



Investing in a Green Future: Finance, Industrial Policy and the Green Transition

Ramaa Vasudevan

January 2025

*This paper was presented as part of the
"Sovereign Debt and Climate Finance Conference" at PERI,
May 2024*

WORKINGPAPER SERIES

Number 616

Investing in a Green Future: Finance, Industrial Policy and the Green transition

Ramaa Vasudevan

Colorado State University

Abstract

We present a framework to assess green climate finance and the pathways to building a climate aligned financial system. This would involve the strategic reorientation of central bank interventions, national development banks and multilateral and regional banks and coherent purposive collaborations between these institutions and interventions to decisively reshape the contemporary global financial system that is out of tune with the long-term imperatives of climate action. Aligning finance to climate goals at the necessary scale, pace and direction requires the calibration of financial flows across three axes: 'public-private'; 'real-financial' and 'national-international'. Along the first axis the nature-depleting, climate imperiling logic of short-term private profitability needs to be contained in order to pursue the public priorities of climate action. Along the second axis, policy efforts have to be geared to ensuring that financial flows are financing investments in climate mitigation and adaptation and not simply providing more fodder for the global portfolio glut and financial accumulation. Finally, along the third axis warding global funding and support on appropriate terms has to be provided to the most vulnerable countries while buttressing national ownership of the green mission.

1. Introduction

We face a precipitously steep path, and a sharply narrowing window to actions reducing carbon emissions that would limit warming to within the 1.5 C range necessary to contain the impact of climate change.

There is a pressing urgency to actions to accelerate the pace of climate mitigation and adaptation. This

urgency has led to the resurgence of debates around ‘green’ industrial policy as an essential means to achieve the transition. The conventional market-based approach focused on carbon prices has proved to be inadequate. It has become abundantly clear that the scale of technological innovations, institutional redesign and overhaul of the policy-framework necessary to ensure a resilient future in the face of climate constraints cannot be achieved merely by tinkering with prices.

As climate action policy embraces the urgent need to go beyond carbon pricing and emission trades to actively promote strategic investments in decarbonization and building green infrastructure and industry, it has to contend with the question of how to effectively deploy state policy to mobilize private capital in support of climate-related priorities. This involves confronting both the political space within which states, and private capital negotiate the pursuit of green industrial policy, and the distributional consequences of the policies adopted. The neoliberal approach—also termed the ‘derisking state’—grounded in a framework of protecting private property and finance, favors broad incentives and the calibration of risks and returns on green finance to induce private capital to take climate policy goals on board. The target is attracting private finance, rather than the actual building of green productive capacity, by shielding it from the risks and uncertainty generated by its actions. At the opposite pole is what can be called the ‘big green state’—a state-directed approach where the state seizes control and ownership of investment in support of climate goals (Gabor and Braun, 2023). While the derisking state has been critiqued for subordinating climate goals to the imperatives of finance with dubious implications for sustainability and stability, the prospect of the big green state is contingent on the social, political and institutional context in which green industrial policy is framed and implemented. The terrain between these two poles of the derisking state and the big green state is captured by the conception of the green-mission and the green new deal that is strategically oriented to directing and coordinating private investment along the path to a sustainable green future (Mazzucato, 2016b; Pollin, 2016; Mazzucato and McPherson, 2018; Pettifor, 2019; UNCTAD, 2019; Chomsky and Pollin, 2020; Mazzucato and Ryan-Collins, 2022).

The imperatives of a strategic green mission are underscored more sharply in light of evidence that while progress has been made in reducing emissions growth in the transport and electricity sectors, industry — in particular iron, steel, cement oil and gas and chemicals — poses a significant challenge as a source of continued emission growth.¹ It is clear that the transition to a low carbon economy demands technological innovations, institutional restructuring and a revamped policy approach. Developing countries that contribute the least to carbon emissions are the most exposed to the impacts of climate change (Chancel, Bothe and Voituriez, 2023). Already hamstrung for resources for climate mitigation and adaptation, the impact of climate change is squeezing fiscal space and exacerbating debt burdens. As climate stress compounds debt distress, the need for revamping the institutional mechanisms of climate finance becomes more imperative.

This paper surveys a range of proposals, practices and policies that are aimed at aligning finance to climate goals at the necessary scale, pace and direction that is urgently needed, with a focus on the global south. We first delineate what distinguishes green industrial policy from conventional industrial policy and explore the concrete hurdles confronting the green mission in developing countries. This is the point of departure for pinpointing the specific challenges posed by the contemporary international financial system to undertaking a green new deal or a green mission at the national and global level. We present a framework to assess green climate finance and the pathways to building a climate aligned financial system. The concrete basis of such pathways lies in concrete national and globally coordinated strategies and plans for green structural transformation. But policy interventions and reforms at both the national and international levels are needed to ensure the requisite quantum and quality of financing for climate action is forthcoming from public and private actors. This would involve the strategic reorientation of central bank interventions, national development banks and multilateral and regional banks and coherent purposive collaborations between these institutions and interventions to decisively

¹ Emissions from agriculture, particularly from Africa, South and South-East Asia, and Brazil, also constitute a source of rising emissions.

reshape the contemporary global financial system that is out of tune with the long-term imperatives of climate action.

2. Conceptualizing Green Industrial Policy

Industrial policy has historically been about the active strategic role of states in engineering structural transformations in countries in the context of late industrialization and ‘catching up’ with developed countries². From a dynamic developmental perspective, it encompasses the strategic shift from low value-added, low-tech and low-quality products to high value-added, hi-tech and high-quality products.

There has been a revival of interest in the role of industrial policy in accelerating the transition to low-carbon economy. Within the market-based framework of the neoliberal policy paradigm the argument for industrial policy is framed in terms of addressing market failures and externalities that persistently and systematically misprice the social costs and returns to green technologies (Hallegatte, Fay and Vogt-Schilb, 2013; Rodrik, 2014; Stern and Stiglitz, 2023). Apart from the failures of markets in coordinating investments across sectors and providing ‘public goods’, information externalities that circumscribe industrial diversification (Rodrik 2014) and the ‘dilemma’ of underpricing of social returns has been underscored (Stern and Stiglitz, 2023).

However, the climate challenge, like the developmental challenge, demands more than fixing the market through price signals — it demands the strategic shaping and creation of markets (Mazzucato, 2016a; Mazzucato and Ryan-Collins, 2022). Instead of defining green industrial policy narrowly as “sector-targeted policies that affect the economic production structure with the aim of generating environmental benefits” (Hallegatte, Fay and Vogt-Schilb, 2013), it is more appropriate to conceptualize it as a policy framework to accelerate a far-reaching structural transformation within planetary boundaries that support climate mitigation and adaptation — a green mission or a green structural transformation³.

² See Andreoni and Chang (2019); Chang and Andreoni (2020) for a review.

³ Beyond climate impacts the green mission would encompass the absolute limitation of environmental damages of human activity to natural capital, ecosystems and biodiversity.

The pervasive and wide-spread impacts of climate change across different regions, sectors and across different aspects of human lives make it clear that such a mission is not simply about a transition to a low carbon economy but must embrace a more integrated, holistic dynamic approach encompassing different sectors and institutions and national borders (Mazzucato and Semieniuk, 2017). There are a variety of different pathways to accelerating a green structural transformation (Gallagher *et al.*, 2023).

Green industrial policy, with its goal of stimulating structural transformation within climate constraints and planetary boundaries needs to be distinguished conceptually from the industrial policy in the past:

- 1) Industrial policy was historically about the sectoral shift away from agriculture towards manufacturing. Green industrial policy, however, involves dismantling industries and infrastructure that are carbon-intensive and dependent on fossil fuels, while building an industrial landscape based on renewable energy. The transformation is also more complicated than a sectoral shift and involves more than investment and divestment to enable a transition to a low carbon system with a lower overall energy intensity. The fossil-based economic system is a complex, integrated system and the goal is to build an equally complex and integrated *renewable* system to replace it. But the two systems are incongruous with each other, and transitioning requires coordinated, sequenced and targeted investment (Brussler, 2023). The transition is not simply about unplugging from one system and plugging into another. It requires developing new components, new links, and a fundamental rewiring of the economy. The uncertainty and instability inherent in investment dynamics would be amplified as the transition would face bottlenecks and shocks (Feygin, 2022). Beyond the challenge of building productive capacity, this reinforces the problem of coordination in an investment-centered green industrial policy. The operative constraint here is that of ‘planning capacity’ for coordination outside the market (Mason, 2022). The scale and scope of coordination needed to

engineer the green transition raise strategic questions that are more vexed than the debates around balanced and unbalanced growth in development planning.

- 2) The scope of activities being promoted under the rubric of ‘green industrial policy’ need to be broadened beyond a narrow focus on manufacturing.
 - a. Given the high rate of carbon emissions of agriculture and food production, and the challenge that climate change poses to food security, the green mission must include the production structure in agriculture and spillover effects from renewable policies on forest cover⁴.
 - b. The concerns about premature de-industrialization notwithstanding, the green transition would involve nurturing a range of services, in particular in education, health-care and conservation to support the social and material needs of the global population.
 - c. Green policy efforts need to focus on both mitigation and adaptation. Investments directed at climate adaptation may not add to productive capacity and the stock of productive capital even though they are integral to the green mission⁵. Such activities also tend to be under-funded by private capital since they offer negligible returns. Green investments that substitute or displace other (carbon-intensive) investments would not contribute to aggregate demand. If the objective is to build resilience in the face of mounting environmental impacts, then the economic calculus needs include essential, non-additional, non-productive green investments whether or not they contribute to productive capital stock or aggregate

⁴ Vikas Rawal has highlighted the risk of imposing the burden of climate risk mitigation of small farmers in the global south. The Program of Action on the construction of a New International Economic Order, adopted by the Havana Group emphasizes the need for “ the development of a coordinated policy framework for small-scale, cooperative, and family farming in order to defend food sovereignty, promote sustainable agroecological practices, and sustain crop diversity across the South.” (Progressive International 2024)

⁵ Jackson and Victor (2020); Victor (2022) while investigating the macroeconomic impact of green investment offer a taxonomy to distinguish between whether or not investments add to productive capital stock (productive/non-productive) or to aggregate demand (additional/non-additional). Non-additional green investment displaces conventional investment with no net effect on aggregate demand, but is unlikely to be of significance for developing countries.

demand. This marks a departure from the developmental rationale for industrial policy to kickstart the growth of value-added and productivity as the path to ensuring a better standard of living.

- 3) Green industrial policy cannot be focused solely on GDP growth but needs to embrace a broader range of measures of social well-being and social provisioning to ensure decent standards of living and inclusion for the global population⁶. About 50 percent of emission activity is concentrated among the richest decile of the global population. At the same time the deleterious impacts of climate change falls disproportionately on the low-income, vulnerable populations, predominantly in the global south (Chancel, Bothe and Voituriez, 2023). Green industrial policy, therefore, cannot be effectively pursued without addressing the deeper roots of growing inequality between and within countries as an integral part of the green mission of decoupling economic provisioning from fossil fuel.

3. Defining the Challenges

The challenges faced by developmental states in spearheading industrial transformation in the post-war period offers some insights for a contemporary green mission. The eclipse of industrial policy under the neoliberal impetus was grounded in the belief that state failure was more pernicious than market failure. Rent-seeking behavior and incomplete information lead to efficiency and welfare losses. This critique is based on a static-efficiency perspective that views industrial policy as being useful only in addressing market failures rather than as a driver of structural transformation. Post-war developmental states, however, did face major challenges and obstacles in their initiatives to spearhead the structural transformation of their domestic economies — in particular the challenges of dependence, sectoral imbalances, democratic deficit, technological bias and financing shortfalls.

⁶ Barth and Jacob (2022) offer the conception of ‘post-growth’ as a shared agenda to bridge the divide between proponents of degrowth and green growth.

While these challenges reappear in the context of ‘green’ industrial policy, distinct new challenges confront states in the global south today. The uncharted complexity of the phase transition that climate change is precipitating introduces radical uncertainty on a more profound and urgent scale into green industrial policy than the uncertainty associated with large-scale investment projects at the heart of traditional industrial policy. Green industrial policy also confronts a distinct challenge of the entrenched interests of carbon capital and global finance that run counter to the needs of climate change action.

3.1 Dependence and the external constraint

The pursuit of industrialization through protection and support to infant industries confronted external obstacles arising from financial and technological dependence of late developers on imports, technology, and capital from advanced economies dominating the technological frontiers and international markets. This would appear in the form of a foreign exchange constraint. The divergent paths followed by East Asia and Latin America (export-led/import substituting) are held out as models of how state-directed development of dynamic comparative advantage, through technological upgradation to augment productive capabilities and promote exports, can be a critical component of effective industrial policy that consciously sought to generate foreign exchange earnings⁷. The failure to address the external constraint led to deteriorating external balances and debt crises in Latin America, and the consequent eclipse of industrial policy under the IMF-WB stabilization and structural adjustment programs.

The green transition confronts a situation where developing countries have been inducted into the low value-added, labor-intensive segments of global production networks. Integration into corporate controlled global value chains places producers in the south in a position where they depend on technology and markets in the north. The scope for industrial diversification and upgradation is circumscribed by the position within the global network. Carbon emission policies in the north have also led to the relocation of carbon-intensive segments of the production chain (for instance steel, fertilizers,

⁷ See for instance the seminal Amsden (1992, 2003)

and cement) to developing countries, complicating their drive to embark on a green transition. Less developed countries risk falling into the unsustainable development path of specializing in carbon-intensive goods for the export market and emerging as global pollution havens (UNCTAD, 2022). In this context, the adoption of trade policies like the EU Carbon Border Adjustment Mechanisms to target carbon intensive imports and prevent carbon leakage would have adverse effects on exporters in the south, reinforcing dependence of some of these countries on commodity exports, and exports related to the critical metals like lithium, cobalt, and nickel. Without the global diffusion of technological innovations to facilitate the reduction of the carbon intensity of production processes in developing countries, they would get locked into an extractivist green agenda (Bruna, 2022; Voskoboynik and Andreucci, 2022). Climate shocks that disrupt trade, also trigger a sharp deterioration in the balance of payments position, with commodity exporters being particularly vulnerable, and climate risks jeopardize access to international capital (Volz *et al.*, 2020).

3.2 Sectoral imbalances:

The emergence of sectoral imbalances for instance between agriculture and manufacturing or within manufacturing between heavy industry and capital goods sector and more labor-intensive consumer goods sector imposed structural constraints on economic development. These constraints arise from both technological and demand interdependencies and linkages. Sectoral imbalances also raised thorny distributional issues arising from the ‘squeeze’ of agriculture and the slow growth of employment in manufacturing as developmental states pursued heavy industrialization strategies.

Apart from coordinating and harnessing sectoral linkages effectively, green industrial policy also needs to contend with the ecological and environmental spillovers of renewable energy policies. For instance, in Brazil, the promotion of sugarcane and soyabean cultivation for biofuel has led to deforestation in the Amazon region, while land acquisition for wind and solar photovoltaic infrastructure has led to displacements. The wind and solar project launched in the Rann of Kutch in India is threatening the unique ecosystem of that region. The ecological spillovers also impact the lives and livelihoods of

people in these regions, while extraction and expropriation of natural resources in the pursuit of green transitions can harm local communities and ecosystems. In the context of corporate controlled global production networks there is the additional dimension of disentangling the high and low carbon intensity segments of the chain.

3.3 Democratic deficit and distribution:

The political and institutional failures to build broad-based domestic support and forge close links between state and society — embedded autonomy (Evans, 1995) — for the developmental strategy has posed a major obstacle to successful industrialization. Apart from providing incentives, industrial policy depends on reciprocal obligations and disciplining mechanisms that enforce specified performance criterion and discipline and direct private capital into strategic sectors (Amsden, 2003; Wade, 2018). The limited capacity of the state to elicit the cooperation of private capital while enlisting key sections of private capital in support of the developmental strategy can thwart the program. The capture of state priorities by large business houses or other dominant elites is not simply a problem of inefficient outcomes of rent-seeking and cronyism. It is more fundamentally about a democratic deficit and the subordination of social priorities to the goals of private profitability. The consequent exclusion and marginalization of peasants, rural labor, and urban working poor from the fruits of industrialization undermines the credibility of the state in the pursuit of industrialization.

The green mission raises more complex distributive issues. These stem from the significant inequality in emissions by income level *within* countries, with those at the top income deciles responsible for higher per capita emissions, and the unequal impact of climate change on the poorest in these regions (Chancel, Bothe and Voituriez, 2023). If the green transition is to offer a path to a just transition, the green developmental state has to include marginalized populations in the project and navigate the resistance of elite, corporate and business interests to the social priorities of the green mission. Those whose livelihoods are adversely affected by the accelerated phase-out of carbon intensive sectors also need to be protected through the devolution of financing mechanisms and community led approaches (DCF Alliance,

2019). The success of a green mission depends on forging a social consensus to build and buttress the state's institutional capacity to drive a green structural transformation while ensuring the participation and compliance of private capital. These challenges are further intensified by the impact of climate change on exacerbating inequality, migration outflows and conflict in vulnerable regions.

3.4. Technological bias

The risks and uncertainty associated with technological innovation are deterrents to transformative private R&D spending. States play an important role in steering technologies and fostering innovation (Mazzucato, 2016a; Mazzucato and Semieniuk, 2017). States in the global south lacking resources and policy space for such entrepreneurial public investment face a disadvantage, so that advanced capitalist countries (and China) control and dominate technological frontiers. To the advantages of being the first mover, is the monopoly granted by the framework of intellectual property rights. Further, the impetus to technological innovation in the advanced capitalist countries has been skewed towards capital intensive technologies, and this labor-saving technology is inappropriate for the labor surplus economies in the Global South. Less-developed countries have been locked into low-skill, low-value added and extractive sectors.

Private capital lacks the incentive, given the large initial outlays, the long and uncertain gestation period and the complex coordination needs, to seed and propagate green technological innovations. What is more, the trajectory of technological innovation driven by calculus of private profitability displays a labor-saving and nature-depleting bias that is inappropriate for fostering decent jobs creation in labor surplus economies and militates against the goals of environmental protection conservation. Changing the calculus is not simply about fixing price incentives, but more fundamentally about reshaping norms and practices that the pursuit of profits engenders. Even apart from the need for state to incubate transformative innovations and actively shape and create markets (Mazzucato, 2016a, 2016b; Mazzucato and Semieniuk, 2017), the developmental state would need to play a crucial role in turning the direction of technical innovations against the grain of labor-saving and nature-depleting technical change.

Historically, techno-economic paradigm shifts, have been steered by state interventions; and the green structural transformation is no different (Perez, 2015). The additional wrinkle is that *globally and locally* coordinated strategies to develop and diffuse green technologies are needed if developing countries are to leap-frog the destructive phase of carbon-intensive industrialization to a launch a green transition.

3.5 The carbon capital barrier

Industrial policy has historically contended with deep-rooted, landed interests domestically, as developmental states sought to mobilize agricultural surpluses to fuel the industrialization drive and shift the locus of accumulation from agriculture to manufacturing. Decarbonization requires more far-reaching structural and systemic transformation involving both divestment of carbon capital and investment in carbon capital. The obstacle before the green transition is the formidable clout of carbon capital — the powerful lobby of fossil-fuel industry — both domestically and globally⁸. This includes coal and carbon intensive agriculture on one hand and the powerful oil producing cartel on the other. The lock-in to fossil fuels is reinforced by considerations of energy security. Developing countries dependent on carbon intensive exports also risk significant dislocation and displacement of livelihoods (and potential loss of fore exchange earnings) in the absence of viable, equitable paths to navigate the phase out of fossil fuels, and carbon-intensive patterns of specialization. Investment in fossil fuels continues to grow. It is estimated that a 110 percent-greater increase in fossil fuels production is slated by 2030 than is compatible with the 1.5°C target (UNEP *et al.*, 2023). The hard problem of transitioning the workforce in these sectors to decent sustainable livelihoods also needs to be addressed.

At the same time, the twin challenges of managing the risks and uncertainty arising from the simultaneous ‘sunrising’ of green industry and the ‘sunsetting’ of brown’ industry is unprecedented (Semieniuk *et al.*, 2021) and poses risks to macro-financial stability arising from asset bubbles, revaluations, defaults (Kedward, Gabor and Ryan-Collins, 2022). The regulation and phase out of carbon

⁸ The role of the coalition fossil producers in thwarting a stronger agreement on phasing out fossil fuels in the recent COP-28 summit bears testimony to the obstacle posed by this powerful lobby.

capital would lead to asset stranding as expectations of future profits from capital invested in fossil fuels evaporate, with particular impacts for developing country fossil fuel producers, who face additional disadvantages from policy uncertainty, the resource curse and the inequities of the climate change and the responsibilities of climate action (Ansari and Holz, 2020). Beyond the impact on producer countries, the pattern of financial ownership implies that global investors primarily in OECD countries are highly exposed to these risks and might have perverse incentive to impede the phase-out (Semieniuk *et al.*, 2022).

3.6 The Finance gap:

The major obstacle to the pursuit of industrial policy by developmental states is the availability of finance. Limited fiscal space has severely constrained developing country states in launching successful industrialization strategies. These limits have been compounded by external debt and the regime of monetary stringency and fiscal austerity imposed under the neoliberal policy agenda that effectively eclipsed industrial policy.

Despite the recent resurgence of industrial policy, the finance constraint is even more significant for the green mission. It is estimated that emerging market developing countries (other than China) would need about \$2.4 trillion annually by 2030 in order to meet the Paris agreement goals, and about \$1 trillion of this would need to come from external sources (Bhattacharya *et al.*, 2023). Funding has been increasing, but the \$100 billion target negotiated as part of the Copenhagen Accord in 2009 and later enshrined in the agreements at Cancun (2010) and Paris (2015) have proved elusive and are skewed towards developed countries rather than developing countries, public rather than private finance and climate mitigation rather than adaptation, and remain primarily in the form of debt (Songwe, Stern and Bhattacharya, 2022; Bhattacharya *et al.*, 2023). About 90 percent of the funding was geographically concentrated in China, USA Europe, Japan, Brazil and India leaving other countries far behind (Ameli, Kothari and Rickman, 2023).

The obstacles in mobilizing financing of the quantity and quality needed for the green mission are compounded by the institutional framework of global finance which continues to channel funds to carbon capital. Global banks have funneled about \$3.2 trillion into fossil fuels since the signing of the Paris Agreement in 2015 and another \$370 billion into agro-industry — financing that is more than twenty-fold what these banks have provided governments for climate action (Action Aid, 2023). Total subsidies for high carbon-intensity fossil fuels, agriculture and fisheries sectors, at least \$8 trillion, is more than 56 times the actual investments in nature and biodiversity (Bhattacharya *et al.*, 2023). The top 30 global asset managers invested at least \$3.5 billion in newly issued bond securities of fossil fuel developers in the 18 months between January 2022 and June 2023. Exchange Traded Funds allocated 13.6 % of their primary market portfolio flows to carbon-intensive sectors from 2015 to 2020 (Wilson and Caldecott, 2021)⁹. Despite the rhetorical commitment to green goals and the increasing cost-competitiveness of renewable energy the channels of private finance are not only failing to fund climate transition, but they are continuing to promote the expansion of fossil fuel. Battiston *et al.* (2017) estimate the high-carbon exposure of the financial sector to be about 45 percent of their portfolio.

The total assets of global financial institutions reached \$461 trillion in 2022, about \$218 trillion of which was in the hands of non-bank financial institutions (FSB, 2023). The problem of mobilizing private finance is, then, not one of the capacities, but that the contemporary international financial system is not fit for the purpose of accelerating the structural transformation needed for the green mission. The global spread of financialization further confounds the challenge of financing a green transition. Developing countries are embarking on green transitions while being subject to financial subordination in the contemporary stage of financialized, global capitalism under the aegis of the finance-led policy paradigm of the Wall Street Consensus.

⁹ According to the estimates of Buchner *et al.*, (2023) at \$7 trillion fossil fuel spending surpassed global climate finance at 1.3 trillion in 2022. Commercial banks and institutional investors contributed less than 20 percent of climate finance.

Finance remains the major hurdle to any vision of a global green new deal. The problem is not the paucity of overall funds. It is more fundamentally that of the structural and institutional hurdles that the international financial system places before state directed initiatives to mobilize and channel funds towards climate resilient and climate aligned structural transformation. The fundamental challenge to the green mission is the need to transform the financial system to better support climate and ecological imperatives while containing its inherent risks, procyclicality and asymmetry. Rising to this challenge poses a complex collective action problem requiring coordination across states, private capital, civil society and the international community (Bolton *et al.*, 2020).

The rest of this paper is focused on this question.

4. Finance and Climate Change

4.1 Financialization and Climate Risks

In recent decades global banks have turned from lending to non-financial firms, to lending to households and capital markets. The financial system has become increasingly decoupled from funding production and building productive capacity and directed disproportionately to the accumulation of financial assets and real estate both in advanced capitalist countries and in developing countries (dos Santos, 2013; Lapavistas, 2013). This trend has been termed financialization, broadly defined as “the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies” (Epstein, 2005, 3), breeds speculation, short-termism, volatility, uncertainty and financial instability.

The impatient short-termism of global finance — including global banks, institutional investors, and asset managers — is at odds with the long-term horizon of the green mission. While there is a growing recognition of the threat posed by climate change to financial stability¹⁰ — including the

¹⁰ The Network for Greening the Financial System (NGFS), an international grouping of now central banks and financial supervisors is reflecting this recognition.

physical, transition and liability risks arising from climate change (Carney, 2015; Campiglio *et al.*, 2018) — the logic of private finance privileges immediate, short-term financial disruptions and instability over the longer-term, irreversible climate risks (Chenet, Ryan-Collins and Van Lerven, 2021). The time frames of financial investors are much shorter than that of climate risks (Carney, 2015; Christophers, 2019; Ameli, Kothari and Grubb, 2021). The ‘tragedy of the horizon’ (Carney, 2015) that plagues endeavors to tackle climate change is accentuated by the dominance of the logic of finance and financial motivations in the accumulation process of the integrated global economy. The endogenous and systemic character of climate related financial risks, however, requires a macroprudential precautionary approach emphasizing immediate preventative actions and a more conscious steering of finance, with a closer interrogation of emerging drivers, transmission channels and feedback effects between climate change and financial stability (Chenet, Ryan-Collins and Van Lerven, 2021). The climate transition cannot be left in the hands of private finance.

The problem of finance has been posed in terms of providing appropriate incentives to attract and leverage private financial flows by absorbing the risks on the public balance-sheets. The key solutions proposed under IMF guidelines include measures to price climate risk, improve mechanisms of risk disclosure and develop new financial instruments with enhanced risk-return profiles that would broaden the investor base. The emphasis on transparency is based on the misplaced expectation that financial investors will respond ‘rationally’ to disclosures by divesting from fossil fuels and switching to low-carbon assets (Ameli, Kothari and Grubb, 2021). The preferred neoliberal light-touch approach to prudential regulation is also profoundly inadequate, in the face of the radical uncertainty and systemic risks that characterizes climate shocks, to that task of stabilizing the financial system (Schoemaker and Tilburg, 2016; Chenet, Ryan-Collins and Van Lerven, 2021).

The notion that climate change induced financial instability can be managed by relying on voluntary risk disclosure as the tool for asserting market discipline and eliciting stabilizing behavior rests on flawed assumptions about the incentives of global financial investors and fails to grasp the

implications of the concentration of power in few global banks, institutional investors and asset managers (Christophers, 2017). It also elides the reality that global financial investors tend to exclude private sector early-stage green innovators (Semieniuk and Mazzucato, 2019) and climate adaptation investments in developing countries and that the investment behavior of institutional investors, who remain principal holders of fossil-fuel investments, is a significant source of excess financial market volatility (Christophers, 2019).

The contemporary financial landscape is dominated by large institutional investors and asset managers who rival the structural power and systemic importance of global banks while evading the regulatory regime that the latter are subject to. Fossil fuel acquisitions by top 10 US private equity firms, which are exempt from public disclosure rule, have outpaced renewable energy investments (Giachino, 2021). Sustainability rhetoric notwithstanding, the top 30 asset managers included have been pumping funds into companies actively engaged in fossil fuel expansion (Reclaim Finance, Sunrise Project and Sierra Club, 2023). Collateral-based liquidity mechanisms undergirding market-based credit creation also undermine interventions seeking to tighten credit to carbon emitters by providing a path to indirect financing through repo markets (Kedward, Gabor and Ryan-Collins, 2022).

The financial system is vulnerable to growing climate risks and is at the same time responsible for financing activities that promote carbon emissions and environmental degradation, necessitating the adoption of a double materiality perspective accounting for both climate risks and financial instability risks (Battiston *et al.*, 2017; Boissinot *et al.*, 2022). The prevailing approach has proved unequal to funding the green mission in the requisite scale and direction. By focusing on shoring up asset prices to accelerate credit flows, this approach has fueled financial innovation and the accumulation of financial assets rather than real green investment, perversely endangering both financial stability and climate resilience. It has failed to restrain the growth of carbon capital and is on the contrary implicated in its persistent growth, while funding only a small proportion of climate mitigation and adaptation investments. Existing inequalities are perpetuated by the path dependencies (in the form of feedback and

investment lock-in effects) inherent in the pattern of private capital flows that concentrate investment flows into already established regions and sectors. (Rickman *et al.*, 2022; Ameli, Kothari and Rickman, 2023).

4.2 Financial subordination

The dominant paradigm of ‘derisking’ as a way of enlisting and leveraging private finance under the Wall Street Consensus, seeks to usurp the agenda of a green transition to expand the frontiers of financial returns, by pushing market-based finance as the panacea. Instead of taking the lead in coordinating and channeling financial flows to launch a climate-aligned structural transformation, states put their resources behind the generation of bankable, investable ‘green’ assets to feed the appetite of global institutional investors awash with funds — what has been termed a portfolio glut. (Gabor 2021). The dominant discourse poses the problem as that of devising ways of mobilizing this glut of private institutional capital (including asset management funds and institutional investors) in order to close the finance gap in a context where developing countries have limited fiscal space (World Bank, 2018, 2019). Policy is focused on deploying public resources to backstop public-private partnerships through subsidies and guarantees and to forging market structures and creating market instruments that are in line with the mandates of global investors (Dafermos, Gabor and Michell, 2021). This approach is yet to yield any real dividends. More pernicious, this approach serves to restore and reaffirm the existing climate endangering order.

The Wall Street Consensus reflects the dominance of US-led finance in a global financial system anchored to the dollar and is embedded in mechanisms that engender financial subordination. The proliferation of global financial flows in the recent decades has exacerbated fragility and the incidence of financial crises globally while integrating developing countries in subordinate positions in the global financial system. (Bonizzi, Kaltenbrunner and Powell, 2020, 2022). The global south has become embroiled in financial cycles driven by liquidity and credit conditions in the financial center in the north, specifically financial center in the US (Rey, 2015). As a result, the global south has taken on the burden

of being the shock absorber or safety valve for international financial system flush with liquidity and seeking new profit frontiers. The global financial system has thus fostered both instability and inequality, severely restricting the policy space of developing countries even as it serves as a mechanism for extracting and concentrating revenues and surpluses from across the globe and entrenching financial subordination. This was manifest in the perverse paradox that capital flows out from developing countries towards the developed center (Alfaro, Kalemli-Ozcan and Volosovych, 2008; Gourinchas and Jeanne, 2013), and the stockpiling of dollar reserves by central banks in developing countries as a safeguard against capital volatility (Rodrik, 2006; Gallagher and Shrestha, 2012)¹¹.

Part of the problem is the curse of the original sin— the necessity and proclivity for borrowing in a foreign currency. The waves of capital flows that engulfed developing countries fueled an unsustainable accumulation of short-term foreign currency debt (Kose *et al.*, 2019). Developing countries borrowing short-term in foreign currency are vulnerable to capital reversals and crisis. The original sin arises from the subordinate position that currencies of developing countries occupy in the international monetary hierarchy of the dollar. A higher return is required to provide funding to these countries, and they face a disproportionate burden when global liquidity dries up. The cost of capital, including for green projects is significantly higher in developing countries compared to developed countries (Ameli *et al.*, 2021). Private capital costs range from 6% for developing countries in Asia and Oceania, to 7.7% in Latin America and the Caribbean, and 12% for Africa, which is a recipe for unsustainable debt accumulation given lower growth rates (Gallagher *et al.*, 2023) While this cost premium reflects higher ‘macro-risks’ — the hedging costs of capital borrowing in a foreign currency — it also involves a substantial procyclical overpayment for currency risks of subordinate currencies (Persaud, 2023). As the hedged returns in foreign currencies for long-term green projects in developing countries are insufficient to attract foreign investors, global

¹¹ The recent interest hiking and quantitative tightening cycle has propelled a significant outflow from emerging markets.

investors demand guarantees, privileges, and immunity from any losses from adverse events and shocks as an incentive to invest.

This is the rationale for the derisking state. The burden of growing risks falls on the developing state's balance-sheet, and ultimately on their broader population, even as the returns to global finance are protected. Climate-related losses trigger capital flight and balance of payments crises, amplifying the volatility of capital flows as developing countries have become even more sensitive to external shocks arising from financial conditions in the leading financial center in USA (Volz *et al.*, 2020; Kling *et al.*, 2021).

Disruptions triggered by climate shocks, therefore, add another layer to the process of financial subordination, by tightening conditions at precisely the moment the need for funding is at a peak. Climate vulnerable countries face an incremental cost of sovereign debt due to elevated risk perceptions, which exacerbates the fiscal burden, adding to costs of both public and private sector borrowing beyond what is implied in macroeconomic fundamentals (Buhr *et al.*, 2018; Volz *et al.*, 2020; Beirne, Renzhi and Volz, 2021; Kling *et al.*, 2021)¹². Rising financial costs imposes a burden on top of the physical costs of climate risks, perpetuating the vicious cycle of a climate investment trap as the most vulnerable less developed countries become more fiscally and financially constrained and less able to spearhead climate mitigation and adaptation (Buhr *et al.*, 2018; Ameli *et al.*, 2021; Kling *et al.*, 2021; Gallagher *et al.*, 2023). The higher cost of capital in countries with a greater exposure to climate risks leads to debt distress, financial exclusion, squeezing investment (and tax revenues) pro-cyclically. This further embeds these countries in financial cycles that could derail the climate agenda. There is a complex nexus between climate change and sovereign risk (Volz *et al.*, 2020) that the derisking approach elides and perpetuates.

¹² Buhr *et al.*(2018) estimate an addition \$40 billion in interest payments on government debt and an added \$62 billion on private debt over a decade.

To confound matters further, investment in climate adaptation that would lead to circumventing loss and damage and improving the sovereign risk profile of climate vulnerable countries, does not offer the pecuniary returns that would attract private capital. Finance for climate adaptation (\$63 billion in 2021-2022), which is less than 5 percent of global climate finance, is provided primarily by public agencies and falls short of the needs of developing countries (estimated at \$212 billion by 2030) (Buchner *et al.*, 2023).

The chronic inadequacy of private funds of for climate finance for the most vulnerable less developed countries arises despite the global portfolio glut, due to the prevailing priorities and risk-return assessments that govern investment decisions of global investors, and the limits they place on state initiatives. The specter of debt distress stalking climate-vulnerable countries also represents the abrogation of the ‘polluter-pays’ principle in international finance (Songwe, Stern and Bhattacharya, 2022). Thus, the Wall Street Consensus enables global finance to exploit its structural power for short-term profits from climate vulnerability. This path to financing climate action reinforces global injustice through what has been termed the ‘exposing by self-protecting’ (whereby the attempt by global finance to reduce exposure to risk induces a sell-off and triggers a hike in borrowing costs) and ‘decarbonising by exploiting’ (where finance-induced decarbonization relies on green-extractivism) channels (Dafermos, 2023).

Aligning the international financial system with global climate action requires a more systemic transformation of the financial system. The green mission is incompatible with the regime of financialization and financial subordination that has embroiled developing countries and captured the developmental project.

4.3 Contours of Climate Finance

The contemporary global financial architecture is clearly ill-suited for providing finance on the scale, scope and substance needed to address climate change. Developing countries have been subjected to multiple overlapping shocks against the backdrop of the looming debt crisis, while their access to

international liquidity and credit is severely restricted. Urgent and far-reaching transformation of the global financial landscape is essential and involves both a re-orientation of domestic monetary fiscal and financial policy, and the revamping of international financial institutions and arrangements. Climate finance policies are embedded in the institutional capacities and the underlying power structures that constrain and govern policy implementation and cooperation. This requires confronting. Pinning a developmental strategy on a turn to private finance as a way of surmounting the constraints faced by states in the south is doomed to failure since it does not confront the deep-rooted contradictions of the neoliberal modes of accumulation in this financialized stage of global capitalism (Bernards, 2024). In light of the preceding discussion, we can lay out the different axes along which climate finance, defined broadly as the financing of investments that contribute positively to a green structural transformation, can be comprehended¹³.

The first — *the public-private dimension*— involves the relation between the state and markets and the concrete ways in which the state intervenes in engineering the green transition. A distinction can be made between whether the state engages directly in channeling credit (either through public ownership of banks or through credit quotas and subsidies or whether its interventions are indirect through nudges and incentives (for instance risk disclosures). This can be framed along the axis between market-fixing versus market-shaping (Mazzucato, 2016a) or between broad/indicative versus fine-grained/directed approaches (Mason, 2023). The policy debates are often about how the transformation cannot be achieved without private capital, but what is indisputable is that it is impossible without the proactive role of the state. Beyond the debates about whether public investment crowds in or crowds out private investment, the critical role of the state as a catalytic agent in planning, launching and coordinating a green structural transformation needs to be embraced (Mazzucato and Semieniuk, 2017; Owen, Brennan and Lyon, 2018;

¹³ The taxonomy for classifying industrial policy in terms of the nature of targets and instruments articulated by (Mason, 2023) and further developed in (Tooze, 2023) along political and institutional dimensions inform this argument.

Deleidi, Mazzucato and Semieniuk, 2020; Mazzucato, 2022)¹⁴. This raises questions about the embeddedness and democratic accountability of the state, and its capacity to discipline non-financial businesses and private financial institutions. While the greening of state policy unfolds in the context of the prevailing balance of class forces and domestic institutions (Tooze, 2023), the state also plays a role in shaping this balance and in the emergence of strong green coalitions within civil society (Mason, 2023). The bottom-line, however, is that green goals cannot be conditional on ensuring private profitability and the state has to strategically redirect investment and reshape the macro-financial context of investment decisions to achieve these ends.

The second dimension — *the real-financial dimension* —relates to whether climate finance is directed towards actual capital expenditure in climate mitigation or adaptation or whether it fuels further financialization by creating new financial assets without making a direct impact on building green productive capacity, while thwarting the green mission through green-washing and continued financing of fossil fuels. Regulations mandating ‘green’ standards, with associated incentives *and* penalties need to be tailored to reconfigure financial flows in line with climate imperatives. But the contemporary financial architecture needs more pervasive reforms if the overriding calculus of short-term returns is to be reined in. Otherwise, the continual pressure of revamping regulations to keep pace with the financial systems ingenuity and impetus in engineering ways to evade and pushback against the regulatory regime will overwhelm the green initiatives.

The third dimension spans the interphase between *national (and local) and international*. The United Nations Framework Convention on Climate Change (UNFCCC) highlights ‘common but differentiated responsibilities’ of nations in the context of climate action. Climate mitigation and adaptation is on the one hand a quintessential global public good that needs collective, cooperative,

¹⁴ Deleidi, Mazzucato and Semieniuk (2020) show that the impact of public investments on private investment is positive and also consistently higher than the impact of policies like feed-in tariffs, taxes and renewable portfolio standards in general

planning and provisioning. Much of cumulative emissions have arisen due to carbon intensive trajectories of the advanced capitalist countries, while the impacts are being felt most severely in least developed countries. At the same time the rapid rise in emissions emanating from growth in emerging markets threatens to accelerate the climate change. On the other hand, global liquidity undergirding and stabilizing cross-border financial flows is also in essence a global public good (Kindleberger, 1981). With the dollar established as the global key currency the hybrid hierarchical mechanisms generating global liquidity and financial safety-nets have enabled US-led finance to draw returns in the form of capital gains, fees and commissions, and higher interest rates from the global south while compelling the stockpiling of dollar reserves as a buffer against capital flow reversals and currency gyrations. The compulsory duty imposed on peripheral countries whose currencies are lower down in the international monetary hierarchy has emerged in tandem with the exorbitant privilege accruing to the global dollar (Carneiro and De Conti, 2022). This global financial architecture systematically misallocates and underfunds the climate mitigation and adaptation needs of developing countries. The inequities embedded in the higher cost and unequal access to international capital flows imply that private capital flows are not forthcoming in the right quantity for the appropriate purposes, while the most vulnerable countries are further hamstrung in terms of public finance and fiscal space by growing debt burdens (Ameli, Kothari and Rickman, 2023). Financing growing climate-related spending in the global South cannot be undertaken solely based on domestic resource mobilization. Directing sustainable financial flows from the global north to the global south is essential to prevent locking developing countries into a high-carbon development trap. But debt is not simply an obstacle to green transition. The prevailing response to debt-financing and restructuring has been shaped by the history of colonization, financial subordination and ‘unequal ecological exchange’ that has transferred the brunt of financial fragility and the ecological destruction to the global south (Perry, 2021; Hickel *et al.*, 2022). It is incompatible with a just transition.

These three dimensions ‘public-private’; ‘real-financial’ and ‘national-international’ are pivotal to effectively calibrating financial flows. The question along the first axis is to what extent is the nature-

depleting, climate imperiling logic of short-term private profitability being contained in order to pursue the public priorities of climate action. Along the second axis, to what degree are policy efforts directed at ensuring that financial flows are financing investments in climate mitigation and adaptation and not simply providing more fodder for the global portfolio glut and financial accumulation. Finally, the third axis turns the spotlight on stewarding global funding and support on appropriate terms to the most vulnerable countries while buttressing national ownership of the green mission.

5. Green Financial Policy and a Green Financial Architecture: An Assessment

The default neoliberal approach of concentrating on market-led initiatives to mobilize private capital has failed to generate financing on the scale and scope needed for green transformation. Financial flows are not aligned with climate goals and capital is not flowing in the right directions (in terms of both sectors and regions) or at the necessary pace.

Market-fixing risk-disclosure and price discovery (through emission trades) led by ‘better-informed’ financial institutions have been the preferred path to decarbonization. This approach is a founded on the twin premises of fiscal constraints on public investment and market constraints on private investment in high-risk capital-intensive green innovation, technology, and infrastructure. The path out of this impasse was seen as the state stepping in to underwrite, absorb and socialize risks and privatize returns to attract global finance, while crafting prudential and macro-prudential policies that incorporate the climate dimensions (Schoenmaker and Van Tilburg 2016).

But the radical uncertainty and path dependencies inherent in climate change (Hall, Foxon and Bolton, 2017; Chenet, Ryan-Collins and Van Lerven, 2021) and the systemic risks and pro-cyclicality it engenders, necessitate forms of financing — patient and long-term — that do not conform to the risk-return profiles of global investors. To devise a policy framework that would break through the structural constraints imposed by fiscal incapacity and financial subordination, we need to eschew the ‘efficient markets’ framework for an ‘adaptive markets’ understanding of the institutional structure of the evolving financial system (Hall, Foxon and Bolton, 2017) and shift the policy paradigm from market-fixing to

market-shaping perspectives (Kedward, Ryan-Collins and Chenet, 2020; Kedward, Gabor and Ryan-Collins, 2022). Green financial policies must be adopted as part of a broader range of regulatory, fiscal, industrial, environmental and distributional policies. Effective mobilization of finance for climate action also needs to contend with the higher debt burdens and restricted access to funding faced by less developed vulnerable countries.

In this section we consider policy pathways to aligning the domestic and international financial system with climate imperatives. Central Banks, National Development Banks and Multilateral (and Regional) Development Banks are in distinct positions to shape this realignment and undergird cooperative, coordinated strategies to mobilize funding for the climate transition. Central banks and national development banks are key agents in mobilizing and channeling finance for national green transitions. However, without a fundamental realignment of the global financial system to better support green structural transformation the space for national initiatives will be circumscribed. To this end multilateral development banks need to reorient their approach so as to better support and expand national policy space.

5.1. Central Banks Regulatory Framework and Credit Policy

Epstein (2005) underscores the historical role of central banks as agents of development, coordinating with other state agencies to promote structural change and channeling credit into priority sectors. This pivotal role was eclipsed by the mantra of central bank independence and monetary dominance promoted under the neoliberal policy agenda. The imperative now is for central banks to adapt some of the tools that were effectively deployed in the past to help catalyze the green transition. The mix of policy tools and instruments range from informational and regulatory to more direct price-incentives and quantitative controls. The scope for central banks interventions would be informed by the institutional context of their relationship with domestic financial markets and global finance on one hand, and fiscal authorities and *other* central banks on the other. Most significantly, in place of the mantra central bank independence

that subordinates monetary policy to the priorities of global finance, central bank policy and interventions would need to be democratically accountable to the domestic working people.

There is a growing recognition that central banks and financial regulators need to take climate change into account in their regulatory policy framework and that climate risk can impact the channels of monetary policy transmission adversely (Schoenmaker and Tilburg, 2016; Campiglio *et al.*, 2018; NGFS, 2021). There is, however, less consensus on the appropriate policy approach. The lines of contention around regulatory policy can be framed broadly as between the risk-exposure and systemic-risk approaches (Dafermos 2022); between prudential and promotional approaches (Baer, Campiglio and Deyris, 2021) and between the risk-based and allocative green credit approaches (Kedward, Gabor and Ryan-Collins, 2022). While there are differences in framing and emphasis across these typologies there is a common core to the characterization of the lines of division.

The market risk-exposure approach argues that monetary interventions and financial regulations should reflect climate risks. The mandate of central banks is to enable ‘quantification’ of climate risks and induce financial institutions to curtail risk exposure in response to this information. The parameters of interventions within the risk-exposure approach are based on the principle of market neutrality and the understanding that incomplete and asymmetric information is the primary deterrent to green finance. The regulatory tools proposed include stress testing and scenario analysis incorporating climate risk, and private taxonomies for classifying green and dirty assets (Christophers, 2017; Campiglio *et al.*, 2018; Monnin, 2018; Kedward, Ryan-Collins and Chenet, 2020; Chenet, Ryan-Collins and Van Lerven, 2021). ‘Market- neutral’ interventions by central banks have, however, not been neutral in their climate impacts (Dafermos, 2022). Thus, corporate bond purchases under quantitative-easing policies displayed a carbon-intensive bias (Matikainen, Campiglio and Zenghelis, 2017). Further, there is little evidence that such interventions have any significant impact on shifting the asset allocations of private finance (Christophers, 2019; Ameli, Kothari and Grubb, 2021). Green renewables and fossil fuels are not simple substitutes in the portfolio choices of financial investors that can be recalibrated in the desired direction by tweaking

price signals (Ameli, Kothari and Grubb, 2021). Institutional investors and asset managers, in fact, use the regulatory arbitrage opportunities provided by the blind-spots and loopholes of the risk-based approach to fund high carbon sectors through market-based mechanisms including equity and equity ETFs/funds, and bonds and bond ETFs/funds (Kedward, Gabor and Ryan-Collins, 2022). Macro-financial governance based on derisking, emphasizes a prudential approach to ensuring financial stability in the face of climate risks. Central banks are tasked with deploying monetary and regulatory interventions to generate financial assets that conform to the mandates of global investors, while incorporating climate risks into the disclosure and stress-testing framework through tools like Climate VaR, Carbon Earning at Risk, and Paris Agreement Capital Transition Assessment. The micro and macro-prudential regulatory framework is aimed at encouraging the financing of ‘green’ activities but is not similarly directed at discouraging funding of ‘brown’ investments.

Wary of ‘mission overreach’ and ‘politicization’ of central banks, the perceived trade-offs between mitigating balance-sheet risk and actively supporting the green transition, and between monetary policy effectiveness and climate action, are viewed as deterrents to more direct interventions (NGFS, 2021). The stress on market-friendly ways to enhance the risk-return profile of green projects to make them attractive to global finance, undermines the capacity of the state to discipline global finance, entrenching dependency, while jeopardizing the green mission. Further, the integration of climate-related risks into regulatory and monetary policy frameworks is not enough to shockproof the international financial system against green swan events, making it incumbent on central banks to be at the forefront of promoting long-termism and sustainable finance (Bolton *et al.*, 2020).

In contrast, the systemic risk approach argues that the radical uncertainty and the complexities embedded in system-wide interactions involved in climate change render the risks unamenable to quantification. Climate risks also interact with and amplify nature-related risks (Kedward, Ryan-Collins and Chenet, 2020). This approach also recognizes that finance is far from neutral and that climate risks are not exogenous to central bank actions but can arise and be exacerbated as a consequence of central

bank interventions. Without enforcing penalties, the voluntary disclosures of climate risks cannot change investor behavior. Shedding the passive ‘informational’ role, central banks need to directly steer the transition to low carbon economy in an orderly, stable manner, while coordinating its monetary and regulatory framework with climate policies both domestically and internationally (Dafermos, 2022). Instead of enabling the subversion of climate action by the overriding logic of finance, the remit of the allocative green credit policy framework seeks to actively promote the green structural transformation by channeling credit towards the real goals of climate mitigation and adaptation. Rather than relying solely on the blunt tool of price mechanisms and arms-length prudential regulations that are prone to regulatory capture, regulatory arbitrage and greenwashing, this approach prioritizes tackling the structural constraints on green financing (Kedward, Gabor and Ryan-Collins, 2022) and seeks to reassert public, democratic control over private financial markets (Baer, Campiglio and Deyris, 2021) through a strategic mix of incentives, penalties and mandates. The focus is turned from efficiency to effectiveness of credit policies in financing the green structural transformation, from stabilizing or underwriting the expectations and speculative appetites of private finance to reshaping the financial landscape through both inducements and penalties.

The global financial crisis and the pandemic set the stage for the widespread adoption of ‘unconventional’ balance-sheet policies (Borio and Disyatat, 2009) opening the way for deploying central bank interventions to spearhead a green transition. While these unconventional policies including changing the terms and eligibility for discounting and broadening asset purchase were designed to ensure financial stability, they can be repurposed to promote climate resilience and for ‘green’ credit guidance. Proposals include configuring central bank asset portfolios and lending (as practiced by BoJ), long-term refinancing (a policy taken up by the ECB) and greening collateral frameworks in line with climate goals, thus deploying the balance-sheet capacity of central banks to influence asset prices and private credit indirectly by calibrating funding conditions in the financial markets (Campiglio, 2016; Ryan-Collins and Dikau, 2017; Campiglio *et al.*, 2018; Oustry *et al.*, 2020; Dikau and Volz, 2021; Dafermos *et al.*, 2021b).

Institutional capital with an outsized influence in capital markets must also be brought within the purview of these policies (Kedward, Gabor and Ryan-Collins, 2022). Such active credit guidance goes beyond the policy framework of micro and macro-prudential regulations to bring climate risks into the risk calculus of financial institutions, and to directly steer the allocation of credit across different sectors in line with the green mission. In the context of regulations, there is the much harder task of curbing the excessive power and control exercised by these institutions and containing market-based finance in order to moor finance more closely to the ‘green’ productive/provisioning economy. Apart from identifying systematically important financial institutions and subjecting these to greater regulation and higher capital requirements given the systemic risk they pose, carbon-exposure needs to be added to the identifying criterion (Ryan-Collins and Dikau 2017) and non-banking financial institutions need to be brought into the regulatory ambit of too big to fail.

Central banks can play a pivotal role in coordinating and giving an impetus to climate transition across institutions and borders, while preserving financial stability and containing adverse distributional consequences. It is critical that the mandate for financial stability does not come at the expense of a high-carbon recovery (Dikau, Robins and Volz, 2020). Green credit policies need to be based on clear criteria and classification to distinguish green and brown activities, instruments and entities. Here the allocative credit approach makes a case for public (with democratic oversight and inter-agency cooperation) rather than private taxonomies (developed by global finance and global corporations with vested interests and perverse incentives); mandatory (or quasi-mandatory) rather than voluntary disclosures; and discretionary (climate-aligned) rather than risk-based criteria for calibrating credit guidance (Kedward, Gabor and Ryan-Collins, 2022).

A variety of measures including differential capital requirements that are calibrated to the climate risk exposure of bank loan portfolios, green supporting and brown penalizing factors, sectoral leverage-ratios targeting green sectors, large exposure limits to curb brown sectors, countercyclical capital buffers that mitigate risks along the carbon intensive cycle, are available to promote climate-aligned finance.

D’Orazio and Popoyan (2019) document the cluster of low income and emerging economies that have adopted mandatory prudential instruments to channel credit to green sectors. The suitability of each instrument is conditioned by the specific institutional context and must also contend with the complex and opaque sphere of institutional capital by instituting capital requirements, along with punitive leverage ratios, and adjustments to margin requirements and haircuts to penalize brown assets while promoting green assets (Kedward, Gabor and Ryan-Collins, 2022).

Apart from this more direct credit guidance and allocation through price incentives like interest rate floors and ceilings and credit subsidies to priority green sectors targeting market environment, and more ‘coercive’ quantitative controls on credit flows like credit quotas, floors and ceilings, credit controls and portfolio restrictions, loan to value income caps and lending ratios, and the direct equity contributions and targeted credit-lines to national development banks can be used to stimulate green lending and curtail brown lending¹⁵. To give some examples, the Reserve Bank of India includes renewable energy in its priority sector lending targets. Bangladesh has a minimum bank lending ratio for sustainable financing. Brazil’s central bank has restricted certain forms of brown financing like crop expansion in the Amazon Forest region. South Korea has set a lower interest rate for green activities. Under the People’s Bank of China green refinancing scheme banks must lend to green activities at a targeted level to qualify for discounted funding (Ryan-Collins and Dikau, 2017; Dikau and Volz, 2021), and green bonds have lower credit rating requirements when offered as banks’ collateral within the PBoC’s medium-term loan facility (Baer, Campiglio and Deyris, 2021). Less favored by advanced capitalist countries and the neoliberal policy discourse on the grounds that directed credit policies distort markets and misallocate funds, these policies are being successfully adopted in developing countries (Ryan-Collins and Dikau, 2017; Campiglio *et al.*, 2018).

¹⁵ See (Bezemer *et al.*, 2018, 2023a) for a review of credit policy.

The pervasive spread of market-based financing geared to asset trading rather than productive investment demands a more direct approach to credit allocation to restore lending for building productive capacity (Bezemer *et al.*, 2018, 2023b). In order to expand the reach of credit policy to the sphere of institutional capital, measures like outright bans in certain sectors to ensure that brown companies are denied financing, 100 percent haircuts on securities issued by fossil fuel companies, to limit the scope for funding through private repo markets, excluding brown assets from the ESG index, and forced sales of brown assets to a public bad bank need to be adopted (Kedward, Gabor and Ryan-Collins, 2022).

Finally, central banks have been accumulating significant excess reserves that could be mobilized towards buttressing climate finance. Some countries have set up Sovereign Wealth Funds (SWF) as a way to invest excess reserves productively. Instead of a neoliberal orientation to investment norms focused exclusively on financial returns, preservation of cross-border flows and international financial stability as being promoted under the Santiago Principles, the principles governing SWF portfolio strategies can be deployed to support the climate agenda, for instance through supplementing central bank assistance to national development banks by purchasing their bonds. The compulsion to stockpile reserves as a buffer against volatile capital flows can also be attenuated by adopting capital controls and some forms of mutual liquidity support (including swaplines) across developing country central banks. This would expand domestic macroeconomic policy space to pursue a green mission. The challenge of calibrating capital controls with mobilizing global finance, could be navigated by the adoption of ‘green’ conditionalities for private foreign investments.

5.2 National Development Banks

National development banks (NDBs) and state investment banks could play a strategic role promoting green innovation and structural transformation. NDBs have been a central plank of the post-war developmental project of countries as a lead agency mobilizing funds and coordinating investments across capital intensive enterprises and infrastructure (Mazzucato and Penna, 2015; Chandrasekhar, 2016). With the neoliberal backlash against the developmental state, NDBs were charged with being tools

of financial repression that thwarted the development of capital markets. The persistent shortfall in private lending, combined with the overwhelming urgency of scaling up green investment has revived interest in the potential role of NDBs. This includes NDBs with a specific environmental mandate to promote low carbon transitions.¹⁶

While varying in terms of ownership structure, forms of capitalization, investment mandates and lending models, these banks are distinctive in their capacity to provide credit for productive, publicly-mandated purposes at cheaper rates, and are characterized by greater stability of funding in terms of higher equity and long-term funding ratios, and lower ratios of non-performing loans (Chandrasekhar, 2016; Griffith-Jones and Ocampo, 2019). Access to public guarantees and recapitalization, and to lower-cost credit allows these banks to lower benchmark lending rates in priority green sectors. There is also enough evidence that NDBs have successfully mobilized and shaped private sector involvement in green sectors (Mazzucato and Semieniuk, 2018b; Deleidi, Mazzucato and Semieniuk, 2020). Despite challenges in terms of scale, political and social accountability, and macroeconomic constraints, NDBs are indispensable to green initiatives (Stuart and Gallagher, 2016).

As sources of patient, committed long-term capital these banks are well positioned to mobilize funding across the entire green innovation chain, from basic research and seed finance to market entry, and for climate mitigation and adaptation projects where private capital is not forthcoming. Their role is not limited to mobilizing and allocating credit, but they can also help to plan, design, implement and monitor effective green projects¹⁷. They have non-financial advantages, including knowledge and experience in navigating domestic institutions and technologies (Griffith-Jones, Attridge and Gouett, 2020). Thus, NDBs can offer pathways to engage private capital through technical and financial

¹⁶ China Development Bank in China, and Indian Renewable Energy Development Agency in India being two examples.

¹⁷ National development banks have played an important role in China, Brazil, Mexico and Korea in spearheading investments in green sectors and green credit allocative policies (Stuart and Gallagher, 2016; Kedward, Gabor and Ryan-Collins, 2022).

assistance in planning and development and scaling-up projects and providing greater access and inclusion in benefits and decision-making through community trusts and community banks (Studart and Gallagher, 2016). Their vast portfolio of funding tools also allows them to match the most appropriate tool to the specific needs of the project (for example equity for cutting-edge innovation, loans to incremental innovation projects, grants to blue-sky R&D) (Mazzucato and Penna, 2015). Both targeted lending and NDBs rate high in terms of effectiveness in mobilizing private finance and environmental integrity and can also be used to promote small and medium enterprises more effectively compared to green bonds (Bhandary, Gallagher and Zhang, 2021). Beyond providing technical and financial support and identifying and developing projects, NDBs can exert an influence in greening the overall policy framework (Griffith-Jones, Attridge and Gouett, 2020).

The significance of NDBs to the green transition is accentuated in the context of their potential to exert a countervailing force against the overarching logic of financialization and the speculative, risk-return mandates of global finance that is undermining the prospects for a green transition. NDBs can be re-purposed as incubators and critical hubs of a resilient financial system that subserves the goals of green and inclusive development rather than enforcing destabilizing and polarizing financial dynamics. They can also help attenuate the grip of the vicious dynamics of debt accumulation and capital flow reversals linked to global financial cycles by providing a countercyclical buffer, and more significantly, by paving a path to reducing dependence by leveraging public finance to providing alternative lower-cost long-term funding for investment.

NDBs are critical conduits for mobilizing and channeling global funding — blending public and private, national and international funds. They can be used to create national platforms for co-financing and engagement domestically, regionally, and internationally; and to develop mechanisms to mobilize funding on the principles of equity and sharing of returns. Even if NDBs are encouraged to raise funds in domestic and international capital markets, their lending capacity needs to be undergirded by capital and equity support from the state and central bank, in order to insulate them from dependence on

derisking strategies to enlisting global investors. As vehicles that can leverage public support and guarantees to embed private sector green initiatives, NDBs would enable developing countries to reclaim policy autonomy from the priorities emanating from global investors and play a more proactive role in changing the norms and parameters governing financial decision-making. With purposive coordination NDBs could be critical channels to reinvigorate and reshape multilateral institutions along the lines of common but differentiated responsibilities and help ensure that the global south's reliance on external support for technology and finance does not perpetuate financial subordination and block a just, green transition. They are the natural partners for international funders and multilateral agencies, while helping ground international commitments to climate finance in the nationally owned green missions.

5.3 Multilateral and Regional Development Banks

If democratically conceived domestic initiatives at allocative credit policies are to be executed in a fiscally sound and financially stable manner, they would need to be buttressed by globally coordinated, purposive efforts towards both mobilization and reallocation towards the global south. This is especially so for the most vulnerable less developed countries confronting the triple specter of rising debt levels, the higher cost of capital and deteriorating credit ratings. Multilateral and regional development banks (MDBs), including the World Bank (WB), European Development Bank (EDB), Inter-American Development Bank (IADB), Asian Infrastructure Investment Bank (AIIB), New Development Bank (NDB), Islamic Development Bank, Development Bank of Latin America (CAF), Asian Development Bank (ADB), and African Development Bank (AfDB), can play a critical role in such a process¹⁸. The Bridgetown Initiative, the Paris New Global Financing Pact, and G20 deliberations have all underscored the urgent need to revamp and reform multilateral development banks to make them fit for the purposes of meeting global climate goals and supporting national initiatives at green structural transformation in partnership with regional and national development banks. To achieve this MDBs should explicitly define

¹⁸ Regional development banks like CAF played a major role in infrastructure in Latin America

and include financing global public goods and the protection of global commons in their mandate (UN-HLAB 2022). It is also necessary to overhaul their mandates as instruments of financial subordination.

International financial assistance remains skewed towards short-term aid tied to conditionalities of fiscal consolidation with a stress on self-insurance against climate risks. The international financial architecture must be reconfigured to effectively coordinate and deliver low-cost funding for national green missions in the global south in an equal partnership that preserves and expands their policy space. While differing in terms of mandates and structures, multilateral and regional development banks are an important source of stable, concessional, long-term finance for green innovations and investment. There is an imperative to expand the scale of lending for climate action at least three-fold, and that of concessional finance at least fourfold by 2030 (Bhattacharya *et al.*, 2023).

Apart from shareholder equity in the form of paid-in capital and a notional buffer of callable capital, these banks draw on funding from capital markets. The fact that the latter source of funding is governed by credit-ratings, constrains MDB lending capacity as additional exposures could trigger downgrades under the prevailing risk-assessment approach adopted by private credit rating agencies¹⁹. It is also time to consider along with public taxonomies, a global public credit rating —possibly under the UN system. However, there is considerable headroom for these institutions to optimize the management of their balance sheet and expand lending, even without an increase in the equity base (Munir and Gallagher, 2020). Estimates of a G20 panel suggest that MDBs can increase their lending by \$600 billion to \$1.2 trillion without jeopardizing their credit rating (Gallagher *et al.*, 2023).

Sensible ideas include strengthening the governance of capital adequacy, balance-sheet optimization (including lowering the equity to loan ratio), and directly engaging with credit rating agencies to calibrate their risk-assessment framework based on a more appropriate understanding of the

¹⁹ This includes factoring in the higher risk-mitigation capacity and the preferred creditor status of these institutions, and taking into account and allowing temporary subscriptions to callable capital and adopting net income measures optimize balance-sheet capacity (Songwe, Stern and Bhattacharya, 2022).

distinct financial structure and strength of these banks (Gallagher *et al.*, 2023). Proposals have also focused on the adoption of new financial innovations, in particular guarantees, securitization and ‘blended finance’. But the level of mobilization of private finance has been low and uptake of blended finance instruments, which are time consuming and costly to replicate, has been insufficient (Songwe, Stern and Bhattacharya, 2022).

There is no getting away from the urgent necessity for ramping up the capital base of these institutions through regular capital infusions in order to expand their lending capacity. Alongside expanded lending, institutional reforms are also necessary if these institutions are to reorient their policy approach towards supporting and strengthening resilient and inclusive nationally owned green development strategies. This includes going beyond a focus on projects to a programmatic approach supporting more holistic nationally developed roadmaps to green transitions and helping build networks of relationships across borders and entities that would help sustain virtuous cumulative cycle of investment flows (Ameli, Kothari and Rickman, 2023). It would also necessitate eschewing programming based on a prescriptive checklist of macro-financial indicators to lending and support grounded on the principles of inclusive climate resilience and the development of national platforms for planning and implementation of green missions and setting up a public credit ratings system.

The financial heft of MDBs can be effectively deployed to strengthen the capacity of developing countries to draw and channel funds towards the goals of green transformation, while easing lending conditions and facilitating negotiations for a more sustainable restructuring of debt in times of debt distress, adverse macroeconomic conditions, and climate-related disasters. This includes lending at lower than the market prevailing market rates, extending the grace periods for loan repayments and broadening existing mechanisms to provide emergency finance and relief to these countries (Ameli, Kothari and

Rickman, 2023). Support for public investment should be ramped up, particularly, where there are large spillovers and where revenue streams are not high enough to attract private finance²⁰.

The hype of public-private partnerships notwithstanding, MDBs have been relatively unsuccessful in harnessing private finance for climate action. In 2022 only \$17 billion in private finance was mobilized for lending to developing countries compared with \$80.6 billion of own lending by MDBs (Bhattacharya *et al.*, 2023). The approach to attracting and steering private capital has been the provision of hedging instruments, portfolio guarantees and insurance and the promotion of blended finance as a way of matching risk-adjusted returns of investments to investor requirements of asset managers and institutional investors. It is, however, not clear that blended finance vehicles including co-lending platforms, structured investment funds, green bond funds and new climate and nature assets have been effective in filling the financing gap and mobilizing *additional* funds from global investors towards concrete climate action, especially at the geographical and technological frontiers where returns from climate action are the least ‘bankable’ in the sense of conforming to a profit-driven model (Lankes, 2021).

The underlying presumption is that the vast portfolios of global investors will only be mobilized if the risks are borne asymmetrically by the developing country public entities. This approach promotes moral hazard, while accentuating debt distress and fiscal instability in the borrowing country. To be effective blended finance instruments must be drawn up with a more balanced distribution and sharing of risks and returns. Instead of focusing on cushioning risks for institutional investors, MDBs capacity to aggregate and pool exposures needs to be redesigned for better impact and scale and be geared to providing a safety-net for the developing countries to pursue climate action rather than safeguarding asset returns for global investors. There is a case to be made for greater collaboration and risk-pooling among MDBs that would allow MDBs to leverage their capital base to expand lending capacity more effectively.

²⁰ Apart from funding and emergency finance, these institutions can be critical to developing hubs for technical and risk-monitoring support and developing risk-sharing and insurance solutions geared to climate goals rather than financial risk return parameters.

Thus, the Climate Investment Fund has been put forward as a way to mobilize and channel investments through a group of MDBs (WB, ADB, AfDB EDB and IADB) to pilot and implement climate solutions by providing concessional finance. Exposure exchanges, involving synthetic exchanges of sovereign exposures to reduce single obligor constraints and portfolio concentrations are also being proposed²¹.

It is also clear that the growing burden of debt is thwarting the green transition. Debt renegotiations are confounded by the multiplicity of actors involved —Paris Club and non-Paris Club countries, the IMF and the WB and private creditors. Any globally coordinated climate financing efforts would be doomed to fail if it is not undergirded by effective debt relief, standstills and resolution mechanisms that are directly linked to green goals (Ramos *et al.*, 2023). Support for a sustainable debt-for-climate initiative must also be responsive to the different contexts and constraints of climate-vulnerable indebted countries facing debt distress, liquidity crisis and fiscal and financial shortfalls (Viterbo, Bhandary and Gallagher, 2020)²². MDBs need to deploy their collective heft to steer debt resolution in ways that gives a big push to the green agenda while undergirding debt sustainability, helping to break the vicious cycle of the climate vulnerability and mounting debt burdens. Funding support should be long-term and delinked from conditionalities tied to fiscal consolidation and instead be based on concrete national climate commitments. While grants and concessional finance have to remain the central plank of such initiatives, there are proposals aimed at harnessing private finance in ways that would free up resources for governments to invest in climate action without triggering a crisis or cutbacks including:

- 1) Swap of old debt with new ‘green recovery’ bonds bearing a significant haircut and Brady-bond type credit enhancements backed by a special Guarantee Facility for Green and Inclusive

²¹ For example, African Development Banks \$1 billion exposure exchange with Asian Development bank would help buttress the former banks capacity to support member nations green development strategies

²² The debt for climate initiative is conceived in terms of pillars: debt-stock relief for countries with an unsustainable level of debt and high climate vulnerability; debt flow relief by rescheduling debt maturities for countries facing liquidity problems; debt standstill agreements for countries not eligible under the first two pillars that have high climate vulnerability and risk of biodiversity loss.

Recovery. A key difference from the original Brady bonds which were guaranteed by holdings of US treasuries is that the guarantee facility would draw from collective capital contributions from the World Bank and from regional development banks. Further, proposals pair the incentives of credit enhancement with penalties to bondholders for non-participation (Volz *et al.*, 2021)²³.

- 2) Debt for Climate Swaps, which allow debtor governments to reduce their contractual debt obligations in return for a commitment to devote the freed-up resources to climate action²⁴. To be effective in helping restore debt sustainability while increasing fiscal space, these swaps have to go beyond piecemeal operations, and actually both make a dent in the debt burden and lead to incremental climate investment (Steele and Patel, 2020; Essers, Cassimon and Prowse, 2021; Chamon *et al.*, 2022). Incentives to creditors stem from a higher potential value than the original distressed debt and positive reputational and regulatory payoffs²⁵.

Moving away from promoting preventative self-insurance by climate vulnerable countries, these measures would need to be supported by augmenting the Climate Loss and Damage fund agreed to in COP28 and incorporating natural disaster clauses (designed to be net present-value neutral) in all debt contracts to provide countries facing extreme events the fiscal space to recover as advocated by the Bridgetown Initiative (Viterbo, Bhandary and Gallagher, 2020; Volz *et al.*, 2021; Songwe, Stern and Bhattacharya, 2022; Bhattacharya *et al.*, 2023). Further, to be effective these initiatives need to be scaled up from a project to a program centered framework and be designed to reinforce and strengthen national plans, strategies and governance structures rather than bypassing or reshaping these to privilege

²³ The facility would guarantee bondholders or commercial banks to receive up to 18 months' worth of interest payments in case the sovereign misses a payment and provide a partial guarantee of the value of the new bonds.

²⁴ For instance the Caribbean Small Island Developing States have been working collectively on a proposal for debt for climate and nature swaps.

²⁵ Under such an arrangement, part of the restructured payments would be placed in regional or national climate funds, for instance the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) for funding a Caribbean Resilience Fund.

institutional investor mandates. The proposal for a FX Guarantee Facility instituted jointly by MDBs and the IMF would help shore up these mechanisms by providing a counter-cyclical mechanism with a public-good mandate that would pool liquidity and capital in times of market stress to offer a partial FX guarantee and limit the systematic overvaluation of currency risk for nations with subordinate currencies (Persaud, 2023).

Even if the objective is to entice investors by reducing the risks inherent in such investments, the global externalities, and inequities inherent in climate change and climate action suggest that the appropriate place for ‘last resort’ risk absorption lies with multilateral and regional agencies rather than the public balance-sheets of vulnerable developing countries. Efforts need to be directed at strengthening the capital base of these institutions by expanding the paid in capital of shareholders in line with the common and differentiated responsibilities for climate action. An International Financing Facility for climate action at the global and regional levels to expand the pool of low-cost finance is a potential pathway (Songwe, Stern and Bhattacharya, 2022). Another proposal that seeks to surmount core country reluctance to augment their contributions is that of floating ‘sustainable future bonds’, which central banks could purchase as a safe asset in their portfolios (Zucker-Marques and Gallagher, 2023). This would enable the excess reserves currently stock-piled by central banks to be re-configured to serve climate goals by expanding the equity base of MDBs²⁶.

The distinctive position and balance-sheet capacity of MDBs should be deployed to mitigate risk for the most vulnerable states seeking to implement inclusive, green missions. The logic of financialization has circumscribed the role of grants and concessional finance in climate funding. It is also fundamentally at odds with the urgent needs of nationally-owned, green structural transformation (Bertilsson and Thörn, 2021). Instead of serving as handmaidens to the agendas of global investors by providing more fodder for

²⁶ A proposal that aims to overcome a potential home-bias in green financing is to grant lender states a proportion of the emission reduction credits for additional financing in climate action in other countries and instituting carbon border taxes that private lenders can pay with carbon credits earned from investments in other states (Sandler and Schrag, 2022).

financialization and reaping profits from climate vulnerable countries, MDBs need to reconfigure their role to better coordinate and support the green missions of developing country states.

The firepower of MDBs, in this reimagined role in a climate aligned international financial architecture, could be effectively buttressed by recycling, reallocating and augmenting the Special Drawing Rights mechanisms through MDBs (including regional banks) to better address the real needs of different countries, while preserving the preferred creditor status and strong credit ratings of these institutions (Seidman *et al.*, 2022; Ameli, Kothari and Rickman, 2023; Paduano, 2023)²⁷. The SDR mechanism can play a transformative role in a globally coordinated initiative to reshape the global financial system in line with the imperatives of a global green new deal and yet is significantly under-utilized²⁸. The monetary hierarchy of the global dollar has not just entrenched financialization and financial subordination, it also poses a challenge to a global new deal. SDRs can be used to provide liquidity support to climate vulnerable states in the periphery who do not have the same access to dollar funds as countries in the core, enabling them to pursue counter-cyclical policies and manage exchange rate volatility, without jeopardizing their green mission. Apart from being channeled through MDBs, climate finance initiatives can build on the Resilience and Sustainability Trust (RST) and Catastrophe Containment and Relief Trust (CCRT), recently instituted by the International Monetary Fund (IMF) to enable the transfer of grants and concessional finance from high to low-income countries for climate resilience investments by reallocating SDRs according to actual pressing needs rather than quotas (Ameli, Kothari and Rickman, 2023)²⁹. The automatic issuance and allocation of SDRS to countries facing

²⁷ The African Development Bank (AfDB) has proposed a rechanneling of the surplus SDRs quotas of core countries by on-lending SDRs through MDBs for a fixed period to be used as equity collateral to expand lending.

²⁸ Paduano (2023) finds that institutional practices and allocation procedures have left nearly a \$1 trillion in SDRs sitting idle. A reallocation of a fraction of the quota of the advanced economies to the most impoverished nations would extinguish their debt (Arauz, Cashman and Merling 2022)

²⁹ For example, a \$319 million arrangement was drawn with Rwanda (150 percent of its SDR quota) under the RST facility towards building climate resilience.

exogenous shocks (including climate shocks) would be another effective way to achieve this goal (UN-HLAB 2022) The Bridgetown Initiative advocates channeling SDRs into a separate Global Climate Mitigation Fund. Special Environmental Drawing Rights and setting up a global climate trust fund that would provide stable, concessional long-term financing tied solely to national climate commitments (eschewing the slew of policy conditionalities and stringent eligibility criterion associated with IMF lending) is another way of repurposing the SDR quotas (UNCTAD, 2019).

SDRs, thus, constitute a critical piece of a repurposed green and inclusive international financial architecture providing the necessary liquidity to backstop a global green new deal and lowering the cost of capital to vulnerable developing countries (Arauz, Cashman and Merling, 2022). SDRs could also serve as the basis for a climate justice stabilizing mechanism like a Climate Justice Facility, which seeks to repay the climate debt of the global North, which has been responsible for the bulk of cumulative emissions rather than further burdening the global south with debt (Dafermos, 2023). Such a facility could be financed by countries in the advanced core on the basis of cumulative emissions to provide loans in perpetuity to states in the global south as way of compensating for the climate debt owed to the South (Dafermos, 2023). The potential role of SDRs is also significant given that debt crises in the global south are triggered primarily by debt-rollover and liquidity constraints problems rather than insolvency and over-indebtedness (Songwe, Stern and Bhattacharya, 2022).

6. Conclusion

Depending on a voluntary turn by global finance to green goals, or the deployment of public-balance-sheets to entice global investors has failed to generate private flows on any significant scale. This failure is brought home most sharply by the record of the Glasgow Financial Alliance for Net Zero (GFANZ). Launched with much fanfare in 2021, this alliance brought global banks, asset management funds insurers

and pension funds together under one umbrella to mobilize private climate finance to emerging and developing economies has hit roadblocks with the disintegration of its insurance arm as large global insurers quit, the exit of a leading global asset management fund and some pension funds and threats of defections by some US financial institutions. Two major asset managers have recently quit while another has pulled back from Climate Action 100+, a global coalition of asset management funds. Hopes of a green transition cannot be pinned on private finance without a fundamental transformation of the financial landscape by leveraging the collectively deployed countervailing force of central banks, NDBs and MDBs

If the initiatives led by global finance have failed to deliver on their promise, the Just Energy Transition Partnerships (JET-P) launched under the banner of the US-led coalition — the International Partners Group (IPG: consisting of the governments of France, Germany, United Kingdom, United States, and the European Union) have not fared much better. The IPG, which can be seen as a geopolitical response to China's emerging role in energy and infrastructure investment under the Belt and Road initiative (Simpson, Jacobs and Gilmour, 2023), seeks to mobilize funds from global sources in collaboration with national platforms to promoting decarbonization, while affording protection to workers and communities adversely affected by the transition through the JET-Ps. JET-Ps signed by South Africa, Indonesia, Senegal and Vietnam have been held up as a template for regional and country platforms to draw a mix of concessional and market finance, while promoting market reforms. Their capacity to draw private funds has not been promising (despite bringing GFANZ into the partnership), the contributions of the IPG in the form of additional concessional capital for green programs have been fragmented (based on discrete separate offers by each country rather than a syndicated pooled funding), insufficient and far short of committed targets, while the critical 'just' dimension remains the most under developed and under-funded (Seiler, Brown and Matthews, 2023; Curtin, 2024, Simpson, Jacobs and Gilmour, 2023). Developing a coherent plan for a just transition is hard enough, getting advanced capitalist states and global finance to fund the implementation of these plans is even more challenging. There is no alternative to expanding multilateral pathways to public funding and grants.

In this context, the Finance in Common initiative, where around 500 NDBs joined forces to form a collaborative network has a greater potential to act as catalyst and countervailing force in the interphase between domestic and international financial markets and between public priorities and the calculus of financial returns. Instead of propagating the Wall Street Consensus such coalitions should use their collective influence to unleash the potential of NDBs in the global South to reshape the institutional frameworks, financial strategies and mandates in ways that help harness global finance to national and regional plans for green transitions.

Ultimately, the urgent imperative of climate finance is to mobilize and channel funds that are concessional, additional and green. This requires a coordinated approach where central banks, NDBs and MDBs act in concert to forge inclusive and participatory platforms for nationally-owned, just, green transitions and mobilize and harness global funds more effectively and cheaply. The guiding principles informing policy initiatives to effectively finance green missions based on the real-financial, public-private and national-international axes are:

1. Reorient the logic of the financial returns towards climate priorities and channel investment more strategically towards green investment in identified sectors rather than churning out investable assets, privileging financial accumulation over the urgent needs of climate mitigation and adaptation. This would involve more direct allocative credit policies, with a critical role played by central banks and NDBs in mobilizing and directing credit flows.
2. Develop mechanisms of public coordination and enforce norms and regulations that subject private finance to the discipline of social accountability and not just market forces by creating public taxonomies and public credit ratings system. This also requires moving beyond nudges and inducements to strategically reshaping practices by making non-compliance more costly in both reputational and financial terms.
3. Reshape the international financial architecture to better serve its role in steering and powering global green transitions that address the global inequities in both the impact of climate change

and the access to global finance. The loss and damages from climate shocks are the outcome of historical missions emanating from the north. Financial commitments on funding from the advanced country states and institutions need to be tied to coherent climate compacts developed by the recipient countries in the south through democratic, domestic processes, and not to conditionalities enforcing fiscal and monetary austerity that are geared to the needs of global investors. The guiding principle here would be to help build domestic capacity to implement nationally-owned, inclusive green missions rather than to guarantee returns to global finance.

The key lessons from this appraisal are:

1. The foundation of a green structural transformation lies in democratically conceived, nationally owned strategies and platforms.
2. Central banks along with national, regional and multilateral banks are part of the tiered, multi-pronged response to the challenge of climate finance and re-aligning the global financial system to better serve a green transition.
3. Cooperation and coordination are critical to global and national initiatives to build a climate-aligned sustainable financial system predicated on strengthening of fiscal and monetary space for developing countries.
4. South-South cooperative agreements need to be forged to build and strengthen the new sustainable financial landscape and as a bulwark against financial subordination.
5. Genuine multilateral arrangements for grants and concessional finance, undergirded by the expansion and reallocation of SDRs is the key lynchpin of a global green deal and ensuring states in the global south have the policy space to pursue their national green missions.

Climate finance strategy needs to contain and push back against the juggernaut of financialization and the structural power of global finance, to build and enforce guardrails that prevent practices and norms of financial decision-making from thwarting long-term climate goals. If risks are to be absorbed

by states and multilateral agencies, it is also necessary to ensure that the benefits are not captured disproportionately by global finance but are realized by broader society and the public in the form of socially desired outcomes, and further that the burden of risks and disruptions is not unleashed on the most vulnerable people and communities.

References

Action Aid (2023) *How the Finance Flows: The banks fueling the climate crisis*, ActionAid International.

Alfaro, L., Kalemli-Ozcan, S. and Volosovych, V. (2008) 'Why Doesn't Capital Flow from Rich to Poor Countries? An Empirical Investigation', *Review of Economics and Statistics*, 90(2), pp. 347–368.

Ameli, N. et al. (2021) 'Higher cost of finance exacerbates a climate investment trap in developing economies', *Nature Communications*, 12(1), p. 4046.

Ameli, N., Kothari, S. and Grubb, M. (2021) 'Misplaced expectations from climate disclosure initiatives', *Nature Climate Change*, 11(11), pp. 917–924.

Ameli, N., Kothari, S. and Rickman, J. (2023) 'Addressing inequities in low-carbon finance flows toward developing countries', *One Earth*, 6(10), pp. 1277–1280.

Amsden, A.H. (1992) *Asia's Next Giant: South Korea and Late Industrialization*. Oxford, New York: Oxford University Press.

Amsden, A.H. (2003) *The Rise of 'The Rest': Challenges to the West from Late-Industrializing Economies*. Oxford, New York: Oxford University Press.

Ansari, D. and Holz, F. (2020) 'Between stranded assets and green transformation: Fossil-fuel-producing developing countries towards 2055', *World Development*, 130, p. 104947.

Arauz, A. Cashman, K., and Merling, L. (2022) *Special Drawing Rights: The Right Tool to Use to Respond to the Pandemic and Other Challenges*. Center for Economic and Policy Research.

Baer, M., Campiglio, E. and Deyris, J. (2021) 'It takes two to dance: Institutional dynamics and climate-related financial policies', *Ecological Economics*, 190, p. 107210.

Barth, J. and Jacobs, M. (2022) 'Sustainable Prosperity in an Uncertain Future: A shared agenda between green growth and degrowth', in *Making the great turnaround work: Economic policy for a green and just transition*. Berlin: Heinrich-Böll-Stiftung (Economic & Social Issues), pp. 17–25. Available at: <https://eu.boell.org/en/sustainable-prosperity-uncertain-future> (Accessed: 28 December 2023).

Battiston, S. et al. (2017) 'A climate stress-test of the financial system', *Nature Climate Change*, 7(4), pp. 283–288.

Beirne, J., Renzhi, N. and Volz, U. (2021) 'Feeling the heat: Climate risks and the cost of sovereign borrowing', *International Review of Economics & Finance*, 76, pp. 920–936.

- Bernards, N. (2024) ‘Where is finance in the financialization of development?’, *Globalizations*, 21(1), pp. 88–102.
- Bertilsson, J. and Thörn, H. (2021) ‘Discourses on transformational change and paradigm shift in the Green Climate Fund: the divide over financialization and country ownership’, *Environmental Politics*, 30(3), pp. 423–441.
- Bezemer, D. et al. (2018) *Credit where it’s due*. 2018–11. UCL Institute for Innovation and Public Purpose.
- Bezemer, D. et al. (2023) ‘Credit policy and the “debt shift” in advanced economies’, *Socio-Economic Review*, 21(1), pp. 437–478.
- Bhandary, R.R., Gallagher, K.S. and Zhang, F. (2021) ‘Climate finance policy in practice: a review of the evidence’, *Climate Policy*, 21(4), pp. 529–545.
- Bhattacharya, A. et al. (2023) *A climate finance framework: decisive action to deliver on the Paris Agreement –*. London: Grantham Research Institute on Climate Change and the Environment.
- Boissinot, J. et al. (2022) *Aligning financial and monetary policies with the concept of double materiality: rationales, proposals and challenges*. Policy Brief 5. London, UK: Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science. Available at: <https://www.inspiregreenfinance.org/publications/> (Accessed: 24 November 2023).
- Bolton, P. et al. (2020) ‘The green swan’. BIS. Available at: <https://www.bis.org/publ/othp31.htm> (Accessed: 15 February 2024).
- Bonizzi, B., Kaltenbrunner, A. and Powell, J. (2020) ‘Subordinate Financialization in Emerging Capitalist Economies’, in P. Mader, D. Mertens, and N. van der Zwan (eds) *The Routledge International Handbook of Financialization*. 1st edn. Routledge, pp. 177–187.
- Bonizzi, B., Kaltenbrunner, A. and Powell, J. (2022) ‘Financialised capitalism and the subordination of emerging capitalist economies’, *Cambridge Journal of Economics*, 46(4), pp. 651–678.
- Borio, C. and Disyatat, P. (2009) ‘Unconventional monetary policies: an appraisal’, *BIS Working Papers*, BIS.
- Bruna, N. (2022) ‘A climate-smart world and the rise of Green Extractivism’, *The Journal of Peasant Studies*, 49(4), pp. 839–864. Available at <https://doi.org/10.1080/03066150.2022.2070482>.
- Brussler, M. (2023) *Transitioning Systems? On coordinating green transitions*, CommonWealth. Available at: <https://www.common-wealth.org/perspectives/transitioning-systems-coordinating-the-green-transition> (Accessed: 27 December 2023).
- Buchner, B. et al. (2023) *Global Landscape of Climate Finance 2023*. Climate Policy Initiative. Available at: <https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2023/> (Accessed: 18 January 2024).
- Buhr, B. et al. (2018) *Climate Change and the Cost of Capital in Developing Countries*. London and Geneva: Imperial College Business School SOAS University of London and UNEP. Available at:

<https://abdn.elsevierpure.com/en/publications/climate-change-and-the-cost-of-capital-in-developing-countries> (Accessed: 16 January 2024).

Campiglio, E. (2016) 'Beyond carbon pricing: The role of banking and monetary policy in financing the transition to a low-carbon economy', *Ecological Economics*, 121, pp. 220–230.

Campiglio, E. et al. (2018) 'Climate change challenges for central banks and financial regulators', *Nature Climate Change*, 8(6), pp. 462–468.

Carneiro, R. and De Conti, B. (2022) 'Exorbitant privilege and compulsory duty: the two faces of the financialised IMS', *Cambridge Journal of Economics*, 46(4), pp. 735–752.

Carney, M. (2015) 'Breaking the tragedy of the horizon - climate change and financial stability'. Speech given at Lloyd's of London., 29 September. Available at: <https://www.bankofengland.co.uk/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability> (Accessed: 30 December 2023).

Chamon, M. et al. (2022) *Debt-for-Climate Swaps: Analysis, Design, and Implementation*. IMF. Available at: <https://www.imf.org/en/Publications/WP/Issues/2022/08/11/Debt-for-Climate-Swaps-Analysis-Design-and-Implementation-522184> (Accessed: 1 February 2024).

Chancel, L., Bothe, P. and Voituriez, T. (2023) *Climate inequality report 2023, Fair taxes for a sustainable future in the global South*. World Inequality Lab. Available at: <https://wid.world/news-article/climate-inequality-report-2023-fair-taxes-for-a-sustainable-future-in-the-global-south/> (Accessed: 28 December 2023).

Chandrasekhar, C.P. (2016) 'National development banks in a comparative perspective', in UNCTAD, *Rethinking Development Strategies after the Financial Crisis Volume II*. United Nations, pp. 21–30.

Chenet, H., Ryan-Collins, J. and Van Lerven, F. (2021) 'Finance, climate-change and radical uncertainty: Towards a precautionary approach to financial policy', *Ecological Economics*, 183, p. 106957.

Chomsky, N. and Pollin, R. (2020) *The climate crisis and the global green new deal: the political economy of saving the planet*. First edition paperback. London ; New York: Verso Books.

Christophers, B. (2017) 'Climate Change and Financial Instability: Risk Disclosure and the Problematics of Neoliberal Governance', *Annals of the American Association of Geographers*, 107(5), pp. 1108–1127.

Christophers, B. (2019) 'Environmental Beta or How Institutional Investors Think about Climate Change and Fossil Fuel Risk', *Annals of the American Association of Geographers*, 109(3), pp. 754–774.

Curtin, J. (2024) *Scaling the JETP Model – Prospects and Pathways for Action*. The Rockefeller Foundation and Environmental Defence Fund. Available at: <https://www.rockefellerfoundation.org/report/scaling-the-jetp-model-prospects-and-pathways-for-action/> (Accessed: 18 February 2024).

Dafermos, Y. (2022) 'Climate change, central banking and financial supervision: beyond the risk exposure approach', in S. Kappes, L.-P. Rochon, and G. Vallet (eds) *The Future of Central Banking*. Edward Elgar Publishing, pp. 175–194.

Dafermos, Y. (2023) Towards a climate just financial system. Working Paper 259. SOAS Department of Economics.

Dafermos, Y. Gabor, D, Nikolaidi, M., Pawloff, A. and van Lerven, F.. (2021) Greening the Eurosystem collateral framework. New Economics Foundation. Available at: <https://neweconomics.org/2021/03/greening-the-eurosystem-collateral-framework> (Accessed: 10 December 2023).

Dafermos, Y., Gabor, D. and Michell, J. (2021) ‘The Wall Street Consensus in pandemic times: what does it mean for climate-aligned development?’, *Canadian Journal of Development Studies / Revue canadienne d’études du développement*, 42(1–2), pp. 238–251.

DCF Alliance, D. (2019) The devolved climate finance mechanisms: principles, implementation and lessons from four semi-arid countries. IIED. Available at: <https://www.iied.org/g04424> (Accessed: 15 February 2024).

Deleidi, M., Mazzucato, M. and Semieniuk, G. (2020) ‘Neither crowding in nor out: Public direct investment mobilising private investment into renewable electricity projects’, *Energy Policy*, 140, p. 111195.

Dikau, S., Robins, N. and Volz, U. (2020) Toolbox for Sustainable Crisis Response Measures for Central Banks and Supervisors. rantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science and SOAS Centre for Sustainable Finance.

Dikau, S. and Volz, U. (2021) ‘Central bank mandates, sustainability objectives and the promotion of green finance’, *Ecological Economics*, 184, p. 107022.

D’Orazio, P. and Popoyan, L. (2019) ‘Fostering green investments and tackling climate-related financial risks: Which role for macroprudential policies?’, *Ecological Economics*, 160, pp. 25–37.

Epstein, G. (2005) Central Banks as Agents of Economic Development. Political Economy Reserach Institute.

Epstein, G.A. (ed.) (2005) Financialization and the world economy. Cheltenham, UK ; Northampton, MA: Edward Elgar.

Essers, D., Cassimon, D. and Prowse, M. (2021) ‘Debt-for-climate swaps: Killing two birds with one stone?’, *Global Environmental Change*, 71, p. 102407. Available at:

Evans, P.B. (1995) Embedded autonomy: states and industrial transformation. Princeton, N.J: Princeton University Press (Princeton paperbacks).

Feygin, Y. (2022) Public Options as Industrial Policy, Building a Ruin. Available at: <https://building-a-ruin.ghost.io/public-options-as-industrial-policy/> (Accessed: 27 December 2023).

FSB (2023) Global monitoring report on non-bank financial intermediation 2023 - Financial Stability Board. Financial Stability Board.

Gabor, D. (2021) The Wall Street Consensus. *Development and Change* 52 (3), pp 429-459

- Gabor, D. and Braun, B. (2023) Green macrofinancial regimes. preprint. SocArXiv. Available at: <https://doi.org/10.31235/osf.io/4pkv8>.
- Gabor, D. and Sylla, N.S. (2023) ‘Derisking Developmentalism: A Tale of Green Hydrogen’, *Development and Change*, p. dech.12779.
- Gallagher, K.P. et al. (2023) ‘Reforming Bretton Woods institutions to achieve climate change and development goals’, *One Earth*, 6(10), pp. 1291–1303. Available at:
- Gallagher, K.P. and Shrestha, E. (2012) ‘The Social Cost of Self-Insurance: Financial Crisis, Reserve Accumulation, and Developing Countries: The Need to Manage the Cost of Self-Insurance’, *Global Policy*, 3(4), pp. 501–509.
- Giachino, A. (2021) Private Equity Propels the Climate Crisis: The Risks of a Shadowy Industry’s Massive Exposure to Oil, Gas and Coal. Private Equity Stakeholder Project. Available at: <https://pestakeholder.org/reports/private-equity-propels-the-climate-crisis-the-risks-of-a-shadowy-industrys-massive-exposure-to-oil-gas-and-coal/> (Accessed: 1 February 2024).
- Gourinchas, P.-O. and Jeanne, O. (2013) ‘Capital Flows to Developing Countries: The Allocation Puzzle’, *The Review of Economic Studies*, 80(4), pp. 1484–1515.
- Griffith-Jones, E. by S. and Ocampo, J.A. (eds) (2019) *The Future of National Development Banks*. Oxford, New York: Oxford University Press (Initiative for Policy Dialogue).
- Griffith-Jones, S., Attridge, S. and Gouett, M. (2020) *Securing climate finance through national development banks*. ODI.
- Hall, S., Foxon, T.J. and Bolton, R. (2017) ‘Investing in low-carbon transitions: energy finance as an adaptive market’, *Climate Policy*, 17(3), pp. 280–298.
- Hallegatte, S., Fay, M. and Vogt-Schilb, A. (2013) *Green Industrial Policies: When and How*. 6677. The World Bank.
- Hickel, J. et al. (2022) ‘Imperialist appropriation in the world economy: Drain from the global South through unequal exchange, 1990–2015’, *Global Environmental Change*, 73, p. 102467.
- Jackson, T. and Victor, P.A. (2020) ‘The Transition to a Sustainable Prosperity-A Stock-Flow-Consistent Ecological Macroeconomic Model for Canada’, *Ecological Economics*, 177, p. 106787.
- Kedward, K., Gabor, D. and Ryan-Collins, J. (2022) ‘Aligning finance with the green transition: From a risk-based to an allocative green credit policy regime.’ Rochester, NY.
- Kedward, K., Ryan-Collins, J. and Chenet, H. (2020) ‘Managing Nature-Related Financial Risks: A Precautionary Policy Approach for Central Banks and Financial Supervisors’, *SSRN Electronic Journal* [Preprint]. Available at: <https://doi.org/10.2139/ssrn.3726637>.
- Kling, G. et al. (2021) ‘The impact of climate vulnerability on firms’ cost of capital and access to finance’, *World Development*, 137, p. 105131.
- Kose, M.A. et al. (2019) *Global Waves of Debt: Causes and Consequences*, World Bank.

Lankes, H.P. (2021) Blended finance for scaling up climate and nature investments. One Planet Lab and Grantham Research Institute on Climate Change and the Environment. Available at: <https://oneplanetsummit.fr/en/one-planet-lab-report-blended-finance-220> (Accessed: 31 January 2024).

Lapavitsas, C. (2013) Profiting without producing: how finance exploits us all. London ; New York: Verso.

Mason, J. (2022) ‘Climate Policy from a Keynesian Point of View’, in Heinrich Böll Foundation, ZOE – Institute for Future-Fit Economies and Finanzwende Recherche (ed.) Making the great turnaround work: Economic policy for a green and just transition. Berlin: Heinrich-Böll-Stiftung (Economic & Social Issues), pp. 86–93.

Mason, J. (2023) ‘Varieties of Industrial Policy’, SlackWire. Available at: <https://jwmason.org/slackwire/varieties-of-industrial-policy/>.

Matikainen, S., Campiglio, E. and Zenghelis, D. (2017) The climate impact of quantitative easing. Policy Paper. Grantham Research Institute on Climate Change and the Environment.

Mazzucato, M. (2016a) ‘From market fixing to market-creating: a new framework for innovation policy’, *Industry and Innovation*, 23(2), pp. 140–156.

Mazzucato, M. (2016b) The green entrepreneurial state. report. University of Sussex. Available at: https://sussex.figshare.com/articles/report/The_green_entrepreneurial_state/23431859/1 (Accessed: 26 December 2023).

Mazzucato, M. (2022) ‘Financing the Green New Deal’, *Nature Sustainability*, 5(2), pp. 93–94.

Mazzucato, M. and McPherson, M. (2018) The Green New Deal: A bold mission-oriented approach. Policy Brief. Institute for Innovation and Public Purpose.

Mazzucato, M. and Penna, C. (2015) Beyond Market Failures The Market Creating and Shaping Roles of State Investment Banks. Institute for New Economic Thinking. Available at: <https://www.ineteconomics.org/research/research-papers/beyond-market-failures-the-market-creating-and-shaping-roles-of-state-investment-banks> (Accessed: 2 February 2024).

Mazzucato, M. and Ryan-Collins, J. (2022) ‘Putting value creation back into “public value”: from market-fixing to market-shaping’, *Journal of Economic Policy Reform*, 25(4), pp. 345–360.

Mazzucato, M. and Semieniuk, G. (2017) ‘Public financing of innovation: new questions’, *Oxford Review of Economic Policy*, 33(1), pp. 24–48. Available at:

Mazzucato, M. and Semieniuk, G. (2018a) ‘Financing renewable energy: Who is financing what and why it matters’, *Technological Forecasting and Social Change*, 127, pp. 8–22.

Mazzucato, M. and Semieniuk, G. (2018b) ‘Financing renewable energy: Who is financing what and why it matters’, *Technological Forecasting and Social Change*, 127, pp. 8–22.

Monnin, P. (2018) Central Banks and the Transition to a Low-Carbon Economy. 3350913. Council On Economic Policies.

- Munir, W. and Gallagher, K.P. (2020) ‘Scaling Up for Sustainable Development: Benefits and Costs of Expanding and Optimizing Balance Sheet in the Multilateral Development Banks’, *Journal of International Development*, 32(2), pp. 222–243.
- NGFS (2021) Adapting central bank operations to a hotter world: Reviewing some options. Network for Greening the Financial System. Available at: <https://www.ngfs.net/en/adapting-central-bank-operations-hotter-world-reviewing-some-options> (Accessed: 2 February 2024).
- Oustry, A. et al. (2020) Climate-related Risks and Central Banks’ Collateral Policy: a Methodological Experiment. Banque de France. Available at: <https://publications.banque-france.fr/en/climate-related-risks-and-central-banks-collateral-policy-methodological-experiment> (Accessed: 30 January 2024).
- Owen, R., Brennan, G. and Lyon, F. (2018) ‘Enabling investment for the transition to a low carbon economy: government policy to finance early stage green innovation’, *Current Opinion in Environmental Sustainability*, 31, pp. 137–145.
- Paduano, S. (2023) SDR Rechanneling and ECB Rules. London: Finance Development Lab, LSE.
- Perez, C. (2015) ‘Capitalism, Technology and a Green Global Golden Age: The Role of History in Helping to Shape the Future’, *The Political Quarterly*, 86(S1), pp. 191–217.
- Perry, K.K. (2021) ‘Financing a Global Green New Deal: Greening Capitalism or Taming Financialization for a New “Civilizing” Multilateralism?’, *Development and Change*, 52(4), pp. 1022–1044.
- Persaud, A. (2023) Unblocking the green transformation in developing countries with a partial foreign exchange guarantee. Climate Policy Initiative.
- Pettifor, A. (2019) *The case for the Green New Deal*. London: Verso.
- Progressive International (2024) Program of Action on the Construction of a New International Economic Order (<https://act.progressive.international/nieo-poa/>)
- Pollin, R. (2016) *Global Green Growth for Human Development*. United Nations Development Programme.
- Ramos, L. et al. (2023) *Debt Relief for a Green and Inclusive Recovery*. Boston, London, Berlin: Boston University Global Development Policy Center; Centre for Sustainable Finance, SOAS, University of London; Heinrich-Böll-Stiftung. Available at: https://energypedia.info/wiki/Publication_-_Guaranteeing_sustainable_development:_Debt_Relief_for_a_Green_and_Inclusive_Recovery (Accessed: 14 January 2024).
- Reclaim Finance, Sunrise Project and Sierra Club (2023) *Who’s Managing Your Future? An Assessment of Asset Managers’ Climate Action*. Available at: https://www.sierraclub.org/sites/www.sierraclub.org/files/2023-06/Asset_Manager_Report_V5.pdf.
- Rey, H. (2015) *Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence*. w21162. Cambridge, MA: National Bureau of Economic Research, p. w21162.

- Rhodium Group (2023) Rhodium Climate Outlook: Probabilistic Projections of Energy, Emissions, and Global Temperature Rise. Available at: <https://rhg.com/research/rhodium-climate-outlook-2023/> (Accessed: 25 December 2023).
- Rickman, J., Kothari, S., Larosa, F, and Ameli, N. (2022) The Unequal Distribution of International Climate Finance Flows and Its Underlying Drivers. preprint. (Available at: <https://doi.org/10.21203/rs.3.rs-1188981/v1>).
- Rodrik, D. (2006) ‘The social cost of foreign exchange reserves’, *International Economic Journal*, 20(3), pp. 253–266.
- Rodrik, D. (2014) ‘Green industrial policy’, *Oxford Review of Economic Policy*, 30(3), pp. 469–491.
- Ryan-Collins, J. and Dikau, S. (2017) Green central banking in emerging market and developing country economies. London: The New Economic Foundation.
- Sandler, E. and Schrag, D. (2022) Financing the Energy Transition through Cross-Border Investment | Belfer Center for Science and International Affairs. Belfer Center for Science and International Affairs, Harvard Kennedy School.
- dos Santos, P.L. (2013) ‘A cause for policy concern: the expansion of household credit in middle-income economies’, *International Review of Applied Economics*, 27(3), pp. 316–338.
- Schoenmaker, D. and Tilburg, R.V. (2016) ‘What Role for Financial Supervisors in Addressing Environmental Risks?’, *Comparative Economic Studies*, 58(3), pp. 317–334.
- Seidman, D. et al. (2022) Special Drawing Rights: The Right Tool to Use to Respond to the Pandemic and Other Challenges. Available at: <https://cepr.net/report/special-drawing-rights-the-right-tool-to-use/> (Accessed: 13 January 2024).
- Seiler, A.A., Brown, H. and Matthews, S. (2023) The JETPs of South Africa and Indonesia. Center for Global Development.
- Semieniuk, G. et al. (2022) ‘Stranded fossil-fuel assets translate to major losses for investors in advanced economies’, *Nature Climate Change*, 12(6), pp. 532–538.
- Semieniuk, G. and Mazzucato, M. (2019) ‘Financing green growth’, in R. Fouquet (ed.) *Handbook on Green Growth*. Edward Elgar Publishing.
- Stern, N. and Stiglitz, J.E. (2023) ‘Climate change and growth’, *Industrial and Corporate Change*, 32(2), pp. 277–303.
- Songwe, V., Stern, N. and Bhattacharya, A. (2022) Finance for climate action: Scaling up investment for climate and development. London: Grantham Research Institute on Climate Change and the Environment.
- Steele, P. and Patel, S. (2020) Tackling the triple crisis. Using debt swaps to address debt, climate and nature loss post-COVID-19. London: IIED.
- Stern, N. and Stiglitz, J.E. (2023) ‘Climate change and growth’, *Industrial and Corporate Change*, 32(2), pp. 277–303.

- Studart, R. and Gallagher, K.P. (2016) *Infrastructure for Sustainable Development: The Role of National Development Banks*. Global Economic Governance Initiative, Global Development Policy Center.
- Tooze, A. (2023) ‘Chartbook 221 The IRA (& the Fed) debate - bringing hegemony back in.’, Chartbook, 17 June. Available at: <https://adamtooze.substack.com/p/chartbook-221-the-ira-and-the-fed> (Accessed: 26 January 2024).
- UNCTAD (2019) *Trade and Development Report 2019*. Geneva: United Nations.
- UNCTAD (2022) *Least Developed Countries Report 2022*. United Nations Conference on Trade and Development.
- UNEP et al. (2023) *The Production Gap: Phasing down or phasing up? Top fossil fuel producers plan even more extraction despite climate promises*. Stockholm Environment Institute, Climate Analytics, E3G, International Institute for Sustainable Development and United Nations Environment Programme.
- UN-HLAB (2022) *A Breakthrough for People and Planet, High-Level Advisory Board on Effective Multilateralism* (<https://highleveladvisoryboard.org/breakthrough/>)
- Victor, P.A. (2022) ‘The Macroeconomics of a Green Transformation: The Role of Green Investment’, in Heinrich Böll Foundation, ZOE – Institute for Future-Fit Economies and Finanzwende Recherche (ed.) *Making the great turnaround work: Economic policy for a green and just transition*. Berlin: Heinrich-Böll-Stiftung, pp. 55–65.
- Viterbo, A., Bhandary, R.R. and Gallagher, K.P. (2020) *The Architecture for a Debt-for-Climate Initiative*. Background Paper to the Debt Relief for Green and Inclusive Recovery Project. Heinrich Böll Foundation, Center for Sustainable Finance (SOAS, University of London), and Global Development Policy Center (Boston University).
- Volz, U. et al. (2020) *Climate Change and Sovereign Risk*. SOAS University of London. Available at: <https://doi.org/10.25501/SOAS.00033524>.
- Volz, U. et al. (2021) *Debt Relief for a Green and Inclusive Recovery: Securing Private-Sector Participation and Creating Policy Space for Sustainable Development*. Berlin, London, and Boston: Heinrich-Böll-Stiftung; SOAS, University of London; and Boston University.
- Voskoboynik, D.M. and Andreucci, D. (2022) ‘Greening extractivism: Environmental discourses and resource governance in the “Lithium Triangle”’, *Environment and Planning E: Nature and Space*, 5(2), pp. 787–809.
- Wade, R.H. (2018) ‘The Developmental State: Dead or Alive?’, *Development and Change*, 49(2), pp. 518–546.
- Wilson, C. and Caldecott, B. (2021) *Breaking the Bond: Primary Markets and Carbon-Intensive Financing*. Oxford: University of Oxford Smith School of Enterprise and the Environment Working Paper.
- World Bank (2018) *Maximizing Finance for Development*, World Bank.
- World Bank (2019) *Action Plan on Climate Change Adaptation and Resilience: Managing Risks for a More Resilient Future*. Washington: World Bank.

Zucker-Marques, M. and Gallagher, K.P. (2023) 'Sustainable future bonds: Boosting multilateral development banks lending and improving the global reserve system', Global Policy, (