CHAPTER 3

FINANCIAL SECTOR POLICIES TO UNLOCK PRIVATE CLIMATE FINANCE IN EMERGING MARKET AND DEVELOPING ECONOMIES

Chapter 3 at a Glance

- The International Energy Agency projects climate mitigation investment needs to increase to $2 trillion per year by 2030 in emerging market and developing economies (EMDEs). This corresponds to 12 percent of total investment in these countries, up significantly from the current 3 percent.
- We estimate that the private sector needs to cover the majority of climate mitigation investment needs in EMDEs—between 80 and 90 percent depending on whether China is included—because public investment growth is projected to be limited.
- Yet, EMDEs face significant challenges in attracting private capital. Many have sub–investment-grade credit ratings, limiting their potential investor base and resulting in high financing costs. Even investment-grade-rated EMDEs may find it difficult to attract climate private finance due to several barriers.
- The phasing out of coal is necessary to reach climate goals, yet it is challenging as many EMDEs highly depend on coal. Phasing out coal-fired power plants will require substantial private investments and public support.
- Climate policies and commitments of major banks and insurance companies are not yet aligned with net zero emission targets, curtailing the alignment of private financial flows with the climate transition.

Policy Recommendations

- A broad mix of policies is needed to create an attractive environment for private capital in EMDEs.
- Carbon pricing can be highly effective in shifting capital flows toward low-carbon investments, but policymakers need to complement it with additional policies to unlock private climate finance in EMDEs.
- Structural policies, specifically those aimed at strengthening macroeconomic fundamentals, deepening financial markets, improving policy predictability, and fostering institutional and governance frameworks, are key to lowering the cost of capital, mobilizing domestic financial resources, and improving credit ratings in EMDEs. Strong climate policies and commitments can help send an important signal to investors.
- Appropriate policies and innovative financing structures for the coal phaseout need to be tailored to country circumstances.
- Strengthening the climate information architecture—data, disclosures, and alignment approaches (including taxonomies)—is an important part of the policy mix. Investors rely on high-quality, reliable, and comparable data, which many EMDEs still lack.
- Transition taxonomies in EMDEs could be a valuable tool to align incentives and mobilize private financing including in carbon-intensive sectors.
- Disclosures and labels for sustainable investment funds should enhance market transparency, integrity, and alignment with climate objectives to achieve climate impact.
- Expanded use of guarantees by multilateral development banks and donors could be an effective instrument to reduce real and perceived risks in EMDEs.
- Blended finance structures could improve the risk–reward profile of investment opportunities and broaden the range of private sector investors, thereby helping address real and perceived risks in EMDEs.
- The IMF Resilience and Sustainability Facility, by supporting reforms, can help create an enabling investment environment and attract private capital.

The authors of this chapter are Torsten Ehlers (co-lead), Charlotte Gardes-Landolfini (co-lead), Ekaterina Gratcheva, Shivani Singh, Hamid Tabarraei, and Yanzhe Xiao, under the guidance of Prasad Ananthakrishnan and Fabio Natalucci. Markus Brunnermeier was an expert advisor.

Introduction

Substantial investment in low-emissions technologies such as renewable energy is needed to reduce global greenhouse gas emissions to net zero by 2050. The International Energy Agency estimates that, by the end of 2030, climate mitigation investment needs will increase to about $2 trillion per year in emerging market and developing economies (EMDEs)—about 40 percent of global investment needs (see Online Annex 3.7 for a list of countries). This estimate implies that climate mitigation investments will have to climb to 12 percent of total investments in EMDEs by 2030—a significant increase from the current 3 percent.

The private sector will have to play a key role in financing climate mitigation investments in EMDEs, given limited fiscal space amid challenging market conditions. Our estimates suggest that the share of private finance must increase significantly.[1] By 2030, private finance will have to cover about 80 percent of the climate mitigation investment needs in EMDEs. Excluding China, the private financing share is even higher—about 90 percent.

Because more than half of global greenhouse gas emissions comes from major emerging markets, they need significant mitigation investments. But these countries have market access and, sometimes, deep domestic capital markets. Developing economies contribute less than 15 percent to global greenhouse gas emissions. They have fewer climate mitigation investment needs, but less access to global markets and less ability to attract private capital, as their financial and capital markets are less developed.

Climate investment flows have been increasing both globally and in EMDEs but remain limited (Naran and others 2022). Despite a proliferation of supportive financial sector policies and climate commitments by financial institutions, a substantive shift in financing flows from high- to low-emissions assets, in particular in EMDEs, has still not materialized.

Many EMDEs face fundamental challenges in attracting private sector capital—even before considering barriers specifically related to climate finance. About 40 percent of emerging market economies and nearly all developing economies do not reach an investment-grade rating or have no rating at all. As a result, most large institutional investors do not invest in these countries. In some EMDEs, high political risks, legal and institutional uncertainty, and implementation risks are hurdles that add to the already-high financing costs. In addition, the lack of well-structured, investable climate project pipelines is often an obstacle to the deployment of private capital. Furthermore, EMDEs still lack high-quality, reliable, and comparable climate-related data, making the assessment of risks and opportunities more complex for private investors.

Given the political hurdles of implementing carbon pricing and EMDE-specific challenges, a broad mix of policies is needed to create an attractive investment environment for private capital to support climate finance needs in EMDEs. Carbon pricing, as well as the reform of fossil fuel subsidies, can be highly effective in shifting private capital flows to low-emissions investments by providing a strong and credible price signal to investors. But carbon pricing may be politically challenging to implement and should be complemented with other policies (see Chapter 1 in the October 2023 *Fiscal Monitor*). Further structural policies are needed in EMDEs to mobilize domestic and international private climate finance, including structural reforms, strong climate policies and commitments, well-designed subsidies where fiscal space allows, and innovative financing approaches to phasing out coal.

A stronger climate information architecture—data, disclosures, and alignment approaches (including taxonomies)—is necessary to attract private investors in EMDEs. High-quality, reliable, and comparable data are a prerequisite to assess and price risks and opportunities and thus make informed investment decisions. A weak climate information architecture increases the risks of "greenwashing" (investments wrongly marketed or classified as climate-beneficial) and reduces market transparency.

Financial sector policies should refocus on fostering climate impact (such as a reduction in greenhouse gas emissions) to help mobilize private climate finance while considering EMDE-specific requirements. Current financial sector policies often

[1]The term "private finance" refers to financial flows not related to the public sector. Public sector sources are public institutions such as governments (all levels), multilateral development banks, national development banks, state-owned banks, and other state-owned entities.

focus on identifying activities and assets that are already "green." Transition taxonomies in EMDEs could help identify activities that could better align incentives and significantly reduce emissions over time, including in the most carbon-intensive sectors.[2] Transition taxonomies and other climate alignment tools should integrate measures for a managed phaseout of coal-fired power plants, given the need to leverage private finance. Disclosures and labels for sustainable investment funds should enhance market transparency, market integrity, and alignment with climate objectives to foster positive outcomes for climate impact. Climate impact scores should be constructed to better align climate outcomes with investor expectations on climate impacts.

Public–private risk sharing, including through enhancing the financial capacity and operating model of multilateral development banks (MDBs), is crucial to attract more private capital in EMDEs. Innovative financing instruments can help overcome the real and perceived hurdles to private investment in EMDEs. Blended finance, including the enhanced use of MDBs' and donors' guarantees, can greatly help to achieve derisking and broaden the investor base if designed well and used appropriately. In low-income countries, larger international public support is essential given the steep challenges in attracting private climate finance.

The IMF Resilience and Sustainability Facility (RSF) can help catalyze private capital by enhancing a country's capacity for climate investments with a combination of policy reforms, capacity development, and longer-term financing. Through its convening power, the IMF can bring together governments, MDBs, and the private sector to foster the financing of much-needed climate investments. The IMF can help strengthen public financial and climate investment management to support the development of a pipeline of investable projects and provide capacity development to support the collection of high-quality, reliable, and comparable climate-related data.

[2]Transition taxonomies aim to identify the types of activities, underlying technologies, and industrial processes that have the potential for substantial reduction in greenhouse gas emissions, allowing for a common understanding of investments conducive to a Paris-aligned transition. They differ from, say, green bond taxonomies, which typically identify technologies that are already low carbon.

The Crucial Role of Private Finance

Large volumes of climate mitigation investment are needed by 2030 (Figure 3.1, panel 1). To achieve net zero greenhouse gas emissions by 2050, global gross climate mitigation investment will need to reach about $5 trillion annually by 2030.[3] Although there are notable uncertainties around these estimates, the most widely used projections suggest that about 60 to 70 percent of investment needs are in the energy sector.

Climate mitigation investment needs in EMDEs are projected to increase to $2 trillion by 2030, which represents about 40 percent of global mitigation investment needs. This translates to about 12 percent of total investments in EMDEs in 2030, a fourfold increase from the current share of about 3 percent (Figure 3.1, panel 2).

Private capital is key for financing climate investment needs, both globally and in EMDEs. Judging from the IMF's country-by-country gross investment projections, the growth in total public investment will not cover the increasing climate investment needs by 2030. Private capital would have to account for a much larger share of climate investment needs than the current 40 percent in EMDEs (Figure 3.1, panel 3).[4] In a scenario in which the share of climate investments in total public investment increases by a factor of 1.5 from current levels, the private sector would have to cover 80 percent of climate investment needs in EMDEs by 2030 (see Online Annex 3.2 for details). When China is excluded, it is more than 90 percent. China has ample domestic financial resources, and the public sector has played a significant role in funding climate investment needs, including through state-owned entities.

Climate mitigation, however, is only one part of the challenge. Adaptation finance is also important, because EMDEs need to build resilience against the future physical effects of climate change and compensate for economic and social consequences.

[3]This projection refers to gross investment needs as estimated by the International Energy Agency. All projected investment needs reported in this chapter are adjusted for inflation and are expressed in 2020 US dollars. A large share of climate mitigation investments is expected to come from a reallocation of investment with a relatively small net increase in investment at around 1 percent of GDP (see IMF 2021). The estimate includes investments due to increasing energy demand driven, for instance, by economic development. See Online Annex 3.1 for details.

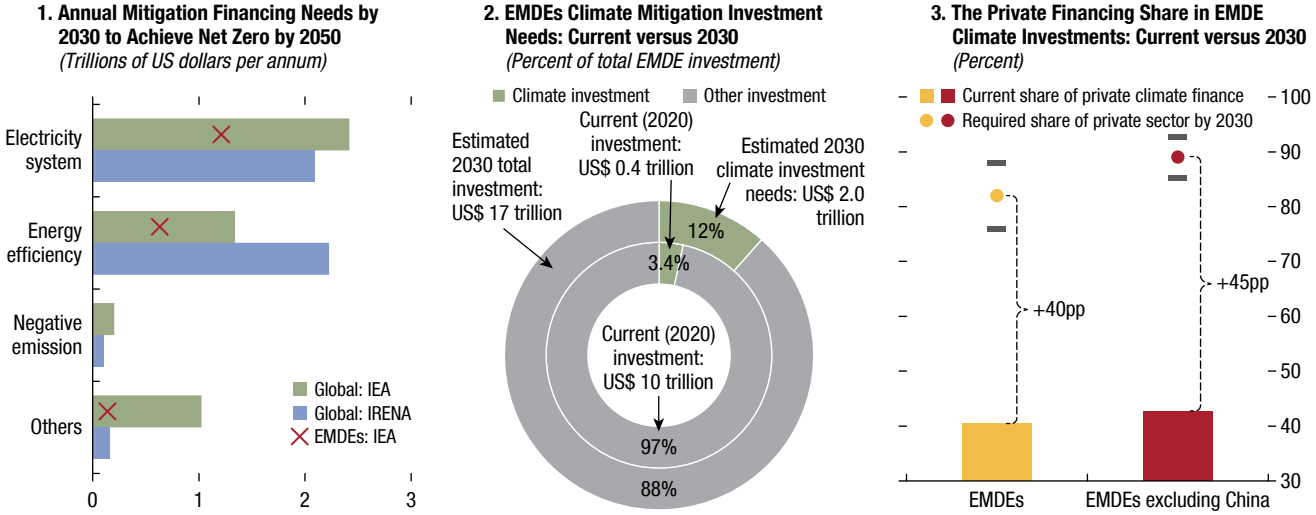
[4]The private sector share of climate finance is calculated as the residual of climate investment needs not covered by the public sector. Gross public sector investment in 2030 is based on IMF projections. See Online Annex 3.2 for details.

Figure 3.1. Estimated Climate Investment Needs and the Key Role of Private Finance

Global climate investment needs are estimated to increase to about $5 trillion per annum by 2030.

Climate mitigation investments in EMDEs need to increase to 12 percent of their total investments ...

... with private finance having to cover a major share of climate mitigation investments.



Sources: Climate Policy Initiative; International Energy Agency 2021, 2023a; International Renewable Energy Agency 2023; and IMF staff calculations.
Note: Amounts in panels 1 and 2 are inflation adjusted. In panel 1, investment needs refer to a net zero greenhouse gas emissions by 2050 scenario. In panel 3, the maximum (minimum) range refers to a scenario where the climate share of public investments stays the same (doubles) as the current level. The point estimate is based on a public climate financing share that increases by a factor of 1.5 until 2030. See Online Annexes 3.1 and 3.2 for details. EMDEs = emerging market and developing economies; IEA = International Energy Agency; IRENA = International Renewable Energy Agency.

This is especially the case in developing economies, which are often strongly affected by climate change but may not have the necessary capacity to adapt. Although current adaptation investments are small relative to mitigation investment needs, they may grow significantly if climate mitigation efforts fall short and climate hazards intensify (see Chapter 2 of the October 2022 *Global Financial Stability Report*).

Barriers to Deploying Private Climate Finance in EMDEs

A major constraint to attracting private investment is the lack of an investment-grade sovereign credit rating for many EMDEs. Only about 60 percent of emerging markets and a mere 8 percent of developing economies have an investment-grade rating.[5] The sovereign rating also serves as a benchmark for the credit rating of private entities (the "rating ceiling"). The distinction between instruments rated "investment grade" versus those rated "below investment grade" is of utmost significance in international capital markets, effectively determining the potential investor base. Many fiduciaries define their sole eligible investments as those rated "investment grade." Various banking and insurance regulations discourage, if not prohibit, regulated entities from holding non–investment-grade investments.

Current methodologies of credit rating agencies do not reward middle- and lower-income countries that implement better climate policies. Climate-related policies are highly relevant for the long-term ability of sovereigns to service their debt. Yet, middle- and low-income countries do not benefit from effective energy transition policies in terms of improved credit ratings or outlooks, despite credit rating agencies claiming to consider credit-material environmental, social, and governance (ESG) factors in their ratings (Box 3.1). As long as this practice persists, the potential benefits of climate investments for credit ratings and thereby financing costs are limited.

Supply of capital to EMDEs is strongly driven by capital allocation decisions of global financial institutions, and allocations to EMDEs are significantly below their contribution to global GDP or their growth potential. Most large institutions appear to use "top-down"

[5]Among developing economies, 58 percent have a rating below investment grade, and 34 percent have no sovereign rating at all. See Online Annex 3.3.

allocation models based on historical data. Several large investment institutions avoid EMDEs altogether. Market participants suggest that investors are concerned, among other things, about (1) the perceived risk–return profiles of investments in EMDEs not being in line with institutional investors' risk bearing capacity; (2) difficulties in navigating EMDEs' perceived complexities; (3) reputational risk of investing in markets with inadequate governance, poor institutional capacity, and an uncertain policy environment; and (4) in particular for climate finance, increasingly stringent ESG regulations in advanced economies, which raise compliance risks and costs for EMDE investments. More specialized firms actively seeking EMDE investments typically take advantage of informational asymmetries to identify quality investment opportunities. Although these investors understand the full complexity of EMDEs and invest resources into actively developing these capabilities, their scale is still limited.

Investors who seek EMDE investment opportunities cite several constraints to deploying their capital. EMDEs lack well-structured, investable project pipelines in local markets that meet the risk–return requirements of private investors. The bankable projects in lower-income countries are driven primarily by MDBs and their own balance sheet deployment, with limited participation from the private sector. Project implementation in EMDEs often faces slow disbursements, regulatory changes, and typically long timelines well beyond those required in the private sector. Typical projects are small, apart from some large infrastructure projects. The dearth of pooled investments at scale leads to high due diligence costs and lack of diversification, foiling participation of global institutional investors.

Project execution in EMDEs is further complicated by low domestic capital market development. Lower- and lower-middle-income countries do not have established or mature capital markets.[6] Low financial and capital market development limits domestic resource mobilization and deters international investors. In addition, even EMDEs with more developed capital markets may have complex operating environments such as withholding taxes, local regulatory restrictions, and potential currency repatriation restrictions.

[6]See for instance, the IMF Financial Development Index Database, which summarizes how developed a country's financial markets and institutions are in terms of depth (size and liquidity), access (ability of individuals and companies to access financial services), and efficiency (ability of institutions to provide financial services at low cost and with sustainable revenues and level of activity of capital markets).

Challenges in managing foreign exchange risk are often cited as impediments to meaningfully scaling up private climate finance in EMDEs. The management of foreign exchange risk is challenging for climate finance in EMDEs, so investors resort to climate investments with limited or no foreign exchange risk exposure. Foreign exchange risk can thus hinder cross-border investment flows and local debt market development. Commercial hedging options exist, primarily in larger EMDEs, but tend to be expensive, with limited liquidity, and incomplete, especially at the tenor and size needed to support large-scale, long-term projects. Market hedging options are virtually nonexistent in smaller emerging markets and low-income countries.

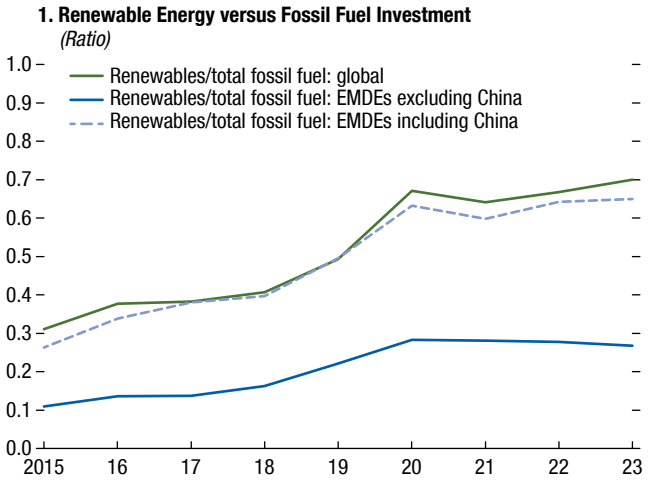
Potential Limits to the Speed of the Energy Transition in EMDEs

In addition to broad barriers to private capital, EMDEs face several hurdles specific to the transition to renewable energy while phasing out fossil fuels. Renewable energy production and distribution has high upfront fixed capital costs (for example, solar panels and electricity grids with energy storage capacity), whereas subsequent marginal costs tend to be lower. Renewable energy projects typically carry significant policy risks, especially in EMDEs—a risk that companies struggle to price and manage compared to conventional market risks. To implement these projects, a number of issues need to be addressed, such as prerequisite infrastructures, intermittency of renewables and storage capacity, supply chain issues, permits (often in multiple jurisdictions or involving multiple regulations), and integration into the electricity distribution network. Due to a combination of policy uncertainty and risk premium for EMDEs, renewable energy in EMDEs is financially less attractive than in advanced economies. In some major emerging markets, high borrowing costs more than double the cost of renewable electricity production.[7]

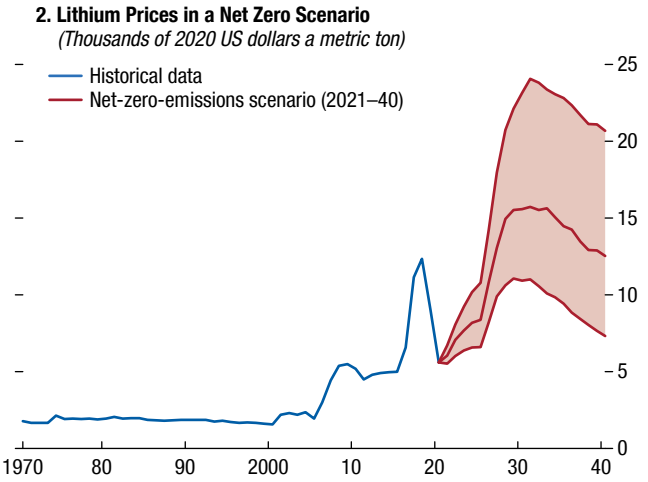
[7]A recent report by the International Energy Agency (2023a) states, "For the moment, the cost of capital for a typical utility-scale solar project can be two or three times higher in key emerging economies than in advanced economies or China, reflecting real and perceived risks at the country, sectoral and project levels. Tackling these risks and bringing down the cost of capital will require new and better ways of working between the public and private sectors." See also the International Energy Agency Cost of Capital Observatory (https://www.iea.org/reports/cost-of-capital-observatory/tools-and-analysis#abstract).

Figure 3.2. Renewable Energy Investment in EMDEs and Lithium Price Projections

Renewable energy investment in EMDEs (excluding China) is still lagging behind fossil fuels ...



... while expected increases in the prices of critical metals such as lithium could slow the renewable energy transition.



Sources: Boer, Pescatori, and Stuermer 2023; International Energy Agency 2023b; and IMF staff calculations.
Note: Bands in panel 2 show the confidence interval around price estimate. See Boer, Pescatori, and Stuermer 2023. EMDEs = emerging market and developing economies.

Despite recent improvements, investment in renewable energy in EMDEs (except for China) still lags behind investments in fossil fuel (Figure 3.2, panel 1). Estimates suggest that a target ratio of about 4:1 for renewable over fossil fuel investment is required globally throughout this decade (Bloomberg NEF 2022). In addition, total fossil fuel subsidies have surged to a record high in 2022 and are expected to increase further in EMDEs (IMF 2023).

At the same time, actions taken by advanced economies could slow the renewable energy transition in EMDEs. As advanced economies accelerate their energy transition, the supply of critical metals and minerals is projected to fall short of demand, putting upward pressure on their prices and further raising the costs of renewable energy (Figure 3.2, panel 2).

A phaseout of coal is necessary to reach climate goals, considering that coal-based energy production is the single largest source of greenhouse gas emissions globally (about 20 percent). Amid a surge in coal-fired power capacity since 2000, EMDEs now account for three-fourths of the world's 9,000 coal-fired power plants and about 90 percent of the global capital tied in coal-fired power plants (World Bank 2023). However, only about 20 percent of current coal-fired generation is covered by agreements among countries to phase out coal or stop developing new power plants (International Energy Agency 2022).

The scale and age of coal-fired power plants in EMDEs create unique challenges to phasing out coal. Across EMDEs, coal dependence differs considerably (Table 3.1). Power plants are still relatively young in EMDEs (about 40 years in the United States compared with less than 15 years in the Asia Pacific region, for example). On average, it takes about 43 years to phase out coal after a peak in coal consumption per capita has been reached (IMF 2020).

Phasing out coal-fired power plants in EMDEs implies significant costs in terms of decommissioning, retirement, and social adjustments. Net financial value of coal-fired power plants is lost when such plants are retired before their expected lifespan, as capital expenditures cannot be recovered. Yet, phasing out coal could yield considerable net economic and social gains—potentially about $85 trillion (Adrian, Bolton, and Kleinnijenhuis 2022)—especially given the availability of increasingly lower cost renewable energy alternatives.

Measures to phasing out coal need to be tailored to country characteristics, with innovative and tailored financing solutions. This includes appropriate sequencing for retirement of coal-fired power plants, involving

Table 3.1. Coal Dependence in Selected EMDEs

Categories of Coal-Using Economies	EMDE Examples
Phasing out coal	Chile, Kazakhstan, Romania
Established coal user economy	Cambodia, China, India, Morocco, Myanmar, Thailand, Türkiye, Ukraine
Expanding coal-fired capacity (large coal project pipeline)	Bangladesh, Côte d'Ivoire, Ethiopia, Kenya, Mongolia, Mozambique, Pakistan, Philippines, Sri Lanka, Tanzania, Vietnam
High export dependence on the coal extractive industry	Colombia, Indonesia, South Africa, Venezuela

Sources: Steckel and Jacob 2022; and IMF staff illustration.
Note: EMDEs = emerging market and developing economies.

public and private counterparts, regulatory reforms, and consideration of development and social priorities. Experience from the Just Energy Transition Partnerships (Indonesia, Senegal, South Africa, Vietnam) will be highly valuable in this context. Coal-exporting countries will require an economic diversification strategy, alongside socioeconomic ("just transition") considerations. A country's capacity to plan and prepare managed coal phaseouts is often a bottleneck. In addition, mobilizing global investors and using a range of financial structures (Climate Policy Initiative, Climate Bonds Initiative, and RMI 2022), including blended finance and securitization instruments to repurpose or retire coal-fired power plants, can be challenging. There are no standardized criteria for repurposing of plants, and coal phaseout plans are currently not eligible in transition finance frameworks and taxonomies.

Capital investment in the energy sector continues to flow into fossil fuels, which are responsible for 75 percent of global greenhouse gas emissions, increasing carbon lock-in risks while delaying diversification in the energy sector. Because energy security concerns may complicate the low-carbon transition in the short term, it is crucial to align investments with climate goals given the limited potential for repurposing of fossil fuel infrastructure. So far, capital expenditures in the coal industry have remained stable despite policy support for investments in clean energy (Figure 3.3, panel 1).[8]

[8]Policies include the 2022 REPowerEU and the 2023 Green Deal Industrial Plan in the European Union, the Inflation Reduction Act of 2022 in the United States, and China's 14th Five-Year Plan on Renewable Energy Development and Modern Energy System.

Such a trend is driven by strong demand and high coal prices, especially in China and the rest of the Asia Pacific region (International Energy Agency 2023b). Further investments increase the risks of coal-fired power plants continuing to operate for longer than desirable (so-called carbon lock-in).

Capital investments continue apace in the oil and gas sectors, whereas the sector's low-carbon investments remain limited. Although capital expenditures in the oil and gas sector have rebounded in 2022, their low-carbon component (for example, investments to diversify energy operations, such as in solar cells, onshore and offshore wind, and carbon capture and storage technologies) have been insufficient despite a 300 percent increase between 2020 and 2022 (see Figure 3.3, panel 2). Capital expenditure forecasts for new oil and gas fields remain high, especially in EMDEs, accounting for roughly 75 percent and 95 percent of energy industry investments by 2030 and 2050, respectively. Nonlisted companies in EMDEs account for about one-third of investment plans in new oil and gas capacity (Figure 3.3, panel 3). Nonlisted companies are typically subject to less outside pressure from shareholders and stakeholders to decarbonize their operations. Meanwhile, national oil companies have started to diversify and decarbonize because of growing pressure, as they depend heavily on international capital (Palacios 2021).

Government climate policies can help limit fossil fuel expansion, especially in oil- and gas-dependent EMDEs. Indicators of current climate policies, emission-reduction targets, and governments' nationally determined contributions under the Paris Agreement tend to be negatively correlated with capital expenditure estimates for oil and gas fields by 2030 in EMDEs (Figure 3.3, panel 4).

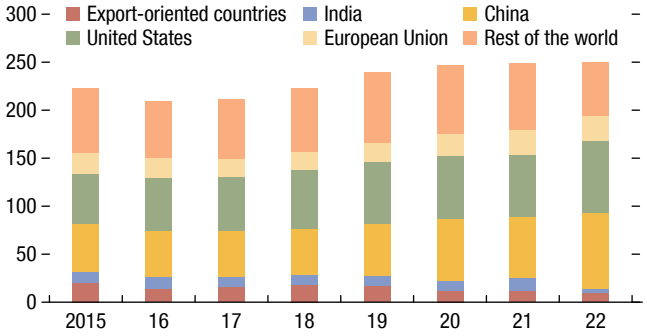
Lack of Climate Impact of Financial Institutions' Commitments and Policies

An assessment of the climate policies of 30 global systemically important banks (G-SIBs) demonstrates the need for more ambitious alignment with net zero targets. Some banks incorporate the exclusion of project finance to new greenfield coal mines and power plants in their policies related to their lending portfolios and investment activities (Figure 3.4, panel 1, "Exclusion of project finance to coal mines, plants, and infrastructure").

Figure 3.3. Fossil Fuels Investment Trends Are Not Yet Aligned with Climate Goals

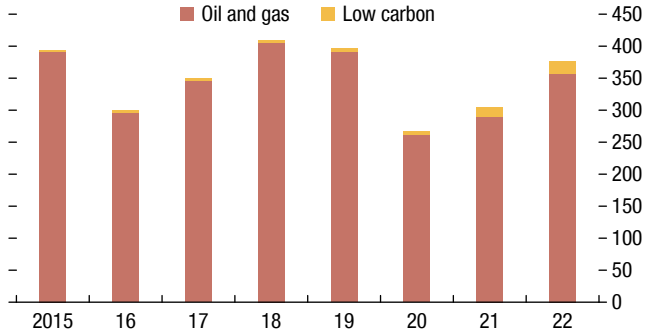
Investment is holding steady in the coal industry ...

1. Capital Expenditure in the Coal Industry by Region
(Billions of US dollars)



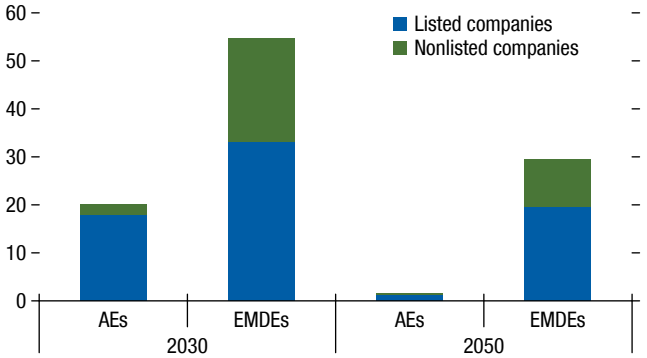
... while low-carbon investment in the oil and gas industry remains extremely limited.

2. Total Oil and Gas versus Low-Carbon Capital Expenditure
(Billions of US dollars)



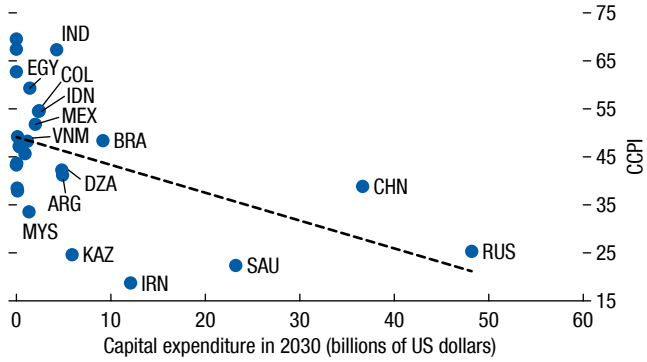
Investment in new oil and gas capacity holds firm, especially in EMDEs ...

3. Capital Expenditure in New Oil and Gas Fields
(Billions of US dollars)



... but stronger climate policies seem to contribute to companies' investment plans in oil and gas capacity.

4. Capital Expenditure in New and Existing Oil and Gas Fields by 2030 versus Climate Policies in EMDEs
(Billions of US dollars, index)



Sources: Bloomberg Finance L.P.; Germanwatch e.V.; International Energy Agency 2023b; Rystad; Urgewald Global Coal Exit List 2022; and IMF staff calculations.
Note: Panel 2 only includes production capital expenditure. "Low-carbon capex" refers to capital expenditure in renewable power; grids; storage; carbon capture, usage and storage; and energy efficiency. In panel 4, data from the CCPI are as of 2021. CCPI evaluates climate change performance based on greenhouse gas emissions, renewable energy, energy use, and climate policy. Climate policy is assessed both in its design and in its effective implementation. The CCPI ranking method sets zero as the bottom cutoff, and 100 points are the maximum a country can achieve. Data labels in panel 2 use International Organization for Standardization (ISO) country codes. AEs = advanced economies; CCPI = Climate Change Performance Index; EMDEs = emerging market and developing economies.

Most of them, however, have no policy or weak criteria regarding the provision of financial services for coal expansion or net-zero-aligned coal phaseout ("Net-zero-aligned coal phaseout policy" and "Limitation of financial services to coal expansion"). Policies targeted at transition financing of the oil and gas industry are even more limited ("Net-zero-aligned oil and gas policy").

Global insurers' climate policies have also shown limited success to date in aligning underwriting and investment portfolios to net zero targets (Figure 3.4, panel 3). Major Asian and North American insurance companies have not published such policies, whereas European ones have recently adopted more restrictive criteria for coal investment and underwriting, such as the exclusion of coal expansion.

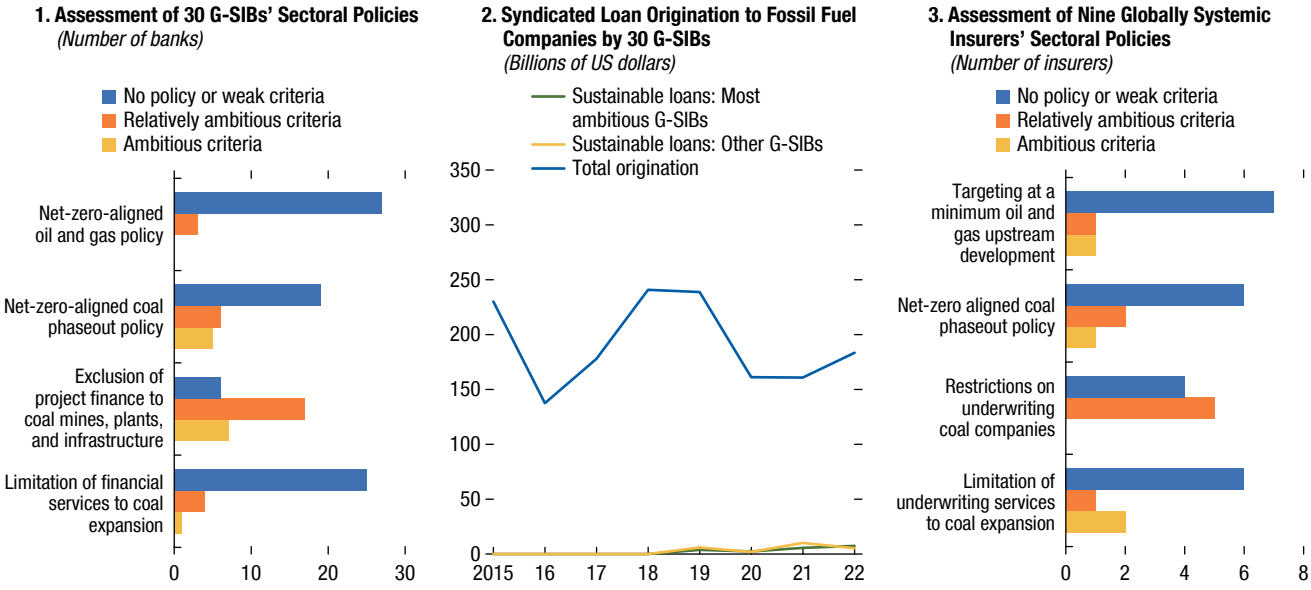
Climate policies by large banks and insurers (potential large investors in EMDEs) tend to overlook transition financing needs. Without mandatory alignment or disclosure policies and meaningful carbon pricing, banks appear to continue to provide financing to fossil fuel firms without properly pricing the risk of stranded assets (Beyene and others 2021). There is a disconnect between banks' climate

Figure 3.4. Banks and Insurers' Climate Policies Lack Robust Alignment with Net Zero Targets, as Banks' Loan Origination to Fossil Fuel Companies Remains Strong

Major banks' policies on fossil fuels still show limited ambition ...

... which is reflected in syndicated loan originations, including for banks with more ambitious policies.

Insurers' climate policies also lack ambition.



Sources: Dealogic and IMF staff assessment and calculations.
Note: For panels 1 and 3, the description of the assessment methodology is detailed in Online Annex 3.4. In panel 2, fossil fuel companies are classified based on Standard Industrial Classification. Syndicated loan data were used because they capture a significant part of the energy sector credit (Weyzig and others 2014). Sustainable loans include both green loans and ESG linked loans. If one loan contains multiple lead banks, loan value is equally allocated to each lead bank. ESG = environmental, social, and governance; G-SIBs = global systemically important banks.

disclosures and their carbon-intensive lending that is not offset by a greater low-carbon lending activity (Gianetti and others 2023). G-SIB lending to fossil fuel companies has remained stable since the Paris Agreement and increased in the aftermath of the pandemic (Figure 3.4, panel 2). The share of sustainable loans to these same companies has been minimal. G-SIBs that have been assessed as most ambitious based on their sectoral policies have not seen a greater increase in sustainable loans than their less ambitious peers. Yet, research has shown the positive effect of banks adopting stricter climate policies on energy sector decarbonization. Coal-fired power plants owned by companies dependent on banks with stricter climate policies are more likely to be retired or repurposed, contributing to lower emissions (Green and Vallee 2023). In the private equity sector, limited disclosures constrain the assessment of their fossil fuel exposure as their fossil fuel investments have been increasing (Giachino and Mehta-Neugebauer 2021).

Investment Funds and Climate Impact

Investment funds have emerged as important players in mobilizing private capital for sustainable investments. Sustainable investment funds have grown considerably faster than conventional funds, especially since 2019 (Figure 3.5, panel 1).[9] Funds that incorporate ESG characteristics into their investment strategies are the largest category, whereas "sustainability-themed" funds incorporate one or more sustainability themes into their investment approach. Nonetheless, climate impact investment funds, dedicated to addressing climate change and supporting the shift toward a low-carbon economy, remain small (see Online Annex 3.5 for details).

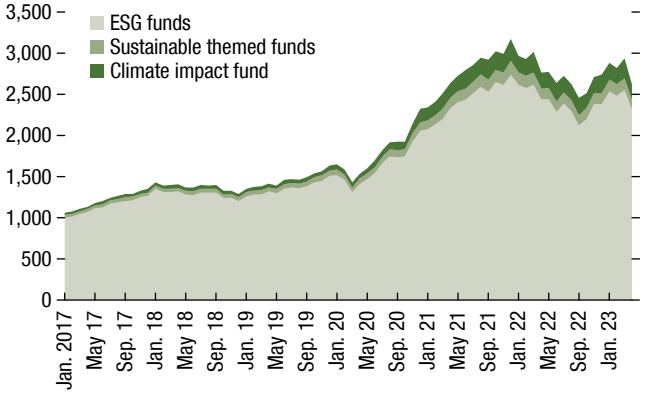
Climate impact funds allocate a larger portion of their portfolios to EMDE assets (equities and bonds)

[9]Since 2019, sustainable funds have consistently maintained positive net flows and outperformed conventional funds, except for brief instances in 2022 and 2023 (so far).

Figure 3.5. Sustainable Investment Funds Are Growing Fast, But Their Climate Benefits Are Uncertain

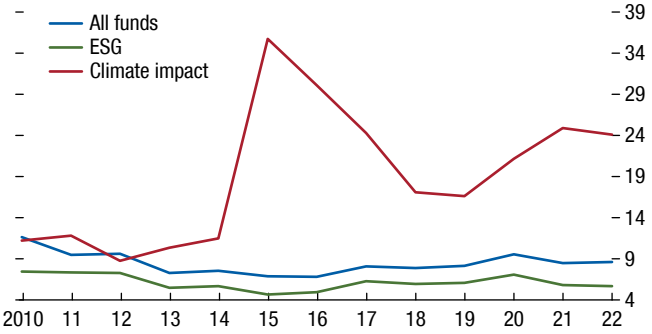
Despite the rapid growth in ESG investing, the share of funds dedicated to climate impact remains very small.

1. Assets under Management of Sustainable Investment Funds, by Fund Label
(Billions of US dollars)



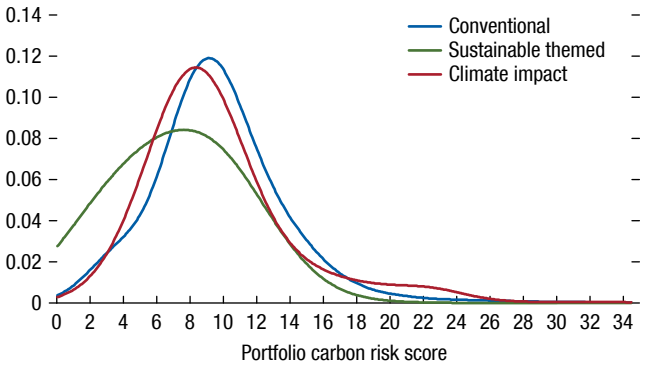
Climate impact funds tend to have high allocations to emerging market equities and bonds.

2. Funds Allocation to EMDEs, by Fund Label
(Percent of total fund size)



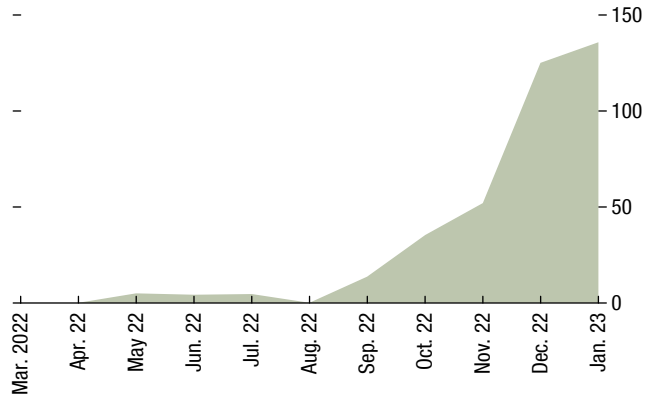
Some funds are not as "green" as the label suggests as illustrated by the distribution of portfolio carbon risk scores.

3. Portfolio Carbon Risk Score Distribution
(Probability mass)



The SFDR in the European Union brought a wave of reclassifications from Article 9 ("dark green") to Article 8 ("light green").

4. Assets under Management for Funds Downgraded from Article 9 to Article 8
(Billions of US dollars)



Sources: Morningstar; and IMF staff calculations.
Note: Panel 1 shows the assets under management by fund labels as constructed by Morningstar (see Online Annex 3.5). EMDEs = emerging market and developing economies; ESG = environmental, social, and governance; SFDR = Sustainable Finance Disclosure Regulation.

compared with other types of funds—about one quarter of their total assets under management (AUM). This share is considerably higher than for other investment funds (Figure 3.5, panel 2). ESG funds (a much larger category) allocate only a small share of their portfolio to EMDE assets, and this allocation is mostly concentrated in major emerging markets (see Chapter 2 of the October 2022 *Global Financial Stability Report*).

However, a significant number of climate impact funds contain assets with meaningful transition risks. Morningstar's carbon risk score and similar measures can be used to assess the transition risk of fund portfolios (see Online Annex 3.5). The carbon risk score distribution for climate impact funds closely resembles that of conventional funds, and the right tail indicates even higher transition risks for a sizable share of these funds (Figure 3.5, panel 3). Such exposure does not appear in line with their intended

purpose of directing investments toward low-carbon finance, suggesting that some of these funds might not be as green or sustainable as their label suggests.[10]

The EU Sustainable Finance Disclosure Regulation (SFDR) imposes mandatory ESG disclosure obligations for asset managers and other financial market participants. Under the SFDR disclosure requirement classification system, funds fall into one of three categories: Article 6 (no sustainability focus), Article 8 ("light green," promoting environmental characteristics), or Article 9 ("dark green," a clear objective of sustainable investment). The requirements, enacted in February 2023, apply to all funds operating in Europe and brought a wave of reclassifications from dark green to light green funds (Figure 3.5, panel 4). Initial analysis (see Online Annex 3.5) suggests that funds classified as dark green attracted higher inflows compared with Article 6 funds. This suggests that disclosure requirements such as those in the EU SFDR can enhance transparency and channel capital toward verified sustainable investments.

E Scores and Climate Impact: The Case for New Types of Impact Scores

Corporate ESG scores are a key ingredient of ESG-style funds. In implementing their ESG investment strategies, many investment managers use ESG scores and subscores (such as E, S, or G pillar scores), often from a several providers. The current design of corporate ESG scores, however, does not appear to steer private finance to investments with a positive climate impact (Elmalt, Kirti, and Igan 2021).

Corporate ESG scores are designed to capture nonfinancial risks and are not necessarily aligned with climate impact. The purpose of the most commonly used corporate ESG scores, and the E (environmental) pillar scores, is to capture the nonfinancial risks a firm is exposed to.[11] This is different from a firm creating a positive (or negative) climate impact. A renewable energy firm, for example, can be subject to high climate risks, even though it creates a significant positive climate impact (by reducing the carbon intensity of electricity generation).

Three construction features of corporate ESG scores reduce their ability to reflect the degree of impact:

1. ESG scores combine a multitude of data points to capture a wide range of nonfinancial risks. Only a relatively small subset of data points, however, may be related to creating ESG impact.
2. ESG scores are not necessarily proportional to ESG performance. A firm is not necessarily twice as "good" as another if its ESG score is twice as high.
3. Corporate ESG scores are industry specific. Corporate ESG scores are constructed to be relative to firms in the same industry. A firm in the materials sector with a high carbon intensity may score relatively well, as other firms in the sector tend to have high emissions as well. However, in terms of climate impact, it does not matter how this firm compares with others in its industry, but only how carbon intensive its activities are.

New types of climate impact scores can be constructed using the data corporate ESG scoring providers already collect. Online Annex 3.6 provides the details of how such a score could be constructed with data from one ESG provider.[12] The scores cover about 10,300 listed firms, of which more than 2,700 are incorporated in emerging markets.[13] The design principle of the newly constructed impact scores is twofold. First, the scores consider only data points that directly reflect climate impact (16 data points out of 64 used for the E score), capture current climate performance (for example, carbon intensity), and contain information about potential future emission reductions (for example, emission reduction targets). Second, the impact scores are calculated so that a significantly higher value maps into significantly better climate impact characteristics, independent of the industry to which a firm belongs.

Impact-oriented scores, particularly for climate impact, could be useful to asset managers and foster transparency for investors. Although corporate ESG scores focus on nonfinancial risks, investors may nevertheless expect firms with better ESG or E scores to also have lower carbon emission intensities. This correlation, however, is usually weak or even positive (firms with

[10]The results are robust to including other related transition scores such as portfolio carbon risk exposure and portfolio carbons stranded assets exposure scores.

[11]See, for example, MSCI (https://www.msci.com/our-solutions/esg-investing/esg-ratings) or Sustainalytics (https://www.sustainalytics.com/esg-ratings).

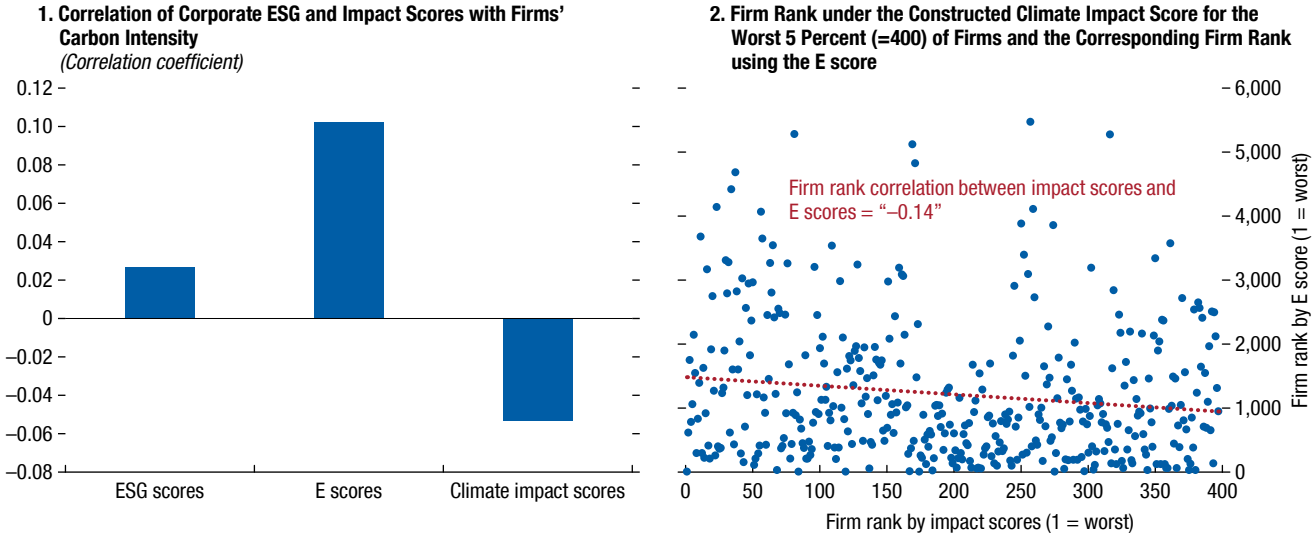
[12]Refinitiv is one of the few data providers that supplies the underlying data points of their ESG scores, as is Sustainalytics.

[13]See also Chapter 2 of the October 2022 *Global Financial Stability Report*, which provides a detailed analysis on ESG scores of EMDE firms.

Figure 3.6. Newly Constructed Impact Scores versus E Scores

Contrary to expectations, firms with higher carbon intensities can have higher ESG or E scores.

A common "negative screening" investment strategy that underweights or excludes the worst firms would affect different firms using an impact versus an E score.



Sources: Refinitiv; and IMF staff calculations.
Note: In panels 1 and 2, all correlations are statistically significant at the 1 percent level. Correlations between ESG/E scores with carbon intensity are rank (Spearman) correlations as these scores are ordinal. ESG = environmental, social, and governance.

better scores, counterintuitively, tend to have higher emission intensities). Impact scores could better reflect such investor expectations (Figure 3.6, panel 1). Impact scores could also help in the construction of portfolios at impact funds, which tend to have relatively high EMDE asset allocations (see above).

Climate impact–oriented scores would yield a substantially different ranking of firms than E scores.[14] Firms within the worst 5 percent (rank < 400) under the impact score can have a significant higher rank under the E score (Figure 3.6, panel 2). For investors that would consider using impact scores, this could significantly affect portfolio allocations. For instance, under a negative screening strategy commonly used by ESG fund managers, firms with the worst scores are excluded or underweighted. Using the impact versus the E score would produce significantly different portfolio allocations by underweighting or excluding different firms.[15] Although specific results depend on the ESG data provider, this outcome reflects the fundamental difference between scores focusing on nonfinancial risks and climate impact.[16]

Policy Recommendations

Given the political hurdles of implementing carbon pricing and EMDE-specific challenges, a broad mix of policies is needed to create an attractive investment environment and unlock private climate finance in EMDEs. Carbon pricing can be highly effective in pricing climate externalities and creating transition opportunities and can shift capital flows toward low-carbon investments. It can also increase the effectiveness of financial sector policies by providing a strong and credible price signal to investors. However, carbon pricing, which involves a range of design options influencing its distributional and social effects, may be politically challenging and needs to be complemented with other policies (see Chapter 1 of

[14]To make the scores comparable and reflect their use by investment managers, the scores are used to create a firm ranking.

[15]Portfolio allocations would also shift using a best-in-class strategy, which focuses on the best-ranked firms. See Online Annex 3.6.

[16]The underlying data points are generally different across data providers—both in the risk they aim to measure (scope) and in the indicator by which a given risk is measured (measurement). See Berg, Koelbel, and Rigobon (2022).

the October 2023 *Fiscal Monitor*). A first step is the reform of fossil fuel subsidies, which are at a record high and are projected to increase in EMDEs (IMF 2023). Strong climate policies and commitments, such as legally enshrined national commitments to achieve net zero emissions by a given date, provide a strong signal to private investors. Environmental regulation can set standards for activities or technologies and thereby spur climate innovation and financing. Green subsidies for both the adoption of existing technologies and research and development of new technologies can help accelerate the transition. But subsidies can create fiscal risks, as they can be expensive and distortionary if not designed well (Box 3.2). In some low-income countries, however, these policy options may not be feasible, and international support and policy initiatives are essential.

Authorities should strengthen the climate information architecture (data, disclosures, taxonomies). High-quality, reliable, and internationally comparable data are a prerequisite for efficient pricing of risks and opportunities and for making informed investment decisions. A strong climate information architecture can also help lower the risk of "greenwashing," thereby fostering market transparency and integrity. Yet such data are still lacking in many EMDEs. The disclosure standards proposed by the International Sustainability Standards Board will help create a global baseline and a valuable framework. To strengthen the climate information architecture, policymakers should find the right balance across geographies to reflect the local context and purpose, in particular in EMDEs given their unique challenges. They should consider factors such as the characteristics and maturity of the market, existing regulatory context, national decarbonization policy priorities, and climate financing needs.

Policymakers should implement structural reforms and policies aiming to overcome the fundamental barriers to investment in EMDEs, boost domestic resource mobilization, and attract private capital (Budina and others 2023). Cognizant of country context and circumstances, a range of long-term structural policies can help reduce capital costs and improve credit ratings—a crucial factor for international investors. These include strengthening macroeconomic fundamentals, deepening financial markets, improving policy predictability, and fostering institutional and governance frameworks. These policies also help mobilize domestic resources, key to boosting climate investments (Group of Twenty Independent Expert Group 2023). Green public investment in infrastructure can complement private innovation and investment in low-carbon technologies (see the October 2023 *Fiscal Monitor*). A predictable pipeline of quality projects that directly support a country's climate objectives is necessary to attract private investors.

Policymakers should support coal phaseout in EMDEs with innovative and tailored financing solutions. Transition taxonomies, other alignment tools, and planning frameworks should integrate measures for a managed phaseout of coal to support the commitments of corporations and financial institutions. A variety of financial instruments, including blended finance, should be used to enable the retirement and repurposing of existing coal-fired power plants. MDBs could support and accompany the development of renewable energy alternatives to new coal-fired power plants alongside country-level energy transition plans and in line with development priorities.

Just Energy Transition Partnerships can help EMDEs retire existing coal-fired power plants that would otherwise continue to operate for many years given their relatively long expected life span. With the help of public and donor financing, Just Energy Transition Partnerships can help minimize negative economic effects, supported by policies to boost renewable energy and address the social implications to ensure that workers and communities are supported (for example, through reskilling or social safety nets).

A refocusing of financial sector policies on climate impact would facilitate progress in mobilizing private capital for climate and could take account of the specific challenges faced by EMDEs. Financial sector policies, such as climate-related disclosure requirements, taxonomies, and standards for sustainable financial instruments and products should actively incentivize the transition toward and financing of a low-carbon economy. They should also cover climate adaptation, which is a core issue for EMDEs.

Regulators in EMDEs should consider developing transition taxonomies, a valuable alignment tool for mobilizing the financing of low-carbon activities. These taxonomies aim to identify activities with a potential for significant improvements in emissions over time and across sectors, including in the most carbon-intensive and hard-to-abate sectors such as steel, cement, chemicals, and heavy transportation. The emission reduction targets and criteria in transition taxonomies should be

connected to a country's nationally determined contributions, long-term strategies, and their supporting sectoral decarbonization targets. Countries should devise sectoral transition plans, particularly in the energy sector, as well as develop an investable pipeline of projects supporting the achievement of their objectives. The Activating Alignment report (Gardes-Landolfini and others 2023) identifies common principles and technical considerations to connect countries' climate plans and alignment approaches, such as taxonomies. In addition, building trust in transition finance, especially in EMDEs, involves the adoption of external independent sustainability reporting assurance standards and greater capacity building for assurers.

International climate disclosure initiatives should target the standardization of transition plans, including for financial institutions. Transition plans allow companies to communicate concrete climate-related objectives and targets, actions, and accountability mechanisms to achieve their emission reduction goals. Standardization is needed for transition plan targets and underlying metrics to allow comparisons across firms and to enhance the credibility of transition plans. Although global efforts are ongoing, interoperability remains a key objective. As emphasized by the Network for Greening the Financial System (NGFS 2023), transition plans for banks could be a useful tool for microprudential authorities to develop a forward-looking view of whether the risks resulting from a financial institution's transition strategy are commensurate with its risk management framework. Climate policies and commitments by financial institutions should be more ambitious and forceful enough to mobilize sufficient private capital.

Regulators and supervisors should ensure that disclosures and labels for sustainable investment funds enhance market transparency, market integrity, and alignment with climate objectives to foster climate impact–oriented outcomes. Investment fund labels that credibly signal an alignment with greenhouse gas emissions objectives (for example, net zero emissions by 2050) are needed to promote the alignment of financial flows with climate goals. The use of sustainability labels is still lax, and regulators and supervisors should set clear rules and tighten enforcement to safeguard market transparency and integrity. This would benefit in particular EMDEs with functioning capital markets, as climate impact–oriented funds appear to have higher EMDE allocations than the much larger ESG funds.

ESG data providers should offer climate impact–oriented scores as a tool for fund managers and investors. Climate impact scores could be constructed with the data ESG rating providers already collect. Impact scores that better align climate outcomes and investor expectations could be a useful alternative metric to ESG scores. Regulators should consider evaluating the sufficiency of oversight for ESG ratings and data providers (IOSCO 2021).

Credit rating agencies' and sovereign ESG methodologies need to be realigned to meet growing investor demand for sustainability and climate-aligned tools and products. These information intermediaries are critical in redirecting capital to green and sustainable investments, including in EMDEs. Many factors related to a country's long-term sustainability, such as mineral wealth, fossil fuels, and forest capital, could be material for a sovereign credit assessment but are not adequately reflected in sovereign credit ratings, especially for middle- and low-income countries. As ESG factors become relevant for investment decisions, sovereign ESG products need to evolve to better reflect climate factors and cover material differences across EMDEs in terms of exposure and opportunities related to climate change, energy and resource management, and land use and agriculture.

Public–private risk sharing is critical to foster climate private investments in EMDEs. Financing structures that allow for pooling, diversification, and credit enhancements can help reduce the cost of private capital and attract a broad range of institutional investors (see also Chapter 2 of the October 2022 *Global Financial Stability Report*). For example, blended finance structures allow the public sector (including MDBs, domestic governments, and development finance institutions), sometimes with the support of philanthropies, to improve the risk–return profile of investment opportunities and broaden the range of private investors. Technical assistance from MDBs is crucial to help build investment project pipelines and assist with project development and monitoring.

Expanded use of guarantees by MDBs and donors could be an effective instrument to reduce real and perceived risks in EMDEs and thereby broaden the potential private investor base. MDBs' ongoing discussions with the G20 and international community is an important step to enhance MDBs' financial capacity and operating models, based on recommendations made in the Capital Adequacy Framework Review of

the G20 (Group of Twenty 2023, Group of Twenty Independent Expert Group 2023). To further incentivize deployment of donors' guarantees in EMDEs, the Development Assistance Committee of the Organisation for Economic Co-operation and Development is actively engaging with members to reach a consensus on official development assistance eligibility of members' private sector instruments, treatment of loans to the private sector, as well as treatment of credit guarantees, following its decision in 2016 to pursue an enhanced enabling environment for partnerships with the private sector (OECD 2022). Policymakers should also consider whether there are regulatory barriers disincentivizing the use of MDB and donor guarantees by financial institutions such as by banks and insurance companies.

The RSF, supported by the convening power of the IMF, can act as a catalyst by bringing together governments, MDBs, and the private sector to foster the financing of climate investments. Although the total size of the Resilience and Sustainability Trust is small (about $40 billion) relative to global climate investment needs, reforms supported by the RSF can help create an enabling environment to attract private climate finance. Member countries may choose to use part of the fiscal space created by the RSF to provide risk-sharing and credit enhancement mechanisms to private investors, taking into account fiscal and debt sustainability considerations (Box 3.3). In combination with the traditional IMF programs, the RSF can also help address macroeconomic challenges in member countries, which in turn can mobilize domestic financial resources. The IMF Green Public Financial Management framework provides a holistic view of entry points and opportunities for integrating climate priorities into public financial management. The IMF Climate–Public Investment Management Assessment can help governments identify improvements in public investment institutions and processes to build low-carbon and climate-resilient infrastructure. The IMF can also provide capacity development, which may be needed particularly in low-income countries, to advance climate policies including the collection of high-quality, reliable, and comparable climate-related data.

Box 3.1. The Importance of Credit Rating Agencies and ESG Data Providers in Directing Capital Flows to Climate Investments in EMDEs

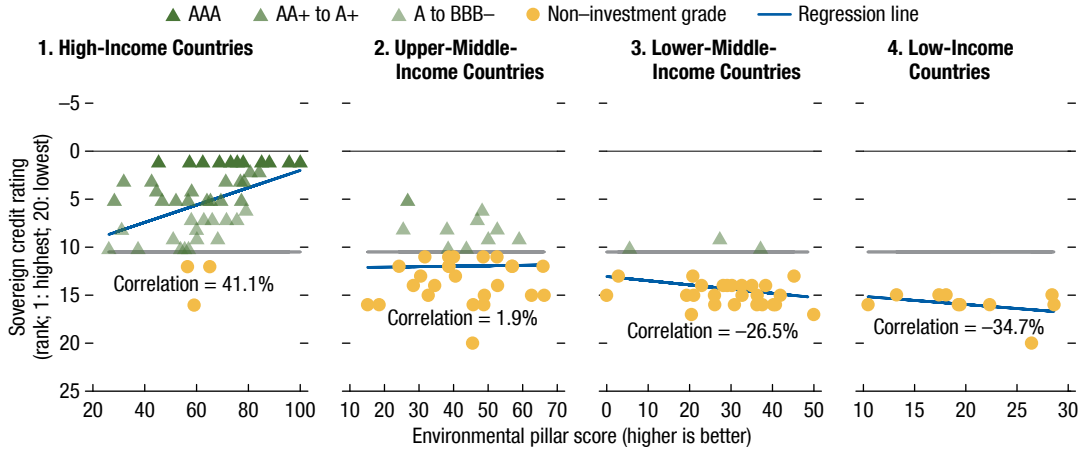
For nearly two centuries, credit rating agencies have aimed to assess the capacity and willingness of an issuer to meet its financial obligations on time and in full. Credit rating agencies have become crucial to the global financial architecture, influencing capital flows in emerging market and developing economies (EMDEs). With the increasing focus on sustainable finance, investors have sought another type of information that challenges traditional market practices regarding the key factors that determine sovereign credit risk, such as debt and fiscal risks—information that has a broader definition of sustainability and is complementary to financial and economic factors. This development has resulted in the now $7.7 billion environmental, social, and governance (ESG) industry, expected to quadruple by 2030. This industry aims to assess sovereign sustainability driven by changing societal perspectives on what constitutes investment "return."

However, the time horizon of events such as climate change or factors affecting a broader definition of a sovereign's long-term sustainability (such as mineral wealth, fossil fuels, and natural capital) poses several challenges to fully integrating these considerations in credit rating agencies' and ESG providers' sovereign methodologies. Notably, there is a disconnect between the current investment horizon considered by the financial industry and the horizon over which many ESG factors are expected to be material from a creditworthiness perspective. This significantly curtails the possibility of integrating these factors into sovereign credit assessments. Furthermore, the understanding of materiality of ESG and sustainability factors and how they will affect sovereign creditworthiness are still evolving, with notable limitations around modeling and comprehensive data (Gratcheva and others 2022).

Recent studies demonstrate how these challenges affect the industry's ability to direct capital to more sustainable investments in EMDEs. Gratcheva and others (2022) quantify how credit rating agencies' assessments of EMDEs fall short of fully reflecting these countries' preparedness for a low-carbon transition or their exposure to stranded asset risks because of these countries' dependence on the hydrocarbon sector. Furthermore, unlike high- and upper-middle-income countries, lower-middle-income and low-income countries are generally not rewarded for good E policies (Figure 3.1.1), such as climate mitigation and adaptation policies. EMDEs that

Figure 3.1.1. Sovereign Credit Ratings and ESG Risks

Better ESG scores only translate into better sovereign credit ratings for high-income countries; middle- and low-income countries do not benefit from better energy transition policies.



Source: Gratcheva and others 2022.
Note: The gray line distinguishes between investment-grade ratings (above) and non–investment-grade ratings (below).
ESG = environmental, social, and governance.

Box 3.1 *(continued)*

depend on fossil fuels and have exposure to high levels of stranded asset risks are not penalized.

Institutional investors increasingly rely on the assessment of ESG providers in making sovereign investment decisions. In contrast with the mature sovereign credit assessments by credit rating agencies, sovereign ESG methodologies are a nascent ESG segment, having emerged only in the last several years and continuing to evolve. In response to the growing focus on E factors, sovereign ESG score providers have increased the weight of the E pillar from an average of 23 percent in 2020 to 35 percent in 2023. Climate factors, however, are still not reflected by the majority of sovereign ESG scores. Furthermore, there is little agreement among sovereign ESG score providers on what constitutes good sovereign performance on environmental issues and what E factors are material (such as climate change, natural hazards, energy and resource management, land use and agriculture) across countries with different income levels and in different regions (Gratcheva and O'Reilly Gurhy, forthcoming).

Box 3.2. Can Green Subsidies Substitute for Carbon Prices?

Recent IMF research (Capelle and others, forthcoming) highlights how policies that promote efficient production could help reduce emissions. This work draws on self-reported data on emissions for a global sample of more than 4,000 large, listed firms. Emission intensities—emissions scaled by revenues—vary dramatically in firms operating in the same industry and country. Indeed, comparing within firms that offer similar products, emissions per unit of production for the worst 10 percent of emitters are more than six times larger than those of the best 10 percent. These results hold for both emerging market and developing economies (EMDEs) and advanced economies. The heterogeneity in emission intensities is even larger within EMDEs after controlling for industry fixed effects.

In both EMDEs and advanced economies, environmental performance is driven by innovation and technology. Firms with fewer green operations use older physical capital stocks, are less knowledge-intensive and innovative, and are less productive (Figure 3.2.1, panel 1).

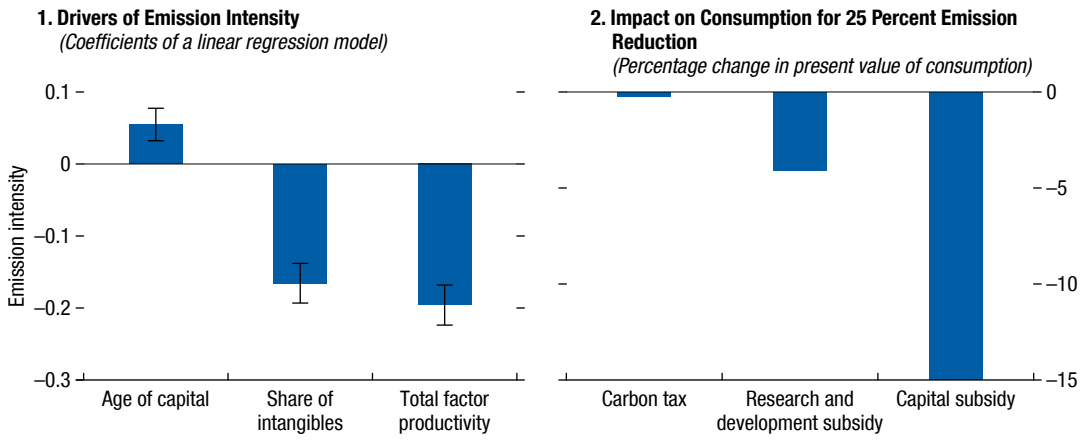
Could then subsidies that support innovation and better adoption of frontier technologies substitute for carbon pricing in cutting emissions? Capelle and others (forthcoming) present a granular general equilibrium model in which emissions are endogenously determined by choices about knowledge accumulation and capital vintage made by heterogeneous firms. The model is calibrated to match a rich set of empirical moments and can incorporate a range of policies including carbon taxation and subsidies for research and development and for adopting existing technologies.

Subsidies can help cut emissions but at significantly larger costs than carbon pricing. Figure 3.2.1, panel 2, shows the cost of reducing emissions by 25 percent through carbon taxes, subsidies targeting innovation, or subsidies targeting upgraded capital stocks in terms of the present value of consumption. Although the model is calibrated to match US data, the economic drivers are highly relevant for EMDEs, too. Two economic forces lead to higher costs for emission cuts achieved through subsidies:

- First, subsidies are comparatively weak levers to cut emissions: they do not directly incentivize lower energy consumption and can create incentives for firms to expand as they become more productive. Achieving significant emission cuts without carbon pricing requires large subsidies.
- Second, subsidies may misallocate resources in the economy, and larger subsidies induce stronger misallocation. The costs of targeting large emission cuts through subsidies alone are therefore high.

This box was prepared by Damien Capelle, Divya Kirti, Nicola Pierri, and German Villegas Bauer.

Figure 3.2.1. Firms' Emission Intensity and the Economic Cost of Subsidies



Sources: Capelle and others (forthcoming); and IMF staff calculations.
Note: Panel 1 shows the coefficients from ordinary least squares regressions of emission intensities against the age of capital, share of intangible assets, and total factor productivity. All variables are standardized to have a mean of 0 and a standard deviation of 1. Standard errors in parentheses, clustered at the country × industry × year level. Finance, public administration, and utilities are excluded. Four-digit Standard Industrial Classification codes are used. Panel 2 shows simulation results based on the multicountry, multisector, and multifirm model developed and estimated in Capelle and others (forthcoming). Each policy targets a 25 percent reduction in corporate emissions.

Box 3.3. Catalyzing the Resilience and Sustainability Facility: Early Lessons Learned

There are a number of important lessons learned from early engagement of the IMF in Bangladesh, Barbados, Costa Rica, Jamaica, and Rwanda. First, given that emerging market and developing economy (EMDE) climate financing needs are substantial and that no single institution can provide financing at the required scale, it is essential that governments, international financial institutions, and development partners work together, leveraging each institution's respective expertise to mobilize additional climate finance. Second, the required scale of climate resource mobilization necessitates coordinated actions across three pillars: climate policy reforms, capacity development, and innovative financing approaches. Using part of the fiscal space created by Resilience and Sustainability Facility (RSF) arrangements in a prudent manner could help crowd in additional financing for climate investments. Any facility that uses public resources should have appropriate governance structures. Project selection, impact reporting, monitoring, and verification processes should be in line with the highest international standards. Furthermore, any climate solution should be customized to each country's unique climate needs and economic characteristics. For example, adaptation and mitigation investments are likely to require different policy solutions and financing arrangements. Limited market size and lack of a robust pipeline of bankable projects are likely to be larger impediments in smaller economies, which may require a pooling of projects through regional approaches.

Scaling Up Climate Finance in Barbados and Rwanda

Barbados and Rwanda provide two examples of intensive collaboration across stakeholders and innovative use of financial resources to crowd in private climate investments in the context of the RSF.[1]

Barbados adopted innovative initiatives to accelerate its transition to net zero and boost climate resilience. The government of Barbados used part of the fiscal space created by the RSF as equity capital for a new Blue Green Bank which will provide lending for private sector green investments in affordable homes, hurricane-resilient roofs, and the electrification of transport, among others. The bank receives funding support from the Green Climate Fund and US Agency for International Development as well as technical support from partners, including the Development Bank of Latin America and the Caribbean (CAF) and the Inter-American Development Bank. Furthermore, low-cost and long-term financing instruments and grants from development partners will support government investment in water, sanitation, and flood and coastal protection projects, among others. Partners will also support government capacity and expertise in public–private partnerships to attract private investment to build more resilient infrastructure.

Rwanda similarly adopted a new programmatic approach to supporting climate investments through its green investment facility, Ireme Invest, set up by the Rwanda Green Fund and the Development Bank of Rwanda. Under the RSF arrangement, development partners such as Agence Française de Développement and the European Investment Bank have committed to scale up climate financing with budget support, technical assistance, and long-term low-cost loans.[2] This initiative is expected to fund a pipeline of projects estimated at €400 million, including €130 million in equity contributions from private investors, highlighting the catalyzing role of the initiative. The government of Rwanda is also prepared to scale up the equity of the Development Bank, as the pipeline of projects expands further.

[1]For further information on the Resilience and Sustainability Facility for Barbados, see https://www.imf.org/en/News/Articles/2023/06/22/pr23231-barbados-forms-coalition-multilateral-banks-develop-infras-investments-building-rsf-imf.

[2]For further information on the Resilience and Sustainability Facility for Rwanda, see https://www.imf.org/en/News/Articles/2023/06/21/pr23224-rwanda-partners-euro-300m-financing-prvt-investment-climate-resilience-rsf-imf.

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