DWS RESEARCH INSTITUTE

DWS

October 2019 / Responsible Investing

Responsible investing—The world tour

How the U.S. is playing a leading role, why ESG is particularly relevant for Emerging Markets, and Europe's ambitions to be a global rule setter

Introduction

ESG activity is evolving around the world at an accelerating pace. In this article, we will investigate the instigators of change— from investors, businesses, governments, regulators, supervisors, and civil society—to better understand, not just geographic differences, but also the direction of travel and the rate of change.

We find that public policy initiatives, such as the United Nations' Sustainable Development Goals, are framing a new investment agenda which is increasingly being championed by a younger demographic cohort. For example, in the U.S., 93% of Millennials agree that social or environmental impact is important to investment decisions.[1]

With Millennials in the U.S. representing 79.8 million, or 25% of the U.S. population, they are projected to exceed baby-boomers to represent the largest demographic group in the country.[2] U.S. millennials are also in line to inherit U.S.$30 trillion in wealth over the next 30-40 years, implying an ever deeper adherence to ESG investment techniques in the years ahead.[3]

The financial materiality of climate risk has also become a defining ESG risk, and opportunity, for multiple stakeholders. All regions are exposed to the three channels of climate risk, namely—physical, litigation, and transition risk.

In Asia, five out of six people live in an area vulnerable to extreme weather events.[4] In the U.S., 250 weather and climate disasters have hit the country between 1980 and July 2019 with a cumulative loss of US$1.7 trillion, which equates to 8% of U.S. gross domestic product (GDP) in 2018.[5] While, in Europe, the highest overall economic losses in absolute terms from weather and climate-related losses since 1980 have been registered in Germany, Italy and France.[6]

When it comes to litigation risk, we find that the law courts are becoming a new instrument to enforce and accelerate climate change action. To date, 1,200 climate change cases have been filed across 30 jurisdictions including Australia, the UK, New Zealand, Brazil, Spain, Canada and India. However, the lion's share of climate change litigation is taking place in the U.S., with over 950 cases filed there so far.[7]

Robert Bush
DWS Research Institute
Robert.Bush@dws.com

Michael Lewis
Head of ESG Thematic Research
Michael.Lewis@dws.com

For Institutional investors and Professional investors

Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect

October 2019 — For Qualified Investors (Art. 10 Para. 3 of the Swiss Federal Collective Investment Schemes Act (CISA).For Professional Clients (MiFID Directive 2014/65/EU Annex II) only. For Institutional investors only. Further distribution of this material is strictly prohibited.

Australia: For Profesisonal Invstors only

Litigation examples include nine U.S. cities and counties from New York to San Francisco suing major fossil fuel companies, and seeking compensation for climate change damage such as pollution and rising sea levels.

Additionally, efforts to curb greenhouse gas emissions through technologies, such as the electrification of the transportation sector, and/or government regulation such as carbon pricing schemes, also pose risks and opportunities for company valuations.

Not surprisingly, these climate risks are capturing the attention of regulators. Since 2010, a growing number of U.S. state insurance regulators are including climate risk assessments in their regulatory reviews. This effort has been supported by the National Association of Insurance Commissioners (NAIC). Today, the NAIC surveys in excess of 1,000 companies that write more than USD100 million in premium across the states of California, Connecticut, Minnesota, New Mexico, New York and Washington capturing more than 70% of the entire U.S. insurance market.[8]

At a global level, the Network for Greening the Financial System (NGFS) has moved beyond its eight founding member central banks to encompass 42 members and eight observers sharing best practises, for example in the area of climate risk management in the financial sector.[9]

However, we believe significantly more needs to be done. Recently, U.S. SEC Commissioner Hester Peirce highlighted the pitfalls and shortcomings of ESG ratings.[10] We agree, and it underscores why we are supportive of the efforts of the European Union (EU) Action Plan and the Task Force for Climate-related Financial Disclosures. Efforts to stamp out greenwashing are long overdue, indeed we believe these are imperative to support the development of the sustainable finance industry.

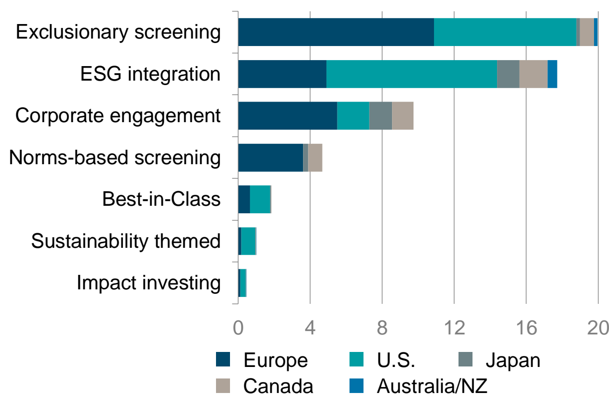
Investment styles and geographic bias

Earlier this year, the Global Sustainable Investment Alliance (GSIA) published its biennial report examining sustainable investment trends around the world.[11] The GSIA pools ESG data from regional organizations that enables a comparison of ESG assets by region and investment style. Since the GSIA published its first report in 2012, some interesting observations can be made.

- First, when the inaugural report was published eight years ago the GSIA survey reported on ESG assets across seven regions compared to just five today. This may reflect the challenges of gathering robust ESG data for emerging markets. Today, GSIA reports on ESG assets in Africa separately and via the African Investing for Impact Barometer. This reveals ESG assets are concentrated in South Africa (93%) with West Africa (4%) and East Africa (2%) making up the majority of the balance. GSIA has just begun to track sustainable investing trends in Latin America.
- Second, since 2012 the size of ESG assets in the five key regions has increased by 130% with the smaller regions of Japan and Australia/NZ posting the fastest growth over this period. This has meant that the concentration of ESG assets held in Europe and the U.S. combined has moderated somewhat, from 94% to 85% of ESG assets globally.
- Third, ESG investment styles are dominated by just three strategies: (i) exclusion screens, (ii) ESG integration and (iii) corporate engagement/shareholder action. This is as true today as it was eight years ago.
- Fourth, regional biases continue to persist, with exclusion screens the most dominant strategy in Europe, ESG integration most prevalent in the U.S., and corporate engagement the preferred strategy in Japan, a reflection of the importance of Japan's Stewardship Code.
- Fifth, while sustainability themed and impact investing styles continue to show strong growth, volumes remain trivial relative to other investment styles. Moreover, assets in both strategies are predominantly concentrated in the U.S.
- Sixth, the proportion of ESG assets relative to managed assets has grown across all regions since 2012. The most dramatic increase has occurred in Australia and New Zealand where the share has leapt from under 15% to 63.2%, see Figure 2. Meanwhile in the U.S., the ratio has more than doubled from 11% to 25.7%. Notably, there has been a decline in the proportion of ESG assets relative to total managed assets in Europe, since 2014 they have fallen 10 percentage points to 48.8%. GSIA assigns this declining trend to stricter definitions as to how to classify ESG assets.
- As part of the EU's efforts to improve the trust and integrity of the sustainable finance market, we expect ESG definitions and standards to become even stricter, with potential implications not just for Europe, but also further afield if the taxonomy of the EU Action Plan becomes a template for other regions.

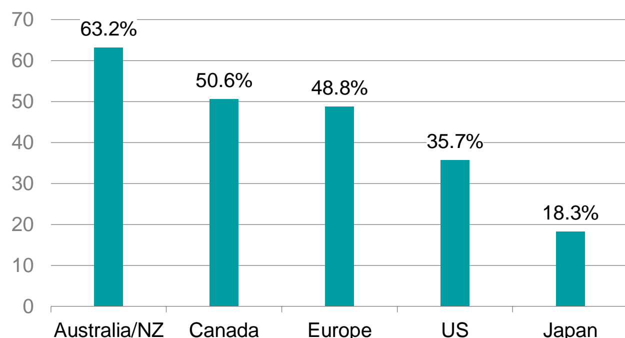
Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect. This information is intended for informational purposes only and does not constitute investment advice, a recommendation, an offer or solicitation

FIGURE 1: ESG ASSETS BY STATEGY AND REGION 2018
(USD trillion)



Source: GSIA (April 2019). Global Sustainable Investment Review 2018.

FIGURE 2: PROPORTION OF ESG ASSETS RELATIVE TO TOTAL MANAGED ASSETS



Source: GSIA (April 2019). Global Sustainable Investment Review 2018.

Green credentials around the world

There exists a significant divergence of green credentials of financial centres around the world. One of the most comprehensive surveys ranking international financial centres based on the quality and depth of their green financing activities is conducted by Finance Watch in its Global Green Finance Index.[12]

The objective is to assess the penetration of green finance in a financial center's overall financial activities (depth) as well as to rate a financial center independently from its market volumes (quality). The survey attempts to assess the degree to which green finance makes up a significant proportion of the activity of the financial center, or whether the scale and scope of green finance is limited and eclipsed by a larger amount of 'brown activities' such as fossil fuel financing.

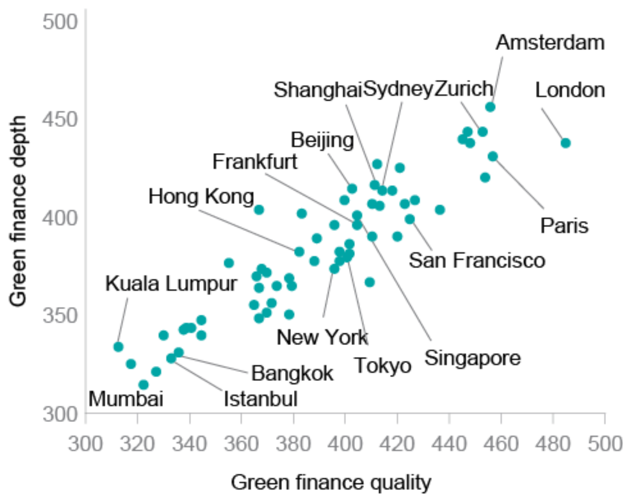
Consequently having a robust audit of the green and "brown" (e.g. fossil fuel) financing activities across global financial centers provides a useful assessment of the risks and opportunities these cities may face in the transition to a low carbon economy. For example, in the event that technology, regulation and carbon pricing schemes trigger a downward revaluation of fossil fuel assets those stock exchanges with a disproportionate share of such company listings would be particularly exposed.

In its most recent edition published in March 2019, the Global Green Finance Index examined 63 financial centers around the world. It revealed the significant divergence when it comes to green finance activity, with European cities leading and many Asian centres lagging, see Figure 3. Within the European universe, Amsterdam ranks top overall, but London leads when ranked solely on green finance quality. North American centres are typically middle ranking, with San Francisco and Montreal ranked top in their respective countries, and New York on a par with Tokyo.

Other Asian centres are divided between middle ranking centres and laggards. For example, Sydney and Melbourne are competing strongly with Shanghai, Beijing and Singapore while Mumbai, Bangkok and Kuala Lumpur are ranked at the bottom of the list on both depth and quality.

Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect. This information is intended for informational purposes only and does not constitute investment advice, a recommendation, an offer or solicitation.
Past performance, actual or simulated, is not a reliable indicator of future results.

FIGURE 3: GREEN FINANCE RANKINGS BY DEPTH AND QUALITY AROUND THE WORLD



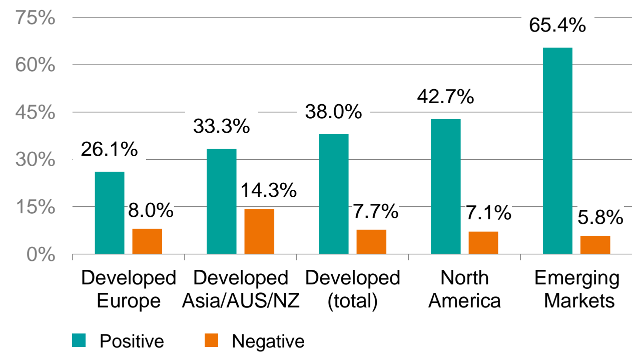
Source: Global Green Finance Index 3 (March 2019).

Between 1970 and 2015, there have been approximately 2,250 unique studies examining the link between ESG and corporate financial performance (CFP).[13] The most compelling result from this analysis is the strong correlation between ESG and CFP in the group of Emerging Market studies. The results revealed that, where there was a regional identifier, 65.4% of studies showed a positive link between ESG and CFP, significantly higher than in developed markets, see Figure 4.

The more compelling results for emerging markets corresponds well with survey evidence conducted by the Principles for Responsible Investment (PRI) which found that retail investors in emerging markets such as Brazil and South Africa appeared to be more engaged on ESG issues than their counterparts in the developed world.[14]

The PRI survey polled workers who are investing for retirement in the U.S., UK, France, Australia, South Africa and Brazil. It revealed that respondents in emerging market countries often had the highest levels of concern when it came to key ESG issues such as the burning of fossil fuels, the use of child labour, excessive CEO remuneration and corporations that made use of tax loopholes.

FIGURE 4: EMERGING MARKETS POST THE STRONGEST POSITIVE LINK BETWEEN ESG AND CORPORATE FINANCIAL PERFORMANCE

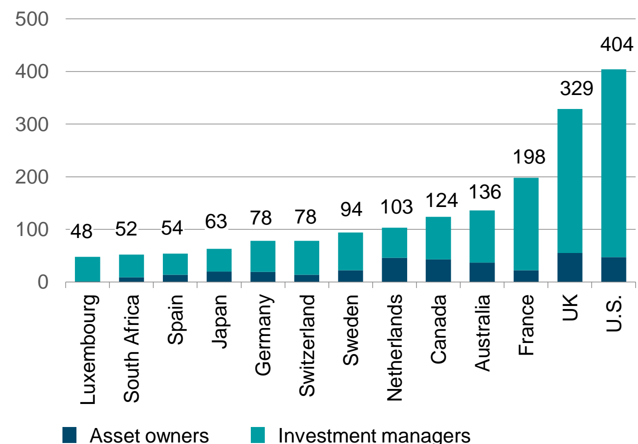


Source: DWS-Global Research Institute white paper (December 2015). ESG and Corporate Financial Performance.

U.S. investors, corporations and states are important role models

When it comes to the adoption of key ESG initiatives, the United States plays a crucial role. For example, the U.S. has, combined, the largest number of asset owner and asset manager signatories to the PRI.[15] One of the obligations of a PRI signatory includes the incorporation of ESG issues into the investment process and from next year, it will become mandatory for PRI signatories to report how they have considered specific climate risks in their investment portfolios.[16]

FIGURE 5: THE U.S. LEADS WHEN IT COMES TO THE NUMBER OF ASSET OWNER AND MANAGER PRI SIGNATORIES



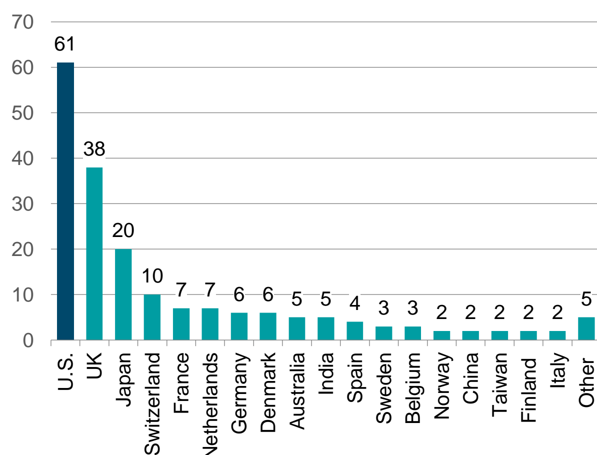
Source: PRI signatory database (August 2019).

Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect. This information is intended for informational purposes only and does not constitute investment advice, a recommendation, an offer or solicitation.
Past performance, actual or simulated, is not a reliable indicator of future results.

In terms of corporate commitments to renewable electricity, Anglo-Saxon corporations are world leading. This is highlighted by the RE100 initiative, which brings together major companies committed to sourcing 100% renewable electricity globally in the shortest possible time span, and by 2050 at the latest. We find that the RE100 initiative is dominated by companies headquartered in the U.S., followed by the UK. Combined these two countries make up just over 50% of RE100 corporate signatories, which in July of this year totalled 190. Altogether, these companies are creating demand in excess of 188 TWH (terawatt hours) of renewable energy every year – almost enough to power a country like Thailand with a population close to 70 million.[17]

Research conducted by The Climate Group reveals that there is also a direct correlation between companies signed up for RE100 and of those companies achieving above-average financial performance as measured by net profit margin and EBIT margin.[17] This out-performance is irrespective of the sector in which the company operates. From our perspective, this means that RE100 companies are typically leaders in their respective sectors. Interestingly, a survey conducted by the Climate Group and CDP last year revealed that 88% of RE100 members cited the economic case as a key driver for joining RE100.[18] A reflection of the rapid decline in renewable power prices over recent years suggests that an increasing number of companies may be making renewable commitments in the years ahead.

FIGURE 6: THE U.S. DOMINATES WHEN IT COMES TO THE NUMBER OF COMPANIES SIGNED UP FOR THE RE100 INITIATIVE



Source: The Climate Group (August 2019). RE100.

Another factor bringing ESG—and specifically climate change—into the heart of business and investor operations is the growing trend to use the law courts to enforce and accelerate climate change action. Research by Clyde & Co., the global law firm, revealed that to date 1,200 climate change cases have been filed across 30 jurisdictions including Australia, the UK, New Zealand, Brazil, Spain, Canada and India.[7] However, the lion's share of climate change litigation is taking place in the U.S. with over 950 cases filed there so far. Examples include nine U.S. cities and counties from New York to San Francisco suing major fossil fuel companies and seeking compensation for climate change damage such as pollution and rising sea levels.

Consequently, investments which might have been viewed as safe from a litigation perspective are anything but, particularly given the rapid advancements taking place in the field of climate change science and specifically extreme event attribution. This assesses the degree to which an extreme weather event is attributable to climate change or should be assigned to natural weather patterns and/or random climate variability. In the event that the science behind extreme event attribution proves more reliable, we would expect the greater the litigation risk around climate will become.

In addition to litigation risk, there is considerable focus on the financial loss triggered by extreme weather events in the US such as hurricanes, floods and wildfires. Between 1980 and July 2019, 250 weather and climate disasters have hit the country with a cumulative loss of $1.7 trillion.[5] Hurricanes remain the most damaging and costly weather events to affect the US such that between 2016 and 2018, the US was impacted by six separate billion-dollar hurricanes incurring total losses of US$329.9 billion and 3,318 fatalities.[19] In 2018, California also experienced its costliest, deadliest and largest wildfires since records began in 1933. In total, more than 8.7 million acres burned across the U.S. last year, well above the 10-year average of 6.8 million.[20]

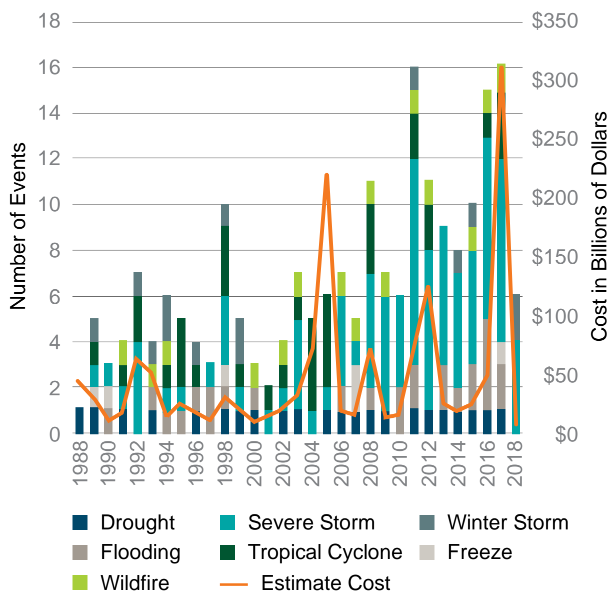
Floods have also caused significant disruption across the country. For example, since 1993, the Mississippi River Valley has sustained successive 100-, 200-, and 500-year flood events as well as a 50-year drought.[21] Since the Mississippi river transports 40% of U.S. total agricultural output and the river crosses through 10 U.S. states, it is no wonder this has triggered the Mississippi River Cities and Towns Initiative (MRCTI).[21] Since 2012, MRCTI's work aims to protect and

Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect. This information is intended for informational purposes only and does not constitute investment advice, a recommendation, an offer or solicitation.
Past performance, actual or simulated, is not a reliable indicator of future results.

restore the Mississippi River as well as build resilience for the 124 cities and towns whose welfare is directly linked to the river.

FIGURE 7: CLIMATE EVENTS AND FINANCIAL LOSS IN THE UNITED STATES (1988 – 2018)

Billion-Dollar disater event types by year (CPI-adjusted)



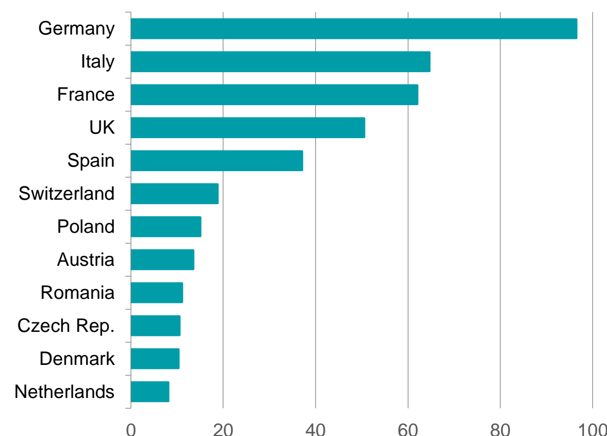
Source: NOAA National Center for Environmental Information (NCEI) U.S. Billion-dollar weather and climate disasters (2019).

Asia, Central America and Europe are also exposed to financial losses triggered by extreme weather events. In Asia, five out of six people live in an area vulnerable to extreme weather events.[4] Between 1998 and 2017, five of the world's 10 most affected countries by extreme weather events were in Asia namely, Myanmar, Philippines, Bangladesh, Pakistan and Vietnam. The primary risks across this region ranging from typhoons, droughts, sea level rise and coastal flooding.[22] The majority of the other most affected countries were in the Americas such as Puerto Rico, Honduras, Haiti and Nicaragua. Since Asia's population is increasingly urbanised and coastal, flood losses are likely to intensify in the years ahead and specifically in the high population centres of Guangzhou, Mumbai, Kolkata, Shenzhen, Jakarta, Bangkok and Nagoya.[23]

In Europe, the highest overall economic losses in absolute terms from extreme weather and climate-related events between 1980 and 2017 were registered in Germany, Italy and France, see Figure 8.[24] The most expensive climate extremes over this period were the 2002 flood in Central Europe, the 2003 drought and heat-wave, the 1999 winter storm Lothar and the October 2000 flood in Italy and France. However, when financial losses are assessed as a share of GDP, Croatia, Czech Republic and Hungary were the most impacted.

FIGURE 8: ECONOMIC LOSSES IN EUROPE FROM WEATHER AND CLIMATE-RELATED EVENTS (1980 – 2017)

Economic losses EUR billion (1980 – 2017)



Source: NatCatSERVICE, Munich Re; European Environment Agency (April 2019). Economic losses from climate-related extremes in Europe.

Not surprisingly, climate risk measurement and management have prompted global regulators and supervisors to act. Since 2010, a growing number of U.S. state insurance regulators are including climate risk assessments into their regulatory reviews. This effort has been supported by the National Association of Insurance Commissioners (NAIC). Today, the NAIC surveys in excess of 1,000 companies that write more than $100 million in premium capturing more than 70% of the entire U.S. insurance market.[8]

At a global level the Network for Greening the Financial System (NGFS) has moved beyond its eight founding member central banks to encompass 42 members and eight observers sharing best practises, for example in the area of climate risk management in the financial sector.[9] In April 2019, the NGFS published its first assessment report including a call for action as to what central banks and supervisors can do to ensure the financial system is resilient

Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect. This information is intended for informational purposes only and does not constitute investment advice, a recommendation, an offer or solicitation.
Past performance, actual or simulated, is not a reliable indicator of future results.

to climate risks and their role in promoting a more sustainable financial system. The NGFS's recommendations included integrating climate-related risks into prudential supervision as well as central banks integrating sustainability factors into their own portfolio management such as the Banks' pension fund and reserves.

Global initiatives to enhance the integrity of ESG

The EU Action Plan on Sustainable Finance goes beyond mere recommendations to powerful legislative action that aims not only for the EU to meet is climate and energy commitments under the 2015 Paris climate agreement, but also to move sustainability into the core activities of financial institutions operating in the EU many of which will be required to demonstrate how they integrate ESG factors into their investment processes.

One of the most urgent tasks is a robust classification and labelling system to bring much needed consistency and trust to the market. So called green-washing is a growing problem that potentially undermines the whole industry. The origins of greenwashing date back to the 1980s when certain corporates overstated or even falsely claimed their positive environmental credentials, which were typically deployed in marketing campaigns.

In response many jurisdictions such as the U.S. and UK have attempted to tighten advertising standards around such activities through the Federal Trade Commission and the Advertising Standards Authority respectively. The routes to stamp out greenwashing from a European perspective is being driven by a unified EU classification system on whether an economic activity qualifies as being environmentally sustainable for investment purposes. This taxonomy will be used by regulators at a national and EU level, for example in labelling schemes and for verifying claims that financial products are environmentally sustainable. This will apply to all entities whether EU based or not, operating and selling investment products in Europe.

Improved disclosure is also essential. We applaud the plan to require institutional asset managers to show exactly how their investments are aligned with their stated sustainability objectives. Indeed we hope the EU Action Plan will encourage greater clarity on the duties of all investors as they relate to environmental, social and governance factors.

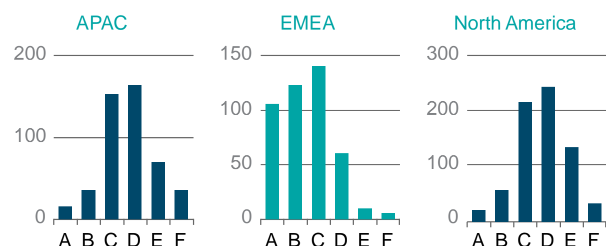
We believe this in turn should drive efforts to integrate ESG into investment processes. As a result, investors may benefit not only from a more liquid pool of sustainable products, but also from the increased pressure on companies to improve their sustainability reporting. Indeed woeful levels of ESG-related information, particularly around climate risks and ESG ratings based on incomplete and/or poor corporate disclosure pose a real risk for investors. This is one of the key objectives of the Task Force on Climate-related Financial Disclosures.

Even so, challenges for investors to identify climate risks as well as broader ESG controversies remain. ESG disclosure has come under fire since companies typically only tend to report on issues that paint them in a good light, but with little to no financial materiality.

This is borne out by 2018 research which reveals ESG disclosure has a very weak correlation to financial performance and introduces hazards for investors since ESG disclosure plays an important role in driving ESG ratings. As we have highlighted in the past, increasing the ESG quality of a portfolio may simply deliver a large cap bias, or be overly exposed to European securities reflecting the uneven nature of ESG disclosure information by region, Figure 9.[25]

Such concerns were highlighted by SEC Commissioner Hester Peirce in June 2019. Efforts to improve ESG and specifically climate-related disclosure such as through the EU Action Plan, the Task Force on Climate-related Financial Disclosures, the work of the Sustainable Accounting Standards Board (SASB) as well as the European Bank for Reconstruction and Development (EBRD) and the Global Centre on Adaptation are therefore to be commended.[10]

FIGURE 9: ESG RATINGS DISTRIBUTION BY MSCI REGION (number of corporations)



Source: DWS Investment GmbH (April 2018).

Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect. This information is intended for informational purposes only and does not constitute investment advice, a recommendation, an offer or solicitation.
Past performance, actual or simulated, is not a reliable indicator of future results.

Looking ahead

It can be argued that today we are experiencing a new industrial revolution, fuelled by technologies encompassing digitalization, artificial intelligence, automation, biotechnology, fintech and clean technologies. Digital technologies, which are enabling more individuals and businesses to gain access to financial services via mobile phones and the internet, will encourage G20 efforts to increase financial inclusion. According to the World Bank there are an estimated 1.7 billion working age adults with no access to financial services with a disproportionate number (56%) being women.[26] The delivery of financial services is also part of the solution to a number of the United Nations' Sustainable Development Goals such as ending poverty, gender equality and good health and well-being.

Similarly, environmental or clean technologies such as wind, solar, water efficiency (blue tech) and electric vehicles are increasingly viable due to improved cost competitiveness. For example, solar photovoltaic panel costs have declined by over 80% since 2009. Since renewables represent just under 10% of total power generation globally, but, account for almost 50% of the growth in global power generation in 2018 this should trigger not just a transformation of the power generating sector globally, but also curb carbon emissions across other parts of the economy, such as in the transportation sector.[27]

For example, electric vehicles pose significant disruption risk to traditional auto makers given more and more countries are introducing laws to bans the sale of petrol and diesel cars, in some instances as soon as 2030. This is leading to a re-pricing in the car sector such that as of last year the 25 largest auto manufacturers made up just 20% of the market cap of the world's 15 largest tech companies, compared to 60% eight years ago.[28]

Technology is also part of the solution for building smarter and more sustainable cities. Cities account for almost 70% of the world's energy consumption and a similar share of global CO_2 emission.[29] Part of the improvements in cities will likely come in the form of technologies invading the energy, transportation and real estate sectors—for example, smart meters are being installed in residential and commercial properties to improve efficiencies in the areas of heat, noise, and light, as well as security. Technologies are also being deployed to improve the efficiency of building materials and fittings as well as in the areas of packaging, processing, waste reduction and recycling with particular focus on plastics.

ESG-focused technologies are therefore significantly more viable today than just a few years ago when government subsidies played a more important role. The more viable nature of ESG technologies today is important since many question the extent to which ESG will survive the next economic downturn. Indeed when the last recession struck in 2009 global efforts to address key ESG issues, such as climate change, collapsed alongside the removal of many government subsidies supporting green technologies.

Conclusion

On certain metrics responsible investing seems to be gaining ground. For example, in Australia and New Zealand the proportion of ESG assets relative to managed assets has risen from under 15% to 63.2% since 2012. Yet, on other metrics, such as the size of the green bond market, which represents just 2% of total bonds outstanding, the responsible investing market is still in its infancy.

However, we see encouraging trends. For example, the growing number of signatories to the Principles for Responsible Investment, led by the United States, mean an increasing number of asset owners and managers are commited to integrating ESG issues into their investment processes.

ESG also has varying regional investment repercussions, with the strongest correlation between ESG and corporate financial performance occurring in Emerging Markets. This makes sense since emerging market countries are particularly susceptible to key ESG issues such as the environmental impacts from the burning of fossil fuels, the social dimension of forced labor and the incidence of corruption.

We believe another important catalyst for driving the ESG and climate risk agenda has been from increasing international and regional regulation. This includes the EU Action Plan, the Task Force on Climate-related Financial Disclosures, the Network for Greening the Financial System as well as many insurance regulators around the world, and specifically those in six U.S. states, introducing climate considerations into their regulatory reviews.

Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect. This information is intended for informational purposes only and does not constitute investment advice, a recommendation, an offer or solicitation.
Past performance, actual or simulated, is not a reliable indicator of future results.

[1] Goldman Sachs (April 2017). The PMs Guide to the ESG Revolution
[2] PEW Research Center (April 2017)
[3] Accenture Consulting (2016)
[4] Climate Central (November 2015). Rising seas threaten land home to half a billion
[5] NOAA National Center for Environmental Information (NCEI) U.S. Billion-dollar weather and climate disasters (1980-2019)
[6] NatCatSERVICE, Munich Re; European Environment Agency (April 2019). Economic losses from climate-related extremes in Europe
[7] Clyde & Co (March 2019). Climate change – the evolving landscape of litigation
[8] NAIC Climate Risk Disclosure Survey, California Department of Insurance https://www.insurance.ca.gov/0250-insurers/0300-insurers/0100-applications/ClimateSurvey/index.cfm
[9] Banque de France (July 2019) https://www.banque-france.fr/en/financial-stability/international-role/network-greening-financial-system/about-us
[10] Commissioner Hester M. Peirce (June 2019). Scarlet Letters: Remarks before the American Enterprise Institute
[11] GSIA (April 2018). Global Sustainable Investment Review 2018
[12] Finance Watch (May 2019). Global Green Finance Index 3
[13] DWS Global Research Institute (December 2015). ESG and Corporate Financial Performance
[14] PRI YouGov Responsible Investment Survey (September 2015)
[15] PRI signatory database (August 2019)
[17] The Climate Group (November 2018) . Moving to truly global impact
[18] RE100, The Climate Group, CDP (September 2018). Making Business Sense: How RE100 companies have an edge on their peers
[19] The Climate Group, CDP (January 2018). Approaching a tipping point: how corporate users are redefining global electricity
[20] NOAA National Center for Environmental Information (NCEI) (February 2019). 2018s Billion Dollar Disasters in Context
[21] Mississippi River Cities and Towns Initiative (MRCTI) (April 2019). As floods deluge Midwest towns, where is national response to climate disasters?
[22] Kreft, Eckstein and Mechior (2016). Global Climate Risk Index 2019
[23] Asian Development Bank (January 2017) A Region at risk: The human dimensions of climate change in Asia and the Pacific
[24] NatCatSERVICE, Munich Re; European Environment Agency (April 2019). Economic losses from climate-related extremes in Europe
[25] DWS Research Institute (October 2018). The quant road to ESG integration
[26] World Bank (April 2018). The Global Findex Database 2017
[27] Irena (January 2018). Renewable Power Generation Costs in 2017
[28] KPMG (January 2018). The changing landscape of disruptive technologies
[29] C40 Cities https://www.c40.org/why_cities

Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect. This information is intended for informational purposes only and does not constitute investment advice, a recommendation, an offer or solicitation

Important information – UK - FOR PROFESSIONAL CLIENTS ONLY

Issued in the UK by DWS Investments UK Limited. DWS Investments UK Limited is authorised and regulated by the Financial Conduct Authority.

Any reference to “DWS”, “Deutsche Asset Management” or “Deutsche AM” shall, unless otherwise required by the context, be understood as a reference to DWS Investments UK Limited including any of its parent companies, any of its or its parents affiliates or subsidiaries and, as the case may be, any investment companies promoted or managed by any of those entities.

This document is a “non-retail communication” within the meaning of the FCA's Rules and is directed only at persons satisfying the FCA’s client categorisation criteria for an eligible counterparty or a professional client. This document is not intended for and should not be relied upon by a retail client.

This document is intended for discussion purposes only and does not create any legally binding obligations on the part of DWS Group GmbH & Co. KGaA and/or its affiliates (DWS). Without limitation, this document does not constitute an offer, an invitation to offer or a recommendation to enter into any transaction. When making an investment decision, you should rely solely on the final documentation relating to the transaction and not the summary contained herein. DWS is not acting as your financial adviser or in any other fiduciary capacity in relation to this transaction. The transaction(s) or products(s) mentioned herein may not be appropriate for all investors and before entering into any transaction you should take steps to ensure that you fully understand the transaction and have made an independent assessment of the appropriateness of the transaction in the light of your own objectives and circumstances, including the possible risks and benefits of entering into such transaction. For general information regarding the nature and risks of the proposed transaction and types of financial instruments please go to https://www.db.com/company/en/risk-disclosures.htm. You should also consider seeking advice from your own advisers in making this assessment. If you decide to enter into a transaction with DWS, you do so in reliance on your own judgment.

Although information in this document has been obtained from sources believed to be reliable, we do not guarantee its accuracy, completeness or fairness, and it should not be relied upon as such. All opinions and estimates herein, including forecast returns, reflect our judgment on the date of this document and are subject to change without notice and involve a number of assumptions which may not prove valid.

Any opinions expressed herein may differ from the opinions expressed by Deutsche Bank AG and/or any other of its affiliates (DB). DB may engage in transactions in a manner inconsistent with the views discussed herein. DB trades or may trade as principal in the instruments (or related derivatives), and may have proprietary positions in the instruments (or related derivatives) discussed herein. DB may make a market in the instruments (or related derivatives) discussed herein.

DWS SPECIFICALLY DISCLAIMS ALL LIABILITY FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL OR OTHER LOSSES OR DAMAGES INCLUDING LOSS OF PROFITS INCURRED BY YOU OR ANY THIRD PARTY THAT MAY ARISE FROM ANY RELIANCE ON THIS DOCUMENT OR FOR THE RELIABILITY, ACCURACY, COMPLETENESS OR TIMELINESS THEREOF.

This document has been prepared without consideration of the investment needs, objectives or financial circumstances of any investor. Before making an investment decision, investors need to consider, with or without the assistance of an investment adviser, whether the investments and strategies described or provided by DWS, are appropriate, in light of their particular investment needs, objectives and financial circumstances. Furthermore, this document is for information/discussion purposes only and does not constitute an offer, recommendation or solicitation to conclude a transaction and should not be treated as giving investment advice.

DWS does not give tax or legal advice. Investors should seek advice from their own tax experts and lawyers, in considering investments and strategies suggested by DWS. Investments with DWS are not guaranteed, unless specified. Investments are subject to various risks, including market fluctuations, regulatory change, counterparty risk, possible delays in repayment and loss of income and principal invested. The value of investments can fall as well as rise and you may not recover the amount originally invested at any point in time. Furthermore, substantial fluctuations of the value of the investment are possible even over short periods of time.

This document contains forward looking statements. Forward looking statements include, but are not limited to assumptions, estimates, projections, opinions, models and hypothetical performance analysis. The forward looking statements expressed constitute the author’s judgment as of the date of this material. Forward looking statements involve significant elements of subjective judgments and analyses and changes thereto and/or consideration of different or additional factors could have a material impact on the results indicated. Therefore, actual results may vary, perhaps materially, from the results contained herein. No representation or warranty is made by DWS as to the reasonableness or completeness of such forward looking statements or to any other financial information contained herein. The terms of any investment will be exclusively subject to the detailed provisions, including risk considerations, contained in the offering documents.

This document may not be reproduced or circulated without our written authority. The manner of circulation and distribution of this document may be restricted by law or regulation in certain countries, including the United States. This document is not directed to, or intended for distribution to or use by, any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction, including the United States, where such distribution, publication, availability or use would be contrary to law or regulation or which would subject DWS to any registration or licensing requirement within such jurisdiction not currently met within such jurisdiction. Persons into whose possession this document may come are required to inform themselves of, and to observe, such restrictions.

PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.

© DWS Investments UK Limited 2019.

Important information – EMEA

This marketing communication is intended for professional clients only.

DWS is the brand name under which DWS Group GmbH & Co. KGaA and its subsidiaries operate their business activities. Clients will be provided DWS products or services by one or more legal entities that will be identified to clients pursuant to the contracts, agreements, offering materials or other documentation relevant to such products or services.

The information contained in this document does not constitute investment advice.

All statements of opinion reflect the current assessment of DWS International GmbH and are subject to change without notice.

Forecasts are not a reliable indicator of future performance. Forecasts are based on assumptions, estimates, opinions and hypothetical performance analysis, therefore actual results may vary, perhaps materially, from the results contained here.

Past performance, [actual or simulated], is not a reliable indication of future performance.

The information contained in this document does not constitute a financial analysis but qualifies as marketing communication. This marketing communication is neither subject to all legal provisions ensuring the impartiality of financial analysis nor to any prohibition on trading prior to the publication of financial analyses.

This document and the information contained herein may only be distributed and published in jurisdictions in which such distribution and publication is permissible in accordance with applicable law in those jurisdictions. Direct or indirect distribution of this document is prohibited in the USA as well as to or for the account of US persons and persons residing in the USA.

DWS International GmbH. As of: October 2019.

Important Information – APAC

DWS is the brand name of DWS Group GmbH & Co. KGaA. The respective legal entities offering products or services under the DWS brand are specified in the respective contracts, sales materials and other product information documents. DWS Group GmbH & Co. KGaA, its affiliated companies and its officers and employees (collectively “DWS Group”) are communicating this document in good faith and on the following basis.

This document has been prepared without consideration of the investment needs, objectives or financial circumstances of any investor. Before making an investment decision, investors need to consider, with or without the assistance of an investment adviser, whether the investments and strategies described or provided by DWS Group, are appropriate, in light of their particular investment needs, objectives and financial circumstances. Furthermore, this document is for information/discussion purposes only and does not constitute an offer, recommendation or solicitation to conclude a transaction and should not be treated as giving investment advice.

DWS Group does not give tax or legal advice. Investors should seek advice from their own tax experts and lawyers, in considering investments and strategies suggested by DWS Group. Investments with DWS Group are not guaranteed, unless specified.

Investments are subject to various risks, including market fluctuations, regulatory change, possible delays in repayment and loss of income and principal invested. The value of investments can fall as well as rise and you might not get back the amount originally invested at any point in time. Furthermore, substantial fluctuations of the value of the investment are possible even over short periods of time. The terms of any investment will be exclusively subject to the detailed provisions, including risk considerations, contained in the offering documents. When making an investment decision, you should rely on the final documentation relating to the transaction and not the summary contained herein. Past performance is no guarantee of current or future performance. Nothing contained herein shall constitute any representation or warranty as to future performance.

Although the information herein has been obtained from sources believed to be reliable, DWS Group does not guarantee its accuracy, completeness or fairness. No liability for any error or omission is accepted by DWS Group. Opinions and estimates may be changed without notice and involve a number of assumptions which may not prove valid. All third party data (such as MSCI, S&P, Dow Jones, FTSE, Bank of America Merrill Lynch, Factset & Bloomberg) are copyrighted by and proprietary to the

provider. DWS Group or persons associated with it may (i) maintain a long or short position in securities referred to herein, or in related futures or options, and (ii) purchase or sell, make a market in, or engage in any other transaction involving such securities, and earn brokerage or other compensation.

The document was not produced, reviewed or edited by any research department within DWS Group and is not investment research. Therefore, laws and regulations relating to investment research do not apply to it. Any opinions expressed herein may differ from the opinions expressed by other DWS Group departments including research departments. This document may contain forward looking statements. Forward looking statements include, but are not limited to assumptions, estimates, projections, opinions, models and hypothetical performance analysis. The forward looking statements expressed constitute the author's judgment as of the date of this material. Forward looking statements involve significant elements of subjective judgments and analyses and changes thereto and/or consideration of different or additional factors could have a material impact on the results indicated. Therefore, actual results may vary, perhaps materially, from the results contained herein. No representation or warranty is made by DWS Group as to the reasonableness or completeness of such forward looking statements or to any other financial information contained herein.

This document may not be reproduced or circulated without DWS Group's written authority. The manner of circulation and distribution of this document may be restricted by law or regulation in certain countries.

This document is not directed to, or intended for distribution to or use by, any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction, where such distribution, publication, availability or use would be contrary to law or regulation or which would subject DWS Group to any registration or licensing requirement within such jurisdiction not currently met within such jurisdiction. Persons into whose possession this document may come are required to inform themselves of, and to observe, such restrictions.

Unless notified to the contrary in a particular case, investment instruments are not insured by the Federal Deposit Insurance Corporation ("FDIC") or any other governmental entity, and are not guaranteed by or obligations of DWS Group.

In Hong Kong, this document is issued by DWS Investments Hong Kong Limited and the content of this document has not been reviewed by the Securities and Futures Commission.

© 2019 DWS Investments Hong Kong Limited

In Singapore, this document is issued by DWS Investments Singapore Limited and the content of this document has not been reviewed by the Monetary Authority of Singapore.

© 2019 DWS Investments Singapore Limited

Important information – U.S.

For institutional client and registered representative use only. Not for public viewing or distribution.

DWS does not render legal or tax advice, and the information contained in this communication should not be regarded as such. The comments, opinions and estimates contained herein are based on or derived from publicly available information from sources that we believe to be reliable. We do not guarantee their accuracy. This material is for informational purposes only and sets forth our views as of this date. The underlying assumptions and these views are subject to change without notice.

Past performance is not indicative of future returns.

Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Investments come with risk. The value of an investment can fall as well as rise and your capital may be at risk. You might not get back the amount originally invested at any point in time.

The brand DWS represents DWS Group GmbH & Co. KGaA and any of its subsidiaries, such as DWS Distributors, Inc., which offers investment products, or DWS Investment Management Americas, Inc. and RREEF America L.L.C., which offer advisory services.

© 2019 DWS Group GmbH & Co. KGaA. All rights reserved. R-070752-1 (9/19)

For investors in Bermuda: This is not an offering of securities or interests in any product. Such securities may be offered or sold in Bermuda only in compliance with the provisions of the Investment Business Act of 2003 of Bermuda which regulates the sale of securities in Bermuda. Additionally, non-Bermudian persons (including companies) may not carry on or engage in any trade or business in Bermuda unless such persons are permitted to do so under applicable Bermuda legislation.

Compliance Code CRC: 070854