter about the asset in that time-window (in the Advanced Companies package one also has access to a counter of the number of *mentions* to a given asset). The *buzz* score, as calculated in Eqn. 1, is published in the Advanced package for time-windows of 60 seconds (in minutely data) or 1440 minutes (in hourly and daily data, except on DST switch dates). The *buzz* in the Core package refers to a 365-day time-window. In addition to the overall *buzz*, the Advanced package also displays the *buzz* level for each of the 10 ESG Categories (see Sections below):

(2)
$$b_{t,a}^{\text{cat}} = \sum_{u \in \text{cat}} \sum_{\tau \in t} |v_{\tau,a,u}|$$

RM-ESG score

We define a polarity function $P(v)$ to determine whether an ESGVar is additive or subtractive to an RM-ESG score:

(3)
$$P(v) = \begin{cases} +1 \; if \; additive \\ -1 \; if \; subtractive \end{cases}$$

Next, we define V_a^{cat} as the set of all ESGVars relevant to a particular asset and category (cat). Finally, each RM-ESG score r is then computed as a ratio of the *buzz* b while Category RM-ESG scores r^{cat} are normalized by the Category buzz b^{cat}:

(4)
$$r_{t,a}^{(\text{cat})} = \frac{\sum_{u \in V_a^{\text{cat}}} v_{t,a,u} P(v_u)}{b_{t,a}^{(\text{cat})}}$$

It's worth noting that a single ESGVar can contribute to multiple RM-ESG scores for an asset. For example, the BenefitsCorpExpand_f ESGVar noted in the "Sentence-level example" Section above is a constituent of the Benefits RM-ESG score. The inverse of BenefitsCorpExpand is BenefitsCorpTight (which connotes shrinking benefits). BenefitsCorpTight contributes to both the Benefits score (with $P(v)=-1$) and to the BenefitsControversy score ($P(v)=+1$).

The Relationship Between Core and Advanced Packages

The Companies and Countries Advanced packages are composed of 80 and 132 raw RM-ESG scores, respectively. An example of these *raw* scores is shown in the table below under the Score Name column. Additionally, the Advanced package also contains 10 Category scores. These Category scores in the Advanced feeds form the basis for the 10 Category, 3 pillar, and 1 overall ESG rankings in the Core packages also exemplified in the table below. The 10 and 9 categorical *controversies* in the Advanced package (Country and Companies, respectively) and their respective level of *buzz* underlie the ESG controversies score in the Core package. Thus, note that the taxonomy of the scores is hierarchical. The details on how the Advanced scores are transformed into Core scores are shown in a following Section.

In summary, the key differences between Advanced and Core packages are:

1. **Granularity:** The Advanced package contains more granular scores: the *raw* RM-ESG scores; While the Core package scores start at the Category level (one hierarchy higher).
2. **Time-window:** The Advanced scores are based on the prior 60-seconds (in minutely files) or 1440 minutes (in hourly and daily files) while the Core rankings are based on a 365-days exponentially weighted moving average.
3. **Relativism:** The Advanced scores are published in their unranked form as computed in Eqns. 1 to 4. These are floats that range from -1 to 1 and are independent from the relative score of an asset with respect to other assets. On the other hand, the Core scores are comparative (within industry for Companies and globally for Countries). The scores in the Core package range from 1 to 100 and are effectively the ranking of an asset with respect to others in the same group.

Pillar score (Core package)	Category score (Core package)	Score Name (Advanced package)	Controversy
Environmental	Emissions	AirborneEmissionsImprovement	N
	Emissions	CarbonEmissionsImprovement	N
	Emissions	ClimateChangeOppVsRisk	N
	Emissions	EnvironmentalInvestment	N
	Emissions	PollutionImprovement	N
	Emissions	PollutionImprovement	N
	Emissions	Recycling	N
	Emissions	RenewableEnergy	N
	Emissions	AirborneEmissionsControversy	Y
	Emissions	CarbonEmissionsControversy	Y
	Emissions	EnvironmentalControversy	Y
	Emissions	IndustrialAccident	Y
	Emissions	PollutionControversy	Y

Advanced Package

For each asset in the Company and Country classes the number of available Advanced scores is as follows (numbers in parenthesis follow the Company and Country order):

- Mentions (1, NA)
- Buzz score (1, 1)
- RM-ESG scores (80, 132)
- Category scores (10, 10)
- Category Buzz scores (10, 10)
- Category Controversies scores (10, 10)

With the exception of *mentions* (a counter of the number of mentions to the asset within that time-window), all Advanced scores are directly obtained from Eqns. 1 to 4.

Advanced Scores Range

There are three styles of Advanced scores: a) directional scores for which a high value is subjectively positive, b) controversy scores for which a high value is subjectively negative (examples are those labeled with Y in the table above), and c) buzz scores which count the frequency of a specific concept in the media. The product user guide defines each score. When appropriate for clarity, the directional Advanced score names were appended with suffixes including “Improvement,” “Direction,” “Efforts”, “Sentiment,” and “Trust.” The names of Controversy scores either reflect a subjectively negative concept, or have the suffix “Controversy.” The *buzz* scores are appended with the suffix “Buzz.” A full listing is available in the product user guide.

a) The Advanced directional RM-ESG scores may range in value from -1 to 1 or be blank (NA). A score will be blank only if no relevant ESGVars are identified over the previous period (60-seconds or 24-hours). By definition, these scores consist of the net difference between ESGVar values of equivalent meaning but opposite valence (subjectively positive versus negative). The difference is then divided by the buzz (see Eqn. 4). For example, managementSentiment is the net difference between managementPositive and managementNegative ESGVars, with the resulting value divided by the overall buzz.

b) The Advanced Controversy scores are exclusively unipolar. The controversy scores measure subjectively negative events such as product flaws and leadership misdeeds. The controversy scores are exclusively comprised of negative valence references. This representation is the opposite polarity of the non-controversy scores, in which high scores have a positive meaning. Unipolar RM-ESG scores (including controversies), such as Anger, typically range between 0 and 1 but may fall below 0. When a unipolar concept is expressed as in “Activists say they are no longer angry with the company,” then the score of Anger is inverted by the negation implied in “no longer”. When such negative expressions outweigh positive expressions of the same sentiment, the unipolar RM-ESG will display negative values. Negative values on unipolar scores are more likely with lower levels of buzz during the observation period. A list of typical value ranges for each RM-ESG score is available in the product user guide.

c) Buzz scores start at 0 (no meaningful scores within the time-window) and have no upper limit (the more references the higher the score will be).

Advanced Scores Sources

Advanced scores are available from four data types (dataType column): News_Headline, News, Social, and News_Social. News_Headline is the score for an appearance in a news article headline and it is a subset of News. News and Social refer to scores from news and social media sources separately. News_Social is an aggregation of News and Social media scores.

Controversy Scores as Negative Subsets of ESG Scores

There are several Advanced score dyads in which the Controversy score is entirely composed of the negative side of the ESG score. These dyads are organized around key themes.

In the below example a product reference is used to illustrate:

- "Company X has developed sustainable products." => Positive (A)
- "Prior products sold by Company X were harmful to the environment." => Negative (B)

Then the score for ProductSentiment and ProductControversy are calculated as:

- ProductSentiment = (A – B)/(Buzz)
- ProductControversy = B/(Buzz)

These dyads may be understood symbolically as A = Positive and B = Negative. The "Sentiment" score equals (A – B). The Controversies score equals (B). Each of the values is then divided by the total buzz for the asset to give a final score for the score.

See below for the listing of Advanced ESG vs Controversy score dyads in the Companies asset class. The format is: stemScore (ESGSuffix vs ControversySuffix; Category: Pillar). Note that the suffixes Sentiment/Improvement/Efforts/Support/Trust all label bipolar (A-B) scores:

- CarbonEmissions (Improvement vs Controversy; Emissions: E)
- AirborneEmissions (Improvement vs Controversy; Emissions: E)
- Pollution (Improvement vs Controversy; Emissions: E)
- Sustainability (Improvement vs Controversy; Environmental Innovation: E)
- Human Rights (Efforts vs Controversy; Human Rights: S)
- Public Health (Support vs Controversy; Community: S)
- Product (Sentiment vs Controversy; Product: S)
- Privacy (Efforts vs Controversy; Product: S)
- Benefits (_ vs Controversy; Workforce: S)
- WorkplaceSafety (Efforts vs Controversy; Workforce: S)
- Diversity (Efforts vs Controversy; Workforce: S)
- Accounting (Sentiment vs Controversy; Shareholders: G)
- Management (Trust vs Controversy; Management: G)

Such dyads were not precisely constructed for Countries assets.

Core Package

For each asset, the Core values are aggregations of the Advanced scores into the following:

- Buzz score (1)
- ESG Overall score (1)
- ESG Combined score (1)
- ESG Controversy score (1)
- Pillar scores (3)
- Category scores (10)

Computing Category Scores

To compute the Category rankings, we start from the Category *News_Social* values published in the Advanced package. The first step is to compute categorical core scores at day t for asset a as an exponentially weighted average of the daily scores r normalized by the weighted buzz b as follows (the tilde henceforth refers to the exponentially weighted value of the variable):

(5) $$\tilde{r}_{t,a} = \frac{\sum_{i=0}^{t} w_i r_{t-i,a}^{\text{cat}} b_{t-i,a}^{\text{cat}}}{\sum_{i=0}^{t} w_i b_{t-i,a}^{\text{cat}}}$$

where w_i are weights attributed to scores and *buzz* values for the prior 365 days (including the day of the calculation). These weights are computed as:

(6) $$w_i = (1-\alpha)^i$$

with:

(7) $$\alpha = 1 - e^{\log(0.5)/h}$$

h in the equation above is the half-life, i.e., the period of time for the exponential weight to reduce to one half. We choose h=90 as a trade-off between recency and volatility of the scores.

Given the character of the media-based data, scores for companies that are infrequently mentioned in the news and social media will be generally sparse. To deal with sparsity we set a default starting value (d) that converges towards $\tilde{r}$ as the *buzz* increases. This applies to assets for which the exponentially weighted category buzz as computed in Eqn. 10 is below 3. This new value is the adjusted RM-ESG score (r^*):

(8) $$r_{t,a\in I}^{*} = d_{t,I} + \left(\tilde{r}_{t,a} - d_{t,I}\right) \cdot min\left(\frac{\tilde{b}_{t,a}}{\tilde{B}_{t,I}}, 1\right)$$

where

(9) $$d_{t,I} = Q_{0.2}(\tilde{r}_{t,a}, a \in I, |\tilde{r}_{t,a}| < 1)$$

(10) $$\tilde{b}_{t,a} = \frac{\sum_{i=0}^{t} w_i b_{t-i,a}^{\text{cat}}}{\sum_{i=0}^{t} w_i}$$

(11) $$\tilde{B}_{t,I} = \begin{cases} avg(\tilde{b}_{t,a}, a \in I) \text{ if Category} \\ Q_{0.2}(\tilde{b}_{t,a}, a \in I) \text{ if Controversy} \end{cases}$$

Note that the default d (expanded in Eqn. 9) is determined as the 0.2 quantile of the RM-ESG values (excluding those that are exactly 1 or -1) of a given category within the industry I in which the asset a is placed into at day t. This will cause companies with low *buzz* to have ESG scores converging towards the rank 20/100 and ESG Controversy scores towards the rank 80/100 (controversy scores are multiplied by -1 before being used in the Core package calculation). The *min* function on the right-hand side of Eqn. 8 is used to determine the magnitude of the adjustment. The function results in a value between 0 and 1 depending on the magnitude of the company's exponentially weighted buzz $\tilde{b}$ (Eqn. 10) and how it compares to the same metric for other companies within its industry (Eqn. 11). The adjustment depends on whether the category refers to a regular ESG score or a controversy score. In the latter case, a company with buzz above its industry average will have $r_{t,a}^{*} = \tilde{r}_{t,a}$, while those below the industry average will have its score converging towards the default (in proportion to the level of buzz). In the controversy case, only scores of companies with buzz in the lowest 0.2 quantile of their respective industry will have $r_{t,a}^{*} \neq \tilde{r}_{t,a}$. In summary, the adjusted scores will always fall between the industry/global default and the unadjusted score. The adjustment on the RM-ESG scores is done to ensure a less fat-tailed distribution due to companies with low levels of buzz.

The Core categorical scores computed as above are then compared to all other assets overall (Countries) or within an industry (Companies). The percentile rank scoring methodology is noted below:

(12)

$$score = \frac{number\ of\ companies\ with\ a\ worse\ value + \frac{number\ of\ companies\ with\ the\ same\ value\ included\ in\ the\ current\ one}{2}}{number\ of\ companies\ with\ a\ value}$$

Finally, the scores obtained from Eqn. 12 are then re-scaled into a 1 to 100 integer (ranking) using a ceiling function:

(13) $$\text{ranking} = ceil(100 \cdot \text{score})$$

The category values in the Core package are thus a 1-100 within-industry for Companies / global for Countries ranking. In summary, these Core Category values thus represent an industry-relative, exponentially-decaying, percentile rank of the relevant scores for the asset over the past 365 days.

From Category Rankings to Pillar and ESG Scores

Of the various topics, themes, and sentiments quantified in the media, some have a greater impact (materiality) for specific industries and companies. The Refinitiv Business Classification Codes (TRBC) classify companies by industry and sector. The materiality of an ESG activity is correlated to the industry in which a company operates, and Core scores for Pillars and the overall ESG rankings are calculated using a weighting scheme based on a company's TRBC code. For example, the CarbonEmissionsImprovement score is significant for Oil-producing companies such as British Petroleum, as it represents the attention and adherence to carbon emissions targets, while it is less relevant to the sustainability activities of some companies, such as Facebook, operating in the software industry without significant direct carbon emissions.

Analysts at Refinitiv developed a static weighting framework that gauges the materiality of each ESG category to the ESG Pillars and ESG Overall scores. A table of the Category weights and their contribution to the Pillars is depicted in **Appendix C** in the Refinitiv ESG Scores Methodology. The driver of the weighting is the number of indicators that make up a category in comparison to all indicators used in the Refinitiv ESG framework. Categories that contain multiple issues like Management (composition, diversity, independence, committees, compensation, etc.) have higher weight than lighter categories such as Human Rights.

Where companies did not have a TRBC code available, a static weighting was utilized, identical to that used in prior version of the Refinitiv ESG product (weighting available upon request). In the Country package all categories are equally weighted into the Pillar and ESG scores.

A mapping of the Category to the Pillar scores is represented in the table below.

Companies assets	
Pillar	**Category**
Environmental	Emissions
Environmental	Environmental Innovation
Environmental	Resource Use
Social	Community
Social	Human Rights
Social	Product
Social	Workforce
Governance	CSR Strategy
Governance	Management
Governance	Shareholders

Country assets	
Pillar	**Category**
Environmental	Emissions
Environmental	Environmental Innovation
Environmental	Resource Use
Social	Community
Social	Culture
Social	Human Rights
Social	Society
Governance	Economics
Governance	Leadership
Governance	Politics

Pillar Scores

There are three Pillar scores for each asset:

- E (Environmental)
- S (Social)
- G (Governance)

The Pillar scores are computed as an industry-specific weighting of the underlying Core Category rankings. A company or country will not have an associated Pillar score if all the underlying category values within that Pillar are NAs. As it is the case with Category scores, the Pillar scores are integers ranging from 1 to 100 (a ceiling function is applied to transform the floats into integers).

In summary, the Core Pillar scores represent a category-weighted (thus indirectly an industry-relative and exponentially-decaying) score of the relevant Category rankings. The scores provide an overview of the company or country's sustainability impact and conduct within each of the 3 ESG pillars.

ESG Score

The ESG scores are constructed in a very similar fashion to the Pillar scores. Thus, the ESG scores represent a category-weighted (thus indirectly an industry-relative and exponentially-decaying) score of all 10 (non-controversy) Category scores. This score provides a single overview of the company or country's sustainability impact and conduct.

ESG Controversy Score

Advanced Controversies scores are aggregated into the Core Controversy score c as follows:

(14)
$$\tilde{c}_{t,a} = -\frac{\sum_{i \in C} r^{\text{cat}}_{t,a,i} b^{\text{cat}}_{t,a,i}}{b_{t,a}}$$

where C refers to the set of 10 Category Controversies in the Advanced package. This score is then ranked within the asset's group (global or industry) according to Eqn. 12 and finally re-scaled (Eqn. 13). Note the negative sign on the right-hand side of Eqn. 14. This is to provide a final score that ranges from most controversies (1) to fewest controversies (100). Note that an NA (not applicable) is attributed to the score if there were no underlying controversies within that time window. The Controversy values thus represent an industry-relative, exponentially-decaying, percentile rank of the relevant scores for the asset over the past 365 days. This score provides a single overview of the company or country's unsustainable impact and controversial conduct.

ESG Combined Score

The ESG Combined score was developed to adjust ESG scores for ESG-related media saturation ("greenwashing") in case of a high level of ESG controversies surrounding a company. If the ESG Controversy score is greater than the ESG score (subjectively more positive), then the ESG Combined score is assigned the value of the ESG score. If the ESG score is higher than the ESG Controversies score (indicating a relatively high level of controversies), then the ESG Combined score is calculated as (**ESG score** + **Controversies score**)/2. The ESG Combined score is thus within the 1-100 range as well (a ceiling function is applied to the scores to transform the floats into integers).

AVAILABLE RM-ESG SCORES

Company Scores

More than 100 RM-ESG scores are calculated using the NLP methodology and score calculation techniques described previously in this document. See Figures 3-6 below for listings of all Advanced RM-ESG scores and RM-ESG Controversy scores for each company and country in the Companies and Countries asset classes.

COMPANIES	PILLAR SCORE Environmental	PILLAR SCORE Social	PILLAR SCORE Governance
CORE OVERALL* Buzz** ESG Overall ESG Combined	CATEGORY SCORES Emission Environmental Innovation Resource Use	CATEGORY SCORES Community Human Rights Product Workforce	CATEGORY SCORES CSR Strategy Management Shareholders
	ADVANCED ANALYTICS EmissionBuzz*** EnvironmentalInnovationBuzz ResourceUseBuzz AirborneEmissionsImprovement CarbonEmissionsImprovement ClimatePolicy EnergyEfficiencyEfforts EnvironmentalInvestment PollutionImprovement Recycling RenewableEnergy RenewableEnergyPolicy SupplyChainSustainability SustainabilityImprovement SustainableInnovation SustainablePackaging	ADVANCED ANALYTICS CommunityBuzz Human RightsBuzz ProductBuzz WorkforceBuzz AccessAffordability Benefits Charity CustomerSatisfaction DiversityEfforts HumanRightsEfforts Innovation PrivacyEfforts ProductSentiment PublicHealthSupport Trust WageFairness WorkLifeBalance WorkplaceDevelopment WorkplaceSafetyEfforts WorkplaceSentiment	ADVANCED ANALYTICS CSR StrategyBuzz ManagementBuzz ShareholdersBuzz AccountingSentiment AntiTakeover Devices CSRActivities ManagementDiversity ManagementSentiment ManagementTrust QualityMgmtSystems

*ALL CAPS designated headers
**Blue scores are published daily in RM-ESG Core
***Advanced scores names are in sentence-case black font; published minutely, hourly, and daily

Figure 3. The Advanced ESG and Core scores included in the Companies asset class.

Company Controversy Scores

COMPANIES CONTROVERSIES			
CORE CONTROVERSIES SCORE ESG Controversies Overall	ENVIRONMENTAL CONTROVERSY SCORES	SOCIAL CONTROVERSY SCORES	GOVERNANCE CONTROVERSY SCORES
	AirborneEmissionsControversy CarbonEmissionsControversy EnvironmentalControversy IndustrialAccident PollutionControversy SustainabilityControversy	AdvertisementDeceptive Anger AntiCompetitiveActs BenefitsControversy ChildLabor ClassActionLawsuit CorruptionControversy CrimeControversy CriticalCountriesControversy DiversityControversy EthicsControversy HumanRightsControversy IPControversy LaborDispute LaborExploitation Layoffs LegalPenalty Litigation Lobbying PrivacyControversy ProductControversy PublicHealthControversy RegulatoryIssues RnDControversy WageControversy WorkplaceSafetyControversy	AccountingControversy AccountingRestatement ActivistInvestorActivity CreditControversy EarningsDecline InsiderDealingControversy ManagementControversy ProfitWarning ProxyFight SecuritiesControversy ShareholderRightsControversy TaxFraudControversy

*ALL CAPS designated headers
**Blue scores are published daily in RM-ESG Core
***Advanced scores names are in sentence-case black font; published minutely, hourly, and daily

Figure 4. The Controversy scores included in the Companies asset class.

Country Scores

COUNTRIES	PILLAR SCORE Environmental	PILLAR SCORE Social	PILLAR SCORE Governance
	CATEGORY SCORES Emission Environmental Innovation Resource Use	CATEGORY SCORES Community Culture Human Rights Society	CATEGORY SCORES Economics Leadership Politics
SUMMARY ESG Buzz** ESG Overall ESG Combined	ADVANCED ENVIRONMENTAL SCORES EmissionBuzz EnvironmentalBuzz ResourceUseBuzz AirborneEmissionsImprovement CarbonEmissionsImprovement CarbonTaxDirection ClimateChangeOppVsRisk EmissionsPolicy EnergyEfficiency EnergyEfficiencyPolicy EnvironmentalEfforts EnvironmentalInvestment ForestHealth MarineProtection NatureProtection PlantBasedDiet PollutionImprovement Recycling RenewableEnergyDevelopment RenewableEnergyPolicy SupplyChainSustainability Sustainability SustainabilityPolicy SustainableInnovation SustainablePackaging	ADVANCED SOCAIL SCORES CommunityBuzz CultureBuzz HumanRightsBuzz SocietyBuzz AccessAffordability AddictionManagement CharityAwareness DataPrivacy DiseaseManagement EducationEfforts Employment EmploymentForecast Fertility FreshWaterAccessEfforts GenderQualityEfforts HumanRightsEfforts ImmigrationSentiment Innovation InternetAccessImprovement LaborDevelopment LiteracyEfforts MinorityEquality PovertyAlleviation PublicHealthEfforts PublicSentiment RnD SmokingManagement SocialEquality SocialExpenditures SocialMobility Trust WageFairness WorkLifeBalance WorkplaceConditions	ADVANCED GOVERNANCE SCORES EconomicsBuzz LeadershipBuzz PoliticsBuzz BusinessLeadersSentiment CiviEngagement CivilSocietyPartnerships FreedomOfAssembly FreedomOfReligion FreedomOfSpeech FreeTrade GovernmentAccountingSentiment GovernmentSentiment GovernmentTrust PoliticalOppositionActivity PoliticalProcessSentiment PropertyRights TariffsDown VotingRights

*ALL CAPS designated headers
**Blue scores are published daily in RM-ESG Core
***Advanced scores names are in sentence-case black font; published minutely, hourly, and daily

Figure 5. The Advanced ESG and Core scores included in the Countries asset class.

Country Controversy Scores

COMPANIES CONTROVERSIES			
ESG CONTROVERSIES SCORE ESG Controversies Overall	ADVANCED ENVIRONMENTAL CONTROVERSY SCORES	ADVANCED SOCIAL CONTROVERSY SCORES	ADVANCED GOVERNANCE CONTROVERSY SCORES
	AgAnimalStress AgCropStress AgriculturalStress AirborneEmissions Controversy CarbonEmissionsControversy Desertification EnvironmentalControversy FactoryFarming Hunger IndustrialAccident Overfishing PollutionControversy SeaLevelRise UnsustainableActivities Warming WildlifeTrafficking	Addiction Anger ChildLabor Corruption Crime CyberCrime DiseaseBurden EthicsControversy FinancialCrime ForcedLabor Homicide HumanDiseaseGI HumanDiseasePulm HumanTrafficking IntellectualPropertyTheft LaborDispute LaborExploitation Layoffs LegalActivity Malnourishment MalnourishmentYouth MinorityViolence Misinformation ObesityAwareness PrivacyControversy PublicHealthControversy Smoking Terrorism ViolenceAgainstWomen ViolentCrime WageInequality War WorkplaceSafetyControversy	Autocracy BusinessFraud ConstitutionalRevision CreditControversy FinancialSystemInstability GovernmentAnger GovernmentCorruption GovernmentInstability GovernmentRepression LeadershipCrime PoliceBrutality PublicDivision Sanctions SocialUnrest UnfairMarkets VotingFraud

*ALL CAPS designated headers
**Blue scores are published daily in RM-ESG Core
***Advanced scores names are in sentence-case black font; published minutely, hourly, and daily

Figure 6. The Controversy scores in the Countries asset class.

The RM-ESG are published for over 30,000 companies and 252 countries and territories.
More documentation about the individual assets and scores covered is available in the product User Guide.

SCORES EXAMPLES

Advanced Score Example and Description

As noted above, three types of scores are delivered in the RM-ESG feeds: Buzz (integer with one decimal place), Core scores (integer, ranging from 1 to 100), and Advanced scores (decimal, ranging from -1 to 1). Core scores for the Overall, Pillar, and Category scores are represented as 1 to 100 relative percentile rankings covering the past 365 days. The Advanced RM-ESG score values are delivered in minutely (60-second), hourly, and daily feeds and range from -1 to 1.

Note that each asset is accompanied by an id, assetCode, and ticker. Additional mapping files are also available, as described in the User Guide. A snapshot of a daily Advanced data file is visible in Figure 7 below.

The file is labelled to emphasize key aspects of the data presentation.

Unseen columns continue off the image to the right.

This is the 2-digit ISO code (Reuters topic code) for each country.

Seperate data feeds delivered from news, social media, and news headlines. News_Social ia an aggregate score.

The 163 country scores cover a variety of ESG themes and controversies.

id	assetCode	windowTimestamp	dataType	systemVersion	buzz	sustainability	sustainabilityPolicy	agriculturalStress	hunger
mp:2020-01-01_20.30.00.Social.COU_ESG.AU	AU	01/01/2020 20:30	Social	MP:4.0.0	1889.5	0.025404	0.016142	0.01032	0.002646
mp:2020-01-01_20.30.00.News_Social.COU_ESG.AU	AU	01/01/2020 20:30	News_Social	MP:4.0.0	9925.4	0.020654	0.007153	0.01204	0.002922
mp:2020-01-01_20.30.00.News_Headline.COU_ESG.AU	AU	01/01/2020 20:30	News_Headline	MP:4.0.0	452.5	0.00221	0.001105	0.00442	0
mp:2020-01-01_20.30.00.News.COU_ESG.AU	AU	01/01/2020 20:30	News	MP:4.0.0	8035.9	0.019537	0.00504	0.012444	0.002987
mp:2020-01-01_20.30.00.Social.COU_ESG.SG	SG	01/01/2020 20:30	Social	MP:4.0.0	226	0.039823	0.017699	0.022124	
mp:2020-01-01_20.30.00.News_Social.COU_ESG.SG	SG	01/01/2020 20:30	News_Social	MP:4.0.0	1416.5	0.042358	0.021179	0.009884	SG
mp:2020-01-01_20.30.00.News_Headline.COU_ESG.SG	SG	01/01/2020 20:30	News_Headline	MP:4.0.0	52	0.057692	0.038462	0.019231	
mp:2020-01-01_20.30.00.News.COU_ESG.SG	SG	01/01/2020 20:30	News	MP:4.0.0	1190.5	0.042839	0.02184	0.00756	
mp:2020-01-01_20.30.00.Social.COU_ESG.US	US	01/01/2020 20:30	Social	MP:4.0.0	35168.4	0.009696	0.00354	0.008701	0.000284
mp:2020-01-01_20.30.00.News_Social.COU_ESG.US	US	01/01/2020 20:30	News_Social	MP:4.0.0	101490.3	0.009671	0.004064	0.007449	0.000256
mp:2020-01-01_20.30.00.News_Headline.COU_ESG.US	US	01/01/2020 20:30	News_Headline	MP:4.0.0	3863	0.00233	0.001294	0.004918	0.000259
mp:2020-01-01_20.30.00.News.COU_ESG.US	US	01/01/2020 20:30	News	MP:4.0.0	66321.9	0.009657	0.004342	0.006785	0.000241
mp:2020-01-01_20.30.00.Social.COU_ESG.YE	YE	01/01/2020 20:30	Social	MP:4.0.0	25			0.12	0.08
mp:2020-01-01_20.30.00.News_Social.COU_ESG.YE	YE	01/01/2020 20:30	News_Social	MP:4.0.0	618.5	0.001617		0.053355	0.069523
mp:2020-01-01_20.30.00.News_Headline.COU_ESG.YE	YE	01/01/2020 20:30	News_Headline	MP:4.0.0	72		YE	0.013889	0.027778
mp:2020-01-01_20.30.00.News.COU_ESG.YE	YE	01/01/2020 20:30	News	MP:4.0.0	593.5	0.001685		0.050548	0.069082

Figure 7. Daily data rows for Countries are depicted. Please see the User Guide for current column ordering.

The fields in the Advanced data files are described in additional detail in the product User Guide.

Advanced ESG scores range from -1 to 1, while ESG controversy scores range from 0 to 1. The value is the percentage of all references to the country (buzz) containing this theme. No score is due to no media coverage of that theme.

Note Yemen has no sustainabilityPolicy references (YE) and relatively higher agricultureStress and hunger values. Singapore has no hunger references (SG).

Core Scores Example

An example of an ESG Core data file is depicted in Figure 8 below. Note that columns for timestamp, IndustryGroup (TRBC code), assetCode (permID), and ticker (stock ticker on primary exchange) are to the left of the data columns. In contrast to Advanced files, the column DataType is not present in Core files because the Core dataType is always News_Social.

windowTimestamp	industry	industryName	assetCode	ticker	name	buzz	ESG	ESGCombined	ESGControversies	Environmental	Governance	Social	ResourceUse
2020-11-24T20:30:00.000Z	531010	Automobiles and auto parts	4297089638	TSLA	Tesla Inc	1035773.5	55	45	35	97	24	40	96
2020-11-24T20:30:00.000Z	534020	Diversified retail	4295905494	AMZN	Amazon.com Inc	788378.5	59	44	28	82	31	67	71
2020-11-24T20:30:00.000Z	571060	Computers, phones and household electronics	4295905573	AAPL	Apple Inc	712672	62	41	21	91	27	66	84
2020-11-24T20:30:00.000Z	572010	Software and IT services	4297297477	FB	Facebook Inc	682180	25	19	13	69	13	24	51
2020-11-24T20:30:00.000Z	572010	Software and IT services	4295907168	MSFT	Microsoft Corp	378710.5	66	50	34	96	41	87	93
2020-11-24T20:30:00.000Z	521010	Aerospace and defense	4295903076	BA	Boeing Co	363803.5	52	37	21	76	19	63	69
2020-11-24T20:30:00.000Z	572010	Software and IT services	4296301199	TWTR	Twitter Inc	246384.5	24	18	13	65	15	21	56
2020-11-24T20:30:00.000Z	531010	Automobiles and auto parts	4295877341	7201	Nissan Motor Co Ltd	176582.5	57	38	20	90	18	52	73
2020-11-24T20:30:00.000Z	531010	Automobiles and auto parts	4295869244	VOW3	Volkswagen AG	172094	52	38	23	89	27	37	93
2020-11-24T20:30:00.000Z	571060	Computers, phones and household electronics	4295882451	5930	Samsung Electronics Co Ltd	167676.5	66	47	27	97	16	79	95
2020-11-24T20:30:00.000Z	551010	Banking services	8589934175	WFC	Wells Fargo & Co	155185.5	37	26	16	88	18	36	86
2020-11-24T20:30:00.000Z	501020	Oil and gas	4295894740	BP.	BP PLC	152095.5	68	63	58	95	29	69	89
2020-11-24T20:30:00.000Z	522030	Professional and commercial services	4295869662	WDI	Wirecard AG	151260.5	37	21	5	67	9	43	35
2020-11-24T20:30:00.000Z	521010	Aerospace and defense	4295884955	AIR	Airbus SE	147905.5	49	33	17	91	19	48	77
2020-11-24T20:30:00.000Z	543010	Food and drug retailing	4295905298	WMT	Walmart Inc	145720.5	83	57	31	93	74	81	97

Figure 8. A data sample from the Core scores. The column names were truncated after the ResourceUse category.

EXPLORING ESG DATA

In this section we review data exploration and quantitative results from the Advanced RM-ESG dataset. Please follow MarketPsych's LinkedIn, webinars, and Lipper blogs to receive notifications of future ESG research updates and whitepapers.

Research: Visualizing ESG Over Time

Using the RM-ESG scores, users can plot media perceptions over time. References to management diversity at Citigroup are depicted below via the ManagementDiversity score. In Figure 9, this score was plotted for Citigroup from 2013 through 2020. Even before Citi was the largest U.S. bank to name a female CEO (Jane Fraser), the firm had been increasing diversity among its management ranks, as seen in the rising ManagementDiversity score from 2013 through early 2021.

News and social media; EWM(1000)

Figure 9. ManagementDiversity in the media regarding Citigroup from 2013 to early 2021.

Some investors express concern that a corporate focus on diversity may distract from firm profitability. However, when the ManagementTrust score is plotted on the global stock heatmap below (available freely on our Eikon App in the App Studio) for the period Dec 2020 -Jan 2021, Citigroup has high marks (see uppermost right corner), indicating that the media approves of recent management moves. The green color represents more positive (higher) ManagementTrust and red tones are more negative. Box size is Buzz.

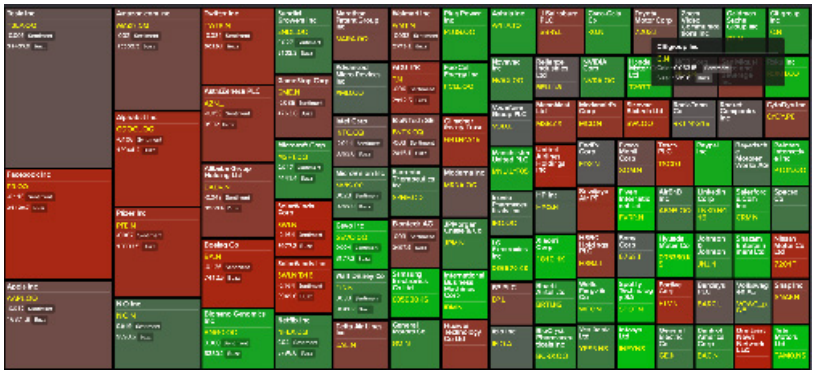
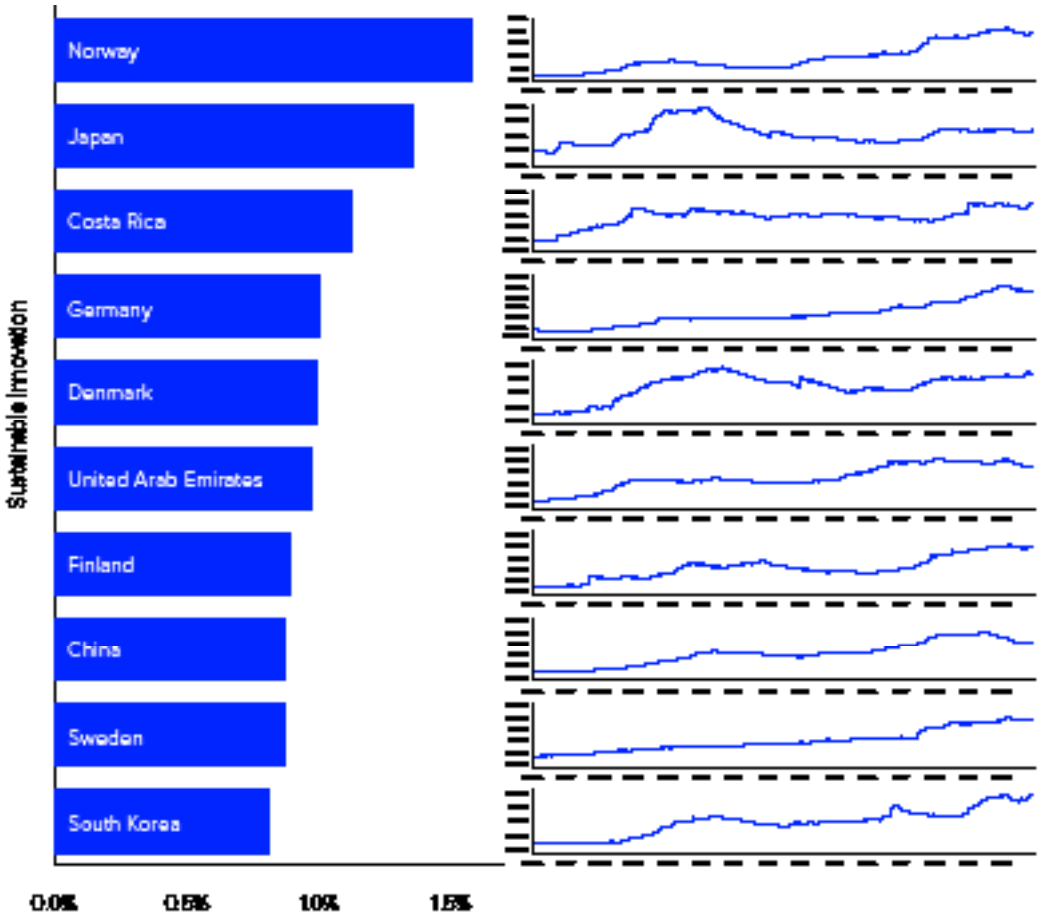


Figure 10. A global stock heatmap depicting ManagementTrust. Note Citigroup is green (indicating relatively higher ManagementTrust) in the uppermost right corner.

Research: Monitoring Sustainability Trends

Using the RM-ESG Advanced scores for countries, users can visualize the growth and development of ESG themes over time. The figure below plots references to SustainableInnovation since 2006 and shows the names of the top scorers in 2020 (#1 Norway, #2 Japan, #3 Costa Rica).

Measure sustainable innovation mentions in media



*News and social media; Top 100 by Buzz; January 1, 1998 - November 30, 2020

Figure 11. Sustainable innovation for the top scoring countries and their progress over time since 2006.

While Costa Rica may seem like a surprising entrant in the top three, few know that the country has over 30% of its territory marked for conservation and 98% of its energy is powered by renewable sources. This dataset can unearth interesting and overlooked sustainability movements.

Portfolio Construction: Invest in Companies with Happy Workplaces

RM-ESG scores are useful for investors' stock selection and portfolio construction. The WorkplaceSentiment score represents the ratio of positive to negative comments about a company's working environment. A higher score indicates more positive workplace sentiment.

In a quantitative study, the returns of S&P 500 stocks were analyzed since 2006. Each company's WorkplaceSentiment scores were averaged over the prior month, and the companies were then ranked. Starting in January 2006, the ranking was renewed monthly and the stock price performance was tracked over the next month. The equity curves depicting the performance of the highest and lowest WorkplaceSentiment portfolios are plotted in the figure below. Each portfolio is long-only. No transaction costs were included in this study.

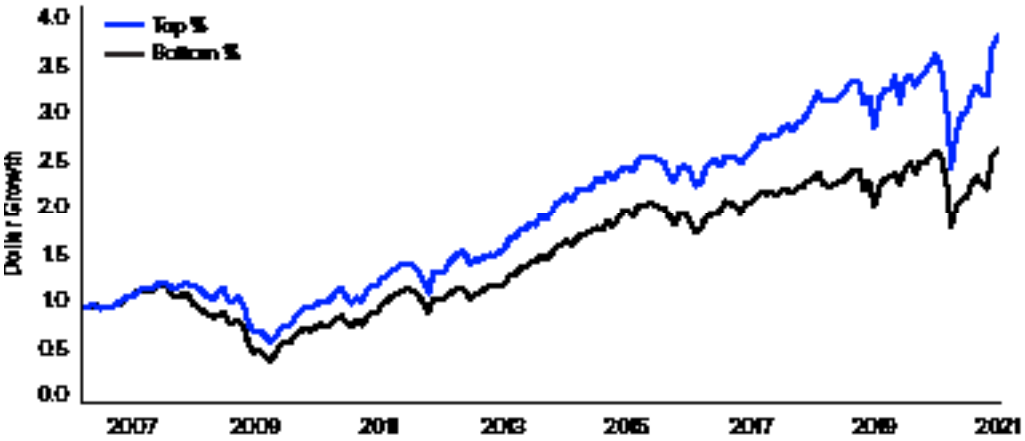
Figure 12. S&P 500 constituent stocks were ranked by their past-month WorkplaceSentiment. The forward stock price performance of a portfolio of the extreme 5% (highest versus lowest) was plotted over the next month. This procedure was repeated monthly.

The monthly WorkplaceSentiment level may provide a useful feature for stock investors. Such findings may encourage companies to cultivate supportive and purpose-driven working environments.

Portfolio Construction: Invest in Companies with Good Management

The ManagementSentiment score represents the ratio of positive to negative comments about a company's leadership. In a quantitative study, the returns of stocks in the S&P 500 were analyzed since 2006. Each month the stocks were sorted into 10% bins (deciles) based on their past month rank.

Starting in January 2006, the ranking was renewed monthly and the performance of each decile was tracked over the next month. The equity curves depicting the performance of the highest and lowest ManagementSentiment deciles are plotted in the figure below. Each portfolio is long-only. No transaction costs were included in this study.

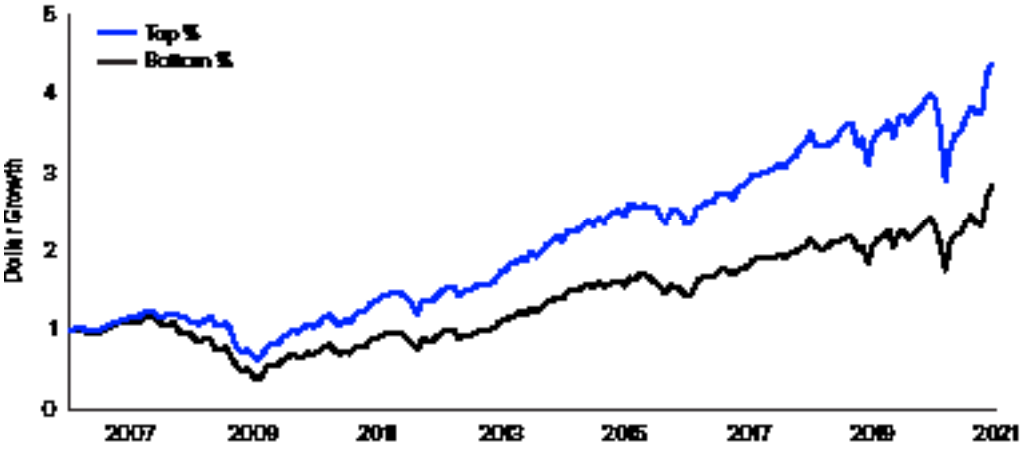


S&P 500 companies; Equal-weight; Monthly rotation; Jan/2006 – Dec/2020; Spread: μ=2.2% (1.42); σ=6.0%

Figure 13. S&P 500 constituent stocks were ranked by their past-month ManagementSentiment and binned into deciles. The forward performance of each decile was plotted over the next month. This procedure was repeated monthly.

Risk Management: Avoid Companies with Accounting Controversies

Controversy scores also show value in quantitative research. The AccountingControversy score measures references to accounting issues – misstatements, revisions, and questionable practices – at companies. After aggregating this score over the prior month, we find significant predictive power over the following month's share price returns, especially at the decile extremes. On average, companies ranked in the top 10% on this score (those with the highest level of media-reported accounting issues) have lower share price performance in the subsequent month. In the figure below we plot the growth of $1 in the most controversial decile ("Top 10% Controversies") versus all other companies ("No controversies") of S&P 500 stocks from 2006 through 2020.



S&P 500 companies; Equal-weight; Monthly rotation; Jan/2006 – Dec/2020; Spread: μ=2.0% (0.90); σ=8.6%

Figure 14. U.S. stocks in the S&P 500 were ranked by their past month AccountingControversy value. A monthly rotational model was executed in which the forward performance of the most controversial decile was plotted alongside the performance of the remaining 90%.

Note that companies with accounting problems (assuming 1 out of 10 in the S&P 500 on a monthly basis) significantly and consistently underperform over time. Risk managers can use the Advanced controversy scores provided in RM-ESG to quickly exit investments in companies with worrisome scores.

CLOSING

"I like to envision the whole world as a jigsaw puzzle. ... If you look at the whole picture, it is overwhelming and terrifying, but if you work on your little part of the jigsaw and know that people all over the world are working on their little bits, that's what will give you hope."

Jane Goodall

The introduction of the Refinitiv MarketPsych ESG Analytics is the culmination of sixteen years of technological development, and the feed is one of the most technologically sophisticated ESG feeds on the market. The RM-ESG are delivered as aggregates of thousands of underlying ESG themes mentioned in news and social media. Each meaning is scored in relation to tens of thousands of companies, cities, regions, and countries. The data's source articles cover twelve languages. Articles whose scores are incorporated into the feed are downloaded within minutes of posting on the web and analyzed within 140 milliseconds. As a result, the coverage is the most timely and exhaustive in the industry.

As seen in this document, there is a clear ethical and financial advantage to deploying ESG data in investments, policy, and research applications. Such scores demonstrate the real-world economic advantages for companies and countries that behave with ESG principles in mind – cultivating happy workplaces, acting ethically in accounting, and deploying positive management practices (to name a few). Our hope is that this data will help drive positive change in the business and political world.

We encourage you to explore this unique dataset. For a data sample, please contact your Refinitiv account manager or submit an inquiry to Refinitiv.

RE1354581/2-21