CHAPTER 3

INVESTMENT FUNDS: FOSTERING THE TRANSITION TO A GREEN ECONOMY

Chapter 3 at a Glance

- The sustainable investment fund sector can be an important driver of the global transition to a green economy but, at the current juncture, is too limited in size and scope to have a major impact and faces challenges related to greenwashing.
- Total assets under management of sustainable investment funds are small but growing rapidly, more than doubling over the past four years to reach $3.6 trillion in 2020. However, climate-oriented funds accounted for only $130 billion of that total.
- Flows into sustainable funds appear to support climate stewardship and encourage the issuance of securities by firms with a more favorable sustainability rating.
- Sustainable investors could also bring financial stability benefits as they are less sensitive to short-term returns.
- Climate-related news has not had a meaningful impact on investment fund returns and flows in the past, but large and sudden transition risk shocks could be disruptive in the future.
- A survey of asset managers suggests that lack of adequate data is a key obstacle to implementing sustainable investment strategies.
- For the sustainable fund sector to become an effective driver of the transition, policymakers should:
  - Urgently strengthen the global climate information architecture (data, disclosures, sustainable finance classifications including climate taxonomies) both for firms and investment funds.
  - Ensure proper regulatory oversight to prevent greenwashing.
- After those elements are in place, tools to channel savings toward transition-enhancing funds (such as financial incentives for investments in climate-oriented funds) could be considered to complement other critical climate-change-mitigation measures, such as a carbon tax.
- To mitigate potential financial stability risks stemming from the transition, policymakers should implement a climate policy consistent with an orderly transition and conduct scenario analysis and stress testing of the investment fund sector.

Introduction

The forthcoming 26th United Nations Climate Change Conference of the Parties (COP26) presents a pivotal opportunity to speed up the transition to a low-greenhouse-gas economy and avoid catastrophic climate change. Global warming resulting from greenhouse gas emissions (especially carbon dioxide from fossil fuels) is an existential threat. To reach the objective of limiting global warming to well below 2°C by 2100, as set out during the Paris conference six years ago, a global transition to a low-greenhouse-gas ("green") economy is required over the next three decades (IPCC 2021). In recent years, the costs of adopting technologies to facilitate the transition have been declining, making such technologies increasingly competitive.[1] Moreover, a growing number of governments have committed to net-zero domestic greenhouse gas emissions by the middle of this century to achieve the transition. Yet emissions continue to rise, and under current policies global warming is expected to miss the Paris Agreement goal by a wide margin

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[1]For example, IRENA (2021) documents that renewables are increasingly the lowest-cost source of electricity in many markets.

(Climate Action Tracker 2021). In this regard, COP26 could be a watershed moment for much needed global climate policy actions to reverse the trend of growing emissions and mitigate climate change.[2]

A successful transition demands a deep economic transformation, requiring the mobilization of private finance on a large scale. According to estimates, achieving net-zero carbon emissions by 2050 will require additional global investments in the range of 0.6 to 1 percent of annual global GDP over the next two decades, amounting to a cumulative $12 trillion to $20 trillion (IEA 2021; IMF 2021a).[3] These investments would need to be oriented away from the fossil fuel sector and toward renewables as well as toward low-emissions solutions within sectors. A green investment push is thus essential and urgent to facilitate the transition (see the October 2020 *World Economic Outlook*).

The global financial sector can play a crucial role in catalyzing private investment and accelerating the transition. In recent years, sustainability considerations encompassing environmental, social, and governance concerns have been increasingly embedded in investment strategies and philosophies, boosting so-called sustainable finance (see the October 2019 *Global Financial Stability Report*). Investors with a sustainability focus may be driven by a pure financial objective (seeking to "do well" by factoring in the increasing relevance of sustainability for financial returns) or by a sustainability objective (seeking to "do good" to actively promote a more sustainable economy and, in the case of climate change, a faster transition) along with the financial objective.

Within the sustainable finance landscape, the investment fund sector is particularly relevant because of its expanding size and focus on sustainability-related issues. The sector has grown significantly since the global financial crisis and now represents about one-third of the assets held by the nonbank financial institution sector.[4] It is at the heart of the paradigm shift toward the integration of sustainability considerations—including climate change mitigation—into investment decisions. This is evidenced by the growing number of networks of investors and asset managers that have demonstrated their commitment to incorporate sustainability issues and support decarbonization efforts.[5] Recent survey evidence also suggests that investment funds—especially those with a sustainable investment mandate—are paying increasing attention to climate change and the transition (Krueger, Sautner, and Starks 2020), and studies indicate that financial markets have started to price in the transition.[6] Pricing in the transition, at least directionally, is important to foster it and to avoid allocating excess capital to firms and projects that do not have a positive impact on climate change mitigation.

Although the investment fund sector can foster the transition, financial stability concerns related to that transition are also pertinent. The exact pathway of the transition to a green economy is still highly uncertain, including how it could play out across countries. It could occur at different speeds and through multiple paths, depending on countries' transition policies, the development and adoption of new clean technologies, and shifts in the preferences of consumers and producers toward low-greenhouse-gas products and services (see the October 2019 *Fiscal Monitor* and the October 2020 *World Economic Outlook*). Different possible transition paths could represent opportunities (such as new investment projects offering high rates of return) but could also be sources of transition risks stemming from the decline in future cash flows of firms adversely

[2]The ongoing COVID-19 pandemic appears to have raised awareness about the possibility of catastrophic events, including climate change, and shifted the momentum (see the October 2020 *Global Financial Stability Report*).

[3]These estimates may be conservative. For example, the Energy Transitions Commission (2020) suggests that, on average, additional investments of about $1.6 trillion a year will be required over the next 30 years to decarbonize the world economy, of which more than $1.3 trillion would be needed in the power sector. BloombergNEF (2021) estimates that annual investment in the energy sector alone will need to rise from about $1.7 trillion today to somewhere between $3.1 trillion and $5.8 trillion, on average, over the next three decades. IEA (2021) estimates that 30 percent of the required investment would come from public sources and 70 percent from private sources.

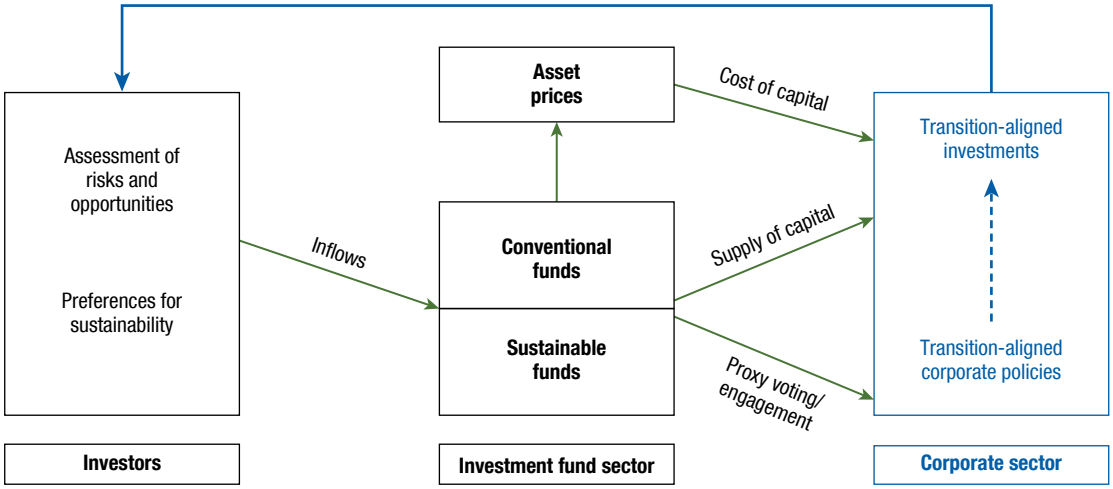
[4]Collective investment vehicles, which cover a diverse range of entities, including hedge funds, money market funds, and other investment funds, grew at an average annual rate of 11 percent over 2013–19 and represented 31 percent of nonbank financial institutions' assets as of the end of 2019 (FSB 2020b).

[5]Such networks and initiatives include the Principles for Responsible Investment, the Climate Action 100+ initiative, the Portfolio Decarbonization Coalition, the UN Zero Carbon Asset Owners Alliance, the Net-Zero Banking Alliance, the COP26 Private Finance Hub, and the Glasgow Financial Alliance for Net Zero.

[6]For example, US climate policy uncertainty is reflected in equity options prices (Ilhan, Sautner, and Vilkov 2020), and global equity investors demand a higher transition risk premium in countries with stricter climate policies (Bolton and Kacperczyk 2021).

Figure 3.1. The Sustainable Investment Fund Sector Can Speed Up the Transition to a Green Economy

Flows into sustainable funds can encourage investments geared toward emissions reductions. Through proxy voting and shareholder engagement, sustainable funds can influence firms' strategies to adopt more sustainable business models.



Source: IMF staff compilation.

affected by the adoption of cleaner technologies (such as those in the fossil fuel sector). Recent analyses have documented that investment funds' exposures to the sectors most sensitive to the transition—including fossil fuels, utilities, energy-intensive manufacturing, and transportation—are indeed significant (Battiston and others 2017; ECB 2021; ESMA 2021). A large and unforeseen transition shock (for example, a sudden realization of the need for rapid significant change across the global economy) could lead to a large repricing of the affected assets, generating financial stability risks.

Against this backdrop, this chapter analyzes the interplay between the global investment fund sector and the transition to a low-greenhouse-gas economy from both the perspective of fostering the transition and the perspective of financial stability risks. In particular, it focuses on two key questions: How do sustainable investment funds—defined as funds with both a financial and a sustainability objective—facilitate the transition? And what has been the impact of transition shocks on the investment fund sector to date?[7] To address these questions, the chapter first develops a simple conceptual framework analyzing the interlinkages between the investment fund sector and the transition. It then draws on that framework to conduct empirical analysis using a sample of more than 54,000 open-end funds—mostly equity, fixed-income, and allocation funds.[8]

Investment Funds and the Transition: A Conceptual Framework

The shift toward sustainable investment funds can support the transformation of the economy through two main channels (Figure 3.1). First, investors make portfolio decisions based on their preferences for sustainability and their assessment of risks and opportunities, and these decisions create inflows into sustainable

[7]Climate-related physical risk is not the focus of this chapter. See Chapter 5 of the April 2020 *Global Financial Stability Report* for an analysis of physical risk and equity prices.

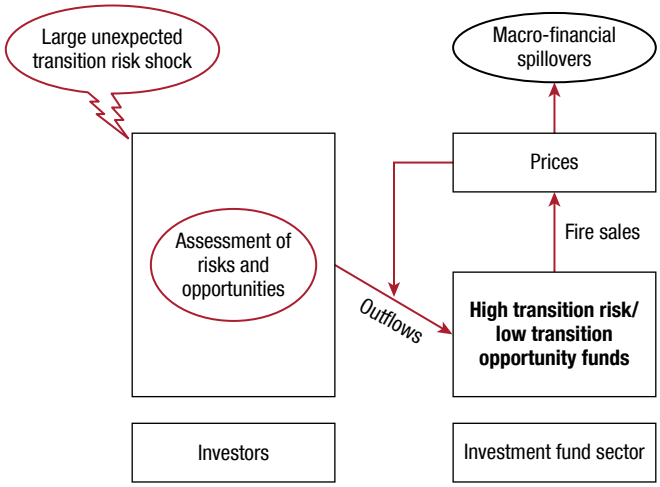
[8]As of the end of 2020, 36,500 funds were still active and totaled $49 trillion in assets under management. The sample covers the period 2010:Q1–20:Q4. Most of these funds are domiciled in advanced economies. At the end of 2020, the shares of equity, fixed-income, and allocation funds (that is, funds with varying allocations across asset classes) were 39.2 percent, 27.6 percent, and 19 percent, respectively. The sample does not capture separately managed accounts, which may account for a significant share of flows into sustainable finance. For example, in Europe they represented about 45 percent of total assets under management at the end of March 2021 (EFAMA 2021). In the chapter's regression analyses, funds are included only if assets under management exceeded $500 million at least once over the entire sample period. See Online Annex 3.1 for a fuller description of the sample and variable definitions.

funds that increase the supply of capital available to firms supporting the transition. This in turn reduces their cost of capital and encourages transition-aligned investments geared toward emissions reductions.[9,10] Second, sustainable funds can influence firms' strategies through stewardship, supporting the move toward more transition-aligned corporate policies. This entails exerting influence through engagement and proxy voting to improve sustainability practices, outcomes, and disclosures.[11] A positive feedback loop could thus emerge through the investment fund sector, with investors' sustainability concerns leading to more investments in climate-change-mitigating projects reflecting risk management and rate-of-return considerations, thus increasing the pace of the transition.

The investment fund sector could also amplify the impact of sudden transition shocks on financial stability. The transition to a green economy could be a source of financial stability risk for firms adversely affected by the accompanying economic transformation as well as for financial institutions that hold claims on these firms. Sudden and larger-than-expected transition shocks—such as a delayed and abrupt tightening in carbon policy—could be amplified by vulnerabilities in the investment fund sector and have a meaningful impact on financial stability.[12] In such a scenario, investors would reassess risks, likely triggering outflows from funds with high exposure to transition risk, potentially leading to runs on these funds and fire sales and causing a further fall in asset values (Figure 3.2).

Figure 3.2. The Transition Could Be a Source of Financial Stability Risk

A large and sudden transition shock could trigger outflows from funds that have large transition-sensitive exposures—a development that could lead to fire sales, thus causing a further fall in asset values and macro-financial spillovers.



Source: IMF staff compilation.

Structural vulnerabilities in the investment fund sector (such as liquidity mismatches between funds' asset holdings and redemption features, credit exposure, and use of financial leverage) could amplify the impact. If large and abrupt, the drops in asset prices could then spill over to other parts of the financial sector and to the real economy through tighter financial conditions.

This chapter employs several empirical approaches to evaluate transition-related opportunities and risks. In particular, the approaches aim to:

- Assess the extent to which the investment fund sector is supporting the transition by examining (1) the evolution of the sustainable fund segment and the exposure of these funds to the transition, (2) the importance of sustainability labels in attracting fund flows, and (3) the role of sustainable funds in climate stewardship and in encouraging the issuance of securities by more environmentally friendly firms.
- Evaluate risks to the investment fund sector from the transition by examining whether (1) climate-related news in the past had any effect on fund flows, performance, and portfolio composition; (2) the size of liquidity buffers is related to funds' exposure to the transition; and (3) sustainable investors ameliorate financial stability risks due to their possibly lower sensitivity to short-term returns.

[9]Funds can also provide debt financing for specific assets and infrastructure geared toward climate change mitigation, including debt that has received a climate bond label. As of September 1, 2021, year-to-date aggregate climate bond issuance amounted to $258.8 billion. For more information, see the Climate Bonds Initiative website at www.climatebonds.net/.

[10]It is possible that the shift in the supply of capital toward firms supporting the transition also raises the cost of capital of firms not necessarily supporting the transition.

[11]Proxy voting is a central feature of corporate governance that allows shareholders to participate in the governance of public firms. Many large asset managers have developed stewardship practices specific to environmental, social, and governance considerations.

[12]Although climate-related physical risks are not considered in this chapter, transition risks could be amplified to the extent that policymakers, consumers, and investors react to the materialization of ever-larger climatic disasters. Climate-related risks are different from other financial risks because the probability of their occurrence is not well reflected in past data and because of their far-reaching impact in terms of breadth and magnitude, the nonlinearities embedded in climate tail risks, and the substantial uncertainty associated with the need to assess risks over an extended time horizon (NGFS 2019; FSB 2020a).

Sustainable Investment Funds Have a Small Market Share but Are Growing Fast

A sustainable investment fund differs from a conventional fund because it has a sustainability objective alongside the traditional risk-return objective. In other words, sustainability considerations are a significant part of the fund's investment focus while seeking financial returns (ICI 2020). To achieve sustainability objectives, funds tend to rely on multiple investing strategies, such as *negative screening* (that is, not investing in certain firms or sectors), *positive screening* (that is, selecting firms that satisfy specific sustainability criteria), or *impact investing* (that is, aiming to make a measurable sustainability impact alongside a financial return). Some sustainable funds have a specific theme, such as the environment or climate change, while others may have a broader focus on environmental, social, and governance issues.

Sustainable investment funds represent only a small fraction of the investment fund universe. A fund's title and description of objectives indicate whether its focus is related to sustainability, the environment, or climate change.[13] In a sample of more than 36,500 funds active as of the end of 2020 analyzed for this chapter, about 4,000 had a sustainability label, of which nearly 1,000 had an environment theme and a little more than 200 had a climate-specific theme (Figure 3.3, panel 1).[14] The size of the sustainable fund segment, and of climate funds in particular, is also small compared with the overall size of the investment fund sector. While total assets under management of the funds in the sample amounted to about $49 trillion as of the end of 2020, sustainable funds, including those with a climate-specific label, totaled about $3.6 trillion. Funds with a specific climate focus accounted for only $130 billion of that total (Figure 3.3, panel 2).

However, sustainable investment funds (and climate funds in particular) have grown faster than their conventional peers in the recent past. Net flows into sustainable funds (as a percent of assets under management) moved broadly at the same pace as those into conventional funds during 2010–19 but increased notably in 2020 (to about 5 percent of lagged assets under management in the fourth quarter of 2020) (Figure 3.3, panel 3). Over the same period, net flows into climate-labeled funds rose significantly, remaining above net flows into conventional funds since 2017 and surging by a staggering 48 percent of assets under management over the four quarters of 2020. One possible reason for the stark increase in flows in 2020 could be the COVID-19 crisis, which raised investor awareness about catastrophic events, including those related to climate change.

Conventional investment funds are also increasingly factoring environmental, social, and governance considerations into their traditional investment processes. In addition, such funds have started to employ negative screens based on these considerations and are using stewardship to influence firms' behavior with respect to them (and related disclosures). Accordingly, the number of asset managers and asset owners that are signatories to the Principles for Responsible Investment—thereby committing to incorporate environmental, social, and governance considerations into investment analysis and decision-making processes—more than doubled from about 1,400 in 2015 to more than 3,000 in 2020 (Figure 3.3, panel 4).

The Exposure of Investment Funds to the Transition Has Remained Broadly Stable

In addition to the specific label, a common way to obtain sustainability information on an investment fund is through scores related to environmental, social, and governance considerations. Data providers collect information about sustainability issues from firms' disclosures, synthesize it through individual scores for each of the three environmental, social, and governance pillars—as well as for their underlying components—and then construct an overall score. Fund-level sustainability scores (also called "ESG [environmental, social, and governance] scores") can then be derived by matching the firm-level scores with information on portfolio holdings of securities. Similar fund-level scores can be computed for each of the three pillars and their components. However, currently available environmental, social, and governance data suffer from several deficiencies in terms of coverage and

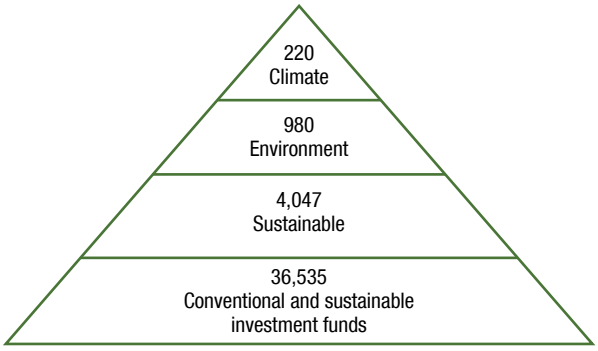
[13]See Online Annex 3.1 for details on the methodology used to classify funds.

[14]As of the end of 2020 the shares of equity, fixed-income, and allocation funds within the subsample of thematic climate funds were 56 percent, 21 percent, and 17 percent, respectively. The share of passive funds was higher for funds with a climate focus (22 percent) compared with conventional funds and other sustainable funds (about 13 percent). Fees of sustainable funds were also slightly higher than those of their conventional peers.

Figure 3.3. Sustainable Investment Funds Have a Small Market Share but Have Grown Fast Recently

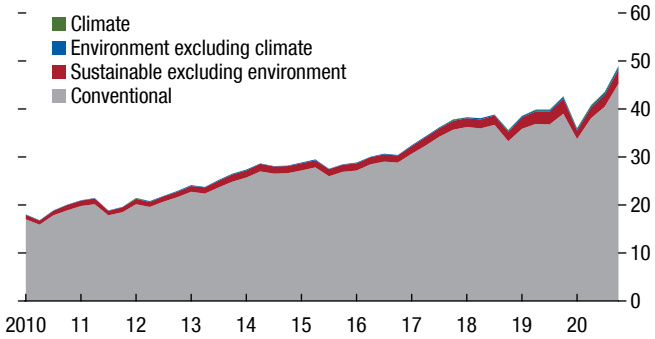
Climate-focused funds account for only a small share of funds ...

1. Number of Funds in the Sample, by Fund Label, 2020:Q4



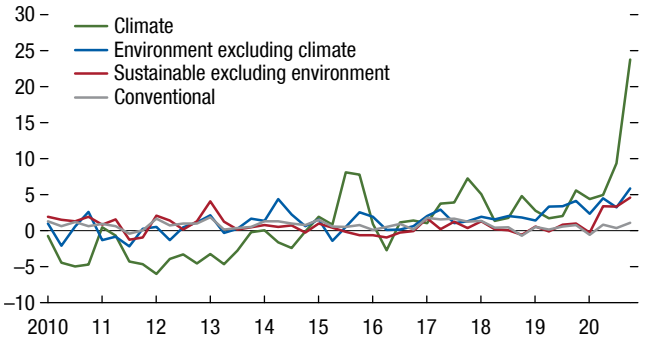
... and of the investment fund sector's total assets under management ...

2. Assets under Management, by Fund Label, 2010:Q1–20:Q4 (Trillions of US dollars)



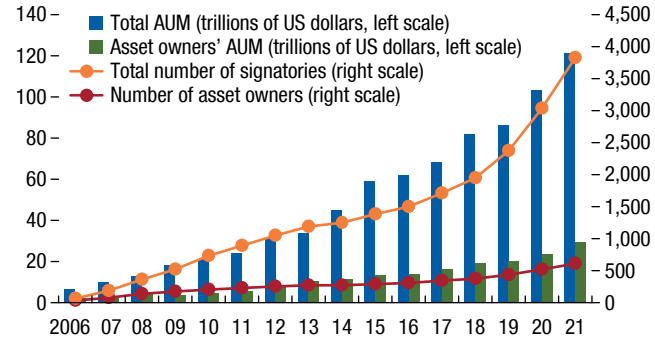
... but they have seen strong inflows in recent years.

3. Net Flows into Funds, by Fund Label, 2010:Q1–20:Q4 (Percent of lagged assets under management; value-weighted)



Conventional funds have increasingly integrated sustainability considerations into their investment processes.

4. Number of Signatories to the Principles for Responsible Investment and Their Assets under Management, 2006–21 (Number, and trillions of US dollars)



Sources: Bloomberg Finance L.P.; Lipper; Morningstar; United Nations Principles for Responsible Investment; and IMF staff calculations.
Note: Fund labels are constructed from fund names and information in prospectuses (see Online Annex 3.1). Panels 2 and 3 show mutually exclusive fund labels. In panel 4, asset owners are organizations that represent the holders of long-term retirement savings, insurance, and other assets, such as pension funds, sovereign wealth funds, insurance companies, and other financial institutions that manage deposits. Data for panel 4 are as of March 2021. AUM = assets under management.

comparability—scores can differ significantly across data providers, though this is less of an issue for the environmental pillar scores (IOSCO 2021a; Gibson Brandon, Krueger, and Schmidt, forthcoming).[15] Portfolio managers often cite data quality issues, multiple disclosure standards, and the lack of a globally agreed-upon taxonomy as obstacles to properly measuring risks, opportunities, and impact related to sustainability (Box 3.1).[16] In fact, only about 55 percent of the equity funds in the sample have sufficient ESG data to be included in the chapter's quantitative analysis.

This chapter constructs two key scores to summarize a fund's exposure to the transition: transition opportunity and carbon intensity. The transition-opportunity

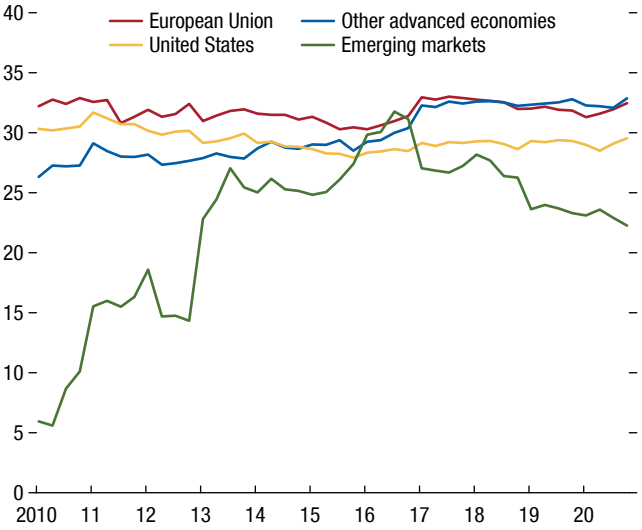
[15]In general, ESG scores—as well as the environmental pillar score—reflect a range of issues much broader than those related to the climate transition. Consistent with ESG scores not fully capturing climate transition efforts, Elmalt, Igan, and Kirti (2021) show that firms' emissions reductions are only weakly associated with their ESG and environmental pillar scores.

[16]In the realm of firm-level climate data, gaps include poor coverage of so-called Scope 3 emissions—that is, indirect greenhouse gas emissions that occur in a firm's value chain net of emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the reporting firm. For a more detailed discussion of climate data gaps, see FSB (2021) and NGFS (2021a). Data quality issues could also be pertinent to the chapter's analysis and could bias some of the chapter's findings. See Online Annexes 3.2 to 3.7 for robustness tests aimed at addressing some of these issues.

Figure 3.4. The Transition-Related Scores of Funds Have Been Broadly Stable

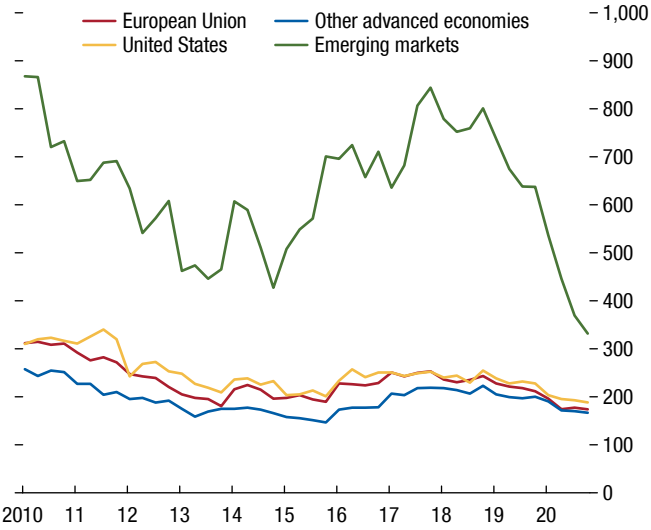
Transition opportunities have remained stable in advanced economies ...

1. Average Transition-Opportunity Score by Fund Domicile, 2010:Q1–20:Q4 (Score 0–100)



... and the average carbon intensity has declined only slightly outside of emerging markets.

2. Average Carbon Intensity by Fund Domicile, 2010:Q1–20:Q4 (Tons of CO_2-equivalent per million US dollars of revenue)



Sources: FactSet; Morningstar; Refinitiv; and IMF staff calculations.
Note: See Online Annex 3.1 for details on the score construction methodology.

score is a composite measure based on a range of metrics that underlie the environmental pillar, such as a company's carbon-reduction and overall environmental management policies and systems, the development of products or technologies related to renewable energy, broader environmental research and development, and a public commitment to divest from fossil fuels.[17] All else equal, a higher score implies that the fund's relative financial performance will likely benefit from a faster transition. By contrast, the carbon-intensity score measures a firm's so-called Scope 1 and Scope 2 greenhouse gas emissions relative to revenue, with a higher score implying that the fund is more likely to be hurt by a quicker transition to a low-carbon economy, all else equal.

In the global investment fund sector, transition opportunities have remained stable while carbon intensities have gradually declined. This is particularly true for funds domiciled in advanced economies (Figure 3.4). For funds domiciled in emerging markets, the scores have been more volatile over time, but nonetheless exhibit a converging trend toward their advanced economy counterparts, at least with respect to carbon intensity.[18]

On average, investment funds with climate labels hold securities with higher transition-opportunity scores than their conventional counterparts. At the same time, however, the carbon intensity of their portfolios is also higher than that of conventional funds (Figure 3.5, panels 1 and 2). This may be because climate-focused funds tend to invest in firms that are more likely to significantly reduce their emissions levels during the transition or facilitate the

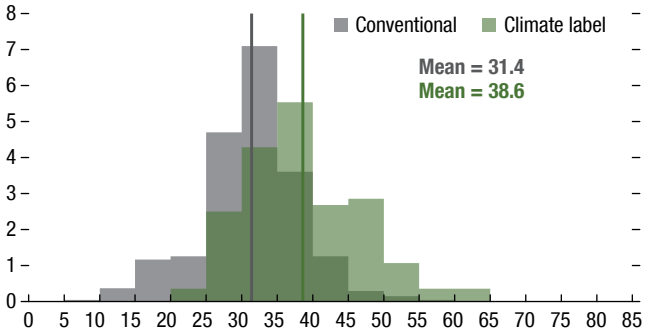
[17]The transition-opportunity score is constructed from Refinitiv's firm-level environmental innovation score (combined with data on portfolio holdings from FactSet) and Morningstar's fund-level carbon management score. The former reflects a company's capacity to reduce environmental costs and burdens for its customers, thereby creating market opportunities through new environmental technologies and processes or eco-designed products. The latter evaluates a company's preparedness and track record in managing carbon operations and products. Both scores are highly positively correlated. See Online Annex 3.1 for detailed information on data sources and the methodology to construct the scores used in the analysis.

[18]The statistics pertaining to emerging market funds should be interpreted with caution as the sample is unbalanced and the number of funds with data on transition-opportunity scores and carbon intensity is small (but increased from about 40 funds in 2017 to about 500 by the end of 2020). In the aggregate, considering both advanced economies and emerging markets, changes in portfolio scores are driven predominantly by funds' portfolio allocations and to a lesser extent by changes in firms' scores (Online Annex 3.2).

Figure 3.5. Climate Investment Funds Have a Strong Tilt toward Transition Opportunities

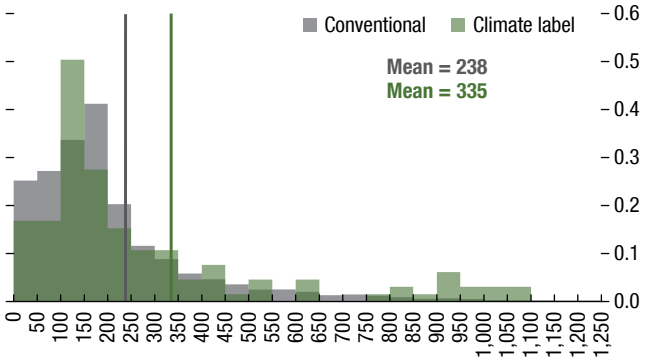
On average, climate funds have higher levels of transition opportunities ...

1. Transition-Opportunity Score Distribution, Climate versus Conventional Funds, 2020:Q4
(*x*-axis: score between 0 and 100; *y*-axis: percent)



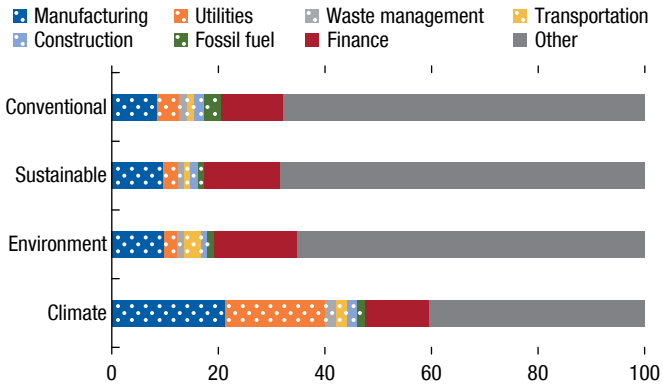
... but portfolios with slightly higher levels of carbon intensity.

2. Carbon-Intensity Score Distribution, Climate versus Conventional Funds, 2020:Q4
(*x*-axis: tons of CO_2-equivalent per million US dollars of revenue; *y*-axis: percent)



Funds with a climate label are more heavily invested in transition-sensitive sectors.

3. Industry Composition of Holdings by Fund Type, 2020:Q4
(Percent, transition-sensitive sectors are dotted)



Sources: Bloomberg Finance L.P.; FactSet; Lipper; Morningstar; Refinitiv; and IMF staff calculations.
Note: Panel 3 shows the asset-weighted average industry composition using the North American Industry Classification System at the two-digit level. The transition-sensitive industries are defined similarly to the "climate-policy-relevant sectors" in Battiston and others (2017). Industries that are not transition-sensitive, apart from finance, are included in the "Other" category. See Online Annex 3.1 for details on the score construction methodology. All three panels are based on mutually exclusive fund labels.

reduction of emissions in other parts of the economy, rather than in those with already low levels of emissions.[19] Indeed, consistent with this hypothesis, climate funds have a substantially larger exposure to firms in transition-sensitive sectors—utilities, manufacturing, transportation, waste management, construction, and fossil fuels—than conventional funds, or those with a sustainability or environmental label (Figure 3.5, panel 3).[20]

The Role of Investment Fund Labels in Driving Fund Flows

Fund labels are an important driver of fund flows. Despite the less-than-perfect matching between fund labels and transition-related metrics, labels still rep-

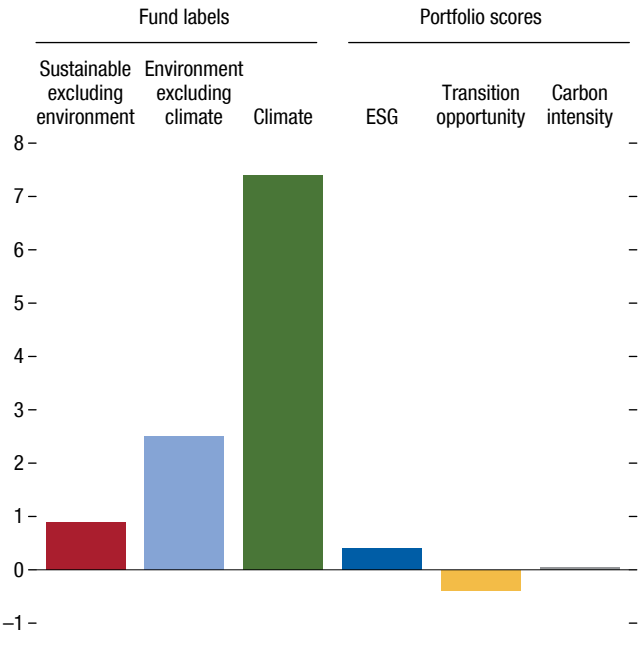
[19]This is, however, not true for funds labeled as sustainable. On average, these funds hold fewer assets with high carbon intensities than conventional funds, even though their transition-opportunity scores are not substantially higher. Climate-themed funds are also more involved in carbon solutions. See Online Annex 3.2.

[20]This finding is robust to using alternative definitions of transition opportunities, such as a narrowly defined measure constructed only with indicators directly related to emissions and portfolio exposures to carbon solutions (Online Annex 3.2).

Figure 3.6. Climate and Sustainability Labels Matter for Flows

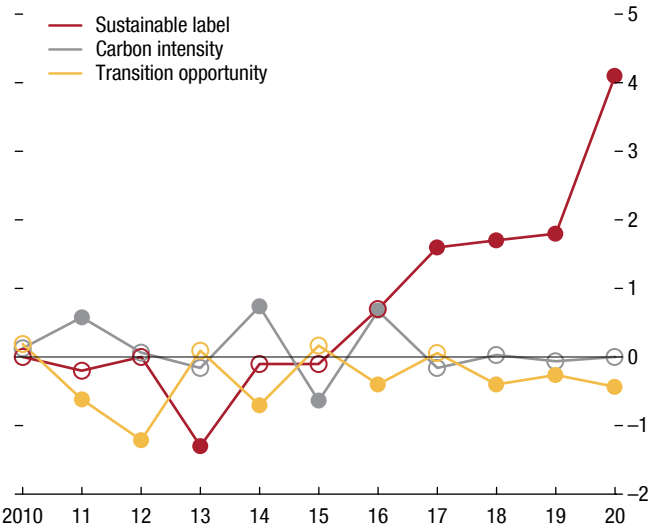
Labels help to attract flows ...

1. Sensitivity of Quarterly Flows to Fund Labels and Portfolio Scores (Percent of lagged total net assets)



... and their importance has increased over time.

2. Sensitivity of Quarterly Flows to Fund Label and Portfolio Transition Scores, 2010–20 (Percent of lagged total net assets)



Sources: Bloomberg Finance L.P.; FactSet; Lipper; Morningstar; Refinitiv; and IMF staff calculations.
Note: Panel 1 shows the impact of different fund labels and one standard deviation increases in portfolio scores. Panel 2 shows the impact of funds' sustainability label, one standard deviation increases in fund transition-opportunity scores, and a one standard deviation increase in funds' carbon intensity on quarterly flows, estimated by year. In both panels, estimates are based on regression models that control for the natural logarithm of fund size, fund age, expense ratios, past flows, past returns, region by year fixed effects, and Morningstar broad category by year fixed effects. Solid bars and circles indicate significance at the 10 percent level or less. ESG = environmental, social, and governance.

resent a convenient and salient way to summarize a fund's investment strategy and its approach to engagement and stewardship. In fact, after controlling for a range of fund characteristics (including funds' portfolio transition-opportunity score, carbon intensity, ESG score, past returns, and asset class), labels are shown to be an important driver of fund flows (Figure 3.6, panel 1). Moreover, the importance of sustainability labels appears to have increased in recent years (Figure 3.6, panel 2).

Investment fund labels—and by implication sustainable finance classifications (including climate taxonomies) to align investments with climate goals—can be a key tool for channeling flows to sustainable and climate-focused funds. Sustainable finance classifications can help guide the behavior of firms and facilitate investors' assessment of firms' transition pathway—and thus contribute to the scaling up of sustainable finance markets. Looking ahead, they can play an important role in defining what is sustainable and thus in determining the flow of capital toward sustainable projects. Proper regulatory oversight needs to be in place to prevent "greenwashing"—that is, deceptive marketing used to persuade the public that an organization's products, aims, and policies are environmentally friendly—and to ensure that labels fairly represent funds' investment objectives. One effort in this direction is the European Union's Sustainable Finance Disclosure Regulation, which went into effect in March 2021 and requires environmental, social, and governance disclosures of certain financial market participants.[21]

Sustainable and Climate Investment Funds Can Facilitate the Transition

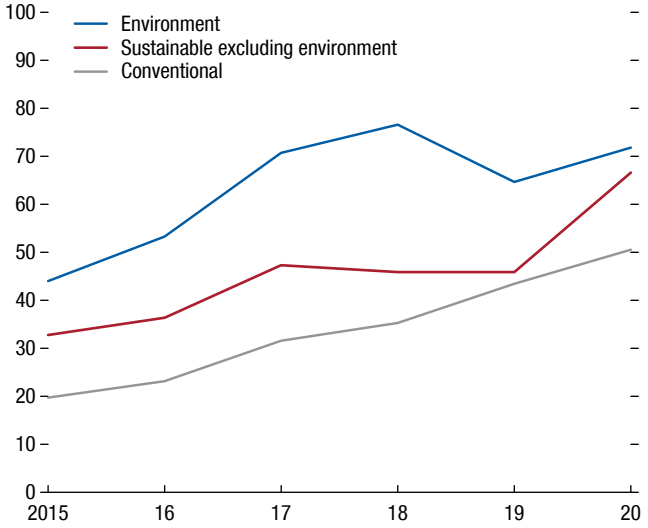
Climate-related shareholder resolutions put to a vote at firms' annual general meetings—for example, on emission-reduction targets or climate-related

[21]So are the recent UK Financial Conduct Authority's guiding principles for the design, delivery, and disclosure of sustainable investment funds.

Figure 3.7. Sustainable Investment Funds Appear to Be Leaders in Climate Stewardship

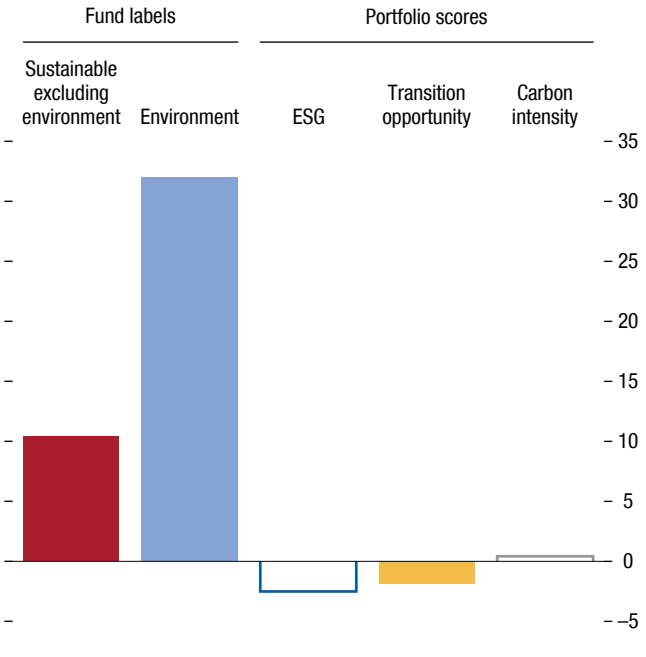
Sustainable and environment funds support climate-related shareholder resolutions more than their conventional peers.

1. Share of Votes in Favor of Climate-Related Resolutions, by Fund Label, 2015–20 (Percent)



Beyond portfolio scores, labels are useful for identifying funds' climate stewardship.

2. Effect of Fund Labels and Transition Scores on the Share of Votes in Favor of Climate-Related Resolutions (Percent)



Sources: Bloomberg Finance L.P.; FactSet; Lipper; Morningstar; Refinitiv; and IMF staff calculations.
Note: Panel 2 shows the impacts of different fund labels and one standard deviation increases in fund portfolio scores on the probability that a fund will vote in support of a climate-related resolution. Estimates are based on regression models that control for the natural logarithm of fund size, fund age, expense ratios, whether a fund is managed passively, region by year fixed effects, and fund category by year fixed effects. There are not enough funds with a climate label in the sample to analyze their proxy voting behavior separately from the broader category of environment-labeled funds. The analysis is based on shareholder resolutions in US publicly traded companies. Solid bars indicate significance at the 10 percent level or less. ESG = environmental, social, and governance.

disclosures—can be an important driver of corporate behavior.[22] Looking at the proxy voting behavior of funds in the sample, it is noteworthy that the support for climate-related shareholder resolutions has trended up over time, indicating that investors are increasingly taking climate-related issues seriously. This support has been significantly greater for sustainable and climate funds than for conventional funds (Figure 3.7, panel 1). Importantly, labels are useful for investors to identify funds' climate stewardship activity: funds with a "sustainable" label, especially those with an "environmental" label, are more likely to support a climate resolution (Figure 3.7, panel 2). Meanwhile, portfolio-level transition scores do not appear to be a good indicator of funds' voting behavior on these resolutions.[23] This finding suggests that sustainable investment funds could help firms adopt a more climate-friendly business model and that a sole focus on funds' portfolios may miss

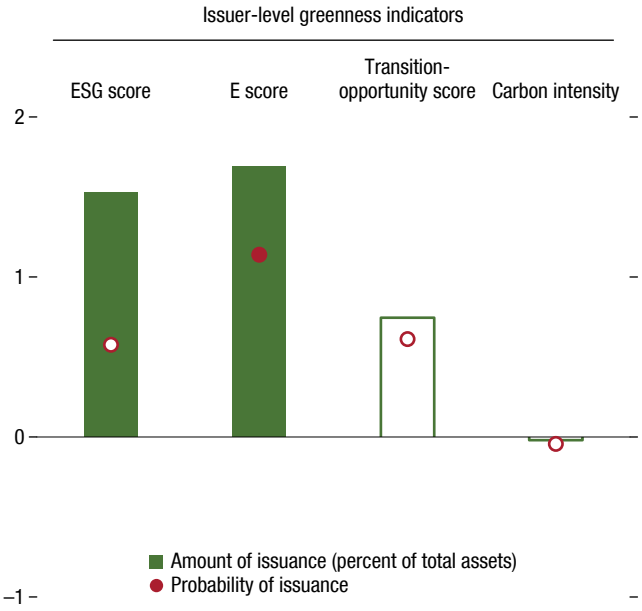
[22]Even though most shareholder resolutions are nonbinding, Flammer (2015) finds that for US publicly traded companies about half of shareholder resolutions on corporate social responsibility are being implemented and that these proposals are associated with a 1.77 percent abnormal return, suggesting that shareholder resolutions influence managerial behavior. Consistent with the view that shareholder activism affects firms' behavior, Flammer, Toffel and Viswanathan (2021) find that shareholder activism increases the voluntary disclosure of climate change risks. In the United States in 2021 there were 66 proposals specifically related to climate change, as well as additional proposals about climate lobbying and disclosure (*Proxy Preview* 2021).

[23]There are not enough funds with a climate label in the sample to analyze their proxy voting behavior separately from the broader category of environment-labeled funds.

Figure 3.8. Flows into Sustainable Funds Have Boosted Bond and Equity Issuance of Green Firms

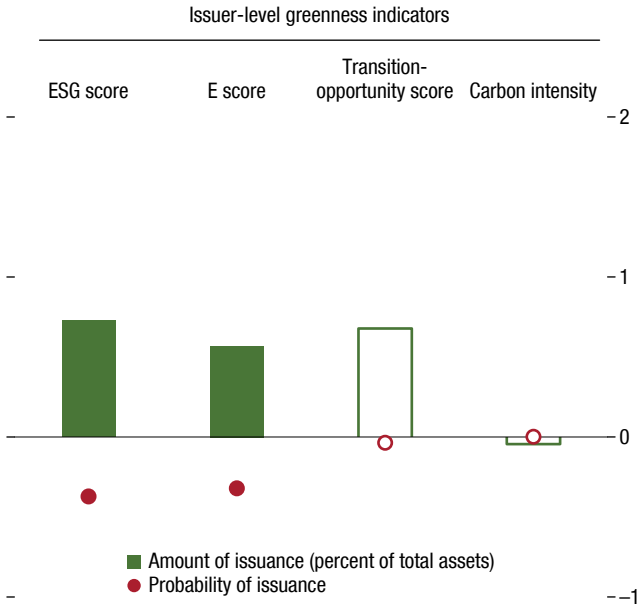
Increased net inflows into sustainable funds result in a higher likelihood and an increased amount of bond issuance by green firms ...

1. Effect of Inflows into Sustainable Funds on Quarterly Bond Issuance Amount and Likelihood of Issuance by Green Firms Relative to Less Green Firms (Percent)



... and an increased amount of equity issuance by green firms relative to less green firms.

2. Effect of Inflows into Sustainable Funds on Quarterly Equity Issuance Amount and Likelihood of Issuance by Green Firms Relative to Less Green Firms (Percent)



Sources: Bloomberg Finance L.P.; Dealogic; FactSet; Lipper; Morningstar; Refinitiv; and IMF staff calculations.
Note: The figure shows the impact of a one standard deviation increase in a firm-specific measure of net inflows into sustainable investment funds on the probability of issuance and the issuance volume of green firms relative to that of less green firms. "Green" firms are defined as those in the 75th percentile of the ESG score, E score, transition-opportunity score, and negative carbon intensity. "Less green" firms are defined as those in the 25th percentile of these scores. Equity issuance may require a longer time to react to financing supply shocks and to the fact that only seasoned equity offerings are considered in this analysis (initial public offerings are not considered). Solid bars and circles indicate statistical significance at the 10 percent level. See Online Annex 3.4 for the methodology. E score = environmental score; ESG = environmental, social, and governance.

an important element of sustainable finance—climate stewardship.

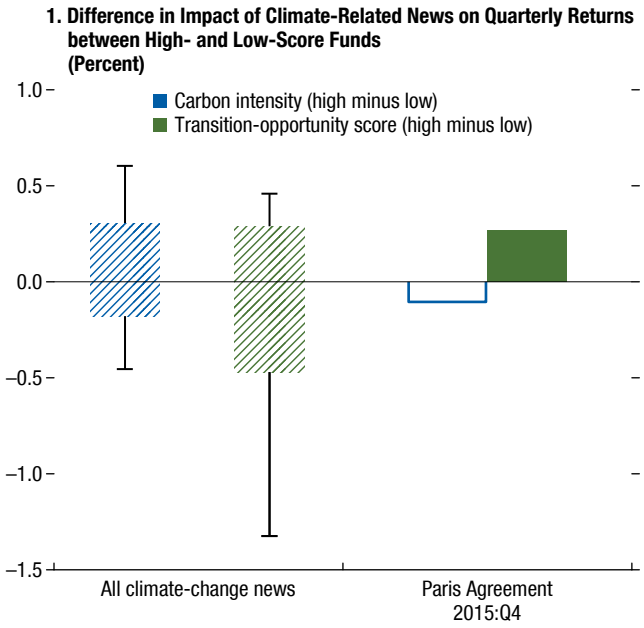
Flows into sustainable investment funds increase the availability of private capital to firms with a more favorable sustainability rating ("green" firms).[24] Firms in transition-sensitive sectors with high ESG or environmental pillar scores are more likely (relative to other firms) to issue bonds and in larger amounts when inflows into sustainable funds increase during a quarter (Figure 3.8, panel 1). Similar results are true for equity issuance, where the amount of equity issued by firms with high ESG or environmental pillar scores increases, even though they issue equity somewhat less frequently (Figure 3.8, panel 2).[25] Interestingly, similar effects are not evident in variables more closely aligned with the transition, such as the transition-opportunity score or carbon intensity. Taken together, this suggests that while sustainable funds have been boosting issuance of firms aligned with the funds' sustainability objective, they may lack the size or focus to foster issuance by firms supporting the transition.

[24]The analysis of securities issuance is based on a sample of 6,449 firms, of which 5,446 issued equities at least once and 3,722 issued bonds at least once during the period 2010:Q1–21:Q1. To establish a direct link between flows into sustainable funds and security issuance, this chapter looks at issuance as a function of flow-driven buying pressure, building on Zhu (2021). The measure of flows used in this analysis captures both flows and firm-specific exposures to flows. See Online Annex 3.3 for methodological details.

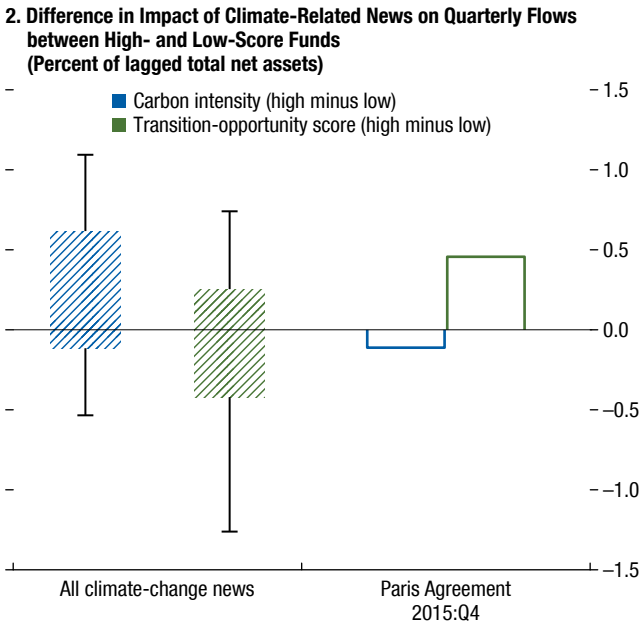
[25]Additional analysis finds that flows into sustainable funds lead to a significant contemporaneous increase in abnormal returns for firms with a high ESG score and high environmental pillar scores (Online Annex 3.4).

Figure 3.9. Fund Returns and Flows Have Barely Reacted to Climate-Related News over the Past 10 Years

Climate-related news has had a small impact on fund returns ...



... and on flows into these funds.



Sources: FactSet; Morningstar; Refinitiv; and IMF staff calculations.
Note: Results are based on panel regressions of flows and returns on nine climate-related event dummies and their interaction with carbon intensity and the transition-opportunity score. Control variables are past returns and flows, the logarithm of fund size, fund expense ratios, and fund age, as well as region-year and fund-type-year fixed effects. Bars depict the differential impact of a shock on funds at the 25th and 75th percentiles of the carbon-intensity and transition-opportunity score distributions. Within the whisker bars in panel 1, three of the carbon-intensity coefficients and four of the transition-opportunity coefficients are insignificant. In panel 2, six of the carbon-intensity coefficients and five of the transition-opportunity coefficients are insignificant. For the Paris Agreement event, solid bars indicate significance at the 10 percent level or less. See Online Annex 3.5 for methodological details.

The Transition Has Not Yet Been a Source of Financial Instability

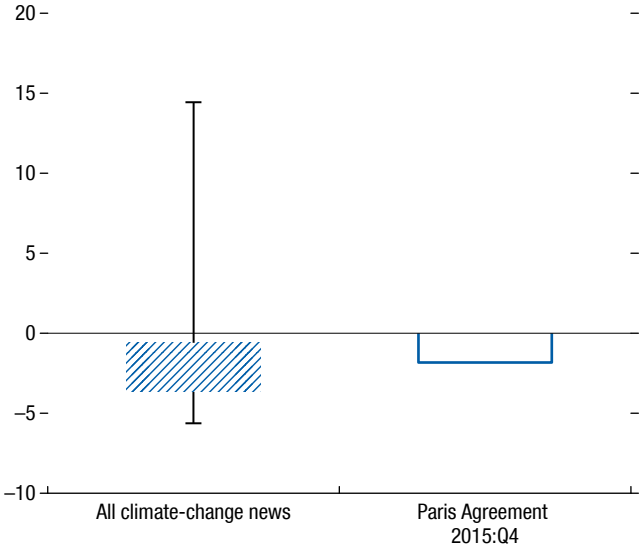
Past climate-related news has not had a systematic impact on investment fund returns and flows.[26] Events containing information about changes in climate risk are likely to lead to coverage in news outlets (Engle and others 2020). The most relevant climate-related news events over the past decade show a relatively small impact on the quarterly return of a fund with a high transition-opportunity score relative to that of a fund with a low score (Figure 3.9, panel 1, green whisker bar). A similar result holds with respect to the return of a fund with high carbon intensity compared with one with low carbon intensity (Figure 3.9, panel 1, blue whisker bar). The impact of climate-related news has also been limited to date in terms of flows (Figure 3.9, panel 2, blue and green whisker bars). A major transition-enhancing event that can be unambiguously associated with widespread climate-related news is the Paris Agreement in the fourth quarter of 2015. As Figure 3.9 shows, the direction of its effects are in line with priors (high-transition-opportunity -score funds and low-carbon-intensity funds benefit), but the size of the effect is small, which suggests that the event did not significantly alter investors' perception of the speed of the transition.

The limited impact of climate-related news on fund flows and performance may explain why such news has not triggered any major portfolio adjustment by investment funds. In general, funds should react to climate-related news by adjusting their transition-related exposures in a direction that makes

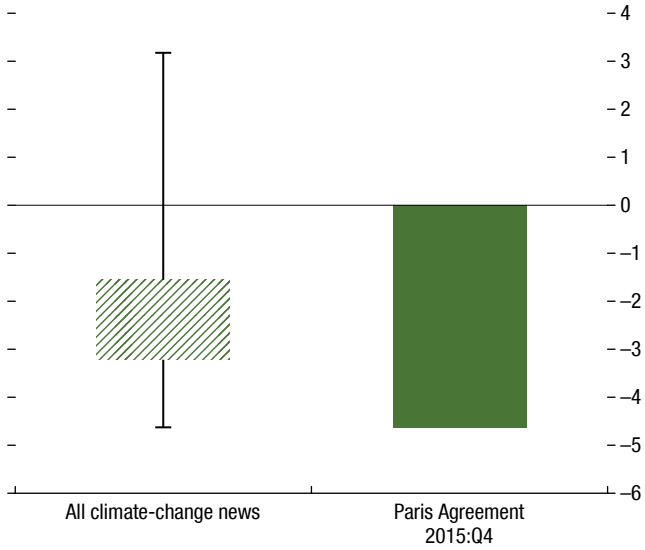
[26]To analyze the impact of transition shocks on fund performance, the chapter first identifies relevant climate-related news by exploiting existing climate-related news indices back to 2010. These indices reflect the occurrence of climate-related phrases, articles, or search queries across several major news sources, namely the *New York Times*, *Wall Street Journal*, and Google News. The *Wall Street Journal* index is obtained from Engle and others (2020), and two *New York Times* indices were kindly provided by Brian Reis and Bob Engle. A total of nine quarters over the sample period with heightened attention to climate change are identified, a few of which correspond to significant transition-related events such as the Paris Agreement in 2015:Q4 (see Online Annex 3.5).

Figure 3.10. The Impact of Climate-Related News on Funds' Transition-Related Scores Has Been Limited

Funds' carbon-intensity scores have not reacted consistently in response to climate-related news ...



... and neither have funds' transition-opportunity scores.



Sources: FactSet; Morningstar; Refinitiv; and IMF staff calculations.
Note: Results are based on panel regressions of carbon-intensity and transition-opportunity scores on nine climate shock dummies. Control variables are past returns and flows, the logarithm of fund size, fund expense ratios, and fund age, as well as region-year and fund-type-year fixed effects. Within the whisker bar in panel 1, six coefficients are insignificant. Within the whisker bar in panel 2, one coefficient is insignificant. For the Paris Agreement event, solid bars indicate significance at the 10 percent level or less. See Online Annex 3.5 for methodological details.

them less exposed to large shocks of the same nature in the future.[27] Yet neither the carbon-intensity nor the transition-opportunity scores of funds appear to have responded meaningfully to climate-related news. For example, both the carbon-intensity and transition-opportunity scores declined slightly following the Paris Agreement in the fourth quarter of 2015, when intuitively this event should have had opposite effects on those scores (Figure 3.10, panels 1 and 2).

Transition-related scores also appear to have some bearing on investment funds' liquidity buffers. For the investment fund sector, a key factor in the ability to absorb or amplify a large transition shock is the size of the buffer provided by liquid assets. An analysis of the relationship between funds' cash holdings and transition-related scores reveals that fund portfolios with a higher transition-opportunity score are associated with lower cash buffers (Figure 3.11, panel 1, green bar), particularly if initial buffers exceed the sector median. At the same time, however, funds with a higher level of carbon intensity also appear to hold less cash than those with lower carbon intensity (Figure 3.11, panel 1, blue bar).[28] This result holds mainly for funds with already-high cash buffers (that is, above the median), suggesting that funds may engage in such behavior only beyond a certain threshold (Figure 3.11, panel 2). While it is not entirely obvious why this is the case, it could be that highly carbon-intensive funds are more tilted toward maximizing financial returns and reach for yield by holding relatively lower liquidity buffers.

A fuller assessment of the ability of investment funds to withstand transition-related liquidity strains would require a comprehensive scenario analysis. Several studies suggest that security-level valuation effects

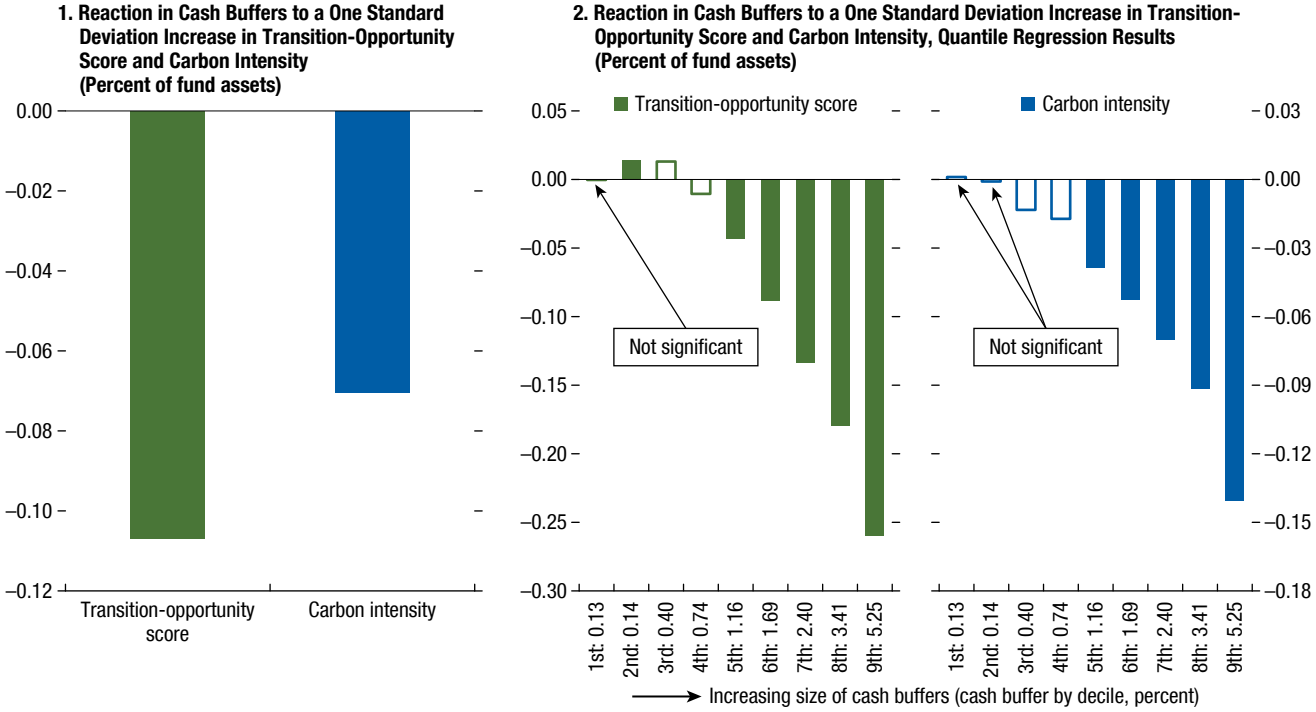
[27]Engle and others (2020) find that portfolios based on ESG scores can be used to hedge against climate-related news events. Hong and Kacperczyk (2009) find that "sin" stocks—companies involved in producing alcohol, tobacco, and gaming—are held less by norm-constrained institutions such as pension plans than by mutual or hedge funds.

[28]For example, a fund with a 2.4 percent cash buffer (which corresponds to the mean) will hold 13.5 basis points less cash if its transition-opportunity score increases by one standard deviation. The same fund will reduce its buffer by 7 basis points if its carbon-intensity score increases by one standard deviation.

Figure 3.11. Sensitivity of Cash Buffers to Transition-Related Scores

Funds with a greater transition-opportunity score hold, on average, less cash, as do funds with greater carbon intensity ...

... but both effects kick in only if funds feel sufficiently comfortable with the initial size of their cash buffers.



Sources: Bloomberg Finance L.P.; FactSet; Morningstar; Refinitiv; and IMF staff calculations.
Note: Results are based on ordinary least squares and unconditional quantile regression models regressing cash and cash equivalent buffers on a dummy denoting whether a fund is labeled as sustainable, on transition-opportunity and carbon-intensity scores as well as their interactions with the sustainability label, and on lagged flows, the logarithm of fund size, fund management fees, a dummy denoting exchange-traded funds, the Chicago Board Options Exchange Volatility Index, a term spread, a credit risk spread, a proxy for US interest levels, and a basket of major exchange rates versus the US dollar. The models include region-year and fund-type-year fixed effects. Solid bars indicate significance at the 10 percent level or less. In panel 2, labels on the *x*-axis indicate deciles and their rank. See Online Annex 3.5 for methodological details.

as a result of transition shocks could be potentially large (ECB 2021; ESMA 2021) and highly sector- and firm-specific (Aberdeen Standard Investments 2021), suggesting significant heterogeneity in performance across funds and scenarios. This underscores the importance of conducting scenario analysis and stress testing of the investment fund sector, though such an exercise is beyond the scope of this chapter.

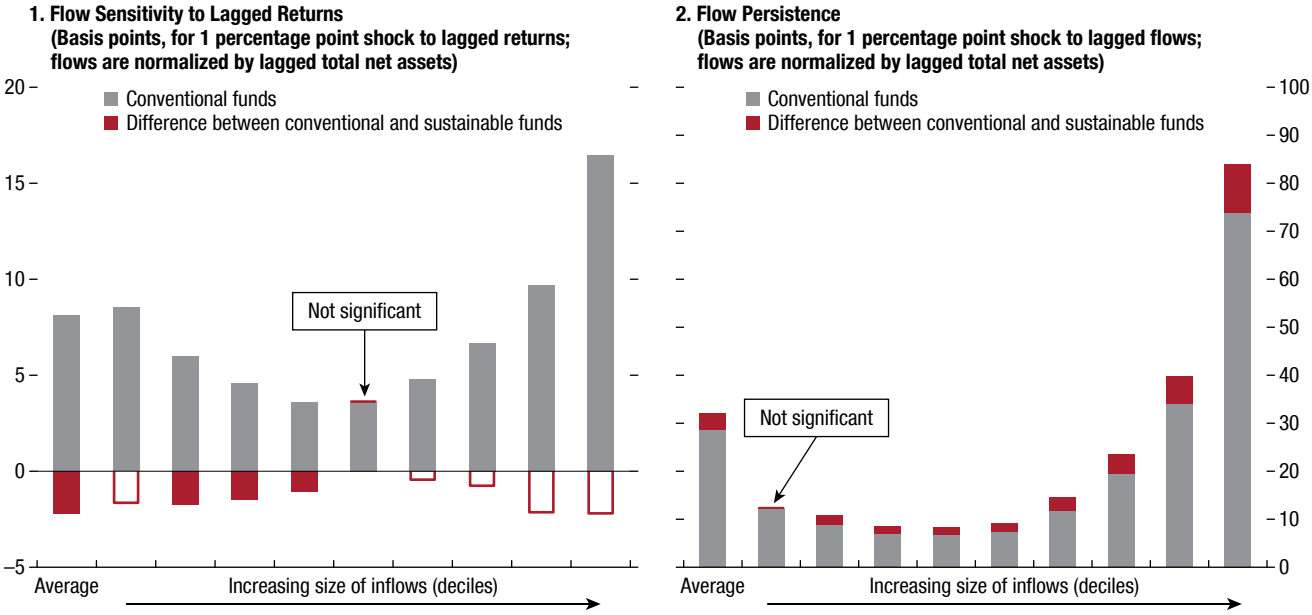
Regardless of the transition scenario that actually plays out, there seem to be financial stability benefits associated with the growth of the sustainable fund sector. Sustainable funds appear to attract investors who are less performance-sensitive and not too short-term-oriented—they thus may be less prone to large redemptions. Following lower returns, flows decline, on average, less for sustainable funds than for conventional funds (Figure 3.12, panel 1, far-left bar).[29] Moreover, the lower sensitivity of sustainable investors tends to be more pronounced when funds are experiencing outflows or smaller inflows (Figure 3.12, panel 1, other bars). Flows to sustainable funds also appear to be more persistent than flows to conventional funds, especially for funds experiencing inflows above the median (Figure 3.12, panel 2). This finding is consistent with the currently observed growth momentum in the sustainable fund sector and indicates that this sector has lower redemption risks and a more stable investor base. On the whole, these results suggest that sustainable funds could be important from

[29]This finding is consistent with El Ghoul and Karoui (2017), who find the behavior of investors with sustainability objectives to be more persistent and less sensitive to past performance.

Figure 3.12. Flow-Performance Relationship

Flows to sustainable funds are less sensitive to past performance than flows to their conventional peers, especially in funds facing outflows.

Flows are persistent for the entire sector, but more so for sustainable funds. This effect is more pronounced for funds facing inflows.



Sources: Morningstar; Refinitiv; and IMF staff calculations.
Note: Results are based on mean and unconditional quantile panel regressions of fund flows on a sustainability label dummy, lagged returns and flows, the interaction of these two variables with the sustainability dummy, the logarithm of fund size, fund expense ratio, fund age, and region-year and fund-type-year fixed effects. See Online Annex 3.6 for additional robustness tests. Solid bars indicate significance at the 10 percent level or lower.

a financial stability perspective and act as a source of stable financing for green investments.

Conclusion and Policy Recommendations

The sustainable investment fund sector can be an important driver of the transition to a green economy, supporting pro-transition corporate behavior through stewardship and potentially boosting investment expenditures of firms that could foster the transition.[30] The sector remains small, however, and fund managers face a number of challenges—including data gaps, risk of corporate greenwashing, multiple disclosure standards, and a lack of globally accepted taxonomies—in implementing investment strategies that support the transition.

To facilitate the assessment of transition-related risks and opportunities in the corporate sector by portfolio managers, investors, and financial authorities, as well as to prevent greenwashing and foster climate finance markets, policymakers should urgently seek convergence on a global climate information architecture (Ferreira and others, forthcoming). Such an architecture should include:

- A harmonized and consistent set of climate-related disclosure standards. Progress is in sight in this area (IFRS 2021).
- High-quality, reliable, and comparable data on climate-related metrics, including forward-looking metrics underpinned by mechanisms such as verification and audits to improve the quality of data. Initiatives are ongoing to fill these data gaps (FSB 2021; NGFS 2021a).
- Globally agreed-upon principles for sustainable finance classifications (including climate taxonomies) to align investment flows with climate goals. Sustainable finance classifications need to be well defined and dynamic to enable effective climate change mitigation through finance, and must also be suitable for adoption across all country groups (advanced, emerging market, and developing economies). A decisive global effort is needed to move forward on this front.

[30]Hong, Wang, and Yang (2021) argue that sustainable finance mandates can be an effective tool to mitigate climate change.

With regard to investment funds, efforts must continue to strengthen disclosures on how they promote sustainability and the transition, including through stewardship and capital allocation. This chapter's findings clearly point to the importance of fund labels and sustainable finance classifications (including taxonomies) to attract inflows. However, proper regulatory oversight and verification mechanisms are essential to avoid greenwashing.[31]

Once the climate information architecture is in place and regulatory oversight is well established, policymakers could also consider tools to channel savings toward transition-enhancing funds to complement other critical climate-change-mitigation policies, such as a carbon tax. These tools could take the form of enhanced eligibility of climate-themed funds for favorable tax treatment in savings products (such as retirement plans or life insurance products).[32,33] Additional research is needed to better understand the optimal design of such fiscal incentives.

To help raise awareness about climate-focused funds and attract investors with specific environmental and climate objectives, asset managers could emphasize the distinction between the broad concept of sustainability (which encompasses environmental, social, and governance issues) and purely climate considerations. They could also increase offerings of funds with well-defined and specific climate-change-mitigation objectives. While several large asset managers have already taken the initiative, others could also publish a description of their stewardship in climate change mitigation specifically.

Although past transition shocks have not been a source of financial instability for the investment fund sector, sudden and large shocks in the future could be disruptive, especially if structural vulnerabilities in the sector (such as liquidity mismatches) are not addressed.[34] To mitigate potential financial stability risks stemming from the transition, policy efforts should be geared toward implementing an orderly transition, using scenario analysis and stress testing to assess the vulnerability of the investment fund sector (NGFS 2021b). In addition, to make the sector more resilient to sudden asset price and redemption shocks, reforms to improve the availability of liquidity and redemption management tools are warranted (FSB 2020c; IMF 2021b).

[31]For example, it would be desirable to have labels and other sustainable finance classifications such as taxonomies based on credible emission-reduction targets of portfolio companies or on funds' active engagement with companies to reach those commitments. See IOSCO (2021b) for a discussion of current and planned regulatory approaches with respect to sustainability-related practices by asset managers.

[32]In addition, regulatory and legal barriers to investing in sustainable funds through retirement plans could be removed. In the United States, legislation was introduced in May 2021 in the House of Representatives and the Senate that seeks to make 401(k) retirement plan sponsors more comfortable with sustainable investing (Hallez 2021). In 2019, 3 percent of 401(k) plans had an environmental, social, and governance option, representing 0.1 percent of plan assets (Norton 2021).

[33]An example of a tax incentive to promote sustainable fund investments is the reform to Luxembourg's "subscription tax" in 2021, which makes the rate of the annual subscription tax applied to investment funds a decreasing function of the share of their investments in sustainable assets, as defined in the EU Taxonomy Regulation (see https://www2.deloitte.com/lu/en/pages/sustainable-development/articles/reduced-subscription-tax-rate.html).

[34]Such large and sudden transition shocks are more likely to occur if efforts to address climate change are delayed, requiring abrupt and intense policy action to address the issue.

Box 3.1. Management of Risks and Opportunities Related to Climate Change Mitigation: Survey of Asset Managers

This box discusses results from a short survey of investment fund managers and other asset management company representatives on the integration of climate change considerations into portfolio management practices as well as on their perception of climate-related risks and opportunities. The survey includes responses of 26 portfolio managers and representatives from 11 asset management firms and one asset owner, with more than $16 trillion in combined assets under management, based in Asia, Europe, and the United States. See Online Annex 3.7 for details on the survey.

Survey participants indicated that sustainability considerations—including climate change considerations—were fully or almost fully integrated into risk management practices in their companies. Within sustainable investing, which typically represents about 10 percent of assets under management, a range of approaches is used. The most common approach relies on exclusionary criteria (for example, excluding certain types of fossil fuel companies); least frequently mentioned approaches were those that rely on positive screening (Figure 3.1.1, panel 1). Some portfolio managers expressed skepticism that a positive impact on climate change mitigation could be achieved by investing solely in firms that are already performing well from an emissions perspective. Although many of the asset managers surveyed also offered impact funds, the relative size of these funds compared with the overall assets under management in sustainable funds was typically small. This is because asset managers found it difficult to measure impact precisely.

This box was prepared by Felix Suntheim and Jérôme Vandenbussche.

To implement their sustainable investment strategies, all survey respondents said they relied on measures of the portfolio carbon footprint and frequently also on measures of expected emissions reduction, often calculated relative to a benchmark (Figure 3.1.1, panel 2). About three-quarters of respondents noted that they use proprietary valuation models. Sector or industry classifications were often considered too crude a tool, with less than half of respondents incorporating them into their investment process. Third-party environmental, social, and governance databases were more widely used as an input (82 percent of respondents). Respondents were often skeptical about the reliability and comparability of aggregate scores and preferred using raw metrics to generate their own scores.

Regarding implementation challenges, the overwhelming majority of respondents thought that lack of data, including the lack of forward-looking data, was a pressing issue to be addressed and that it represented a greater obstacle than the lack of commonly accepted disclosure standards and taxonomies (Figure 3.1.1, panel 3). The lack of data was thought to be particularly acute in private markets.

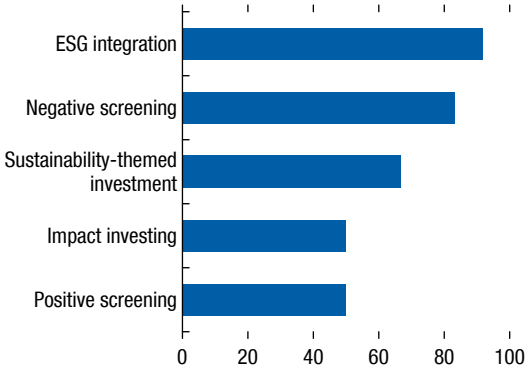
Finally, portfolio managers expressed very heterogeneous beliefs about climate-related risks in the short to medium term (Figure 3.1.1, panel 4). Across a list of five risk factors, policy risk—such as an increase in the price of carbon or a tightening of emissions regulations—was ranked highest by a majority of respondents, followed by physical risk. In terms of opportunities from the transition, respondents considered technological change or changes to consumer preferences to be the most important drivers (66 percent of respondents).

Box 3.1 *(continued)*

Figure 3.1.1. Survey Responses

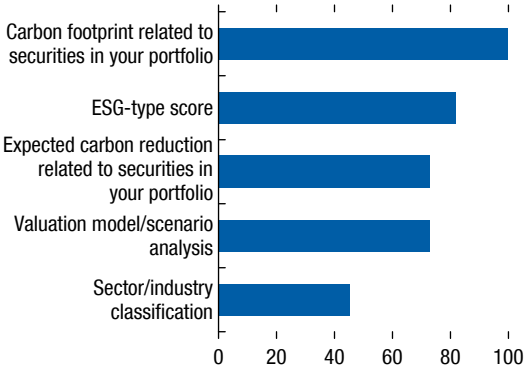
All surveyed asset managers integrate environmental, social, and governance considerations into their investment processes. Negative screening approaches are extremely common, while positive screening and impact investing are relatively less widespread.

1. Approaches Used by Asset Managers to Incorporate Climate Change Mitigation into Sustainable Investment Strategies (Percent of respondents)



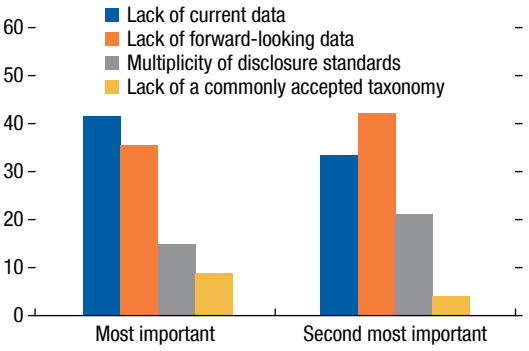
All asset managers analyze the carbon footprint of their investment products. A range of other tools is also very common.

2. Tools Used to Incorporate Risks and Opportunities Related to the Transition into Asset Managers' Investment Decisions (Percent of respondents)



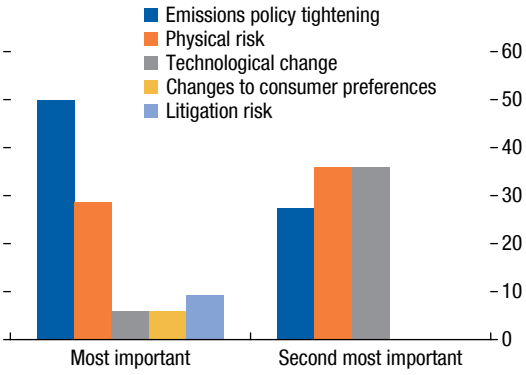
Data gaps were considered the most pressing issues that need to be addressed to facilitate transition-related investing.

3. The Two Most Important Obstacles Faced by Survey Respondents When Integrating Transition-Related Risks and Opportunities into Investment Decisions (Percent of respondents)



Emissions policy tightening was seen as the most important climate-related risk factor, but views varied widely across institutions and fund managers.

4. The Two Most Important Climate-Related Risk Factors over the Next Three Years (Percent of respondents)



Source: IMF staff calculations.
Note: See Online Annex 3.7 for details on the survey. ESG = environmental, social, and governance.

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