Environmental, Social, And Governance:

The ESG Risk Atlas: Sector And Regional Rationales And Scores

July 22, 2020

(***Editor's Note:*** *This version of the ESG Risk Atlas supercedes the version we published on May 13, 2019.)*

What Is The ESG Risk Atlas?

The ESG Risk Atlas provides a global relative positioning of sectors to environmental and social exposures and regional analysis of natural disaster risk, social standards, and governance standards. Risk Atlas sector and governance scores are ranked 1 (low exposure) to 6 (high exposure).

The sector and regional ESG Risk Atlas provides the foundation of our ESG Evaluation analysis.

Regional Risk and Governance Scores

The Regional Risk component of the Risk Atlas highlights our view about the relative risk exposure of countries and regions to natural disasters and the relative quality of corporate governance standards, while drawing on our analytical opinions and public assessments about the strength of ESG-related regulations.

The Risk Atlas ranks countries and regions on a scale of 1-6 for corporate governance, with a score closer to 1 representing relatively stronger standards.

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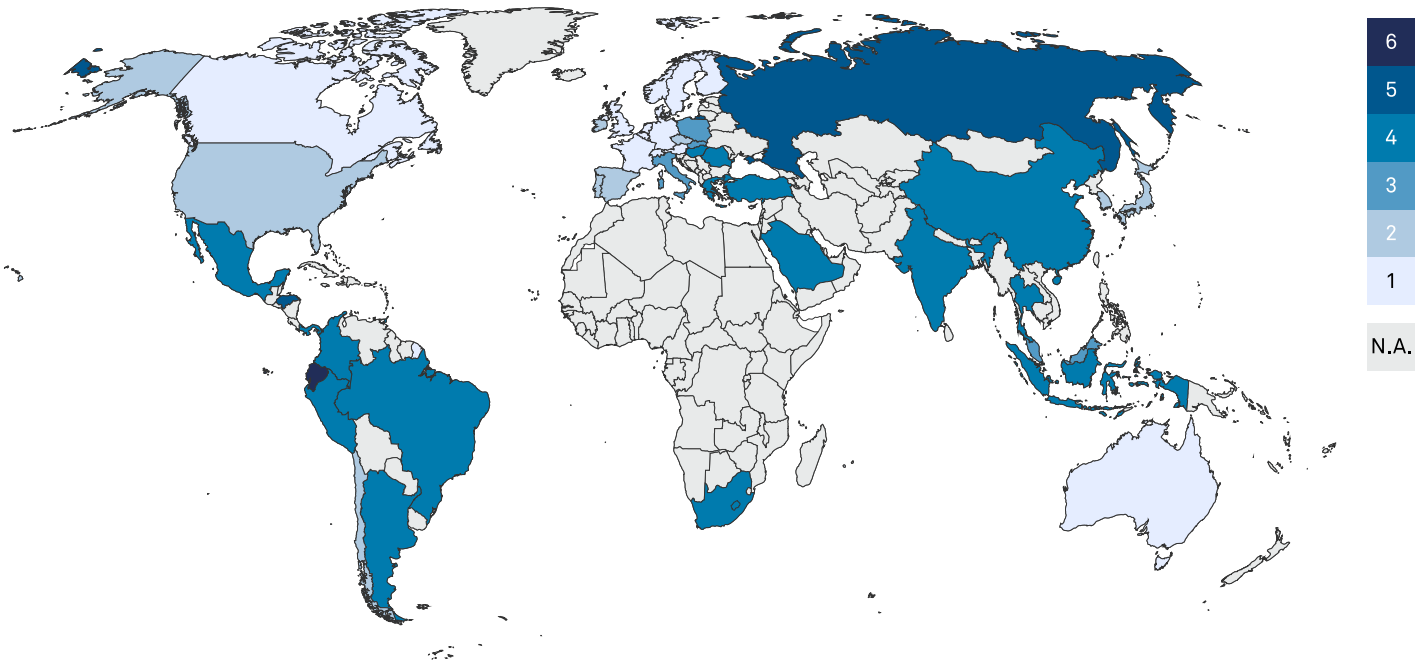
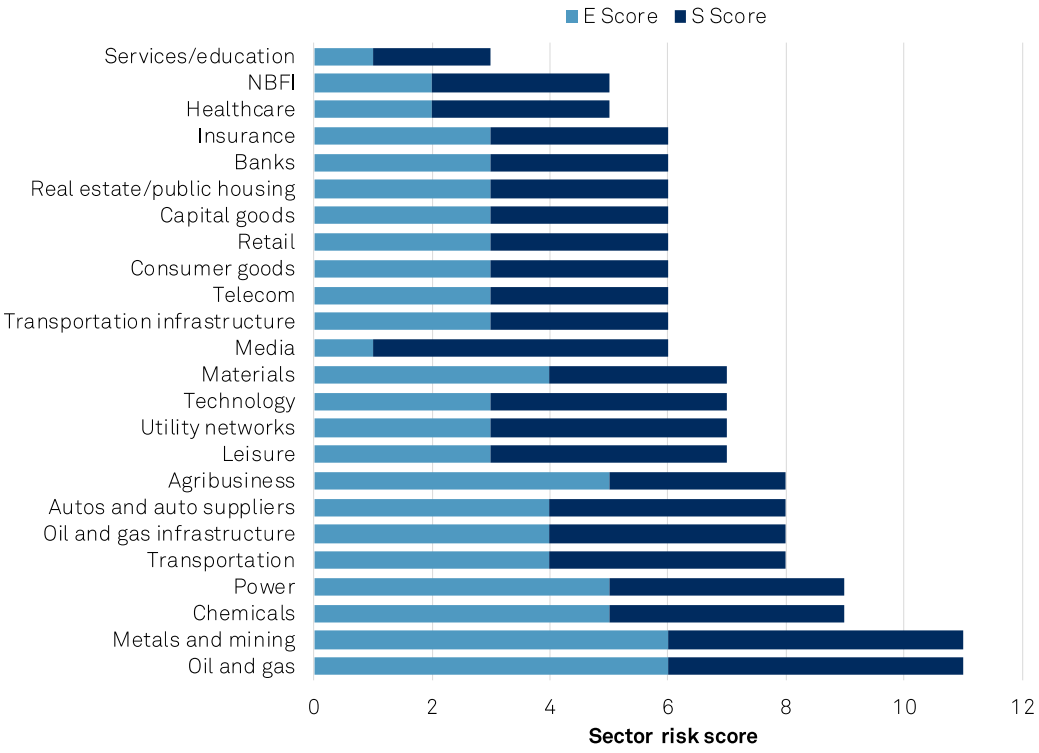
Governance Risk Atlas



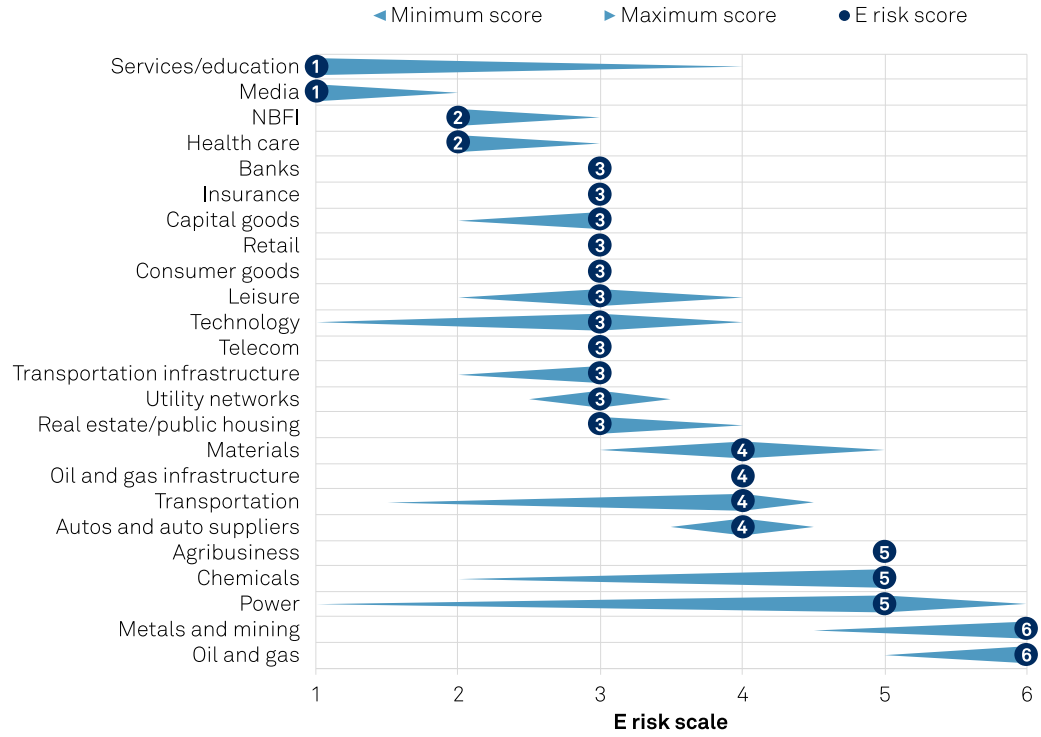
N.A.--Not applicable. Source: S&P Global Ratings.

Sector Risk Atlas



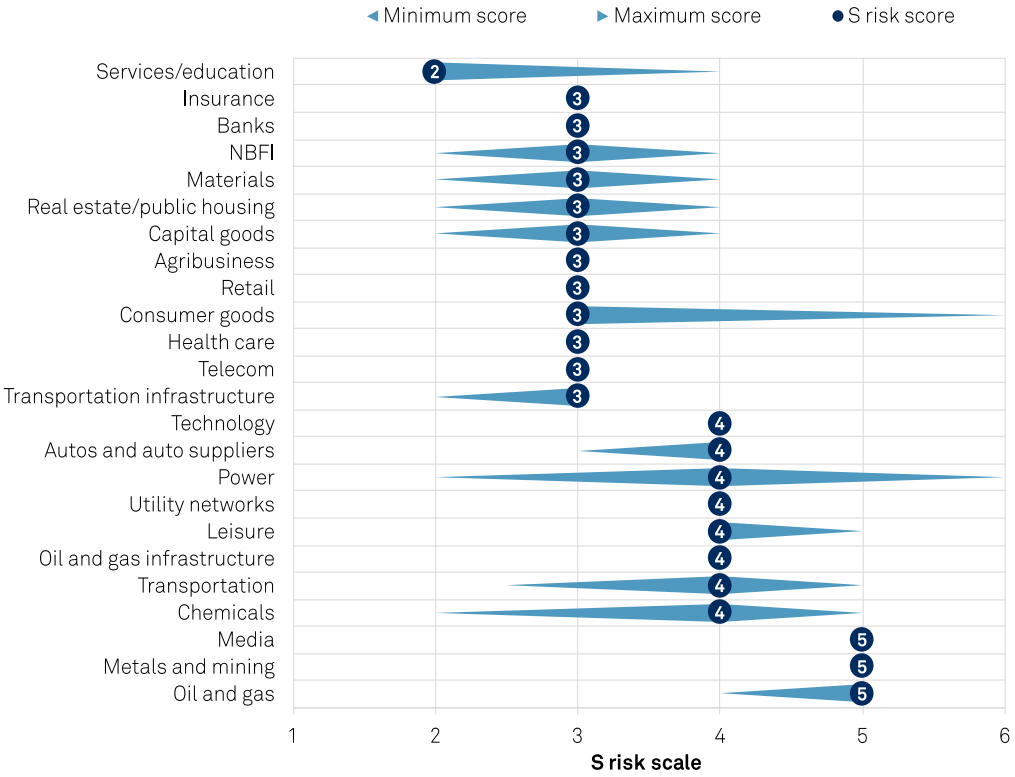
Source: S&P Global Ratings.

Sector Risk Atlas--Environmental



Source: S&P Global Ratings.

Sector Risk Atlas--Social



Source: S&P Global Ratings.

Sector Risks

Table 1

Sector Risk Atlas

Sector	Score	Comments
Agribusiness & Agricommodities		
Environmental	5	Agribusiness is primarily exposed to land use/biodiversity, water use, and physical climate risks, and to a lesser extent greenhouse gases from livestock production and industrial activity. As the global population grows, demand for food will increase. This, in turn, will drive greater demand for farmland use both for human consumption but also land-intensive livestock feed consumption. Consumption of land for livestock feed, in particular, is expected to exceed demand from population growth as societies become wealthier and consume more animal protein. Deforestation and land erosion are residual effects of growing agricultural land use that may threaten food supplies in the future and diminish biodiversity, land, and forest carbon sequestration. Although this risk so far has been largely offset by better yields from more efficient farming practices, reforestation initiatives, and fertilizer use, crop yield and food supply sustainability may become increasingly threatened by population growth, excessive chemical applications, and climate change. Similarly, water use has become a material near-term risk because traditional farming regions could become increasingly less arable as the riverbeds and aquafers that supply them are depleted, or as weather events become more frequent and severe because of climate change. This will lead to increased crop yield volatility. The sector also generates greenhouse gases and other forms of pollution, including methane (from livestock), pesticides, and fertilizer runoff, and the underlying industrial activity of processing agricultural commodities into food ingredients and animal feed. The sector partially offsets its greenhouse gas contribution and waste creation by recycling virtually all meat processing byproducts into other industrial and agricultural uses and by increasing biofuel production to reduce carbon emission growth, albeit while still increasing land use--a carbon reduction offset.
Social	3	Social risks are comparatively less pronounced for agribusiness than environmental risks. Still, limiting food and soil contamination by adhering to prudent safety practices, and adapting to developed market demand for a healthier and more sustainable food supply are the most relevant social risks. To a lesser degree, there is also the challenge of balancing emerging market needs for sustainable agricultural production with community reinvestment and better employee safety and workforce participation standards. Food safety is the most acute social risk in agriculture. Avoiding contamination and disease by adhering to prudent food safety standards and proper origin traceability is paramount to a stable and sustainable food supply chain. We also see customer safety, especially quality assurance and traceability of agricultural products, as important. Consumer attitudes toward genetically modified and engineered foods are another consideration. Although child labor and fatality rates in less automated farming regions remain relatively high, best-in-class agribusiness companies increasingly support local communities by investing in education and developing sustainable farming techniques. This ensures more consistent production and helps meet the sustainability goals of their main clients (large food and beverage multinationals), who are becoming more sensitive to consumer pressure to address these social risks. Overall, given the sector's broad and quickly emerging market-based supply chain, it is important that agribusiness companies manage their supply chains effectively and apply the highest standards in response to all these environmental and social risks.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Autos & Auto Suppliers		
Environmental	4	The automotive sector is materially exposed to greenhouse gas emissions in the product-use phase, as road transportation accounts for about 14% of global emissions. Another area of environmental and regulatory exposure is waste and pollution-related risks such as nitrogen oxides and particulates. Electrification and the transition to environmentally sustainable mobility are significant disruptive forces but equally an established trend; the auto industry has made significant progress. Related regulatory pressure varies according to region. In Europe, regulatory constraints are the strongest due to the imminent tightening of CO2 limits for passenger cars and light commercial vehicles as of end-2020, coupled with material financial sanctions for failure to comply. For this reason, compliance with CO2 regulation is at the very top of OEMs' strategic agendas. China and the U.S. have also set up fuel efficiency targets allowing, however, for a longer transition. We also consider auto suppliers' exposure to emission risks, but to a lesser degree than OEMs because suppliers are not directly exposed to either regulatory fines and/or product acceptance issues. Nonetheless, suppliers that fail to offer environmentally cutting-edge products and technology will likely weaken their competitive positions. Being very material-intensive, auto companies are exposed to sourcing risks given the growing scarcity of resources and the need to improve vehicle recyclability and take charge of product end-of-life management. Because of increased electronic components and electric-vehicle development, auto companies now rely on critical materials, some of which are produced in just a few countries and/or in politically unstable countries. The sourcing of conflict minerals (most commonly tantalum, tin, tungsten, and gold) largely used in electronic components is increasingly regulated.
Social	4	The auto industry is exposed to social workforce-related conflicts, safety risks, and changes in customer behavior. Product safety liability and recall issues are inherent risks that most companies have managed relatively well in recent years with improved product quality and technology, and better claims management. With more electronic components and the development of electric vehicles, product safety will remain an area of focus for automakers. This also presents opportunities for automakers and suppliers in the area of safety technologies that aim to protect vehicle occupants in a crash, as well as reduce the risk of an accident by using lane-departure warning systems, automotive braking, adaptive cruise control, and blind-spot detection. The industry needs to prepare for changing consumer preferences toward transportation as a service, and new mobility options that could disrupt car ownership and traditional customer engagement practices. As a large employer, the auto industry is comparatively highly sensitive to human capital management, given the large numbers employed who are also highly unionized. Good management of labor relations is essential to maintain employee motivation and avoid work stoppages. According to the European Automobile Manufacturers' Association, about 13.8 million Europeans work in the auto industry (directly and indirectly), accounting for 6.1% of all EU jobs. We foresee that future labor negotiations for the industry, including restructurings caused by the COVID-19 crisis, could be challenging.
Banks		
Environmental	3	Environmental risks for the banking sector balance the low use of physical infrastructure and facilities needed to operate, against the large indirect exposure from lending and investment activities. In addition, the rising use of IT services in banking (digitization, cloud computing, and big data) is increasing CO2 emissions, even though banks' physical infrastructure is reducing. Regulators, investors, customers, and activists are increasingly looking at the banking sector's contribution and exposure to environmental risks. These medium- to long-term risks are significant and will be proportionate to the impact of climate change on the economy. While banks have good expertise in managing traditional risks, they currently lack standard measurement tools, data, and human resources to properly deal with the climate transition. Banks are also exposed, through their borrowers, to physical climate risks from increasing chronic hazards (such as increasing temperatures leading to a rise in sea levels or droughts) and acute perils (like floods or storms). On a positive note, we see the increasing integration of ESG criteria in banks' underwriting and investment policies, alongside a generally high level of diversification of their loan and securities portfolios, as important mitigating factors.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Social	3	Human capital management in the banking sector's typically labor-intensive business, as well as customer relationship management, are of paramount importance and pose material social risks. Evolving customer preferences, greater use of digitization, automation, and AI bring new challenges and threats that require banks to adjust their business models. These include continuously training employees in new distribution channels, products, and regulations. Since banks are also outsourcing and offshoring an increasing number of tasks to trim costs and reduce the workforce and branch network, responsible management of their supply chains will become more important. Another challenge for banks is how to keep and attract talent, especially the younger generation, which tends to favor innovative and agile companies. Positively, bank employees typically benefit from safe and healthy working conditions relative to many other sectors. Banks rely on customers' trust to maintain their franchises. Issues regarding conduct with retail customers, such as misselling; or fraudulent activities like money laundering or tax evasion, can cause serious financial and reputational damage. IT issues that disrupt customers' access to banking services, risks of data leaks, and concerns over the treatment or privacy of data are important franchise risks, since open banking in many parts of the world makes it easier for customers to switch banks. Nevertheless, the industry benefits from significant regulation and supervision, which in recent years have been increasingly focusing on ESG risks to support stability and enhance customer confidence.
Capital Goods		
Environmental	3	The capital goods sector includes companies operating in the industrial equipment, components, and services segment. It also includes companies operating in aerospace and defense, and in engineering and construction. We believe the sector has moderate exposure to environmental risks, including greenhouse gas emissions from energy consumption, water use and pollution, waste discharge, and climate-related physical change, although risks and exposures vary by subsector. Capital goods must meet required environmental standards and customers' demand for more energy-efficient products, while mitigating the potential for costs and fines. Given the broad nature of capital goods' end-markets, the sector is exposed to environmental risks in downstream sectors such as oil and gas and utilities, where regulations are also stringent. In the aerospace defense subsector, aircraft engine emissions are increasingly globally regulated, which could increase demand for the newest aircraft, but might also require investment in product development. This could be material if ever-stricter regulations require major technological changes. Companies in engineering and construction are exposed to increasing climate change risk. Although they factor in some weather-related delays to complete construction projects, extreme climate events can cause major delays and project cost overruns. The sector is also very materials-intensive, using mainly steel, iron, aluminum, glass, plastics. The increasing number of electronic components in machinery and vehicles has made them reliant on critical materials that are only produced in a few countries and/or in politically unstable countries. The sourcing of conflict minerals (most common ones being tantalum, tin, tungsten, and gold and largely used in electronic components) is increasingly regulated, and good management of complex supply chains is key to managing this risk. To manage the growing scarcity of materials, the sector will also need to improve recyclability of products and take charge of product end-of-life management by remanufacturing, for example.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Social	3	Material social risks for capital goods companies include those related to human capital management and employee health and safety, albeit exposure to social risks differs by subsectors. Human capital risks include the management and retention of skilled labor, which the industry increasingly relies on to adapt to a changing work environment brought about by greater automation at production plants, increased digitalization, and robotics. Companies also need to maintain productive and long-lasting relationships with employees in fairly highly unionized industries. This is also relevant for aerospace and defense, and engineering and construction. Employees' safety is a key risk for the sector given the use of large and dangerous equipment in the production process. For aircraft manufacturers, product safety is of paramount importance as an aircraft accident caused by a design flaw or poor quality can result in injuries and deaths, as well as order cancellations or significant remediation costs. More specifically for engineering and construction companies, community opposition to construction and the dangers of operating in countries with civil unrest or weaker regulatory regimes is heighted. This can result in more stringent regulations for contractors, as well as higher costs and risks of business disruption.
Consumer Goods		
Environmental	3	Consumer goods companies are exposed to material environmental risks across their value chain. First, waste associated with the end of life of the product and its packaging is likely to drive new regulation and result in substantial compliance costs. In addition, consumer goods companies are exposed to environmental risks in supply chains. The sector sources its raw materials from the agricultural, mining, forestry, chemicals, and oil and gas supply chains, which have significant land, water, emissions, and pollution impacts. Finally, we believe that consumer goods companies are exposed to environmental risks associated with product manufacturing, distribution, and use. These activities may result in significant water consumption, pollution, and energy use. The nature and scale of the impact largely depends on the nature of the product sold. New regulation may incentivize companies to reduce single-use products, switch to low-carbon freight, and develop energy- and water-efficient products and processes.
Social	3	Consumer goods companies are exposed to material social risks across their value chain. First, they are exposed to consumers' fast-changing preferences: innovation and product development are critical to navigating changing consumer preferences, supporting brand value, and maintaining high customer satisfaction and retention. In particular, we expect growing demand for sustainable products, transparent labelling, and responsible advertising to continue, and transition the industry toward purpose-led brands. Second, product safety is a major risk. The manufacturing and use of unsafe products--with harmful components or where a product has malfunctioned--can put the health of employees and users at risk, and result in substantial reputational and financial costs. Finally, they are exposed to risks related to working conditions throughout the supply chain: the manufacturing and distribution of consumer goods, as well as the sourcing of raw materials, rely on a complex and global value chain. This exposes consumer goods companies to human rights breaches and poor working conditions, especially if their suppliers operate in regions with lower labor standards. The tobacco sector has higher social risk due to the health consequences of smoking. It also has stringent regulatory requirements for promotion, marketing, packaging, labeling, and usage. The secular decline of combustible cigarette usage is accelerating. Companies within the sector have managed to offset a good portion of volume declines with prices, and in some cases are diversifying into e-cigarettes and cannabis. However, the latter have short track-records in terms of public health effects, and could become subject to increased controversy.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Chemicals		
Environmental	5	The manufacturing of base chemicals, fertilizers, and industrial gases is highly energy intensive, often using hydrocarbons as feedstock. This results in significant greenhouse gas emissions. The chemicals sector is also exposed to waste, pollution, and toxicity. Air emissions other than greenhouse gases include nitrogen oxide, sulfur oxide, and particulate matter. Even more so, solid waste pollution such as plastics, and hazardous or toxic waste are material environmental risks. This is reflected in long-established regulatory oversight that has become more stringent over time. We view the agrichemicals and petrochemicals subsectors as having the highest environmental exposure, with specialty chemicals, paints, and industrial gases having lower exposure. Petrochemical production facilities are among the most energy-intensive, which in many instances leads to rising exposure to emissions regulations, as well as the risk of rising carbon and energy prices. When looking at the value chain, fertilizers and crop-protection chemicals are particularly exposed to high water use, and land and biodiversity risks, as well as climate change and physical risks. Opportunities in the chemicals sector stem from products that enable lightweighting applications, ones used for water treatment and those that improve the efficiency of resources. Innovations in improving the recycling rates of plastics could also be a green development opportunity for chemical companies. Controversy related to fertilizers has arisen because of concerns about their damaging effect on ground waters, biodiversity, and human health, but they also have a role in improving yields and quality of crops.
Social	4	The key social risks for chemical players are product safety and employee health and safety. Product safety and human health effects can result in hefty regulatory fines, bans, and reputation damage (Bisphenol A for example). Crop-protection chemicals such as glyphosate have attracted litigation related to allegations that they are carcinogenic and harmful to human health. The major human capital risk lies in promoting workplace safety given that chemical manufacturing uses toxic chemicals and inputs and very-high-temperature processes. Companies also need to be prepared for low-probability but potentially high-impact accidents that could injure/poison employees and local communities. Such events can result in financial claims, loss of operational licenses, and community opposition. The chemicals sector is also exposed to changes in consumer behavior driven by environmental and health considerations, notwithstanding the current rising demand for chemical products notably in developed countries and their innovative applications. There has been intense scrutiny about the amount of plastic in the ocean and its effects on marine life, for example. Focusing on innovations that address consumer concerns about environment and health is key in this sector. Consumers, notably in developed economies, are willing to pay a premium for farm produce grown without pesticides or fertilizer, which could affect demand for agrichemical products.
Health care		
Environmental	2	The health care sector includes health care providers (for profit and not-for-profit), pharmaceuticals, biotech and suppliers of health care equipment and devices. Although generally well-managed, health care companies have exposure to environmental risks related to energy use, water use, and waste discharge. The industry uses a lot of water and energy, particularly in pharmaceuticals and health care providers. However, compared with other industries, health care companies are not heavy users of land or fossil fuels, and greenhouse gas emissions are relatively low. Proper handling and disposal of toxic materials, whether bio-hazardous materials generated at hospitals and health care centers or toxic materials used in the manufacture of pharmaceuticals, life science products, and medical devices, is key. Climate events can represent risks, but are mainly opportunities. For pharmaceutical and medical equipment companies, opportunities exist in the development of medicines and treatments to cure new climate-related diseases. However, for providers, there could be some risks from climate and environment-related diseases should the costs and demands of treating those illnesses exceed operational and financial capacity.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Social	3	Social risk is the most important component of the ESG framework for the health care industry given its critical role in society. Pressure is mounting on issues such as the growing gap in access, pricing transparency, cost control, and the focus on increasing safety and quality of care. Longer term, demographic changes, such as aging populations in developed countries, will further increase the societal need for health care. Access to affordable medical care and medications are major themes, including companies' pricing and claims payment policies. In many geographies and segments of the population, access to affordable, quality care is difficult to obtain. In countries where the health system has diverse payors and organizational structures, some organizations provide health care and related services without compensation or for very low, often unprofitable rates. An organization's commitment to continue providing these services, for the good of the local community, will increasingly come under pressure given expected rising demand and costs. Safety is also a major risk given that medical errors--including product recalls, misuse, and failure--could lead to public health issues, an erosion of public trust, and litigation. This could weaken a company's reputation and financial position, as highlighted by the recent opioid crisis. Pandemics pose another social risk in terms of the ability of health care systems to manage and treat large volumes of patients while assuring the health and safety of workers and patients. Given the health care's reliance on highly qualified personnel and shortages of physicians, leading to competition for physicians between subsectors, human capital management (such as promoting good working conditions, protecting employee health and safety and retaining talents) is an important consideration.
Insurance		
Environmental	3	The insurance sector mostly faces the risk of more claims and indirect exposure from investment activities, balanced with its low use of physical infrastructure and facilities as part of its direct activities. Insurers are primarily service providers that produce low greenhouse gas emissions and pollution, with little land and water usage, even if their rising use of IT services (digitization, cloud computing, and big data) is increasing CO2 emissions. However, the insurance industry is exposed to the increasing frequency and severity of extreme weather events, which push up the cost of related insurance claims. Natural catastrophe claims typically represent only 2%-3% of total global insurance claims but are more material for specialist catastrophe risk reinsurers. However, in recent years, we have witnessed prolonged, elevated catastrophe claims related to weather events: for example hurricanes Harvey, Irma, and Maria in 2017; Japanese typhoons Faxai and Hagibis in 2018; Hurricane Dorian in 2019, as well as the spate of secondary perils in recent years such as the U.S. and Australian wildfires. The sector is also exposed to the potential additional cost of health care claims related to air, water, or soil pollution. A strong mitigating factor is that insurers typically can reprice non-life insurance contracts annually. Finally, as some of the largest investors in the world, insurers are financially at risk if the value of companies they invest in becomes depressed because of environmental risks. However, they usually have well-diversified investment portfolios, and many of the largest rated insurers globally are proactively building/acquiring tools to assess climate risks (transition risks, 1.5° alignment risks, physical risks) to reduce their investment exposure to environmental risks.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Social	3	Because the insurance sector is labor-intensive and relies on customer trust, the management of human capital and customer relationships is paramount and poses material social risks. Greater use of digitization, automation, and AI brings new challenges and threats and requires insurers to adjust their business models. This includes continuously training employees in new distribution channels, products, and regulations. Since insurers are also outsourcing and offshoring an increasing number of tasks to trim costs and reduce the workforce, responsible management of supply chains will become more important. Another challenge is how to keep and attract talent, especially the younger generation, which tends to favor innovative and agile companies. Positively, insurance employees typically benefit from safe and healthy working conditions relative to many other sectors. Insurers rely on customer trust to maintain their franchises. Issues regarding conduct with retail customers, such as misselling or unclear insurance terms, can cause serious financial and reputational damage. IT issues that disrupt customers' access to online insurance services, risks of data leaks, and concerns over treatment/privacy of data are important risks that can result in fines and tarnish brands. In addition, as a collector of risks, the insurance industry could face significantly more claims in a mass litigation (asbestos, opioids, or sexual molestation for example). Longer life expectancies could hit life insurers by affecting products covering longevity risk. Severe controversies associated with companies in insurers' investment portfolios, such as those related to human rights, labor rights, non-ethical business behaviors, could also cause financial loss and tarnish reputations.
Leisure		
Environmental	3	The leisure sector comprises a large variety of subsectors: casinos and gaming, leisure facilities, hotels and resorts, cruise lines, and leisure equipment and products. It is exposed to a host of environmental risks that are often interconnected. Risks may increase over time as climate change effects become more disruptive. The increasing frequency and severity of extreme weather events can dampen visitor numbers or damage and destroy assets for example. Ocean acidification and degradation of natural capital can adversely affect the quality of some destinations and lead to burdensome costs for operators concentrated in ecologically sensitive locations, impacting land use. The sector also has exposure to lifecycle waste generation from operating cruise ships, hotels, casinos, and sporting events, which use food, potable water, and other consumables. Cruise companies also have the cost of disposing of steel and other raw materials as ships age and retire. The ability to demonstrate and communicate supply chain sustainability is a key factor for leisure companies because of their consumer-facing and service-oriented roles. Regulatory and legal exposure to issues of waste, emissions, and biodiversity will continue to grow over time and could be particularly impactful for a subset of leisure operators, especially cruise operators and leisure goods manufacturers. Along with increased costs of compliance, this exposure will likely encourage investment in environmentally friendlier innovations like low-emission fuels, efficient leisure goods manufacturing, and sustainable lodging and related certifications.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Social	4	A leisure company's ability to generate profits will depend on its ability to respond to and act on myriad social risks. Major risk factors relate to customer engagement, product safety, data privacy, security, human capital management, and communities. Given the customer facing nature of the leisure industry, exposure to changing customer perceptions and preferences is high and partly driven by social media exposure. Technology has changed the leisure landscape, introducing new ways for consumers to research and purchase travel and enabling greater online gaming access. Leisure companies may need to invest substantial capital to maintain customer trust and ensure data privacy, given the discretionary nature of products and services. Security is another key social consideration. Although difficult to predict, events such as terrorism, geopolitical unrest, and health scares can significantly weigh on travel and leisure demand. Examples include the aftermath of September 11, the European terror attacks in 2015 and 2016, and the COVID-19 pandemic. Product and services safety risks have included fires and fatalities on cruise ships and in several theme parks around the world. Toy and goods manufacturers may face severe reputation and liability risks stemming from unsafe products. We believe many leisure companies face scrutiny about their ability to provide clear and transparent labelling of manufactured goods and communication about the terms of their service offerings, including health and safety measures, as well as their ability to address customer complaints. Leisure companies also often serve a very important role in local communities because substantial revenue is generated by tourism and gaming, and many customer-facing jobs are supplied by these activities, which makes human capital management another key factor. Subcontracting seasonal labor is a common practice, hence compliance with human and labor rights is needed. Increased regulations to protect local communities from the perceived harmful effects of problem gaming can also impair profits. Intensive tourism can create conflicts with local communities, posing another important social risk.
Materials		
Environmental	4	Operations in the materials sector are typically resource-intensive and may result in substantial environmental effects and risks. This will vary by subsector. Building material companies are highly exposed to greenhouse gas, water, waste and pollution, and biodiversity risks. Cement and other heavy-industry building materials companies typically need to extract, transport, and process raw materials to produce end-products, which results in greenhouse gases, other air emissions, solid waste, and water consumption. The cement industry, together with steel, ammonia, and ethylene, produces about half of total CO2 emissions in the industrial sector. Most large cement players, particularly in EMEA, are committed to reducing carbon emissions in line with the Paris Climate Agreement, mainly through greater usage of alternative fuels and raw materials to reduce the clinker ratio. Physical climate effects such as floods, drought, and extreme weather may also affect facilities in the sector. We view container and packaging companies as less exposed to environmental risks than peers, with energy consumption, greenhouse gas emissions, waste, and the use of plastics being the most salient factors. The industry's opportunities include environmentally-friendly initiatives like recycling and lightweighting, as well as reusable, compostable, and recyclable products. Stricter regulations and increased consumer awareness are driving the recent focus on reducing packaging waste, leading to rising demand for more environmentally friendly packaging alternatives and bans on certain plastic packaging in some countries and U.S. states. We expect more regulations will affect the sector. Nevertheless, plastic packaging remains widely used, and we believe it will continue as a key input in some industries due to its unique properties (shatterproof, hygienic, durable, flexible, and lightweight). The pulp sector carries significant environmental risks. Pulp companies are highly water- and energy-intensive albeit somewhat mitigated by lower carbon emissions and energy costs thanks to cogenerating energy from pulp residues. Pulp and paper producers have to focus on the quality and smell of water and air during the production process, bearing in mind the extensive use of chemicals in pulp bleaching. Integrated pulp producers (owing their own forests) are also significantly exposed to land use and biodiversity risks that can be offset by applying sustainable forest management principles (land and biodiversity), as well as to climate change risks that can potentially affect forest health, and severe weather risks (forest fires).

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Social	3	Consumer behavior is increasingly influencing materials companies in the form of greater demand for more sustainable products and accelerated innovation. Consumers are seeking alternatives to traditional plastic packaging, and plastic packaging producers are trying to refocus product ranges toward more sustainable (biodegradable, recyclable, or lightweighted) products. Evolving consumer habits, toward more digitalization and recycling, have weakened demand for graphic and publishing paper. However, the paper sector could benefit from the ongoing move toward plastic-free and more recyclable packaging. Employees and contractors working in construction materials facilities face health and safety risks. That said, companies typically track and manage incidents and have specific programs to educate workforces, which has lowered safety management risk, particularly in developed countries. We believe that forestry and pulp and paper companies face significant social risks stemming from relationships with local communities that might have concerns about water or air pollution.
Media		
Environmental	1	There are few environmental risks for the media sector due to the low and indirect use of raw materials and relatively minimal direct waste output for most of the companies we rate. Content generation companies such as movie studios and advertising agencies generate revenue through intellectual property (IP) development via human capital and creative talent, which creates nominal waste through content production activities. Likewise, media distributors such as television and radio broadcasters have minimal environmental impact outside of their installed communication networks and office facilities. While print-based media such as newspapers, magazine publishers, and printers do emit both liquid and solid waste in their manufacturing processes, we believe current regulations that control byproducts and the declining use of print mean environmental risks for these companies will diminish long term. However, the growing reliance of media consumption on digital distribution and cloud services has increased certain media companies' dependence on data centers in their value chain. Data center operations consume substantial electricity and water, and we believe digital media companies are indirectly exposed to increasing greenhouse gas and water risk as growth in this part of the value chain continues.
Social	5	The media sector's social risks are significant and often correlated. Major risks include IP theft, data privacy, content regulation, social media activism, and key talent retention. IP theft is a substantial risk for most media companies because their business models depend on creating and monetizing proprietary IP with exclusive use rights. Any IP theft would hurt these companies' reputations, competitive advantages, and ultimately their future profitability. Data privacy and security is another significant threat to the industry. Social media companies collect a varying degree of personal or pseudonymous user information that creates substantial risk if this private data were stolen or compromised through operational malfeasance. We believe that as content companies reach for more thrilling or nontraditional entertainment they may face backlash or censorship from content users, governments, or regulators, which may inhibit future revenue growth and profitability. This risk could increase as content producers expand distribution internationally to different cultures and belief systems. Regulatory risks for content producers, and news media companies in particular, include increased consumer and regulatory attention to journalistic integrity, transparent reporting, and the influence of news media on consumers. Consumer or regulatory backlash from any of these risks could impact a company's license to operate, or hurt potential revenue and profitability. Recently, social media movements through microblogging have proliferated. High-profile media companies or media figureheads run the risk of being implicated in a social movement, which could hurt brand reputations and potentially lower growth prospects and cash flows. We view media companies as substantially exposed to key person and key talent risks because they depend on individuals with extraordinary creative talents, charismatic influence, or similar leadership qualities to drive revenue growth. Without this key talent, it's uncertain whether these organizations could maintain critical sales relationships, comparative advantages for creative content, or organizational momentum.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Metals and Mining		
Environmental	6	Mining inherently threatens the environment and competes with other businesses and communities for water and electricity. It can also release toxic elements into the air, water, or soil. Open pit and underground mining involves crushing and treating large amounts of ore, resulting in tailings that can alter ecosystems if not contained properly. Other types of mining like heap leaching use toxic fluids (cyanide or sulfuric acid) that are devastating if leaked into the environment. Alloy production such as steel or aluminium is extremely power-intensive and a heavy air polluter. Steel mills generate significant carbon dioxide, nitrogen oxide, and particular matter that need proper treatment before being released into the open air. Finally, coal-fired power plants are the world's most greenhouse-gas-intensive assets which is why governments are increasingly limiting them and encouraging greener forms of energy.
Social	5	Social risks are substantial in the mining sector. Despite efforts to improve conditions, safety risk is still higher than in other sectors, both for employees who work under difficult conditions in many cases and for communities who may be exposed to accidents, and may also face adverse economic consequences when mines close. Both, of course, can have pronounced financial effects and enduring reputational consequences, with the potential to diminish a social license to operate and sometimes the actual removal of a permit. The sector also faces significant workforce issues. Diversity remains low, and high unionization can periodically lead to labor disruptions. In some parts of the world--generally in remote areas with limited workers' rights--human rights violations may be common and require policies and monitoring to prevent; these issues are more relevant for mining operations than for metal production. Finally, given the commoditized nature of the sector, exposure to customer-related risk is relatively low.
NBFI		
Environmental	2	Environmental risks for non-banking financial institutions (NBFIs; including asset managers) balance the low use of physical infrastructure and facilities needed to operate against material indirect exposure from lending and investment activities (via borrowers and customers). Direct CO2 emissions are limited because NBFIs typically have relatively small footprints, but the fast-growing use of IT services especially in financial market infrastructure companies and some fintech companies in the lending space (digitization, cloud computing, big data) is increasing CO2 emissions. An NBFI's ability to consider these environmental risks and develop policies to ameliorate them can enhance/weaken its reputation. Regulators, investors, customers, and activists are increasingly looking at the nonbank sector's contribution and exposure to environmental risks through their lending and investment activities. For example, in certain subsectors, such as commercial real estate and fleet management, the exposure to physical infrastructure is higher and such subsectors may become the outliers for the environmental score. Nonbanks' ability to develop or acquire tools to assess and reduce the climate-related risks of their lending and investment portfolios is also an important environmental factor.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Social	3	Because the nonbank sector (including asset managers) is generally labor intensive and relies on customer trust, the management of human capital and customer relationships is paramount and poses material social risks. Evolving customer preferences, and greater use of digitization, automation, and AI brings new challenges and threats and require nonbanks to adjust their business models. This includes continuously training employees in new distribution channels, products, and regulations, as well as outsourcing and offshoring an increasing number of tasks to trim costs and reduce the workforce and physical footprint. Responsible management of supply chains will become more important. Another challenge is how to keep and attract talent, especially the younger generation, which tends to favor innovative and agile companies. Positively, nonbank employees typically benefit from safe and healthy working conditions relative to many other sectors. Some nonbanks depend on customer confidence to maintain their franchises. Issues regarding conduct with retail customers, such as misselling or fraudulent activities like money laundering or tax evasion, can be more substantial with nonbanks facing retail customers, and cause serious financial and reputational damage. IT issues that disrupt customers' access to nonbank services, risks of data leaks, and concerns over treatment/privacy of data are important franchise risks. Growth in the nonbank sector has been substantial since the 2008 global financial crisis. While regulators are closely watching certain subsectors such as payday lending, student loans, leveraged lending, and residential mortgage origination/servicing, the industry's regulation and supervision is typically less strict than for banks and this can sometimes result in more aggressive underwriting or collection practices, or more opaque pricing considerations for certain NBFIs (which may become the outliers for the social score).
Oil and Gas		
Environmental	6	The upstream and downstream oil and gas sector is inherently exposed to risks associated with greenhouse gas emissions and pollution, including the impact on biodiversity. Exploration and production has the highest exposure given its sensitivity to long-term oil prices, which is influenced by the pace of the energy transition. Producers are also exposed to spills and leaks (notably offshore), and water use and contamination risks (particularly relevant for shale oil and gas producers as a result of hydraulic fracturing activities). Oilfield service companies' direct environmental exposures vary, with offshore drilling bearing the highest risks (including contaminated drilling mud discharge to the seabed, oily water discharge to the sea, or low-probability, high-severity outright oil spills). Supply vessels are at the other end of the spectrum. We see refining as slightly less exposed than exploration and production, in part given the onshore location of assets and lower risk of uncontrolled pollution. That said, refineries' long asset lives subject them to tighter environmental regulations (for example, reduced sulfur emission standards for bunker fuel oil agreed by the International Maritime Organisation) and long-term demand for oil. Since natural gas emits half the CO2 of coal in power generation, we expect gas to play a role as a bridge fuel in the energy transition over the next two decades or so. Its share is likely to come under downward pressure from clean energy sources when sufficiently developed.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Social	5	Safety management is a key risk for the oil and gas sector given drilling activities and sometimes harsh environmental conditions, especially offshore. Companies typically track and manage incidents and have specific programs to educate workforces. The other key factor relates to their social license to operate, given land use, biodiversity damage, and other disruptions, as well as safety and health considerations that drilling, production, and refining sites can typically create for nearby communities. Relationships with communities and governments are important in that a lack of shared benefits could create opposition. If these risks are not properly managed, oil and gas companies risk not only damaging their social license to operate but also losing their permit to operate. Long-term consumer behavior will likely become more influential in the energy transition away from carbon fuels and disposable plastics (plastics being largely derived from petrochemicals, which account for about 14% of crude oil production) or those uneconomical to recycle. The adoption of low-carbon electric cars will not meaningfully affect oil demand in the next decade. These trends, together with a general shift to increased electrification (fuelled by renewables growth) will reduce the value of oil reserves in the long run and generate "stranded assets" and reduce the oil and gas market valuation. A mitigating factor to an unforeseen or accelerated drop in oil demand stems from the natural decline of oil and gas fields (4%-5% per year), which may help balance supply and demand.
Oil and Gas Infrastructure (Midstream)		
Environmental	4	The primary environmental risks facing the midstream sector are greenhouse gas emissions and pipeline releases. Directly, midstream companies face exposure to methane emissions, though the sector generally has been effective in reducing these emissions in recent years. While not currently extensively regulated, these emissions are substantially more potent than carbon. However, longer term, the sector faces risk related to the energy transition and physical climate change, both chronic (mean temperatures reducing process efficiency for example) and acute (storms and extreme heat/cold causing damage and operational disruption). Demand for oil is already facing headwinds and demand for natural gas could too, eventually, as renewable resources make inroads. This is likely to more directly affect oil and gas exploration and production companies and power generators, but could also have indirect, significant consequences for the midstream sector. The sector also remains exposed to pollution risk in the form of potential pipeline leaks. Water use is not currently a major risk, though the sector does face risk related to land use and biodiversity for new projects, with the latter potentially exacerbated in climate-sensitive regions.
Social	4	The primary social risk for the midstream sector stems from maintaining safe operations. Safety metrics have largely improved, but both employees and communities remain exposed to potential accidents, whether they be leaks or explosions. This is partly why community engagement also represents a significant risk. Numerous pipelines in the U.S. and Canada have faced financial consequences from delays associated with protests and more stringent regulation related to the development of new assets. That said, given that much of the required infrastructure in North America is already built, this risk will likely diminish in the future. The sector has limited employee diversity and an aging workforce. At times the potential for labor supply shortages arises. Customer engagement risk is comparatively low given the business-to-business nature of the sector.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Power		
Environmental	5	The primary environmental risk facing power generators stems from the sector's production of greenhouse gas emissions, accounting for about 40% of global emissions (source: IEA). This implies governments are likely to increasingly regulate these emissions as they seek to stem the effects of anthropogenic climate change. The magnitude of this risk varies sharply depending on generation type, ranging from coal-fired, which faces an existential threat in many parts of the world, to renewable energy, which is seen as necessary for energy transition. The sector faces also growing risks around waste and pollution, with coal generation again highly exposed due to its creation of coal ash and particulates, both of which have come under increased regulatory scrutiny and can be costly to remediate, while nuclear generation leads to vast stores of radioactive waste that can't be easily, quickly, or inexpensively disposed; other subsectors still face pollution risks but are less exposed in the near term. Conventional generators also rely heavily on access to water as a cooling fluid. In water-stressed regions, generators may face difficulty or increased costs procuring water, especially as climate change creates longer and more severe droughts. As power generation is a broad sector grouping, certain subsectors face bespoke risks. Nuclear power is carbon-free, but carries significant low-probability, high-impact event risk that can have wide-ranging and enduring reputational consequences. The safe and permanent disposal of radioactive nuclear waste is another highly complex and difficult environmental problem yet to be solved. As for renewable projects, hydro-power may have near-zero emissions during the use phase but occupies more land than other generation types, sometimes in areas of high biodiversity. Large hydro-power plants can mean the forced resettlement of local communities. Wind and solar also occupy a significant amount of land, and, over time, will likely increasingly rely on battery technology, which creates indirect exposure to environmentally-taxing metals extraction. These projects can also create substantial non-recyclable waste at the end of their lives.
Social	4	Safety management is a critical risk for generators; safety metrics have generally improved in the sector, but there is still exposure to financial and reputational liability stemming from workplace fatalities, as well as to major accidents, notably for coal and nuclear facilities, that spill beyond the generating facilities. These are less common but can weaken a company's social license to operate, and can damage a company's community standing. Generators sometimes face community backlash on environmental grounds, while plant closures can also be highly disruptive to communities. One of the more acute social risks that generators face relates to the workforce. As energy transition takes hold globally, and generation types transform in response to regulation, required skills will also change; consequently, generators with limited age diversity face some exposure and costs associated with reskilling workforces. Unlike regulated utilities in the U.S., the need for direct customer engagement is comparatively low, in part because generators have historically produced a commoditized product. However, as end-users increasingly vet generation for its environmental footprint, this relationship will become more central to generators' decision making. This risk could become more pronounced, too, for integrated utilities, as well as for pure generators who are acquiring retail operations. While utilities are the direct guarantors of reliability and affordability to customers, they are also unable to ensure this without strong and efficient operating performances by generators, who can often be penalized, financially, for an inability to perform.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Real Estate/Public Housing		
Environmental	3	The most significant environmental risk for the real estate sector (real estate operators, homebuilders, developers, and social housing providers) involves mitigating climate change. This includes improving energy and water management to reduce building emissions, and enhancing the resilience of properties to climate events. The building and construction sector accounts for 39% of global carbon emissions including 28% from the energy required for heating, cooling, and lighting, and 11% from emissions associated with materials and construction processes throughout the building lifecycle (source: worldgbc.org). The sector is vulnerable to extreme climate events at the asset level, particularly inland flooding, rising sea levels and coastal floods, and hurricanes or typhoons. Properties are also subject to cold spells, heat waves, drought, and heavy rain, which can adversely affect facilities. Building construction also generates significant waste, including hazardous waste. Environmental risk varies by subsector and depends on the location, asset class, and use of the asset along with the intensity of construction activities. However, companies are increasingly enhancing their environmental performance to reduce operating costs, improve property values, and attract and retain tenants. Tenants are implementing green leases to improve their environmental footprint, by strengthening their ties with stakeholders and supporting customer requirements to adopt better environmental and social frameworks in their operations, as part of the value chain. Most tenants' customers are adopting ESG sustainability parameters; green lease structures help them to improve these parameters and enhance their sustainability framework reporting. Market dynamics and risk exposures are less a concern for social housing operators. They generally have fewer resources to address maintenance and sustainability issues and cannot reposition their assets given their mandate to serve a specific community. Low-income tenants have generally fewer available housing options, resulting in price inelasticity. In terms of environmental effects from construction and exposure to emissions and waste, social housing is similar to other private developments, but runs less risk of falling foul of regulatory standards.
Social	3	The sector's most material social risks stem from employee health and safety during construction, tenants' requirements that buildings comply with the latest safety and environmental regulations, and local communities' perceptions of companies' safety and environmental practices. Changes in consumer behavior and demographic trends are influencing companies' operating strategies and attitudes to ownership of specific assets or developing assets, as we see more developments focus on employee safety, wellbeing, and affordable community developments. Major safety incidents at buildings can severely affect communities. Moreover, the built environment plays an important role in occupants' health, wellbeing, and productivity given people spend nearly 90% of the time indoors. Construction is another important area of risk, especially given the manual labor required from employees and subcontractors, where safety risks are significant and poor performance can weaken their social license to operate. Housing affordability is a growing concern in some markets. Social housing benefits from regulatory frameworks that translate central or local government objectives into more predictable operating environments than for private sector peers. Not-for-profit housing operators are not significantly exposed to consumer preferences as providers of safety-net accommodation; rather, we see more localized risks related to residents being opposed to public housing or negative externalities (high crime for example). Similarly, if a public housing association fails to keep its residents safe with proper housing standards, its reputation and relations with various stakeholders can be damaged, increasing risks around social cohesion and community unrest.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Retail		
Environmental	3	The principal environmental risks facing the retail industry are emissions and waste reduction. Tighter greenhouse gas emission regulations present moderate longer term risks. The majority of greenhouse gas emissions in the industry are produced along the supply chain rather than at the store level. That said, expansive store footprints require substantial energy consumption for lighting and cooling as well as refrigeration for perishable foods. The rapid growth of ecommerce and home delivery is also contributing to increased emissions. Retailers must balance compliance costs with optimal customer delivery. Companies can utilize both owned and outsourced capacity for logistics to provide flexibility by selecting service providers with lower-emission outputs. Retailers are a significant source of solid waste including packaging/shipping materials, unsold goods, single-use plastics, and food waste. The secular shift to online shopping, accelerated by COVID-19, has contributed to increased product and packaging shipping material waste. The rapid growth in off-premises dining (take-out and delivery) is increasing the use of disposable food containers. Minimizing and diverting waste from landfills is another important consideration. Retailers and restaurants that invest in more sustainable production, products, and packaging may be able to better manage costs and maintain brand affinity. Land use is a risk for both customer-facing and logistics operations. Retailers and restaurants also face environmental risks due to their value chains' heavy reliance on water in agricultural and manufacturing processes. Although lightly regulated today, the retail industry could face challenges to its supply chain in the future if water and land-use regulations intensify.
Social	3	Opportunities for sales growth or cost improvements could arise if retailers successfully address changing consumer behavior influenced by climate change and a preference for more sustainable products, particularly in the fashion/apparel and restaurant industries (preferences for plant-based protein for example). Retailers can respond by improving labelling, materials traceability information, and sustainable packaging. Human capital management is important in this labor-intensive sector, with its high employee turnover and reliance on temporary workers. Risks relate to the satisfaction/motivation of the customer-facing workforce and an organization's ability to execute change. Fair compensation, good working conditions, and the health and safety of retailers' direct and indirect (through supply chain transparency) workforces are important social considerations. With the growing impetus to move toward omnichannel business models, retailers are looking to optimize store portfolios and cost bases, and restructure workforces. As retail is a large employer, it has a greater onus to upgrade employee skills and knowledge. Retailers and restaurants need to manage product-sourcing risks and focus on building responsible and sustainable supply chains. From a community perspective, companies' focus on instituting responsible sourcing standards (especially for retailers with private-brand apparel) and avoiding human rights violations across the value chain form key social risks. Brand reputation is inextricably linked to product quality and safety. For grocers and restaurants in particular, risks around food safety need to be properly managed. Foodborne illnesses present a significant risk to consumer health and companies that fail to safeguard against outbreaks can face irreparable reputational damage as well as stiff legal costs. The growth of ecommerce and loyalty programs has given retailers troves of consumer data and the responsibility to safeguard it. The onus of protection is growing, partly due to the negative attention that a data breach can cause. An inability to manage cyber risks could cause reputational damage that, in turn, hurts customer loyalty. Ultimately, an inability to keep customer data secure may see the removal of a company's license to operate.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Services/Education		
Environmental	1	The services sector includes consumer services (including for profit and not for profit education providers) as well as distribution, environmental, facilities, professional, and general support services. Companies typically have little to no manufacturing or industrial operations and are not resources-intensive. Environmental risk in the business services subsector is low given companies' overall minimal exposure to the effects of energy consumption and greenhouse gas emissions, waste and water management, air and land pollution, and toxicity. Fuel consumption and associated costs can be more material for distribution or facility services companies, although high route densities often mitigate this. Climate change is a minor risk for companies sensitive to food input costs, energy and fuel costs, or weather patterns. The education subsector carries similarly minor environmental effects, and exposure is generally limited to energy consumption and localized severe weather changes or natural disasters that affect educational facilities. Sustainability and energy-efficiency upgrades to buildings continue to decrease the subsector's energy and emissions footprint.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Social	2	The services sector faces modest inherent social risks, but the heterogeneity of business models and end-markets can result in considerable variation in social risk factors faced by individual firms at the margins. Companies may be labor-intensive, with employees operating potentially hazardous equipment or on dangerous sites, which heightens safety management risks. Others may operate in the knowledge economy with primarily desk-based personnel, resulting in minimal safety risks. They may manage confidential data, have exposures to consumer behavior and demographic shifts, which present customer and engagement, and community, risks. Very few providers have heightened risks across multiple social factors, and sector fragmentation is likely to cause less severe manifestations than may occur in more consolidated industries. Human capital and safety management and consumer behaviors are the most common social risks faced by sector participants. While workforce mismanagement can disrupt operations, work stoppages or shortages occur less frequently than many other sectors as union employment is uncommon among service companies, interruptions are not as costly, and employees are often easily replaced. Safety management, another risk for labor-intensive operators, is particularly critical for security providers whose staff are subject to dangerous working conditions, though these companies have protocols to minimize the frequency and severity of most high-risk events. Shifting consumer preferences can present both opportunities and risks--for example, the transition to ecommerce has disrupted companies serving brick-and-mortar retailers, but has also created opportunities for virtual service providers. Other companies must deal with the increasing influence of millennial consumers and the declining influence of baby boomers on services relating to lifestyle. Breaches of data protection and cybersecurity are becoming increasingly pervasive and damaging. As the frequency and severity of hackings increases, companies need to invest in technology to stay ahead of sophisticated hackers. The effect of pandemics on business services is moderate, with considerable variation across service lines and business models. For example, labor-intensive on-site services such as catering and staffing are a lot more susceptible to outages caused by quarantine measures than consulting, legal, or insurance services, much of which can be provided remotely. Pandemic effects can also vary markedly across end-markets, even where business models are similar. The education sector shares some similarities with business services, such as exposure to human capital management. However, education services companies are more exposed to workforce interruptions than business services given their skilled labor base and propensity to cause more disruption to operations with any stoppages, especially where employees are heavily unionized. Also, factors such as demographic changes, the social debate around affordability of higher education, and the potential impact of policy changes and geopolitical issues play a large role in shaping the overall risk profile of the education sector globally. However, we believe the education sector provides opportunities and supports social cohesion, and this essential service ensures strong customer demand, some inelasticity in service need, and government and philanthropic support, which mitigate some of the social risks aforementioned. Pandemics have material effects on the education subsector, varying across institutions. Quarantine measures affect operating revenue (particularly auxiliary revenues and state appropriations for public universities) and may impact research funding. A switch to entirely online learning may further pressure the value proposition of a college degree. Institutions best equipped to quickly pivot between online and in-person learning, and maintain a strong value proposition, may face less pandemic-related pressure relative to peers without these characteristics.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Technology		
Environmental	3	The technology sector has direct and indirect environmental risk exposures arising from manufacturing operations, manufactured products, and the use of the internet's physical infrastructure. Hardware and semiconductor firms disproportionately contribute to the sector's environmental risk exposure, compared to software and services firms. Their environmental exposure primarily lies in their indirect operations, as the vast majority of their manufacturing operations are outsourced to suppliers. Asset-intensive manufacturing operations are responsible for most greenhouse gas emissions, given the significant energy consumed in the production process. Largescale consumption of chemicals and non-renewable resources (water, minerals, and metals) tasks companies with carefully managing pollution risks and product lifecycles to recycle materials and reduce/mitigate environmental damage. Technology companies also rely heavily on critical materials, some of them produced mainly in few countries and/or in politically unstable countries. The sourcing of conflict minerals (tantalum, tin, tungsten, gold, largely used in electronic components) has been increasingly regulated and the production of rare-earth commodities is concentrated in very few countries. Technology software and services firms generally have limited physical infrastructure, but they still depend on hardware to power their offerings. This simply shifts the same risks further down the value chain. Given these risks, and increased regulatory and industry focus, hardware and semiconductor companies have increasingly emphasized creating and implementing best practices that extend to their vast global supply chain networks. We believe that these supply chain arrangements, if managed appropriately, present an opportunity to operate more efficiently and in a more environmentally friendly manner. This could improve the environmental risk exposures for hardware and semiconductor firms over time.
Social	4	Major social risks relate to supply chain management, information privacy and security, and workforce and diversity. Many technology companies collect, manage, and monetize sensitive information that is at risk of misuse. Any theft of corporate or individual information could damage a company's reputation and earnings prospects, and increase the risk of regulatory scrutiny and restrictions. For example, noncompliance with the EU's General Data Protection Regulation could carry fines of up to 4% of worldwide revenue. Workload migration to the cloud mandates maintaining a reliable, secure, and economical cloud-computing platform to ensure client satisfaction and mitigate regulatory intervention. Additionally, gender inequality, workforce diversity, skilled labor force and staying ahead of rapid changes in preferences and tastes are all basic operational requirements for technology companies. Health and safety and human/labor rights issues related to working hours, conditions, and labor shortages are also major areas of concern, particularly at suppliers in Asia. Given the environmental and social risks and the closer regulatory and industry focus, it is critical for hardware and semiconductor companies to effectively manage their complex global supply chain networks to extend environmental and social best practices. We believe that supply chains, if managed appropriately, present an opportunity to operate more efficiently and in a more environmentally friendly manner.
Telecom		
Environmental	3	The telecom sector is experiencing a rapid rise in energy consumption driven by the explosion of data usage and processing across its networks. The growth in data traffic directly results in higher electricity consumption and indirectly relates to global greenhouse gas emissions. Telecom-related emissions are mostly Scope 2 (related to energy consumption) and come from both the production of devices (including smartphones) and their usage (in data centers, networks, and direct consumer usage). Environmental responsibility for telcos also includes the end-of-life implications of handsets and equipment used in telecom networks. In many countries, especially in emerging market, there are no facilities to recycle handsets. The telecom sector has more limited exposure to water and land use risks, with the exception of water consumption in data centers. In addition to its effect on the environment, the sector is exposed to climate risks because a notable portion of its operating infrastructure (as well as customers) is exposed to extreme weather conditions like hurricanes, tornadoes, ice storms, or flooding.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Social	3	Data privacy and network stability are the main social factors for telecoms because they are responsible for transmitting information. Failure to protect people's privacy could have significant regulatory and reputational implications for a telco. Also, debate over the societal impact of excessive social media use and the effects of misinformation could increase social pressure to reduce or change usage patterns. Rising health concerns around potential radiation from telecom equipment and devices could affect consumer perceptions of telecom service providers. Telcos are also large employers, typically with a significant unionized workforce (in particular for incumbent players), so human capital management is another key social risk. Given the sector's large and ethnically diverse customer base, community relationships and sensitivity are low but important social-cohesion risks. Safety management risks stem from the industry's technicians and personnel building, and maintaining the telecom infrastructure including towers and data centers. Given the sector's expansive reach and visibility, consumer confidence in telcos' community engagement, social equity, and corporate citizenship also contribute to our social risk assessment.
Transportation		
Environmental	4	Transportation includes airlines, air freight and logistics, road transportation, shipping, and rail. As a result, its subsectors face distinct environmental risks, notably related to greenhouse gas emissions, other types of air pollution, and to a lesser extent waste. We view airline, shipping, and trucking companies as facing the greatest environmental risks from high and increasingly stringent environmental regulations. For airlines, environmental risk derives primarily from emissions, which represent a rapidly increasing share of the global total. Such risks in the medium to long term largely relate to the 2016 U.N.-sponsored International Civil Aviation Organization emissions-reduction rules that apply to international routes. While the requirements can be met using current and planned aircraft engine technology, compliance could become gradually more costly. European airlines face a separate additional emissions trading scheme. Companies that are able to improve fuel efficiency and lower emissions in a cost-effective manner could benefit over the long term. Shipping companies are subject to regulations promulgated by the International Maritime Organization that mandate lower emissions of sulphur compounds and greenhouse gases. As a result, the industry must transition to using cleaner fuels or scrub emissions. It also must manage biodiversity risk related to the transport of ballast water and invasive species, while waste and fuel spills may also occur. Trucking must also comply with regulations for fuel efficiency, greenhouse gases, and other air emissions. Rail faces environmental regulation but in general the risks are lower. Transportation equipment leasing companies generally do not face direct regulation, but are indirectly affected by regulations on their transportation company customers. Being material-intense industries, many companies in the transportation sector also need to deal with vehicle, aircraft, and ship end-of-life management. Dismantling used ships typically causes leakage of hazardous materials into the environment while harming workers' health and safety. The disposal of other transportation assets, including aircraft and vehicles, is easier.
Social	4	Transportation companies vary in their exposure to social risk. Key areas of focus are health and safety, and managing workforce and labor issues. The airline industry is particularly sensitive to health and safety concerns, including airline safety incidents with reputational consequences and legal liability. It is also particularly exposed to health issues such as pandemics, which can dramatically reduce air traffic, revenue, and earnings, potentially leading to structural industry-wide changes. Labor relations is an important consideration because many airlines are heavily unionized and strikes can be costly and disruptive. Community opposition in relation to noise hindrance or pollution tends to be more focused on airports rather than the airlines themselves. Road, shipping, and rail freight transportation are exposed to health and safety risks relating mostly to workforce safety and accidents that endanger others (such as toxic or flammable spills from rail accidents). Companies in the rail industry tend to be heavily unionized, in contrast to shipping and trucking. Most shipping and some road firms typically utilize contract labor sourced from multiple countries, and historically have faced a higher risk of labor rights violations.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Transportation Infrastructure		
Environmental	3	The environmental exposure of transportation infrastructure reflects its indirect exposure to high emissions and air pollution from the transportation industry itself, such as from cars, ships, and planes. Ports and some coastal airports have long-term exposure to physical climate risks such as rising sea levels, while more frequent and extreme weather events can disrupt airport operators and exposed infrastructure providers, typically for shorter time frames. Railways and mass transportation have much stronger environmental credentials and benefits. Because the transportation infrastructure sector facilitates the movement of people and goods, and is subject to periodic shocks, we expect that underlying demand for these assets will not fundamentally change over the next decade as interest in more sustainable operations increases. These infrastructure providers are exposed to volume risk from increasing regulation demanding their users reduce emissions, airports in particular. Land use and biodiversity are other key environmental considerations. Transportation infrastructure businesses are often in populous urban areas and expanding into less urbanized areas means companies must manage any damage to the natural environment. Planning consent for developments requiring new land, or more intensive use of existing land, can be harder to obtain as governments in some jurisdictions respond to increasingly vocal communities.
Social	3	Social exposure for transport infrastructure is more important given the direct impact it has on airports, rail, mass transit, and roads. This is because these assets provide communities essential mobility that must remain affordable, reliable, and safe. By contrast, ports and waterways have comparatively fewer concerns because they focus on activities in bulk cargo and containers, rather than public mobility services. Also, as they operate in the public sphere, infrastructure operators are particularly sensitive to labor actions, while maintaining sound relationships with unions, communities, regulators, and politicians is equally key. When temporary and outsourced labor is used more intensively, the ability to systematically integrate sustainability objectives into the overall supply chain strategy is an important consideration. The COVID-19 pandemic has underscored airports' higher exposure to health factors, but also for rail and mass-transit services. Security and safety risks, including terrorism attacks, are low-probability, high-impact events for tunnels and bridges, but also rail and mass-transit operators and airports. The effects of congestion, noise, and air quality on communities is being increasingly brought to the attention of media, businesses, investors, governments, and regulators, exposing airports to community opposition notably to airport expansions. By contrast, affordable rail and mass-transit has clear social and environmental benefits. Given the long-term nature of infrastructure assets, emerging or future trends in customer behavior need to be well anticipated. Technological innovation (and data security) and changes in mobility patterns (autonomous vehicles, virtual meetings, rising regionalization) expose infrastructure owners to changes in how assets are utilized and paid for, requiring them to adapt traditional customer engagement practices to these new trends.

Table 1

Sector Risk Atlas (cont.)

Sector	Score	Comments
Utility Networks		
Environmental	3	The regulated utility network sector's exposure to environmental risks stems from its infrastructure assets and exposure to the environmental characteristics of entities across value chains. These networks are generally viewed as having high responsibility for ensuring clean water and air and helping to transition to a lower carbon economy. While electric, gas, and water networks each have unique environmental risk drivers, the most material environmental risks facing these subsectors are the physical effects of climate change and mitigation policies.Each subsector also faces some land-use risk; as they grow they risk encroaching on habitable or undeveloped lands that are more exposed to biodiversity issues in some parts of the world. Electric and gas utilities are exposed to significant energy transition risks, indirectly, through their upstream partners. These risks to networks are moderated, at least financially, by the regulatory support they enjoy and their ability to absorb costs through rate increases. However, less direct reputational effects can be significant given utilities' strong brand recognition. For electric transmission and distribution networks, the physical effects of climate change, including more frequent and severe wildfires, storms, hurricanes, and tornadoes, have the potential to disrupt the functioning of critical equipment and processes. Battery storage has its own set of environmental risks, stemming from mining and end-of-life disposals of materials used in battery units. For natural gas networks, we focus on gas explosions and leaks that emit highly potent greenhouse gases and may adversely affect local biodiversity, leading to costly penalties and reputational damage. For water networks, environmental risks are mainly water quality and availability, sometimes because of inefficient and aging infrastructure. Both water quality and availability--essential for this sector--can be impaired by climate-related factors, including droughts and floods.
Social	4	The regulated utility network sector plays a crucial community role by providing essential services that must remain affordable and reliable to ensure conciliatory regulatory and customer relationships. This is the essence of utilities' social license to operate. However, as infrastructure ages, utilities must also ensure safety as leaks, explosions and fires can yield very material financial and reputational consequences. Water utilities may also face public health risks if they are unable to avoid drinking water contamination or stop wastewater from polluting supplies. Governments and regulators focusing increasingly on affordability, which we believe could create barriers to regulated networks' cost recovery. This is especially so in areas facing upward cost pressures from ongoing high investments in renewables and grid strengthening. Longer term, increased costs and improved solar and battery technology could result in some downstream residential, commercial, and industrial customers partially defecting from electric utilities. Utilities also face significant workforce issues. Amid an unrelenting energy transition, electric utilities, specifically, must develop employee bases with appropriate skills to operate the grid of the future, as well as retain employees. Given the sector's high unionization, companies have to focus on labor-relations management to avoid labor disruptions and related costs. Given that utilities are local in nature, they play a prominent role in communities and have large numbers of local employees. This can often result in regulatory support, but also carries a responsibility to contribute to the community and support low income customers, as well as tactfully mitigating disputes around land use as they expand. Finally, given the social responsibility of providing continuous electricity, gas, and water supply, preventing any risk that could lead to a power blackout or water shortage is an important consideration. Cyber-attacks are therefore increased threats for the sector, more so than in many other sectors.

Regional Risks

Table 2

Regional Risk Atlas

Country	Score	Comments
Argentina	4	Much of the workforce remains in the informal sector of the economy and poverty has been rising. The country's regulations and tax code impose heavy compliance costs on businesses, and encourage informality and tax evasion. The rule of law suffers from corruption in public agencies, as well as from the politicization of administrative and sometimes judicial decisions. Nevertheless, a new anti-corruption law was adopted in 2018 (Law 27.401) to address this issue, and corporate governance standards in the country seem to be improving. The recent launch of a new corporate governance-focused segment on the Buenos Aires Stock Exchange and an update to the Corporate Governance Code published in June 2019 are positive steps. The governance segment will have same voluntary basis as the Brazilian Novo Mercado. The revised code, which has been designed to reflect the most recent updates to the OECD/G20 principles of corporate governance, will now cover important new topics such as gender diversity on boards and will operate on a comply-or-explain model for listed companies.
Australia	1	A strong rule of law and regulatory oversight ensures Australia's high corporate governance standards, evidenced by its focus on compliance and accountability. The Hayne Royal Commission into the financial sector found lapses in governance and risk management and effectiveness of financial regulation. Despite this, governance standards remain strong by global standards. Besides extensive regulations, namely from the Corporations Act and the listing rules of the Australian Stock Exchange (ASX), companies have largely accepted the non-binding principles approach to governance defined in the ASX Corporate Governance Principles. The fourth edition of these principles became applicable on Jan. 1, 2020, on a comply-or-explain basis. They particularly focus on director accountability and set a target of 30% female board members for ASX 300 companies. Private and public sector corruption levels are low. Australia ranks 12 on the Transparency International 2019 Corruption Perceptions Index.
Belgium	1	Belgium has strong institutions and rule of law. The Belgian Companies Code forms the legislative framework for corporate governance and the Belgian Code on Corporate Governance (BCCG) is the reference document for best practices. In May 2019, the Corporate Governance Committee published the third edition of the BCCG based on a comply-or-explain model. The 2020 BCCG took effect on Jan. 1, 2020. Changes include guidance on a new option for listed companies to adopt a two-tier board structure similar to the German model, a focus on long-term strategy, and further provisions for board and executive remuneration. Companies of over 500 employees are implementing the EU Non-Financial Reporting Directive's recommendations, which mandate disclosing ESG (including diversity) risk. As in other European countries, ownership is quite concentrated. To promote gender diversity on boards, all listed companies must have at least one-third of any gender on the board.
Brazil	4	Brazil's regulations and complex federal and state tax code impose heavy compliance costs for businesses and encourage informality and tax evasion. Most of the workforce remains in the informal sector of the economy and poverty has been rising. Corruption at the highest government levels has created a strong public backlash and led to several political and business leaders being jailed as part of the Lava Jato investigations. In terms of corruption, Brazil is stagnating in the bottom half of South American countries, ranking 106 out of 180 on the Transparency International 2019 Corruption Perceptions Index. The judicial system, which operates at federal and state levels, can make applying laws complex and slow. While Brazil has comparatively strong laws and regulations, particularly on corporate governance, the main issue is implementation. We expect this to strengthen following recent significant improvements such as stronger B3 stock exchange listing rules on governance (Novo Mercado segment), new governance guidelines for state-owned enterprises, and greater shareholder-rights protection. For instance, instruction 614 from the Brazilian Securities Exchange Commission (CVM) which came into effect on Jan. 1, 2020, improves shareholders' rights in relation to the election of directors. Concentrated ownership is common and the use of multiple-class share structures with unequal voting rights may negatively affect minority shareholders. The Brazilian Institute of Corporate Governance's Corporate Governance Code is the best practice reference document in the market. It is not mandatory, but since 2017 companies must report on its recommendations on a comply-or-explain basis. Despite improvements to board independence and diversity, Brazil lags behind developed markets. There are limited formal requirements for ESG disclosure, but companies, particularly large ones, tend to report widely on their environmental and social efforts.

Table 2

Regional Risk Atlas (cont.)

Country	Score	Comments
Canada	1	The rule of law and respect for human rights are both very strong. Unlike other advanced countries, there has been no rise in populist political parties or social movements that question the mainstream consensus on economic, social, or immigration policies. Canadian governments at all levels have actively pursued environmental and social regulations. While there's no federal regulatory agency, the Ontario Securities Commission (which oversees the Toronto Stock Exchange) carries significant weight regarding corporate governance recommendations. Canada follows a "principles-based" approach to corporate governance. Overall, governance standards are good and improving. Companies usually have smaller boards, meet more often, and have fewer joint CEO/chair positions, but board renewal and over-boarding are issues. However, boards can lack adequate independence, and remuneration or nomination committees are less common than in other jurisdictions. Amendments to the Canada Business Corporation Act (CBCA) came into effect on Jan. 1, 2020, requiring new diversity disclosures for all companies incorporated under the CBCA. The amendments also broaden the definition of diversity including aboriginal persons, visible minorities, and persons with disabilities. Local institutional investors have been active on ESG and stewardship amid growing regulatory momentum to improve companies' ESG disclosures led by the Canadian Securities Administrator.
Chile	2	Chile is one of South America's most stable and prosperous economies with strong political consensus on key economic policies. It enjoys good rule of law and high institutional effectiveness. It is one of only two South American members of the OECD following a two-year compliance period with the organization's mandate. Corporate governance reforms tend to be driven by regulatory initiatives. There is no corporate governance code but various laws and regulations outline governance rules (e.g. The Corporations Act). Chile's Comisión para el Mercado Financiero is the main regulator. In 2015, it instituted the disclosure of information regarding corporate governance standards on a comply-or-explain basis. However, governance requirements still lag behind international markets. Ownership concentration is high and pyramidal ownership structures common. Regulations require local pension funds (Administradoras de Fondos de Pensiones [AFPs]) to consider governance when making investment decisions and be active owners. Over the years, AFPs have helped improve governance practices. Chile ranks much better than other Latin American countries on corruption at 26 out of 180 on the Transparency International 2019 Corruption Perceptions Index.
Colombia	4	Colombia's corporate governance has improved significantly in the past few years, driven particularly by regulators. Colombia is one of only two South American members of the OECD, following a two-year compliance period with the organization's mandate. While Colombia's capital markets remain midsize by Latin American standards, state-owned enterprises (SOEs) represent slightly over half of capitalizations. As such, 2017 reforms aimed at improving standards at SOEs, particularly for board composition and nominations to ensure independence from the government, have been important developments. The governance code, Código País, was an important milestone and published in 2007 as a result of a joint initiative between regulators and the stock exchange. It was revised in 2014. Adoption of the code's recommendations is voluntary on a comply-or-explain basis, and companies are expected to report annually on their compliance. Most large issuers apply most of the recommendations. As is typical in Latin American, Colombian companies have highly concentrated ownership structures but protections for minority shareholders are good. While the country has seen some progress on institutional efficiency and rule of law, corruption remains a significant challenge. It currently ranks 96 out of 180 on the Transparency International 2019 Corruption Perceptions Index, improving from the previous year.
Czech Republic	2	The country's key political and economic institutions have a good track record of independence and effectiveness despite the greater instability of Czech governments, historically. Based on OECD principles, the 2008 Czech corporate governance code is the reference document for best practices. It operates on a comply-or-explain basis, but companies are required to publish an annual statement on their alignment with it. Companies can chose between one- or two-tiered governance structures where a supervisory board oversees the executive board. At companies with over 500 employees, employees can elect one-third of the supervisory board. While the stock exchange doesn't have specific ESG requirements in its listing rules, companies of over 500 employees are implementing the EU Non-Financial Reporting Directive's recommendations, which mandate disclosing ESG risks. The Czech Republic's perceived corruption levels are higher than other EU countries (it ranks 44 out 180 on the Transparency International 2019 Corruption Perceptions Index).

Table 2

Regional Risk Atlas (cont.)

Country	Score	Comments
Denmark	1	Denmark has a mature political and institutional framework, which promotes economic prosperity, competitiveness, and flexibility. There are extensive checks and balances between institutions; free flow of information throughout society with open debate of policy decisions; and timely and reliable data and statistical information. The Danish Companies Act forms the legislative framework for Danish listed companies. Nasdaq Copenhagen's listing rules require companies to comply with the Danish Recommendations on Corporate Governance (the Recommendations) on a comply-or-explain basis. The Recommendations were revised in 2017 to align with the EU Shareholder Rights Directive II and are complemented by the Stewardship Principles, both of which became effective as of January 2020. The Recommendations require boards to be composed of non-executive directors, in majority independent, typically elected on one-year mandates. Board structures can be either dual or unitary. Companies can opt for a board of directors, tasked with strategic management and supervising the executive board, or a supervisory board, only tasked with overseeing an executive board. Under the Companies Act, employees are entitled to elect representatives to the board of directors. This is common in most large listed entities, where employees form about one-third of board seats. In terms of diversity, despite the female labor participation rate being much higher than other European countries at 70%, the number of women on corporate boards is below the EU average. There is no gender quota for boards but the Act on Gender Targets passed in 2012 aims at increasing female participation on boards by developing policies and targets to achieve a "relevant degree of diversity". Following money laundering allegations at local banks, the Danish parliament agreed to provide the Danish Financial Supervisory Authority (FSA) with additional resources and tools. These include introducing broader authority to issue fines, increasing the amount of information banks need to provide to the FSA, and extending the statute of limitations. Denmark ranks first out of 180 countries on the Transparency International 2019 Corruption Perceptions Index.
Ecuador	6	Ecuador's institutions are improving especially in terms of greater openness within the private sector, upholding the rule of law and regulations, and controlling corruption. The government, backed by an agreement with the IMF, has been improving transparency and governance in economic policymaking. However, social unrest has weakened governability and political stability. Ecuador's public institutions remain constrained by weak checks and balances, and shortcomings regarding fiscal transparency and the rule of law persist as do still-high levels of perceived corruption. Ecuador ranks 93 out 180 on the Transparency International 2019 Corruption Perceptions Index, which is a significant improvement from the previous year. There is no corporate governance code and the primary sources of governance rules are found in local laws and regulations. The Quito Stock Exchange has been the main driver of governance improvements. It cofounded the Ecuador Institute of Corporate Governance and the Executive Governance Committee in 2012. The committee has been aligning local practices with the 51 recommendations of the Guide for an Andean Corporate Governance Code produced by the CAF Latin American Development Bank. However, there is no ESG reporting requirement under the listing rules. Ecuador's capital markets remain small by regional standards and most of the economy is private and family-owned.
France	1	France is among the most advanced countries in terms of ESG regulations including mandatory disclosures and reporting sustainability indicators. Overall, corporate governance is in line with advanced economies' standards. In addition to the EU Non-Financial Reporting Directive's recommendations requiring the disclosure of ESG data, French companies must also disclose the social and environmental consequences of their activities under domestic law (Grenelle Act), the financial risks they face from climate change, and their remediation strategies (Energy Transition Law). Under article 173 of the Energy Transition Law, institutional investors must disclose the ESG factors incorporated in their investment policies and their contribution to the energy and ecological transition. Under the law Pacte, which came into effect in May 2019, companies must consider environmental and social issues when developing their strategy. The strong regulatory framework is complemented by the Afep-Medef Code, the corporate governance recommendations from AFG (the French Asset Management Association), and the recommendations from the Financial Markets Authority. All three provide non-binding guidance for best practice on governance and pay. Despite waves of privatization, the state remains an important player in the French capital markets as a shareholder of several large listed companies. On diversity, the Copé-Zimmermann Law has required listed companies to reach at least 40% female board membership since 2017 in a bid to reach parity.

Table 2

Regional Risk Atlas (cont.)

Country	Score	Comments
Germany	1	Germany has strong institutional and governance effectiveness, with much transparency and accountability. Rule of law is strong, the judiciary is independent, and corruption is viewed as a minor issue. Germany has a moderate amount of ESG regulation. While Deutsche Börse AG does not require ESG reporting as a listing rule, companies of over 500 employees are implementing the EU Non-Financial Reporting Directive's recommendations, which mandate the disclosure of ESG data like diversity and pay ratios. The German Corporate Governance Code (Kodex) is the reference document for Germany's best practices and works on a comply-or-explain basis. A new version of the Kodex came into effect on Jan. 1, 2020 when the EU Shareholder Rights Directive II was transposed into German law. Notable improvements include recommendations on board independence, as well as board oversight of related party transactions and executive pay. While the recommendations are less specific than most European codes, companies exhibit strong governance practices. Companies are typically governed by a two-tier board system: a management board of executives, which is overseen by a supervisory board comprising non-executives including shareholder and employee or labor union representatives. While not world-leading, there are corporate disclosure requirements for selected ESG aspects and both occupational pension funds and insurers must state whether and how they account for ESG considerations when managing pension fund assets under their control.
Hong Kong	2	Hong Kong has strong institutions and rule of law. However, many institutions are facing significant challenges addressing acute societal demands. Recent social unrest has somewhat eroded social cohesion and damaged policy effectiveness. Separately, Hong Kong amended its Corporate Governance Code in 2019 and issued its guidance for boards of directors. The new Code is mandatory on a comply-or-explain basis and is divided into principles, code provisions, and recommended best practices. Boards are unitary and must comprise at least one-third independent members. Audit committees must be entirely composed of nonexecutives and chaired by an independent director. Remuneration committees must comprise mostly independents. Hong Kong-listed companies have been required to report on their ESG performance on a comply-or-explain basis since 2017. The Hong Kong Stock Exchange's listing rules require a minimum free float of 25%, but founding families often maintain control. This has continued as new listing rules that came to effect in April 2018 allow for weighted voting rights, or dual-class share structures, for companies from selected sectors. This allows founder shareholders to keep control, disproportionately to their economic interest, which disenfranchises minority shareholders. These new rules also require companies using this tool to set up a governance committee composed entirely of independent, nonexecutive directors. The board does not, however, have to follow its recommendations, which may limit the effectiveness of this provision. Nevertheless, minority investor protections are strong. Related-party transactions, often referred to as continuing connected transactions in Hong Kong, are common but highly regulated. Gender diversity at the executive and board level remains poor. Hong Kong has very low levels of perceived corruption, ranking 16 out 180 on the Transparency International 2019 Corruption Perceptions Index.
India	4	India's social standards remain low by global standards, with significant inequality. The judiciary is among its strongest institutions. The public has considerable faith in its judicial institutions and the court system enjoys robust independence. India's corruption levels are average compared globally but have been gradually improving thanks to its strong democratic institutions. India's corporate governance framework is based on the 2013 Companies Act and the Securities Exchange Board's (SEBI's) regulations. Since 2018, SEBI has been implementing the Kotak governance committee's recommendations to improve practices at listed companies. In January 2020, SEBI also submitted recommendations to the regulator to overhaul the governance regime of related-party transactions, to improve disclosure and oversight and broaden the range of transactions. Board diversity has increased particularly since the 2013 Act mandated all listed companies have at least one female director. Board effectiveness and succession planning are issues. Large boards often comprise directors sitting on multiple boards, which may affect their attendance and effectiveness of participation. Furthermore, many board members have had long tenures, curbing the introduction of new board members, but this will likely improve because retirement is pushing succession planning and creating more churn. ESG reporting has strengthened and more companies are improving their disclosures. Regulators like the Bombay Stock Exchange (BSE) have made ESG disclosures mandatory for the top 500 companies listed on the BSE and National Stock Exchange.

Table 2

Regional Risk Atlas (cont.)

Country	Score	Comments
Indonesia	4	Social standards are in line with most other major developing economies, but there is significant disparity among Indonesian society. Rules for worker protection are strong but enforcement is patchy. Corporate governance standards are generally weak, particularly for smaller or unlisted companies. Indonesia's financial services regulator, Otoritas Jasa Keuangan, released a roadmap to improve corporate governance in 2014 but the implementation of best practices is still lacking. We note that many listed companies often fail to comply with mandatory regulations. Boards often lack independence and diversity, while compensation disclosures are scant. Transparency is limited and ESG disclosure is below other developing countries. Corruption remains an issue as it does in many other countries in the region. The judicial system is inefficient and outcomes can be unpredictable.
Italy	3	Italian institutions' effectiveness somewhat lags behind similarly developed European countries. The perception of corruption is also higher than the European average (the country ranks 51 out of 180 on the Transparency International 2019 Corruption Perceptions Index). The Italian Code of Corporate Governance is the reference document for best practices and follows a comply-or-explain principle. The new version of the Code issued in January 2020 focuses on four key areas: shareholder engagement, proportionality, simplification, and long-term sustainability. The code will be effective after Dec. 31, 2020. Companies of over 500 employees are implementing the EU Non-Financial Reporting Directive's recommendations, which mandates disclosing ESG (including diversity) risks. Ownership is concentrated because many Italian companies continue to be tightly controlled through cross-holdings and pyramidal ownership, often to the detriment of minority shareholder rights. The government also maintains sizeable shareholdings in large publicly listed companies. Italy fares well on female participation on boards thanks to a reform establishing legislated quotas to ensure gender balance on corporate boards. However, boards often lack international expertise.
Japan	2	Corporate governance practices and policies are good but somewhat below the standards of other major advanced economies. Board diversity and transparency are areas where businesses lag their counterparts in other advanced markets. Improving Japanese corporate governance, backed by the recent government's strong initiative, has been a key thrust of the current government's economic revival strategy. The Japanese regulator's revision of the Stewardship Code in 2020 and the Corporate Governance Code in 2018 were important advances but implementation has been somewhat slow. Despite improvements some traditional habits are proving quite entrenched. These include cross-shareholdings among companies, limited outside director oversight, and limited diversification in management. Gender diversity in senior positions remains low--under 4% of executives in listed companies are women--although the government aims to reach 10% female executives and 30% female senior managers by 2020. Japanese boards are typically male-dominated and often by former executives with long tenures. Although it has been improving, the lack of diversity on boards in terms of age, background, gender, and experience might impede progress to transparent governance and decision making that is nimble enough to adapt to a rapidly changing business environment.
Mexico	4	Mexico's public institutions suffer from shortcomings that limit their effectiveness in providing basic public services, ranging from law and order to contract enforcement to proper regulation and supervision. High levels of violence and perceived corruption increase the risks of doing business. Despite regular elections and changes of government, the quality of governance has remained poor, contributing to the country's weak GDP growth in recent years. Mexico has comparatively high levels of perceived corruption, ranking 130 out 180 on the Transparency International 2019 Corruption Perceptions Index. More than half the workforce is in the informal sector, with low wages and few social benefits. The poverty rate has remained high despite a stable economy with low inflation. Mexican politics has been divisive, reflecting social gaps and divisions. Despite significant governance improvements enacted in the Capital Markets Law, dual-class share structures, cross-holdings, and pyramidal structures are common and often to the detriment of minority shareholders rights. Local retirement fund administrators have been a strong proponent of better governance practices. In 2018, the pension regulator, Comisión Nacional del Sistema de Ahorro para el Retiro, published guidelines for funds to explicitly integrate ESG in their investment processes.

Table 2

Regional Risk Atlas (cont.)

Country	Score	Comments
Netherlands	1	The Netherlands has strong institutional effectiveness and rule of law. It has a very active pension fund industry that has been a leader in sustainable investing and stewardship, creating an advanced ecosystem for sustainable finance. In terms of reporting, companies of over 500 employees are implementing the EU Non-Financial Reporting Directive, which mandates disclosing ESG (including diversity) risk. Compared to other European countries, the Netherlands has more dispersed ownership structures with few controlled listed companies. The Frijns Committee (Corporate Governance Code Monitoring Committee) publishes the Dutch Corporate Governance Code, last edited in 2017. The code follows the stakeholder model and focuses on long-term sustainability. There is high compliance with the code's recommendations. Equally, the new Dutch Stewardship Code, went into effect January 2019, considers all stakeholders' interests, not just shareholders'. In February 2019, the government completed a consultation period on a bill proposal to implement a 250-day thinking period for boards. The proposal, which could be an anti-takeover mechanism, raised concerns about shareholder rights because it would give the supervisory board 250 days if shareholders submit a proposal to appoint or remove a director, or if there's a takeover bid. Shareholder rights provisions are otherwise strong, including a binding vote on executive remuneration.
Norway	1	Norway has a long track record of democratic governments with effective and flexible policymaking. There are extensive checks and balances between institutions, free information flows, and policy decisions are openly debated. The Norwegian Public Limited Liability Companies Act of 1997 is the legislative framework for Norwegian listed companies. Listed companies are subject to the Norwegian Code of Practice for Corporate Governance (NCCG) published by the Norwegian Corporate Governance Board, on a comply-or-explain basis. The NCCG consists of 15 recommendations that include: majority independent boards, separate remuneration and nomination committees, and board terms limited to two years. Audit committees are mandatory for listed companies as per the Companies Act. Norway allows both unitary and dual-board structures. A unique feature of the Norwegian governance model is that companies with more than 200 employees must appoint a corporate assembly, which is responsible for electing and monitoring the board of directors. The assembly is composed of shareholder and employee representatives, the latter making up one third of the seats. Employees also nominate and elect one third of the board of directors. Half of the board must be composed of citizens of the European Economic Area. In terms of diversity, Norway has been a leader since the implementation in 2008 of a compulsory gender quota of at least 40% female non-executive directors. Although not a member of the European Union, Norway's corporate governance practices are similar to EU countries' and it has passed many EU directives into national law. This includes the EU Shareholders Rights Directives I and II.
Peru	4	Peru has relatively stable and independent institutions, despite a certain level of political uncertainty. The General Corporations Act provides the basic governance framework for corporations. The Peruvian Regulator or Superintendence of Securities Market (Superintendencia del Mercado de Valores or SMV), published a Code of Good Corporate Governance (Codigo de Buen Gobierno Corporativo, CBGC) in 2013 which only applies to companies listed on the Lima Stock Exchange (Bolsa de Valores de Lima, BVL). However, the Code's recommendations are mostly principle-based and lack specifics. Since 2015, issuers are required to publish a sustainability report as well as a report on their governance practices. Despite these improvements, the overall lack of board independence as well as low levels of transparency and reporting notably on related party transactions, remain important governance issues. While the BVL is one of the oldest in Latin America (since 1860) it is also one the smallest, and most of Peruvian companies are private and family-owned. In 2009, the BVL joined the Latin American Integrated Market or Mercado Integrado Latinoamericano (MILA) formed with the stock exchanges of Colombia and Chile. Peruvian companies still lag global peers in terms of board diversity but in 2019 the BVL committed to reach 30% women on corporate boards by 2030 from 9% today. The country ranks 101 out of 180 on the Transparency International 2019 Corruption Perceptions Index, which is in the lower half for South American countries.

Table 2

Regional Risk Atlas (cont.)

Country	Score	Comments
Romania	4	Romania's institutional effectiveness is weaker than the European average and political interference in independent institutions risks further weakening the rule of law. The Bucharest Stock Exchange has issued a Corporate Governance Code, serving as local best practices. While not mandatory, companies are asked to report their compliance with the code annually or explain their reasons for non-compliance. Shareholder rights protections are good and anti-takeover devices at companies are extremely rare. Overall, corporate disclosure and governance standards lag other European countries, particularly regarding board independence and composition. Romania ranks 70 out 180 on Transparency International 2019 Corruption Perceptions Index, which is lower than other Western European countries. Planned law changes to lower limitation statutes for corruption offenses will likely see it slide further down the index.
Russia	5	Social standards in the Russian Federation are moderate but common indicators of such standards vary quite significantly. Most social indicators suggest greater problems that what would be predicted based purely on a country's per capita income. Political power is highly centralized and essentially concentrated in the hands of the president. Checks and balances are weak. Corruption and rent-seeking is perceived as comparatively high in Russia (it ranks 137 out of 180 on the Transparency International 2019 Corruption Perceptions Index). The enforcement of laws and contracts is often selective. Corporate governance practices vary significantly between large publicly listed companies that are committed to transparency and governance practices in line with their OECD peers and the rest of the market, notably state-owned enterprises (SOEs). SOEs are a defining feature of the Russian economy with the government controlling (directly or indirectly) over one-third of listed companies. There is extensive ecological regulation in Russia, but control over its execution is limited and fines are relatively small. The corporate governance code specifies the basic governance principles required for listing on the stock exchange, which all public companies have to follow on a comply-or-explain basis, but levels of implementation vary. Equally, for many large privately owned companies transparency is a major issue because the quality and breadth of corporate disclosure is intentionally very limited.
Saudi Arabia	4	Saudi Arabia has been working on major initiatives to attract international investments. These include regulations designed to improve corporate governance particularly focusing on shareholder rights and corporate transparency, both of which are key components of Saudi Arabia's Vision 2030. We view the kingdom's inclusion in global equity indices and announcements of large corporate sales, potential international debt issuance, and IPOs as signs of progress. In 2012 the Saudi Arabian Monetary Agency issued governance principles for banks and in 2017 the Capital Markets Authority revised its Corporate Governance Regulations, which applies to all listed companies on a comply-or-explain basis. Ownership of key companies is largely concentrated and two of the most important challenges they face are succession planning and improving transparency. Saudi authorities have recently initiated reforms aimed at liberalizing a traditionally very conservative society, including the promotion of women's rights and increasing labor participation of Saudi nationals.
Singapore	1	Singapore has stable political institutions and the government maintains a pragmatic, forward-looking, and long-term approach on policymaking. The country ranks a high 13 out of 126 on the World Justice Project Rule of Law Index 2019, including first on Order and Security and third on Absence of Corruption. In 2008, the Monetary Authority of Singapore adopted a new Code of Corporate Governance on a comply-or-explain basis. The code became effective in January 2019 but some of its most significant changes will be phased in in 2022. Under the new code, boards must comprise a majority of nonexecutives and be at least one-third independent, or 50% independent if the chair is also the CEO or is not independent. Other notable changes include limiting independent directors' tenures to nine years, requesting disclosure on remuneration, and setting up board-level risk committees. Some of the code's provisions have become mandatory and included in the Singapore Exchange's (SGX) listing rules, such as the nine-year tenure and the independence requirement for boards effective in 2022. In 2016, SGX also introduced mandatory sustainability reporting on a comply-or-explain basis. Companies must publish a sustainability report annually, referencing five primary components: material ESG factors; policies, practices, and performance; targets; sustainability reporting framework; and the board statement. As a result, almost half of SGX-listed companies now report on sustainability issues and this number is steadily climbing.

Table 2

Regional Risk Atlas (cont.)

Country	Score	Comments
Slovakia	3	Corporate governance legislation in Slovakia is primarily based on the Securities Act, the Accounting Act, and the Commercial Code. In 2002, the Stock Exchange and the Financial Market Authority adopted a first version of a corporate governance code. It was then adapted by the Central European Corporate Governance Assn., which released the latest version in 2016. Mostly principle-based, the Code works on a comply-or-explain basis. Although companies are required by law to report annually on their compliance with the Code, the level of adoption and quality of disclosures are low. Companies operate under a dual-board system with a supervisory board overseeing a management board. However, the supervisory board's role is ill-defined by the law and shareholders can still elect and remove members of both boards. This takes an important responsibility away from the supervisory board of directors. Boards often lack independence--there is no independence requirement--and female participation is significantly lower than for the rest of Europe. Corruption perception levels are relatively high and the country ranks in the bottom half of EU countries (59 out of 180 on the Transparency International 2019 Corruption Perceptions Index).
South Africa	4	The Company Act of 2008 and the King Report on Corporate Governance have strived to improve governance practices in South Africa. The King Report, now in its fourth edition (2016), has been a key driver of corporate governance improvements since its inception in 1994. It is a principles-based code for companies that includes integrated sustainability reporting, which the Johannesburg Stock Exchange has now adopted as a listing requirement. Unlisted companies can also choose to adopt the code and must disclose their performance on a comply-or-explain basis. The Companies Act requires, among other things, companies over a certain size to have a social and ethics subcommittee of the board that reports on the U.N. Global Compact's 10 principles on human rights, labor, the environment, and anti-corruption. South Africa has a strong democracy with independent media. In 2016, allegations of leakages of public funds weakened its governance frameworks and public finances. However, checks and balances remain strong especially among the judiciary. Since the new president took power in February 2018, there has been a renewed impetus to the reform agenda and pursuing accountability through the courts and various commissions of inquiry.
South Korea	2	South Korea ranks well in the World Justice Project Rule of Law 2020 index (at 17 of 126 countries) which recognizes the strengths of its justice system as well as its sound legal framework. Corporate governance is good although not as robust as in many other advanced economies. The concentration of corporate decision making, in particular at chaebols (large industrial conglomerates) has often negatively affected minority shareholders' rights and it is one area where Korean businesses lag their competitors in developed economies. Cross-holdings among chaebol members afford them the power to control a large conglomerate while holding a relatively small proportion of shares. The roles of CEO and chair are joint at most Korean listed companies, which could undermine adequate management oversight. As defined in Korean law, listed companies are ruled by two sets of governance standards depending on their capitalization. Large companies must have a majority of outside directors on their boards. Amendments to the Commercial Act that came into effect on Jan. 29, 2020 enhanced shareholder rights and improved governance standards for listed companies notably by setting maximum terms of office for independent directors (six years). As for gender diversity, despite recent gradual improvements South Korea still has the highest percentage of all male boards of the emerging economies. The current government has made chaebol reform a policy priority, but given chaebols' strong dominance over the economy reforms will be cautious and gradual.

Table 2

Regional Risk Atlas (cont.)

Country	Score	Comments
Spain	2	Spain has a strong rule of law and institutions despite undergoing important internal political challenges including from regional independence movements. Spain's corporate governance framework for listed companies has two components: binding provisions from the company law and voluntary recommendations of the Spanish Corporate Governance Code published in 2015 by the Comisión Nacional del Mercado de Valores (CNMV), Spain's national securities commission. In January 2020 the CNMV started to review the code, proposing amendments to executive pay, voting rights, and increasing gender quotas on boards to 40% from 30%--all on a comply-or-explain basis only. The code followed significant legal reforms such as the Law 31/2014, which included binding votes on remuneration policy, stricter regulations on directors' classifications, and new ownership thresholds for shareholders' rights. By law, Spanish boards must establish committees for audits, remuneration, and nominations. Companies must disclose an annual corporate governance report. While the stock exchange does not have specific ESG requirements in its listing rules, companies of over 500 employees are implementing the EU Non-Financial Reporting Directive's recommendations, which mandate disclosing ESG (including diversity) risk.
Sweden	1	Sweden benefits from a long track record of very strong institutional and governance effectiveness. Transparency and accountability is high. It is considered one of the least corrupt countries in the world and there is an unbiased enforcement of contracts through a robust legal system. Relatively strong ESG regulations complement institutional governance. These rules are not limited to corporate disclosure requirements and governance rules but also include legislation that mandates the large AP (Allmänna Pensionsfonder) public pension funds to consider environmental and ethical issues in their investment decisions. An updated version of the Swedish Code of Corporate Governance came into effect on Jan. 1, 2020, following the transposition into law of the EU Shareholder Rights Directive II. The new code establishes standards on executive remuneration disclosure and board independence. However, corporate ownership is still extremely concentrated. Nearly all listed companies have a controlling shareholder, often using dual-class share structures with unequal voting rights to maintain control. Over two-thirds of Swedish companies have multiple share classes, far more than any other European country. Members of the nomination committee are elected directly by the general meeting and, while this is positive for shareholder rights, large shareholders wield a greater influence over the composition of these committees and therefore the overall board.
Thailand	4	Thailand has good institutions and rule of law that remain constrained by its history of sometimes abrupt and unexpected political changes. Thailand currently ranks 101 out 180 on the Transparency International 2019 Corruption Perceptions Index, in the bottom half of Asian countries. Its corporate governance framework is based on the Public Limited Company Act of 1992 and the Securities Exchange Act of 2008. The 2007 Disclosure Manual and the Listed Company Handbook are also sources of governance regulations. The Thai Corporate Governance Code for Listed Companies 2017 is the primary source of governance best practice and works on a comply-or-explain basis. The code is based on the Principles of Good Corporate Governance for Listed Companies published in 2012 by the Stock Exchange. Ownership structures are highly concentrated and the majority of companies are family-owned, including listed companies. Boards are unitary and comprised of a maximum of 12 directors, one-third of whom must be independent, and elected on three-year terms. Audit committees are mandatory for listed companies while nomination and remuneration committees are only recommended. Banks must have a risk committee. In terms of diversity, Thailand leads ASEAN countries with women making up around 20% of all board seats and close to 30% of executive management roles.
Trinidad & Tobago	4	Trinidad and Tobago is a regional financial center for the Caribbean, offering a stable financial system and institutions. With a stable, democratically elected government, the country has shown generally effective policymaking in recent years but policy shifts are possible because of significant long-term fiscal challenges. The Trinidad & Tobago Corporate Governance Code, launched in November 2013, is the principal document that sets out best practices for companies on an apply-or-explain basis. The country ranks 85 out of 180 in the Transparency International 2019 Corruption Perceptions Index, which is in line with the Caribbean regional average.

Table 2

Regional Risk Atlas (cont.)

Country	Score	Comments
Turkey	4	Since 2013, pressures on Turkey's regulatory institutions and judiciary have coincided with weakening checks and balances and less predictable legal enforcement. One of the consequences of this deterioration is a notable decline in foreign direct investment over the past half-decade. Nevertheless, governance standards still benefit from a relatively advanced institutional framework. Since the publication of the landmark Capital Markets Law in 2012 the Capital Markets Board of Turkey has been working on further improving governance standards. Its Corporate Governance Principles (revised in 2014) introduced new and important clauses in areas such as board diversity and related-party transactions, among others, and made some provisions mandatory. Pyramidal ownership structures are prevalent in Turkey where controlled conglomerates own controlling shares at most companies. This affects minority shareholders rights. This is reflected on boards--often made up of several executives from the controlling group--while adherence to international best practices is more common among the key large-cap listed companies.
U.K.	1	The U.K. benefits from strong institutions and corporate governance practices. This includes robust and independent institutions and high rule-of-law standards, as well as very low actual and perceived levels of corruption. Governance guidelines are primarily based on the U.K. Code of Corporate Governance published by the Financial Reporting Council (FRC) and updated in 2018. The revised and strengthened code provides a broad set of recommendations including executive remuneration and board composition, follows a comply-or-explain model, and is widely regarded as best practice internationally. The recent version strengthened provisions on the role of the audit and nomination committees, chair tenure, and stakeholder engagement. An updated version of the U.K. Stewardship Code published by the FRC also came into effect on Jan. 1, 2020. It sets out principles for investors. Overall levels of corporate disclosure on ESG are strong and the country benefits from a very active institutional investor base, which has been fueling the demand for better disclosure and corporate engagement. Legislation that took effect in 2019 will also require pension funds to disclose the financial risks they face arising from ESG factors.
U.S.	2	With robust institutions and rule-of-law standards, the U.S. demonstrates many strong characteristics but lags several other countries with respect to ESG regulations and social indicators. Income inequality is higher than in other OECD countries and has been so for over a century. Social services are similarly less generous than in most wealthy countries. Governance is characterized by a very stable political system, strong rule of law, a powerful judiciary, and effective checks and balances. Conditions of doing business are generally high. The U.S. follows a rules-based approach to corporate governance focused on mandatory compliance with requirements from the major exchanges (NYSE and NASDAQ) as well as legislation. State corporate law is also a key source of corporate governance, particularly Delaware where over half over all U.S. listed companies and close to 70% of Fortune 500 companies are incorporated. Exchanges mandate high standards of corporate governance. The NYSE requires companies listing on its exchange to have boards made up of a majority of independent directors and have separate remuneration and nomination committees. However, formal requirements on ESG reporting are not as established as they are in European countries. While a growing number of companies have an independent chair, the combination of CEO and chair roles is still popular. This can undermine management oversight. Remuneration continues to be a contentious point, because U.S. executive pay dwarves global pay levels. The CEO-to-worker pay ratio is ever-increasing, leading to social tensions and shareholder criticism.

Related Research

- Our Updated ESG Risk Atlas And Key Sustainability Factors: A Companion Guide, July 22, 2020
- Consumer Goods Key Sustainability Factors For ESG Evaluations, July 22, 2020
- Environmental, Social, And Governance Evaluation Analytical Approach, June 17, 2020
- How We Apply Our ESG Evaluation Analytical Approach: Part 2, June 17, 2020

This report does not constitute a rating action.

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