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LEVERAGING MONETARY POLICY TO SUPPORT THE TRANSITIONAL NEEDS OF SOUTH AFRICAN WORKERS

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Authors and acknowledgements

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TABLE OF CONTENTS

Boxes

Figures

Tables

ACRONYMS

ANC	African National Congress
AREMI	Africa Renewable Energy Manufacturing Initiative
BASA	Banking Association of South Africa
BCBS	Basel Committee on Banking Supervision
BIS	Bank of International Settlements
CAFH	Centre for Affordable Housing Finance in Africa
CBES	Climate Biennial Exploratory Scenario
CER	Centre for Environmental Rights
CGFI	United Kingdom Centre for Greening Finance and Investment
CLIFT	Climate Finance for Equitable Transitions
COP	Conference of the Parties
Covid-19	Coronavirus
EBA	European Banking Authority
ECB	European Central Bank
EU	European Union
IDOS	German Institute of Development and Sustainability
IEJ	Institute for Economic Justice
IMF	International Monetary Fund
JETP	Just Energy Transition Partnership
FSB	Financial Stability Board
FSCA	Financial Sector Conduct Authority
G20	Group of 20
GDP	Gross Domestic Product
GEPF	Government Employees Pension Fund
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
LCR	Liquidity Coverage Ratio
LSF	Localisation Support Fund
LTRO	Longer-Term Refinancing Operations
MEC	Minerals Energy Complex
NBFI	Non-Bank Financial Institutions
NGFS	Network for Greening the Financial System
NSFR	Net Stable Funding Ratio
NT	National Treasury of South Africa
OMFIF	Official Monetary and Financial Institutions Forum
PIC	Public Investment Corporation
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SAGFT	South African Green Finance Taxonomy
SAPA	South African Prudential Authority
SARB	South African Reserve Bank
SIB	State Investment Bank
Solar PV	Solar photovoltaic
TPT	Transition Plan Taskforce
TRO	Targeted Refinancing Operations

EXECUTIVE SUMMARY

South Africa's Just Energy Transition Partnership (JETP) does not meet the transition needs of South African workers

- The JETP is a financing deal between South Africa and the governments of France, Germany, the United Kingdom, the United States, and the European Union. It aims to mobilise $8.5 billion over three to five years, to support the implementation of South Africa's revised Nationally Determined Contribution.
- While the JETP aims to stimulate private sector investment in climate and developmental projects through state subsidies and policy concessions, most of the committed finance in the JETP is directed towards electricity infrastructure rather than economic diversification.
- Workers need large scale investment in job creating sectors, such as renewable manufacturing, affordable and energy-efficient housing, and adaptation infrastructure.

South Africa's growth model and approach to monetary governance reinforces the capital-intensive structure and patterns of inequality in South Africa

- Sustained investment in minerals and energy has led to uneven investment in other industries and has not had spillover effects such as wider investment and growth in the South African economy.
- Rather than investing in job creating activities, mining companies have diverted external credit and investment towards speculative investments in mining assets and operations.
- Total investment is well below the 25% of GDP seen as a necessary threshold for dynamic economic growth.
- The operational independence of the South African Reserve Bank (SARB) from the government restricts any possible developmentalist ambitions, because it prevents much needed fiscal and monetary cooperation.
- The SARB's inflation-targeting policy framework has led to money being funnelled towards 'speculative financial sectors' at the expense of investment in productive sectors with job creating potential.
- The SARB's inflation-targeting policy framework is incompatible with a government agenda for widespread job creation.

Recent innovations in central banking practices have so far not provided the platform for developmental climate policies

- Climate-related risks are not well understood by the regulatory community.
- Climate risk information disclosure to bank supervisors should be mandatory.
- Climate stress-testing is underutilised as a means for understanding future risks better.
- The SARB needs to develop its in-house credit assessment capabilities further.
- Measures need to be explored to assess climate-related risks relevant to Non-Bank Financial Institutions (NBFIs).
- Measures need to be explored to prevent NBFIs from simply replacing banks as sources of finance for carbon intensive activities.

Financial sector liquidity is currently underexploited

- South African banks have a low appetite for risk and typically mostly finance households and small to medium enterprises.
- The persistence of quantity-based credit rationing across a range of sizable banking systems suggests that the market-determined interest rate is not a reliable indicator of efficient credit allocation

- Allocating 10% of the ten-year average lending of South African banks towards a developmental government agenda would utilise approximately R52.41bn.
- There is even more underexploited liquidity within South Africa's retirement industry.
- A return to a maximum offshore investment limit of 30% would increase onshore assets held by the retirement industry by an estimated R600bn, with the current infrastructure investment exposure limit being worth additionally an estimated R180bn in that scenario.

This foregrounds the need for a 'promotional' form of central banking

- Coordination between the National Treasury (NT) and the SARB is desirable.
- At present South Africa's Green Finance Taxonomy (SAGFT) does not sufficiently address the transition needs of workers.
- Likewise, the transition needs of workers are not well supported through climate risk assessments.
- This prevents workers' needs from being embedded at the heart of sustainable monetary policy.
- It also inhibits the South Africa government's ability to analyse and design policies to mitigate transition risks workers face.

There are a range of credit allocation policies available to the SARB and the NT

- Indirect, price-based policies could be designed to incentivise lenders by adjusting the relative costs of providing capital to different sectors.
- Direct price-based controls could be designed to determine the price of credit.
- The quantity of credit allocated by the pension fund industry could be set directly by the South African government through asset prescription and/or exposure limits to offshore assets.

1. INTRODUCTION

South Africa stands to be at the centre of the Global South's just transition planning, through the historic Just Energy Transition Partnership (JETP) announced on 2 November 2021. The JETP is a financing deal between South Africa and the governments of France, Germany, the United Kingdom, the United States, and the European Union to mobilise $8.5 billion, over the next three to five years, to support the implementation of South Africa's revised Nationally Determined Contribution (NDC).

The JETP was proposed as a means of accelerating climate action and channelling climate finance to developing countries. However, it remains questionable as to whether this financing model is appropriate for the specific developmental and transition trajectories of South Africa. Most of the committed finance in the South Africa JETP is directed towards electricity infrastructure, and economic diversification appears to be an afterthought. The overarching logic of the JETP, characterised as 'derisking', is premised on the state removing risks to returns on private sector investment in climate and developmental projects, through subsidies and policy concessions, so that profit margins increase sufficiently to make private investment viable (Gabor and Sylla, 2023). This is unlikely to deliver the outcomes that workers need.

This working paper argues that there needs to be significant investment in renewable manufacturing, the building of energy-efficient houses and the construction of climate adaptation infrastructure. Its analysis shows that there is underexploited liquidity in the South African financial system. South African banks have a low appetite for risk and typically provide most financing to households and small to medium enterprises. Allocating 10% of the ten-year average lending of South African banks towards a developmental government agenda would utilise approximately R52.41bn. There

is even more underexploited liquidity within South Africa's retirement industry. A return to a maximum offshore investment limit of 30% would increase onshore assets held by the retirement industry by an estimated R600bn, with the current infrastructure investment exposure limit being worth an additional estimated R180bn in that scenario.

The required investment in a just transition will require a promotional approach to central banking and a reassessment of the South African Reserve Bank's (SARB's) present approach to inflation targeting and capital mobility. This working paper proposes reforms to South Africa's Green Finance Taxonomy (SAGFT) and its approach to assessing climate risk, which will embed the transition needs of workers in the heart of sustainable monetary policy.

This working paper goes on to set out options for financing affordable and energy-efficient housing, adaptation infrastructure, and job creation in renewable manufacturing. First, it looks at indirect, price-based policies to allocate credit. It then discusses two direct, price-based policies which would appear to be appropriate. Finally, it provides a sketch of direct quantity-based policies that would allocate capital from South Africa's burgeoning retirement industry.

2. BACKGROUND

2.1. South Africa's economy: Minerals, money, and growth model

Historically South Africa's industrial policy has harnessed cheap coal and cheap labour for export-oriented mining and minerals beneficiation (Baker 2015). The contours of South Africa's Mineral Energy Complex (MEC) have been drawn by the historical evolution of industrial ownership structures, and the size and influence of the financial system. In the early twentieth century, London-based imperial banks dominated the South African financial system, yet they were relatively insignificant as a conduit of funding for industry. Instead, overseas investment was channelled via non-bank companies that had been set up by the six mining houses. These mining houses in turn controlled all the major mining groups, establishing an oligopolistic industry structure (Ashman and Fine 2013).

Post-Second World War attempts by the state to develop Afrikaner capital were underpinned by the creation of parastatals in electricity, steel, chemicals, and fuel (Fine and Rustomjee 1996). This ultimately fostered closer collaboration and integration between British and Afrikaner large-scale capital (Ashman *et al.* 2021). The formation of merchant banks by mining companies in the 1950s propagated a series of financial mergers, which further concentrated industrial holdings (Ashman and Fine 2013).

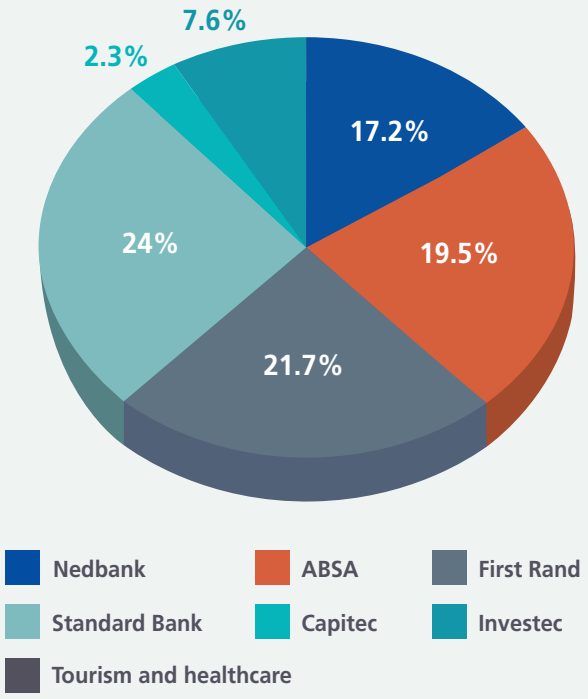
Increased international sanctions imposed on the apartheid government in the 1970s and 1980s led to the withdrawal of foreign capital. These international fetters fostered the increasing development of domestic financial markets, and the concentration of ownership of productive capital within the mining-finance houses (Ashman *et al.* 2021). Liberalising domestic reforms[1] to the financial and monetary system from the late 1970s saw the marked internal expansion of the South African financial sector by the mid-1980s (Ashman *et al.* 2021). However, South Africa's political and economic isolation largely insulated the power sector from prevailing international trends around power sector liberalisation (Baker 2015).

Financial liberalisation continued apace following the election of the African National Congress (ANC) in 1994. The large South African conglomerates responded to the lifting of international sanctions by scaling back their domestic operations and focused on the internationalisation of their economic activities (Ashman *et al.* 2021). This allowed the conglomerates to pay handsome dividends, while

keeping share prices high (Karwowski 2022). In this post-apartheid period, there has been simultaneous deindustrialisation in manufacturing sectors unconnected to extractive industries and the rise of financial profits as the 'main driver' of GDP growth[2] (Newman 2019).

South Africa has a much higher asset-to-GDP ratio than most emerging market economies, with the majority of these assets held in the banking sector (FSCA 2022). The South African banking system still operates with relatively little global competition and is dominated by four institutions, First Rand, Standard Bank, Absa and Nedbank. The sector is considered to be 'conservative on risk-taking', with banks holding capital well above the 10.5% minimum regulatory requirement for capital adequacy (Elsner and Neumann 2023).

Figure 1: South African banks' total assets



Source: Market Share 2019 (adapted from Elsner and Neumann 2023).

Because the banks provide most financing to households and small to medium enterprises, large companies are left to access credit from equity markets (BIS 2014). There have consequently been low levels of overall investment, which is primarily concentrated in highly capital-intensive core sectors such as mining (Ashman *et al.* 2021). Our analysis of the South African banking sector and retirement industry has estimated the scale of finance that could potentially be mobilised through credit allocation (see Table 1).

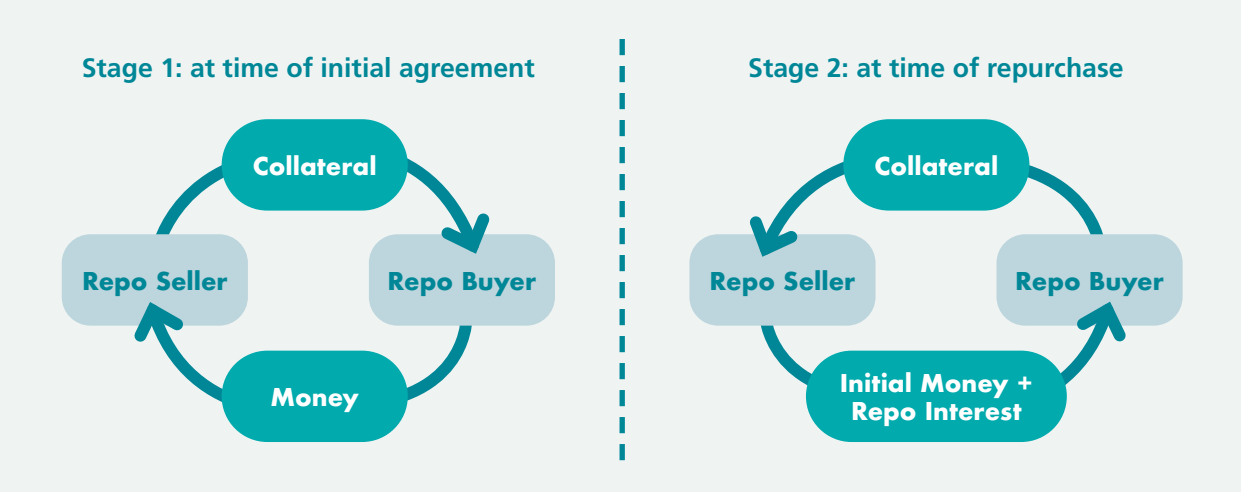
Table 1: The potential scale of bank credit for a just transition

Percentage of average gross lending allocated	Amount that would be allocated over 10 years (R)	Amount that would be allocated over 8 years (R)	Amount that would be allocated over 5 years (R)	Amount that would be allocated over 3 years (R)
10%	52.41bn	41.2bn	26.21bn	15.7bn
8%	41.93bn	33.5bn	20.96bn	12.58bn
5%	26.2bn	20.96bn	13.1bn	7.86bn
2%	10.48bn	8.39bn	5.24bn	3.14bn

Source: Author's calculations and construction. Based on SARB statistics.

The traditional banking sector is not the only potential source of credit in the contemporary financial system. A considerable variety of institutions and activities outside of the regulated banking system — so-called 'market-based finance' or 'non-bank financial institutions' (NBFI) — are able to create credit (Bieri 2020). This lending typically occurs through short-term contractual agreements between banks and other large financial institutions, called 'repurchase agreements' or 'repo.' In such instances, a lender provides cash up front, in exchange for some collateral to secure against default (see Figure 2).

Figure 2: A simplified repurchase agreement



Source: Morris and Collins 2023.

One party sells an asset (usually fixed-income securities) to another party at one price, and commits to repurchase the same, or a part of the same, asset from the second party at a different price, at a future date. This price will be equal to the purchase price plus 'repo interest rate' on the use of the buyer's cash. Collateral underpins this lending, because if a seller defaults during the contracted period, the buyer (as the new legal owner) can sell the asset to a third party to offset their loss. The asset therefore acts as collateral and mitigates the credit risk that the seller has passed on to the buyer (Gabor 2018).

Overall, the NBFI sector is a significant source of funding for South African banks, totalling more than 30% of total bank assets (FSB 2023). In 2019, assets held by South Africa's NBFIs' non-bank financial institutions amounted to more than 200% of GDP (IMF 2020). That said, there has been a longer-term fall in the relative importance of the NBFI sector in South Africa: the share of total financial assets it holds fell between 2017 and 2022 (FSB 2023).

There is considerable variation in the relative systemic importance of the different types of NBFI in the country. South Africa's money market funds have thus far shown minor vulnerability to global shocks that impacted key shadow banking systems, such as the 2008 Global Financial Crisis and the 2020 'Dash for Cash' related to the Covid-19 pandemic. They did, however, experience stress following the collapse of a South African bank in 2014 (FSB 2021). Conversely, hedge funds have proven to be less popular in South Africa than they are elsewhere, and so this part of the NBFI sector is neither large nor interconnected enough to pose a systemic risk to the domestic financial system (Kemp 2017).

The South African retirement industry holds assets in excess of R4 trillion (FSCA 2022), which is equivalent to approximately 50% of the country's GDP (Pillay and Fedderke 2022). Further, pension funds own 40% of the assets on the Johannesburg Stock Exchange (Pillay and Fedderke 2022), and when combined with life insurers hold a higher proportion of individuals' private wealth than in many advanced economies (Orthofer *et al.* 2019). South African Pension Funds are thus hugely important across several scales. The retirement industry contains considerably more potential liquidity than the banking system. In 2022 the Pension Funds Act 24 of 1956 was amended to stimulate greater investment in infrastructure and economic development. The National Treasury (NT) sought to facilitate economic development by introducing a definition of 'infrastructure', and set an exposure limit of 45% for infrastructure investment (NT 2022c). After widespread criticism of the narrow definition offered in earlier drafts, the NT revised its definition of 'infrastructure' so that it applied to:

> any asset that has or operates with a primary objective of developing, constructing and/or maintaining physical assets and technology structures and systems for the provision of utilities, services or facilities for the economy, businesses, or the public (NT 2022d).

However, further recent regulatory changes have also allowed pension funds to invest more of their assets offshore. The maximum limit on assets that funds can hold offshore was increased from 30% to 45% (Van Dijk 2022). The ANC's manifesto for the 2024 general election included a commitment to reintroduce the prescribed assets policy employed by South Africa governments between 1956 and 1989 (ANC 2024). The potential investment that could be either directly or indirectly allocated from the South African retirement industry, under a range of limits to offshore investment, is captured in Table 2.

Table 2: The potential scale of retirement industry investment in a just transition

Limit to offshore assets (%)	Amount to be held onshore (R)	Potential investment in onshore 'infrastructure'				
		Under proposed 45% limit (R)	With 10% prescribed assets (R)	With 8% prescribed assets (R)	With 5% prescribed assets (R)	With 2% prescribed assets (R)
20	3.2trn	1.44trn	32bn	25.6bn	16bn	6.4bn
30	2.8trn	1.26trn	28bn	22.4bn	14bn	5.6bn
45	2.2trn	990bn	22bn	17.6bn	11bn	4.4bn

Source: Author's calculations and construction. Based on SARB statistics.

The shaded row captures the possible investment under the current limits imposed by the NT. A return to a maximum offshore investment limit of 30% would increase onshore assets held by the retirement industry by an estimated R600bn, with the current infrastructure investment limit being worth an additional estimated R180bn in that scenario.

Market-based finance could provide a regulatory arbitrage opportunity for non-taxonomy-compliant energy firms, should supervisory actions make it more expensive (or prohibited) for them to borrow from regulated banks. For example, in the United States, the long-term growth in shadow banking is in part driven by capital and reserve requirement arbitrage (Duca 2016). Unregulated institutional investors and market-based financial institutions may thus provide an alternative financing route for carbon-intensive economic activities (Gelzinis 2021). Not only does this threaten to defeat the purpose of allocative credit policies, but it means that latent transition risks are being transferred beyond the reach of regulators and supervisors (Langley and Morris 2020).

Even without new regulation, fossil fuel companies may already be forced to seek funding from non-bank lenders. Major South African banks are currently reconsidering their lending activities to fossil fuel projects, due to the potential of stranded liabilities. Standard Bank is deliberating whether to provide finance towards the East African Crude Oil Pipeline, while Nedbank has already announced transition plans that will end all new investment in new thermal coal mines by 2025 and new oil production by 2035 (Ford 2024). As Gelzinis (2021) has pointed out, the threat of regulatory arbitrage can be mobilised "as a cudgel to push back against (banking) regulations." Conversely, this also provides a rationale for the expansion of regulatory oversight and powers, to include shadow banking activities.

South African institutional investors, such as pension funds and asset managers, are already a significant source of finance for the South African oil, gas, and coal industries. In 2023, these institutional investors held $7.1 billion investments in coal, oil and gas companies in South Africa, placing South Africa 19/74 countries globally for money invested in fossil fuel companies (CER 2023). As of August 2024, three institutional investors stood out as having significant holdings. The Government Employees Pension Fund (GEPF) held $8.2 billion investments in coal, oil and gas companies.[3] Anglo-South African asset manager, Ninety-One, held $2.7billion worth of bonds and shares in fossil fuel companies. The third largest South African investor is the Public Investment Corporation (PIC), which holds $2.3 billion in coal, oil and gas firms (Urgewald 2024). This asset manager predominantly manages funds on behalf of public sector entities.[4] GEPF had increased its level investment from 2023, while Ninety One's investments remained constant during this period. PIC had significantly reduced its holdings from 2023, and this may well be a result of it being signatory to the United Nations Global Compact and the Principles for Responsible Investment.

The relationship between the financial system and the MEC exerts considerable influence over sectoral and geographic patterns of income and wealth inequality in South Africa (Newman 2019). Overall levels of private investment in fixed capital remain low. Investment is concentrated in MEC sectors, and investment in non-MEC manufacturing is uneven, with motor vehicles and parts being one of the few sectors that has avoided stagnant or declining capital stock (Newman, 2014). This has also stymied possible spillover effects, whereby investment in the MEC sector could promote wider investment and growth in the South African economy. Rather than investing in productive activities that create jobs, mining companies have diverted external credit and investment towards speculative investments in mining assets and exploration operations, as sources of potential profit (Karwowski 2015). Overall investment is well below the 25% of GDP seen as a necessary threshold for dynamic growth (Ashman *et al.* 2021). Employment and job creation have been concentrated in trade, catering and accommodation, and community, social and personal services (Newman 2019). Currently the national average unemployment rate in South Africa is 41%, while the rate for young people is higher, at 45.5% (Stats SA 2024).

2.2. The unsuitability of the JETP financing model

Given the specific developmental priorities of South Africa, it is unclear that the JETP financing model is either sufficient or appropriate. The JETP is premised on an increasingly pervasive paradigm in development finance, widely characterised as 'derisking' (Gabor and Braun 2023). This is a logic whereby the state removes risks to returns on private sector investment in climate and developmental projects, through subsidies and policy concessions, so that profit margins increase sufficiently to make private investment viable (Gabor and Sylla 2023). There is, however, little indication that finance will 'green itself' at anywhere near the pace needed to avoid a climate crisis (Grote and Zook 2022; Vestergaard 2024).The short-termism of investor sentiment and risk/reward analyses are misaligned with the longer-term time horizons needed to develop and expand renewable energy projects in a sustainable way (Christophers 2019). Consequently, the growth of the renewable energy sector has been impeded by deteriorating profit margins (Christophers 2024). The financial logic of derisking therefore threatens to further entrench South Africa's Mineral-Energy-Finance complex (Baloyi and Krinsky 2022).

3. WORKER-ORIENTED MONETARY GOVERNANCE

3.1. The need for promotional central banking

Central banks are a powerful policy instrument, because they possess potentially unlimited balance sheets and the ability to create the safest forms of money, collateral, and credit lines (Wullweber 2024). Since the 1980s, economic 'orthodoxy' has prescribed central banks a particularly narrow role as managers of price stability, with operational independence from government (Moschella 2024). However, when viewed in historical perspective, this orthodoxy should be considered to be a relatively novel and contingent approach to monetary and financial governance (Monnet 2023).

This is certainly the case when one considers the political independence of the SARB. Despite being established in 1921, it was only during the transition to democracy, in the early 1990s, and ahead of the likely election of the African National Congress, that the incumbent National Party moved to make the SARB independent from the machinery of government. (Hickel 2021). This took place in the 1993 interim constitution.

The SARB is one of three African central banks that employ a formal inflation targeting approach to monetary policy (Wambui *et al.* 2023). Senior staff at the SARB have attributed the lower and more stable inflation rates that South Africa has experienced since the 2000s to the implementation of its inflation-targeting regime (Mminele 2019). The corollary to inflation targeting and setting of higher rates has been money syphoned towards 'speculative financial sectors', at the expense of investment in productive sectors with job creating potential (Hickel 2021 p.60). Moreover, this policy framework precludes the SARB from being used to address the acute problems that currently dominate South Africa's economic landscape. Not only is an operationally independent central bank mandated to prioritise price stability over higher levels of employment (Epstein 2019), but it is more likely to reach its inflation target if employment is concentrated in lower paid hospitality and service sectors. It is hard to avoid the conclusion that the inflation targeting policy framework restricts the central bank's role and possible developmentalist ambitions, because it prevents much needed fiscal and monetary cooperation (see Heintz and Ndikumana 2011).

Recent innovations in central banking practices have so far not provided the platform for developmental climate policies. Despite the apparent entrenchment of central bank independence, the 2008 Global Financial Crisis appeared to have created a window of opportunity to rethink this orthodoxy, because interventionist monetary policies, such as asset purchases and quantitative easing techniques, have since been mobilised by central banks to temporarily stabilise financial markets during periods of acute distress[5] (Wullweber 2023). These powerful public institutions have thus positioned themselves as "investors of last resort", by purchasing and guaranteeing assets in capital markets to depress borrowing costs, stave off devaluations, and minimise investor insolvencies (Langley and Morris 2020). A cornerstone of these unconventional monetary policies has been the principle of 'market neutrality', which purportedly prevents central banks from making de facto normative decisions about the likely beneficiaries from asset purchases (Dafermos 2021). Central bank neutrality leads to macroeconomic policies that preserve existing patterns of investment in a financial system and economy (Kedward *et al.* 2024).

The SARB has been a member of the Network for Greening the Financial System (NGFS) since 2019. This coalition of central banks and financial supervisors aims to promote finance for sustainable development, conduct analytical work on climate-related financial issues, and disseminate best practices for sustainable finance, regulation and supervision. To date, the SARB has focused its climate and sustainability efforts on research and advocacy (Positive Money Global 2024). It has been on the steering committee of the NGFS and has repeatedly issued climate-related guidance for financial firms around climate-related risks and disclosures. The SARB has also initiated a climate stress test of systemically important banks.

The SARB's monetary policy activities have been rated as low impact, centred on incorporating climate considerations into its investment management framework and investing €150 million in a green bond (Green Central Banking 2024). This relative inertia around monetary policy played no small part in the SARB being ranked 11/20 in the 2024 edition of Positive Money's 'Green Central Banking Scorecard' (Positive Money Global 2024).This demonstrates that the emergence of central banks as "climate governors of last resort" has not yet led to significant policy activism within South Africa (Langley and Morris 2020).

A more promotional approach is not prohibited by the SARB's current constitutional mandate. While its primary mandate is "to achieve and maintain price stability", the Constitution does situate this within the context of pursuing "balanced and sustainable economic growth" and "the stability of the financial system." (SARB nd: np). It is increasingly clear that climate change contributes to inflationary pressures in both advanced economies and the Global South (Parker 2018). However, price inflation will disproportionately affect those countries that are already most at risk of changing climatic conditions, devaluing in real terms the 'amount of capital' currently thought to be needed 'for adaptation and mitigation' in the Global South (Jackson 2024 p. 5).

It is reasonable to view South Africa as being exposed to these inflationary risks. The main drivers of inflation in South Africa are oil prices, food prices, and exchange rate volatility, two of which are influenced by transition and physical climate change risk. Physical climate change risk is also considered to place countries in Southern Africa at risk of financial instability (Ayele and Fissehai 2024).

South Africa's MEC is not merely a barrier to economic restructuring, the creation of sustainable jobs, and inclusive economic growth. A continued reliance on these sectors exposes South Africa to the risks of higher inflation and financial instability. Not only do these risks fall under the mandated responsibilities of the SARB, but they threaten to worsen living standards and exacerbate existing inequalities in the future. However, as these phenomena emerge from declining climatic and ecological conditions, their true impacts are hard to capture within central banks' economic models (NGFS 2024a). While there is a compelling case for the SARB to contribute towards present adaptation and mitigation efforts, this working paper has argued that this is not possible within the SARB's existing approach to monetary policy.

3.2. The need for credit allocation

The issue of climate change and the green transition has splintered the previous consensus thinking amongst central banks about the validity and desirability of market neutrality (Best 2024). More activist central banks, such as the European Central Bank (ECB), now acknowledge that central bankers shape and make markets (Thiemann *et al.* 2023). To avoid reinforcing the capital-intensive structure of the South African economy, there is a need for a 'promotional' form of central banking, which seeks to 'align monetary policies with green industrial strategy' and foster labour intensive manufacturing to meet the country's social and economic development needs (Kedward *et al.* 2022). Complex, non-linear dynamics associated with green innovation (such as path dependency, network externalities, technological inertia and 'lock-in' effects) mean that dynamic structural economic change requires proactive public policy interventions, including credit allocation (Kedward *et al.* 2024). Such an approach would harness monetary policy levers to deliberately alter existing patterns of investment, by either stimulating lending to renewable projects, or discouraging lending to carbon-intensive MEC activities. These policies would require greater coordination and less independence between key financial agencies such as the NT and the SARB (IEJ and CLiFT 2023).

3.3. The need for an alternative monetary policy anchor

The choice of an alternative anchor for monetary policy should be determined by the policies best suited to create jobs in renewable manufacturing, deliver affordable, energy-efficient housing and construct adaptation infrastructure. If indirect, price-based credit allocation is to be a significant approach, then monetary targets may well be the most promising anchor for monetary policy. Central banks that adopt monetary aggregate targets as an anchor for monetary policy predominantly intervene through domestic credit monetary policy operations. As Wambui *et al.* (2023 p.19) point out, "this type of operation is particularly appropriate for targeted refinancing operations that align with the transition to net zero." Furthermore, attempts to allocate credit towards renewable manufacturing may be undermined by the adoption of exchange rate targeting as an anchor for monetary policy. Central banks with an exchange rate anchor for monetary policy engage in foreign reserve management as a primary strategy (Wambui *et al.*, 2023). Maintaining a targeted exchange rate can hamper a country's ability to respond to domestic shocks. Moreover, it would have to mitigate inflation by strengthening the South African Rand, which would in turn make it harder for South Africa to be a hub for international solar PV module manufacturing.

3.4. The need for capital controls

Proponents of fiscal and monetary policy cooperation for direct investment concede that the main examples of successful industrialisation though developmental state spending occurred in contexts where capital controls were in place (Mikheeva and Ryan-Collins 2022). In the aftermath of the Global Financial Crisis, the IMF (2012) has softened its position on capital controls as a tool to manage the macroeconomic and financial stability risks associated with inflow surges or disruptive outflows. However, as of 2022, the IMF still argued that overall capital flows are desirable, and that capital

controls were to be used in specific circumstances, rather than being a general substitute for 'warranted macroeconomic adjustments' (IMF 2022b). It has not published research or opinions on the desirability of capital controls as a response to climate related risks.

That said, other calls for restrictions on capital mobility are motivated by the aim of enabling developing countries to exercise monetary autonomy and stable exchange rates (Siddiqui 2017). Moreover, as Monnin and Van 't Klooster (2023) point out, other policy tools that have traditionally been utilised as capital controls are being repurposed to support green investment. For example, the loosening of reserve requirements in China to support green lending activities involves the use of a policy lever that is frequently used to steer the holding of foreign assets (Choi 2018). Initial modelling research by the Banca D'Italia does suggest that capital controls on inflows would be suitable for the policy challenges faced by South Africa, as they discourage capital inflows to carbon-intensive firms, and reduce the environmental impact of the carbon-intensive sector (Moro 2021). This would require a shift in South Africa's approach to capital mobility, because its long history of controls on capital outflows has been maintained alongside 'a relatively hands-off approach to managing capital inflows' (Kahn 2015).[6]

4. ADDRESSING THE TRANSITION NEEDS OF WORKERS

4.1. Job creation in renewable manufacturing

Previous renewable energy policy initiatives have not created sustainable jobs at the intended scale. For example, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) sought to garner private investment in renewable industries through a series of tender rounds, yet it has fallen short of the South African government's targets for 'green job' creation. It is estimated that the three main tender sources generated 54 000 jobs, of which approximately 20 000 were 'temporary construction jobs'[7] (Lawrence, 2020 p.104). Moreover, skilled positions are most often filled by personnel outside the relevant local community. The way that the REIPPPP tender process is targeted, at utility-scale bidders rather than smaller scale applicants, has ingrained a 'bias in favour of generating capacity over job creation' (Lawrence 2020 p.104).

The Localisation Support Fund (LSF) (2023) argues that the South African "climate driven need for transition…presents a unique opportunity for renewable local manufacturing" and a potential source and catalyst for long-term job creation. The World Bank (2017) estimates that manufacturing has the highest indirect job creation multipliers in the economy. However, as the above analysis of South Africa's industrial sector and financial system suggests, South Africa's uneven and exclusionary growth poses a barrier to structural economic change. Its productive and globally competitive industries remain extremely concentrated and detached from the development of green strategic value chains, such as solar cells, wind turbines, and battery storage systems (Nkhonjera 2022). Nonetheless, during the past decade the country has become a leading destination for renewable energy investment (Baker 2016). Further, the Africa Renewable Energy Manufacturing Initiative (AREMI) (2023) has evaluated South Africa as having the second best conditions for renewable energy manufacturing out of the fourteen African countries it studied.

Solar PV converts thermal energy into electricity. It is already the world's largest source of renewable energy and is set to overtake both coal and natural gas to become the largest source of energy overall by 2027 (GIZ 2024 p.49).

South Africa is the African nation with the highest projected solar energy demand in 2030 (AREMI 2023). While South Africa is endowed with many of the raw materials needed for solar PV production, it currently has a limited capability to produce related industrial outputs at an internationally competitive level. South Africa's solar production cost is 18 US cents per watt of energy generated, compared to China's 16.3 US cents (AREMI 2023). Moreover, its domestic market is not big enough to promote substantial growth in solar PV-related investment. International competitiveness and export market opportunities will depend on substantial investment, as well as knowledge transfer and private capital. Nonetheless, South Africa is considered to be a feasible hub for international solar PV module[8] manufacturing, due to its high manufacturing value added, good infrastructure availability, and low importation costs (AREMI 2023). Based on its performance in adjacent industries it is considered to have potentially high competitiveness in solar PV module manufacturing within international value chains.

The installation stage is the most employment intensive segment of the Solar PV value chain. From the perspective of economic inclusion and equity, this is identified as the most "promising segment in terms of the participation of small, Black, women and youth owned companies" (GIZ 2024 p.50). Beyond the opportunities for direct job creation, the subsequent indirect job creation catalysed by manufacturing is an attractive prospect. The World Bank (2017) estimates that 3.8 indirect[9] jobs are generated by each direct manufacturing job created.

4.2. Affordable and energy-efficient housing

The housing shortage is a prominent feature of South Africa's uneven and exclusionary economic model.[10] As of 2022, 83.2% of South African households lived in formal dwellings, 12.3% lived in informal dwellings and 4.3% lived in traditional dwellings (CAFH 2023). High urbanisation rates and densification have led to the growth of informal settlements, which account for almost 16% of households in metropolitan areas (CAFH 2023). Alongside this, the demand for affordable housing has increased rapidly, due to high unemployment and a rising cost of living.

The South African Constitution recognises the right of everyone to adequate housing, and over the past 30 years the government has built 2.7 million low-cost houses. Despite this tangible progress in housebuilding, there remains an estimated shortfall of 2.3 million houses (Harsch 2024). The rate of house building has stalled over time, falling from 235 000 fully subsidised houses a year in 1998-99 to 34 000 in 2022-2023 (NT 2024). Pressure on South Africa's affordable housing stock is likely to increase exponentially, with its urbanisation rate expected to rise to 71% by 2030 (CAFH 2023).

The issue of decent and affordable housing intersects with the issues of fuel poverty and energy use. South Africa's urban poor use more affordable, but higher polluting, fuels such as biomass, paraffin and coal, with the poor thermal performance of subsidised housing and informal dwellings reinforcing decisions to use these fuels (Sykes 2009). Mitigation actions in buildings can therefore make a significant contribution to emissions reductions in urban settings (Mirasgedis *et al.* 2024). Not only does South Africa badly need increased affordable housing, but the energy efficiency of that housing stock can also contribute to climate change mitigation efforts.

4.3. Investment in adaptation infrastructure

South Africa has urgent need of investment in climate adaptation infrastructure. Human-induced climate change has contributed to a range of increased extreme weather events in the country, such as increases in the number of extremely hot days, a reduction in rainfall over the winter rainfall period, an increase in multi-year drought events, and in the number and intensity of extreme precipitation events as well as frequent marine heat waves along the coastline (Ziervogel *et al.* 2022). This has increased pressure on natural resources, health, infrastructure, and biodiversity in South Africa. The Cape Town drought of 2016–2018 and the 2022 Durban floods are the most vivid recent examples of the way that South Africa's exposure to the effects of climate change intersects with the economic challenges its population faces today. For example, the droughts were a significant driver of the inflationary spike that South African experienced in 2017-2018 (Mminele 2019).

Accelerated warming has exacerbated water shortages and reduced economic growth (Ziervogel *et al.*, 2022). Facing these climate-induced challenges, South Africa has developed detailed national adaptation strategies to adjust to actual or expected climate change, and reduce vulnerability to the changing climate (Khavhagali *et al.* 2024). Ecosystem-based adaptation is foregrounded in South Africa's National Climate Change Adaptation Strategy (Ziervogel *et al.* 2022). That said, its adaptation efforts have not yet been translated from policy formulation into material action. This is a result of domestic budget constraints and limited fiscal allocation from the national government (Khavhagali *et al.* 2024). Moreover, ecosystem-oriented policies address only a portion of the risks associated with climate change. For example, research indicates that climate change effects on road infrastructure will have a national-level cost impact between $116.8 million and $228.7 million annually by the 2050s, without adaptation (Schweikert *et al.* 2015).

Given urbanisation trends in South Africa, there is considerable need for adaptation infrastructure to be prioritised for funding within urban planning. Such projects have the potential for job creation as well as reversing patterns of historical exclusion from the planning process (Lemanski 2020; Ziervogel *et al.* 2022).

5. EMBEDDING THE TRANSITIONAL NEEDS OF WORKERS WITHIN SOUTH AFRICA'S GREEN FINANCE TAXONOMY

5.1. The launch and limited uptake of the green taxonomy

The South African NT published the first edition of the South African Green Finance Taxonomy (SAGFT) in March 2022. The SAGFT was developed in close collaboration with domestic stakeholders, such as bank representatives and international consultants, and features 'lofty targets' rather than 'concrete levies' on banking activities (Elsner and Neumann 2023).

Crucial for any green taxonomy is how supervisors define and identify the 'greenness' of projects. It is extremely difficult to render climate and environmental risks commensurable with financial risks (Bracking 2019). Positive Money UK (2024) advocates an environmental footprint approach which incorporates considerations of the environmental impacts of financial assets, when assessing how to shape the flow of credit. This advocacy group argues that a "combination of data at the asset, company and sectoral level", that includes both forward- and backward-looking data, would provide supervisors with greater granularity and neutral data, while still allowing them significant flexibility over how they treat each firm, according to the specific cause of the impacts (Positive Money UK 2024). The relative simplicity of the environmental footprint approach, and the way it limits opportunities for firms to arbitrage risk-weighting metrics, make it the most desirable way to adjust the cost of collateral and determine collateral eligibility.

There is scope to increase the use of the SAGFT. Research published a year after the taxonomy's launch found very limited implementation (IDOS 2023a). While the timing of the study undoubtedly

contributed to this conclusion, several pertinent features of this taxonomy limit the incentives firms face for implementing it in the near-term. The German Institute of Development and Sustainability (IDOS) recommends that credible signals be sent to market actors so that they will view the SAGFT as "a common language" within markets, and that international policymakers can work together to develop widespread implementation practices and strategies (Arnoldi 2023).

5.2 Introducing mandatory disclosure rules

At present the SAGFT (2022) does not require mandatory disclosure of relevant taxonomy-related information, which is likely to leave information gaps and limit regulators' capacity to analyse physical and transition climate and credit risks. However, tightening of corporate regulation on disclosures is needed in South Africa, as research has highlighted greenwashing practices within disclosure, specifically at major financial institutions such as Nedbank (Elsner and Neumann 2023). The inclusion of mandatory disclosure requirements for greenhouse gas emissions data and firms' transition plans[11] over a longer time horizon would bolster the internal credit and climate risk assessment capabilities of the SARB (Dikau *et al.* 2024).

5.3 Developing an overarching strategy

Secondly, to be both effective and widely implemented, the SAGFT cannot be rolled out as a standalone decarbonisation tool; instead, it must be meaningfully integrated within an overarching sustainable finance strategy. Afterall, it is 'bankability' that catalyses private investment in green infrastructure (see Grafe *et al.* 2023). Without wider governmental action, a lack of potentially profitable green projects reduces the leverage of a taxonomy, by rendering green standards relatively anachronistic (IDOS 2023b). Section 7 of this paper provides an outline of what a strategy that makes the SAGFT integral to macroeconomic policy might look like.

5.4 Gaining international recognition

Thirdly, the SAGFT is currently not formally recognised by other important relevant standards, such as that developed by the EU (IDOS 2023b). This is despite there being close alignment between the EU and South African taxonomies on over 75% of the criteria for a 'substantial contribution' to environmental objectives (NT 2022b). Present ambiguity over the interoperability of the SAGFT with other key taxonomies presents investors with uncertainty over potential credit and interest rate risks, and threatens to hinder South Africa's ability to attract and retain inflows of foreign capital (IDOS 2023a). There is therefore a need to develop mechanisms to achieve some form of recognition, be it in bilateral negotiations or in a multilateral forum, such as the NGFS or COP.

5.5. Broadening the concern for labour

Finally, there is a need to pay greater attention to the social risks that economic restructuring poses to workers, as well as to harmonise the treatment of labour rights issues across core taxonomies. For example, one potential stumbling block for bilateral or multilateral recognition of the SAGFT is the differential approaches to labour protections between the SAGFT and other core taxonomies. These taxonomies all hold labour and human rights protections to be a qualifying criterion for an environmentally sustainable activity. However, the SAGFT aligns its minimum labour protection safeguard criteria with its South African national legislation, which goes further than the international labour standards specified by the EU taxonomy (NT 2022b). This constitutes one policy area where international discussion is needed.

Moreover, while labour rights are included in the minimum safeguards that are embedded in core green taxonomies, such taxonomies provide the opportunity to do more for workers impacted by economic restructuring. For example, the inclusion of 'transition' support for workers within the

taxonomies would place a greater responsibility on employers to train workers, so that they can produce sustainable outputs, contribute to environmentally sustainable processes in companies, and develop skills needed to work in sustainable production.

6. EMBEDDING THE TRANSITIONAL NEEDS OF WORKERS WITHIN ASSESSMENTS OF CLIMATE-RELATED RISKS

6.1. Foregrounding the environmental footprint of assets

At present, regulatory risk assessments are unable to fully account for "the potentially longer time horizon, the uncertain and non-linear nature of the impact and the likelihood" of climate-related risks (NGFS 2022a). This is a result of the typically backward-looking methodologies employed to calculate risk, which are rooted in historical data sets (Chenet *et al.* 2021). Moreover, at many central banks, monetary policy implementation heavily relies on the ratings produced by credit rating agencies (NGFS 2022b). These rating agencies maintain that they have always taken climate change risks into account when assessing sub-sovereign issuers, where such risks are "identifiable and material", yet they have found it difficult to collect "consistent, high quality, granular and comparable climate-related data" (NGFS 2022b).

To address this, in recent years, systemically important rating agencies, such as Moody's and Standard & Poor's, have aggressively acquired firms with expertise in climate risk modelling and climate data analysis (see Cox *et al.* 2023). However, the rating techniques being developed are reasonably opaque, and typically consider creditworthiness over shorter-term time horizons than those needed for the assessment of climate risk (Cox 2022). Some prominent central banks, such as the Bank of England (2023), have used hypothetical proxies for longer-term policy-induced transition risks, known as 'shadow carbon prices'. The plausibility of these proxies hinges on how market participants view the hypothesised actions of governments and firms, and generating meaningful scenarios for these actors is challenging for operationally independent central banks, or supervisors that impose voluntary disclosure requirements on regulated firms (Morris and Collins 2023).

Additional supervisory reforms are needed to improve monetary authorities' assessments of climate-related risks. Indeed, the SARB's most recent Financial Stability Report (2023) identifies the lack of "comparable, granular climate-related data on financial exposures" and "voluntary reporting" as serious limitations to the Prudential Authority's supervisory and regulatory analysis. In the SARB's (2023) view, such gaps contribute to a medium- to longer-term financial stability risk.

The risk calculation approach to capital requirements requires a tailored approach for climate-related risks. The Basel Committee on Banking Supervision (BCBS) capital framework seeks to insulate banks from the risks by provisioning a ratio of loss-absorbing capital to the risks associated with certain classes of asset (Goodhart 2011). These assets are assigned a 'risk weighting' which is an estimation of the market and credit risks that they face (Langley 2015). These risk weights can impact the profitability of lending as they determine how expensive a loan is for a bank, in terms of the capital needed to grant that loan (Dafermos *et al.* 2021).

However, the risk models that are currently used to estimate capital requirements have not explicitly incorporated environmental risks (Dafermos and Nikolaidi 2022). This means that they neither capture the risk exposure of the financial institutions to environment-related financial risks, nor do they incentivise banks to increase the financing of green activities, or penalise them for financing carbon-emitting activities (Dafermos and Nikolaidi 2022). Consequently, the SARB should categorise capital according to environmental footprint.

6.2. Coordinating state authority and intensifying surveillance

There is currently considerable ambiguity over the speed and course of transition actions by governments and firms, which makes it difficult to estimate and mitigate the transition risks faced by workers (Morris and Collins 2023). Greater coordination and communication between central banks and finance ministries, such as the SARB and the NT, may reduce ambiguities over policy direction.

Secondly, the South African Prudential Authority has considerable scope to improve its surveillance of climate-related risks. The adoption of the BCBS's revised 'Core Principles for Effective Banking Supervision' provides an opportunity to address these institutional weaknesses and systemic vulnerabilities (IMF 2022a). In these revised principles, the BCBS (2024) has included strategic references to climate-related financial risks. As such, supervisors are now also expected to consider climate-related financial risks in their supervision of banks' risk management practices and solvency and liquidity positions.

Due to the heterogenous exposure different supervisory jurisdictions have to climate-related risks, and significant variance in the capacity of individual central banks and private firms, the revised principles recommend bandwidth to consider climate-related financial risks in a 'flexible' manner. However, the revised principles include scope for supervision to require banks to submit information that makes it possible to assess the "materiality of climate-related financial risks" (BCBS 2024). The BCBS recommendations are minimum standards (Goodhart 2011). Therefore, a muscular domestic interpretation of this supervisory power — making information disclosure mandatory — would allow the SARB and NT to strengthen their proposals for the SAGFT.

6.3. Mandatory corporate transition plans

The South African government and SARB can improve their understanding of transition risk by making it mandatory for firms to produce a corporate transition plan. These plans are "detailed multi-year accounts of targets and actions to plan how a given firm will ensure that its business model and strategy are aligned and compatible with a specific environmental objective", such as a target temperature for global warming or relevant national climate legislation (Dikau *et al.* 2022, p. 6). While transition plans require firms to outline how their business model and strategy would remain profitable during economic restructuring away from emissions intensive activities, there are several workforce-oriented disclosures that would improve the equity of the transition process, and help the government and SARB to assess transition risks and support worker needs in a more granular manner. This might include but is not limited to the following[12]:

- Outline skills and competencies needed for employment at the firm during the transition period;
- Describe measures the firm will take to increase the relevant skills, knowledge and training of those currently employed at the firm;
- Outline how the firm intends to recruit for future roles;
- Disclose the extent to which the firm identifies and manages the impacts and dependencies of change on its workforce, value chain counterparts, and customers;
- Disclose the extent to which the firm has assessed and taken into account the impacts and dependencies of the transition plan on its workforce, value chain counterparts, and customers;
- Disclose the extent to which, and how, the firm's current workforce has been included and consulted in the transition planning process; and
- Disclose the methodologies used by the firm to arrive at any projections employed in the transition plan.

6.4. Adjusting the SARB's stress-testing regime

Since the Global Financial Crisis, central banks have developed a wide range of stress-testing methodologies to assess the risk management capabilities and resilience of domestic banking sectors (see Table 3). The modifications to the SARB's macroprudential stress testing regime would provide an opportunity for more intrusive data collection and allow supervisors to better understand and scrutinise the data sets and models produced by credit rating agencies, as these are often purchased and employed by banks and insurers participating in climate stress testing exercises.

Table 3: Four generic types of stress-testing exercise

	When are they used?	Typical purpose	Typical stress included in the scenario	Prominent examples
Prudential stress testing	Within a regular cycle, typically every year or every other year.	To assess the amount of good quality capital that banks have at the end of the scenario. Sometimes, to inform the setting of macroprudential capital buffers.	A low probability/ high impact scenario, featuring three severe economic shocks. Scenarios based on supervisor's view of the current risk environment.	Bank of England's Annual Cyclical Scenario. Federal Reserve's annual Comprehensive Capital and Analysis Review. SARB's biennial Common Stress Test.
Exploratory stress testing	Less frequent than prudential stress tests; used during periods of relative stability.	Sizing/exploring risks and helping banks to develop risk management processes.	A low probability/ high impact stress detached from supervisor's view of the current risk environment.	Bank of England's 2017 and 2019 Biennial Exploratory Scenarios.
Climate scenario analysis	At the discretion of the national supervisor.	Sizing climate-related risks and building risk assessment capacities of banks.	Multiple scenarios, each capturing either physical, transition or liability risk.	Bank of England's 2021/21 Climate Biennial Exploratory Scenario. European Central Bank's 2022 supervisory climate risk stress test.
Reverse stress testing	Crisis management	To assess the immediate solvency of banks and to calibrate possible interventions.	Conditions and losses needed to deplete bank capital reserves	Bank of England conducted a reverse stress test at the start of the Covid-19 Pandemic in 2020.

Source: Author's construction.

While the SARB has added a climate risk add-on to its biennial common stress test of South Africa's six systemically important banks, it does not currently require South African banks and insurers to undertake specialised climate scenario analyses or stress tests (Costa 2023). For example, the SARB could implement a similar strategy to energy shocks to that employed by De Nederlandsche Bank. This central bank explored four scenarios which captured (i) a policy shock scenario, (ii) a technology shock scenario, (iii) a double shock scenario, and (iv) a confidence shock scenario (see Vermeulen *et al.* 2018). The primary purpose of such an exercise would not be to accurately measure risks facing the financial system sector,

but instead to initiate the more foundational work of building the three core stress-testing processes: data collection, the organisation of data, and the analysis of this data (Morris and Bejarano Carbó 2021).

If the SARB were to undertake climate scenario analysis for physical climate change risk and several energy shock scenarios, it would require banks and insurers to provide granular and comparable data on climate exposures and emissions, disclose the models used, and produce transition plans, which supervisors would then process and analyse. By mandating climate scenario exercises, monetary authorities can develop the 'data infrastructures' needed for more effective climate risk analysis (Morris and Collins 2023).

Assessing counterparty risk for large exposure limits and a sectoral leverage ratio would require the SARB to modify some existing approaches to the type and focus of central bank stress test exercises. Central banks, such as the Bank of England and the Federal Reserve, do employ stress-testing exercises to explore banks' exposures to counterparty risk.[13] For example, the Federal Reserve's annual Comprehensive Capital and Analysis Review includes a component that requires major dealers to simulate the default of their largest counterparty. This year that focus has widened so that banks must assume that their five largest hedge fund counterparties all simultaneously default, under two separate stressed scenarios (Clancy 2024).

While stress testing for climate-related counterparty exposures is desirable, such risks are currently not well understood, nor have they been captured well in past risk-sizing exercises by NGFS member central banks. The UK's Centre for Greening Finance and Investment conducted a review of the Bank of England's 2021 CBES exercise, and made recommendations for improved assessment of counterparty risks (see CGFI 2023a/b/c).

The review provides a number of salient insights for the SARB and the South African Prudential Authority (SAPA) to consider in relation to counterparty risk. Idiosyncratic features of stress-testing methodologies, data gaps, collection and reporting inconsistencies and modelling limitations all contribute to stark variations between regulator and bank estimates for counterparty risk exposure (CGFI 2023a). The assessment of counterparty risk in the South African financial system would therefore be improved through the introduction of mandatory disclosure requirements for firm-level emissions data and detailed transition plans, as well as the creation and adoption of consistent standards for counterparty disclosure (CGFI 2023c). Specific counterparty stress test exercises would be a way to expedite banks' own investment in counterparty-level modelling, counterparty data collection and general organisational building. This exercise should comprise two elements: (i) requiring banks to identify their counterparties with the highest environmental footprint, and (ii) assessing the default risk of these counterparties, both individually and simultaneously.

To improve supervisory understandings of how carbon-intensive leverage and exposure impact institutional resilience, reverse stress testing would be an appropriate policy tool. As illustrated in Table 3 above, the objective of this type of stress test differs from those that merely size, scope or explore the consequences of risks, by quantifying how much current viability conditions should change for a bank to hit a pre-determined adverse outcome, such as failure (Feyen and Mare 2021).

6.5. Strengthening the SARB's in-house credit assessment capability

There is a need for innovation around the in-house credit assessment capabilities of the SARB. One blueprint for the SARB would be to try to develop capacities and processes akin to those that generate in-house credit assessments at national central banks in the Eurosystem. These assessments are applied to the quality of collateral pledged by banks when they try to access liquidity from the Eurosystem. Abdelli and Batsaikhan (2022) argue that the existing in-house assessment process, which has two stages, could be repurposed to better capture the medium- and long-term physical and transition-related climate risks that corporates are exposed to. These internal credit assessments by central banks comprise a quantitative stage and an expert qualitative stage.

While greenhouse gas emissions data can be integrated into the first step of credit assessment, using company disclosures, this analysis takes only a one-year horizon into account, and therefore omits

medium- to longer-term transition risks. These authors (Abdelli and Batsaikhan 2022) propose that the qualitative expert assessment stage should include expert scrutiny of firms' transitions plans and the environmental impact of firms' operations. Ultimately, Abdelli and Batsaikhan (2022) argue that repurposing the in-house credit assessments by national central banks would create a potentially less biased, more consistent and less proprietary source of credit assessments than those provided by the major credit rating agencies.

7. APPROACHES TO CREDIT ALLOCATION

The proposals outlined in Sections 3 and 4 have sought to embed the transitional needs of workers within assessments of climate-related risks and the classification of an investment as sustainable. In this way, improvement of climate risk assessment and a better green taxonomy are necessary foundations of an environmentally just monetary policy. With these in place, monetary policy can contribute to a more sustainable economy without compromising on price stability, by increasing the volume of funding for renewable manufacturing, energy-efficient housing, and adaptation infrastructure, and reducing the price of that funding (Aguila and Wullweber 2024).

The persistence of quantity-based credit rationing, "in almost every country that has a functioning and sizable banking system", suggests that the market-determined interest rate is not a reliable indicator of efficient credit allocation (Beyhaghi *et al.* 2020; Kedward *et al.* 2024). Even if there are firms willing to pay a higher interest rate for loans, banks will still not issue additional loans beyond a certain limit (Waters 2012). In this context, allocative credit policies represent a logical approach for influencing the determination of credit quantities by banks and shaping the expectations of loan officers and their willingness to supply credit. This section sets out a series of policy options for allocating credit for the creation of jobs around renewable manufacturing, building affordable and energy efficient housing, and the construction of adaptation infrastructure. The full range of options discussed in this section are presented in Table 4.

Table 4: Promotional monetary policy options for South Africa

Objective	Policies to be considered
Defining 'green' finance and improving the SAGFT	• Use the environmental footprint of firms as a key metric for decision making about credit allocation. • Negotiate formal recognition of the SAGFT by other important standards. • Require mandatory disclosure of emissions data and transition plans by firms. • Meaningfully integrate the SAGFT into an overarching sustainable finance strategy for South Africa.
Promoting green bank loans	• Dual interest rates. • State investment bank. • Sector Targeted refinancing lines. • Environmental footprint incorporation into capital requirement standards. • Implementation of green differentiated capital requirements. • Introduction of limits on banks' exposure to counterparts with high participation in carbon-intensive activities. • Development of leverage ratio between Tier 1 capital and exposure to assets from sectors with carbon-intensive footprints. • Adjustment of Basel III liquidity rules to mitigate any negative impact they may have on the energy transition.

Objective	Policies to be considered
Promoting green lending by NBFIs and institutional investors	• Require institutional investors to allocate a specific 'portion of their investments' to taxonomy-compliant projects, at discounted rates. • Increase capital requirements for institutional holders of bonds with large environmental footprints. • Lower the exposure limit on the quantity of offshore assets that can be held by pension funds. • Prescribe some portion of pension fund assets for taxonomy-compliant projects.
Preventing regulatory arbitrage by carbon capital	• Impose leverage restrictions on international and domestic hedge funds and private equity fund holders of assets with large environmental footprints. • Impose limits on the number of times the same piece of non -taxonomy-compliant collateral can be repledged in market repo transactions. • Devise floors and ceilings for assets likely to fluctuate drastically in value. • Investigate and consider policies that mitigate possible liquidity spirals in non-bank lending for assets vulnerable to transition risk. • Adopt a more experimental research agenda on transition risks in the South African NBFI sector, using agent-based models.
Improving understandings of climate related risks	• Ensure greater coordination between the SARB and NT. • Apply a strong interpretation of the BCBS revised 'Principles for Effective Banking Supervision', making climate risk information disclosure to bank supervisors mandatory. • Introduce into the SARB's stress testing regime climate analysis scenarios and reverse stress tests on bank exposures to carbon-emitting counterparties. • Introduce both quantitative and qualitative in-house credit assessment at the SARB.

7.1. Indirect price-based policies

Indirectly, allocative policies are designed to adjust the relative costs of providing capital to different sectors (Kedward *et al.* 2022). These approaches incentivise, rather than dictate, where credit should be allocated, and are typically among the most prominent and frequently advocated instruments in the relevant policy literature (See van't Klooster and van Tilburg 2020; (Dafermos et al. 2021; Dafermos and Nikolaidi 2022; Vestergaard 2024). They are also the tools that have typically been tried by a small number of NGFS member financial supervisors.

7.1.1 Sector-targeted refinancing lines

Targeted refinancing operations (TROs) predominantly aim to stimulate an economy by easing funding conditions for firms that mainly rely on bank loans to fund their activities, although some central banks also use TROs to pursue longer-term objectives (Colesanti Senni and Monnin 2021 p.5). TROs have been employed in G20 economies to provide effective support to targeted economic segments (Colesanti Senni and Monnin 2021). Given this past success, the rate at which central banks re-finance private financial institutions through Longer-Term Refinancing Operations (LTROs) has been identified as a viable monetary policy lever for credit guidance by central banks (van't Klooster and van Tilburg 2020).

Such 'targeted' refinancing operations would provide discounted funding to private banks conditional on how they, in turn, lend to other institutions and firms. Targeting discounted refinancing according to climate transition goals would effectively link the interest rate that banks pay to the SARB to how their lending to specific sectors complies with the (SAGFT). Proposals for green-targeted LTROs argue that the interest rate a bank pays should be determined by the volume of taxonomy-aligned loans it issues (van't Klooster and van Tilburg 2020). Likewise, certain volumes of taxonomy non-compliant loans could be penalised with a more expensive refinancing rate (Baloyi and Krinsky 2022).

GREEN MORTGAGE LENDING IN HUNGARY

A green mortgage lending policy would link eligibility for preferential lending rates to the Energy Performance Certificate rating and primary energy consumption of the residential mortgages that are being refinanced. Hungary's central bank, the Magyar Nemzeti Bank, attempted to stimulate lending to households for the construction or purchase of energy-efficient residential real estate. In October 2021 it provided $825 million of refinancing to credit institutions at 0% interest, on the condition that this funding be used to fund properties with a minimum energy efficiency label of "BB" and a maximum primary energy consumption of 90 (later 80) kWh/m²/year (NGFS 2024b p. 13). For a similar policy to be implemented in South Africa, the SARB must develop the capacity to evaluate and verify any documentation that purports to show that the bank loans are aligned with the SAGFT energy efficiency metrics.

7.1.2. Green-differentiated capital requirements

Green-differentiated capital requirements, based on environmental footprint, are intended to properly incentivise the reallocation of finance away from environmentally harmful activities. Including a Green Supporting Factor would lower the risk weight on green loans, while the use of a Dirty Penalising Factor would raise the risk weight on dirty loans. These mechanisms are designed to make green loans more affordable and attractive than dirty loans. In this way, they can influence both credit availability and the cost of borrowing. The positive impact of green-differentiated capital requirements on the credit reallocation channel make these desirable for the transition and economic restructuring needs of South Africa (Dafermos and Nikolaidi 2022). The introduction of a green supporting factor alone is not recommended, as it has the potential to increase the leverage of banks, or introduce a significant amount of credit default risk into bank loan books (Dafermos and Nikolaidi 2022). Analysis of the potential impact of green-differentiated capital requirements on bank balance sheets suggests that the use of both green supporting and dirty penalising factors can help banks to counterbalance relative changes in credit availability or liquidity positions that the use of only one type of capital requirement may induce.

HUNGARY'S GREEN SUPPORTING FACTOR

The Magyar Nemzeti Bank introduced a green supporting factor to allow Hungarian banks preferential capital treatment if they apply a 0.3% interest rate reduction to loans judged to be green, according to greenhouse gas intensity data. This policy facilitated $2.4 billion in green loans in 2023, with nearly 75% of these loans were made to renewables and electric transportation companies (Magyar Nemzeti Bank 2024 cf. Azizuddin 2024).

7.1.3. Collateral haircut adjustments and collateral frameworks

Where collateral is used to provide security against loans, it can also be utilised to allocate credit towards renewable energy and industry. For one, 'haircut' adjustments alter the market value of specific bonds or assets when they are used as collateral. The collateral value of a bond is always some fraction lower than the market value of that bond, and this haircut can indirectly steer investment towards or away from those bonds (Vestergaard 2024). The higher the quality of the asset or bond being used as collateral, the lower the haircut will be. In such a way, the haircut effectively establishes parameters on the financing that is available for market-based lending (Dafermos *et al.* 2021).

Green-supporting haircuts, which would reduce the size of the haircuts, would improve the financing conditions for taxonomy-compliant projects. Penalising haircuts, which increase the haircut, would reduce the desirability of these assets as collateral, and influence the cost of borrowing of the firms that issue these securities (Dafermos *et al.* 2021).

Positive screening would use a central bank's collateral framework to provide incentives for banks to lend to, or capital markets to fund projects and assets that support environmentally-friendly activities.

Alternatively, negative screening could be implemented in one of several ways. It could rework central bank's collateral framework so that it either excludes otherwise eligible assets, based on their environmental impact, or increases the haircut on these bonds when they are used as collateral[14]. Modelling research demonstrates that both increasing collateral haircuts for carbon-intensive assets, and decreasing haircuts for lower carbon assets, are effective at increasing carbon-neutral investment and decreasing carbon-intensive investment (McConnell *et al.* 2022). Initial research conducted by the NGFS (2021), based on surveying qualitative expert judgement, suggested that this policy would have positive effects on both the mitigation of climate change and on risk protection.

Collateral frameworks specify the eligibility of the bonds and assets that central banks accept as collateral when providing liquidity to banks, as part of their standard monetary policy operations. As such, collateral frameworks are a policy tool that influences investment beyond the banking system.

A range of think tanks, civil society groups and public policy research networks all consider the use of central bank collateral frameworks to be a potentially powerful policy tool, to assist with decarbonisation objectives (NGFS 2021; Abdelli and Batsaikhan 2022; Kedward *et al.* 2022; Dafermos *et al.* 2022; Dafermos 2023). This follows from findings that collateral frameworks can indirectly steer the private provision of liquidity, and the allocation of resources, in an economy (Nyborg 2017). The rationale for adapting central bank collateral frameworks is to render investment in carbon-intensive industries less attractive by making it either more expensive to borrow against bonds in those industries, or cheaper to borrow against bonds with positive sustainability impacts (See ECB 2022). Experts responding to the NGFS survey judged that, although adjustments to haircuts would not disrupt monetary policy transition mechanisms, designing a feasible framework would be challenging (NGFS 2021). However, as Dafermos *et al.* (2021) suggest, the design of climate-aligned haircuts and margins could rely on the framework that the Financial Stability Board (FSB) has already provided for counter-cyclical haircuts and margins for securities financing transactions. At present the SARB needs to advocate at both FSB and NGFS levels for this approach to be designed and implemented globally.

GREEN COLLATERAL ELIGIBILITY IN CHINA

Starting in 2018, the People's Bank of China has accepted green bonds rated 'double-A and above' as valid collateral within its medium-term lending facility (OMFIF 2020). This policy experiment has been viewed favourably by research into its effectiveness. Research by staff from the Banque de France on the People's Bank of China's inclusion of environmental impacts in its collateral eligibility requirements shows that such reforms had a persistent effect, once they were in place for over six months (Macaire and Naef 2021). A recent study found that this policy led to a significant decrease of 26 basis points in the financing costs of green financial bonds in the primary market (Xue and Yun 2024). This research found that the central banks' endorsement of the eligible bonds implicitly enhanced their perceived quality, driving down borrowing cost for these bonds.

7.1.4. Repurposing large exposure limits

The Global Financial Crisis prompted a renewed supervisory concern for the vulnerability of banks to concentrated exposures to individual counterparties. The default of such counterparties can in turn cause bank failures, if the exposures are particularly large. Although the BCBS has raised awareness about the need for banks to measure and limit the size of large exposures in relation to their capital since at least 1991, it did not prescribe how banks might do this in a standardised or coordinated way until after the 2008 Global Financial Crisis (BCBS 2014a).

As a complement to its revised risk-based capital standard[15], in 2014 the BCBS proposed a supervisory framework for measuring and controlling large exposures to bank counterparts. Such exposure limits are designed to restrict the maximum possible losses a bank could incur, in the case of a failure of either a single counterpart or a connected group of counterparts (D'Orazio and Popoyan 2019). Exposure limits have been identified as a mechanism that could be repurposed to limit banks' exposures to counterparts with high participation in carbon-intensive activities.

For such a policy, banks would need to be able to identify which of their counterparts engage in carbon-emitting activities and then disclose every large exposure connected to carbon-intensive firms, whether a single firm, a group of firms, or interconnected firms (D'Orazio and Popoyan 2019). A mandatory disclosure regime for environmental footprints of firms is needed, alongside a precise regulatory definition of what large exposures to the carbon-intensive sectors are, and the scope of entities it applies to (D'Orazio and Popoyan 2019).

7.1.5. Reconfiguring the Basel III leverage ratio

The Basel Committee on Banking Supervision (BCBS) has identified that, prior to the global financial crisis, many banks built up excessive leverage, while recording 'strong risk-based capital ratios' (BCBS 2014c). The rapid deleveraging that occurred during the peak of the crisis "amplified downward pressures on asset prices" and "exacerbated the feedback loop between losses, falling bank capital and shrinking credit availability" (BCBS 2014c). The BCBS developed its leverage ratio to constrain the growth of on- and off-balance sheet leverage in the banking sector, and supplement its risk-based capital requirements with an uncomplicated additional measure. The aim of the Basel III leverage ratio is to ensure adequate capital provisioning against groups of assets that are deemed to be financial stability risks.

The Basel III leverage ratio comprises a non-risk-based capital limit, in terms of the ratio between a bank's equity and total exposu0res (BCBS 2014c). This policy tool could be reconfigured so that the ratio is between Tier 1 capital and exposure to assets from specific sectors, namely those that have carbon-intensive footprints (D'Orazio and Popoyan 2019). The SARB would need to require banks to collect and disclose both their exposure data and the level of carbon intensity of firms' resources. The SAPA would need to determine the desirable leverage ratio.

7.1.6. Adjustments to Basel III liquidity measures

A core lesson adopted by the financial regulatory community, following the 2008 Global Financial Crisis, was that capital adequacy is not the sole determinant of a bank's resilience to market instability, and that the ability to manage the liquidity of assets is crucial for the proper functioning of the banking sector (Morris and Collins 2023). Consequently, the BCBS advocated liquidity rules to ensure that banks hold buffers of high-quality liquid assets that can be drawn upon during times of extreme stress. Such assets could be converted promptly in private markets into cash. A Liquidity Coverage Ratio (LCR) is designed to provide a short-term stabilising mechanism for banks against future liquidity stresses, by setting an amount of high-quality liquid assets that will fund cash outflows for 30 days (BCBS 2013).

Supplementing the LCR is the introduction of the Net Stable Funding Ratio (NSFR), which is intended to be a counterweight to the incentives banks face to rapidly expand their balance sheets, using cheap and abundant short-term wholesale funding. It is the ratio of available to required stable funding. The NSFR is therefore supposed to limit a bank's overreliance on short-term wholesale funding, and encourage a better assessment of funding risk across all on- and off-balance sheet items (BCBS 20214b). The NSFR has a time horizon of one year and is designed to promote financial stability by fostering a sustainable maturity structure of assets and liabilities.

While such macroprudential levers may well stabilise financial markets, there are concerns that in tandem the Basel III liquidity rules may discourage the long-term financing of green projects, by making long-term investments relatively more expensive (D'Orazio and Popoyan 2019). LCRs are likely to reconfigure bank balance sheets toward assets such as cash, sovereign bonds and corporate bonds with high credit ratings. Alternatively, NSFR requirements will make banks mobilise long-term funds to finance long-term assets. This threatens to render banks more sensitive to temporal mismatches between assets and funding, and lead them to become more reluctant to hold long-term assets.

The Basel III liquidity rules could therefore be adjusted to mitigate any potential negative impact they may have on the energy transition, and to ensure that they constrain the capital available for carbon-intensive assets (D'Orazio and Popoyan 2019). The European Banking Federation (2017) has proposed that any promotional loan linked to green finance, including pass-through loans, is treated as an 'interdependent asset' for the LCR and the NSFR. This would extend the 'no funding risk' status to such loans, and effectively exempt them from stable funding requirements (EBA 2023). This framework could be further repurposed to actively incentivise lending to long-term green projects, by introducing lower requirements for stable funding factors, or short-term liquidity that meet specific conditions or definitions within a revised SAGFT.

7.2. Direct price-based controls

A second approach to price-based controls is controls which directly determine the price of bank credit for particular sectors (Kedward *et al.* 2022). These policies are more coercive than those oriented around incentives, and seem appropriate for allocating credit to affordable and energy-efficient housing, adaptation infrastructure and job creation in renewable manufacturing.

7.2.1. Dual or subsidised interest rates

Interest rate policies have the potential to directly guide investment towards renewable energy generation and local renewable sector manufacturing, because borrowing costs are a main determinant of investment costs in green projects (Positive Money Europe 2024; Aguila and Wullweber 2024). Dual or subsidised interest rates are one mechanism for central banks to offer lower discounting rates to banks that finance projects in specific sectors (Costa 2024). If designed correctly, a dual or subsidised interest rate policy could protect public and private renewable energy projects from being disproportionately impacted by any interest rate increases, implemented by the SARB to fulfil its price stability mandate (Aguila and Wullweber 2024).

ZERO-INTEREST RATES IN JAPAN

Example: Zero interest rates in Japan

Since 2021, the Bank of Japan has provided zero-interest rate finance to banks that invest in renewable energy. These efforts have been criticised for reinforcing existing market and government appetites investment, and the programme has been hampered by the lack of a green or renewable taxonomy against which lending can be assessed (Shirai, 2022).

This case demonstrates that the effectiveness of promotional interest rate policies hinges on the green taxonomy to which they are benchmarked, and the willingness of monetary authorities to pushback against market neutrality.

7.2.2. State investment banks

State investment banks (SIBs) are a well-established mechanism for the direct provision of appropriately priced credit to support industrial development (See Mikheeva and Ryan-Collins 2022). When SIBs enable large scale public investment, they allow policymakers to allocate credit through a direct, quantity-based mechanism, thereby providing a direct immediate response to the problem of quantity-based credit rationing by banks. Their access to low borrowing costs and public guarantee allows them to offer lower interest rates to specific sectors, which then sets a pricing benchmark for private lending (Kedward *et al.* 2022).[16] Successful historical examples of SIBs were housed within government ministries and also "coordinated or closely associated with central banks" (Mikheeva and Ryan-Collins 2022).

7.3. Direct quantity-based policies

Direct quantity-based policies represent a second coercive approach to credit allocation. Such policy instruments directly determine the quantity of bank credit for particular sectors in an economy (Kedward *et al.* 2022). For example, a more coercive version of the LTRO approach would be for supervisors to set requirements for banks to allocate a portion of their loan book to taxonomy-compliant sectors, at discounted rates (IEJ and CLiFT 2023).The "systemic financing challenge" of the green transition requires policymakers to take a holistic view of all potential sources of credit creation (Murau *et al.* 2024).

Direct quantity-based policies should be considered as a way of harnessing the considerable liquidity in South Africa's NBFI sector for developmental goals. This institutional capital appears to represent an appropriate source of investment for adaptation infrastructure and affordable, energy efficient housing. Monetary policy mechanisms to harness the considerable liquidity in South Africa's retirement industry must be explored. Increasing the limit on the quantity of offshore assets that can be held by pensions will expand the potential investment for economic diversification and sustainable industry.

There remains a debate about whether asset prescription would be the most effective mechanism for allocating credit. The ANC's recent proposal for a return to prescribed assets has been publicly criticised by the Financial Sector Conduct Authority (FSCA), which raises doubts about its near-term feasibility (Khumalo 2024). Critics of asset prescription point to poor returns on prescribed assets when they were previously implemented in South Africa (Moonstone Information Refinery 2024). The introduction of the exposure limit of 45% for investments that satisfy the regulatory definition of 'infrastructure' is often cited as a reason that asset prescription is not needed.

While our analysis shows that the potential scale of investment in 'infrastructure' is considerably higher under the current approach, there is no guarantee that significantly higher levels of investment would be extended to sectors such as energy-efficient housing or adaptation infrastructure without direct prescription. There remain doubts that maximum limits would go far enough (Kedward *et al.* 2024). For example, despite the introduction of the infrastructure exposure limit, there has been little reallocation towards alternative asset classes such as 'infrastructure' (Moonstone Information Refinery 2024).

8. SUMMARY AND CONCLUSIONS

South Africa's JETP is a financing deal between South Africa and the governments of France, Germany, the United Kingdom, the United States, and the European Union, which aims to mobilise $8.5 billion over three to five years to support the implementation of South Africa's revised NDC. While the JETP aims to stimulate private sector investment in climate and developmental projects through state subsidies and policy concessions, most of the committed finance in the JETP is directed towards electricity infrastructure, rather than economic diversification or addressing the needs of workers. Large scale investment is needed in job creating sectors, such as renewable manufacturing, affordable and energy-efficient housing, and adaptation infrastructure.

This working paper found that the investment environment in South Africa is currently unable to catalyse dynamic and sustainable economic growth. Continued investment in minerals and energy has led to uneven investment in other industries and has not led to spillover effects, such as wider investment and growth in the South African economy. Rather than investing in job creating activities, mining companies have diverted external credit and investment towards speculative investments in mining assets and operations.

Financial sector liquidity is currently underutilised. South African banks have a low appetite for risk and typically mostly finance households and small to medium enterprises. The persistence of quantity-based credit rationing across a range of sizable banking systems suggests that the market-determined interest rate is not a reliable indicator of efficient credit allocation. Allocating 10% of the ten-year average lending of South African banks towards a developmental government agenda would utilise approximately R52.4bn. There is even more underexploited liquidity within South Africa's retirement industry. A return to a maximum offshore investment limit of 30% would increase onshore assets held by the retirement industry by an estimated R600bn, with the current infrastructure investment exposure limit being worth an estimated additional R180bn in that scenario.

South Africa's approach to monetary governance reinforces the country's capital-intensive structure. The operational independence of the SARB from government restricts any possible developmentalist ambitions, because it prevents much needed fiscal and monetary cooperation. The SARB's inflation targeting policy framework has led to money being funnelled towards 'speculative financial sectors' at the expense of investment in productive sectors with job creating potential. This framework would be incompatible with a government agenda for widespread job creation.

Despite a recent 'green turn' among many prominent central banks, innovations in central banking practices have not yet provided the platform for developmental transition policies. Climate-related risks are not well understood by the regulatory community. This working paper recommended that climate risk information disclosure to bank supervisors be made mandatory and that initial attempts at climate stress-testing be built on to help understand a more comprehensive range of future risks. Further, this paper identified the need for the SARB to develop its own in-house credit assessment capabilities further, explore measures for the assessment of climate-related risks relevant to NBFIs, and investigate regulatory measures that would prevent NBFIs from simply replacing banks as sources of finance for carbon intensive activities.

This working paper has recommended a 'promotional' approach to central banking with considerable coordination between the NT and the SARB. Such an approach would require policy innovation so that the transition needs of workers can be embedded at the heart of sustainable monetary policy. The first edition of the SAGFT does not sufficiently address the transition needs of workers. This working paper has recommended the inclusion of 'transition' support and engagement for workers in the definition of 'green' in the taxonomy, alongside mandatory disclosure of relevant taxonomy-related information, and a wider industrial and monetary strategy, are recommended. Likewise, it has recommended the inclusion of environmental footprints in risk assessments of firms, and the development of mandatory transition plans that require firms to engage deeply with the impacts of transitions on workers.

Finally, this working paper has presented a range of credit allocation instruments for the consideration of South African policymakers. Indirect, price-based policies could be designed to incentivise lenders by adjusting the relative costs of providing capital to different sectors. Direct price-based controls could be designed to determine the price of credit. The quantity of credit allocated by the pension fund industry could be set directly by the South African government through asset prescription and/or exposure limits to offshore assets.

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ENDNOTES

1 Ashman and Fine (2013) argue that the De Kock Commission was instrumental in introducing neoliberal reforms into South African financial markets. The Commission released three reports (in 1979, 1982 and 1985) and forwarded recommendations to roll back capital controls and deregulate financial markets in line with prevailing international trends.

2 The sector contributes 20% to overall GDP (BASA, 2020).

3 Over US$4.5bn of this money is invested in the parastatal Eskom (see Urgewald, 2024).

4 PIC manages funds for entities such as the GEPF, the Unemployment Insurance Fund, the Compensation Commissioner Fund, the Compensation Commissioner Pension Fund and the Associated Institutions Pension Fund (CER, 2023).

5 For example, the Federal Reserve extended various forms of liquidity in the form of dollar swap lines and discount windows- to the global financial system in 2015, 2019, and during the Covid-19 Pandemic (See Wullweber, 2024).

6 South Africa currently employs exchange controls on outflows of capital under Regulation 3(1) of the Exchange Control Regulations, 1961 and limits the size of overseas investments by South African companies and institutional investors (SARB n.d.).

7 These estimates are caveated as being extremely optimistic as the data used does not employed well defined categories and assumes no overlapping job creation by the three tenders (See Lawrence, 2020, p. 104).

8 This involves connecting individual PV cells together into chains to increase their power output.

9 An 'indirect job' is defined as one which is created to produce the goods and services needed by workers with direct jobs.

10 As the mayor of Cape Town notes "Cape Town's entire spatial policy is aimed at unstitching [apartheid's] legacy over time" (Bourdin, 2024, n.p.).

11 The SARB and NT need these transition plans from both corporate and financial firms.

12 These recommendations are adapted from those outlined in TTP 2024 pp. 10-13.

13 It should be noted that much of the current focus of central banks is on banks' exposures to central counterparties in derivatives markets.

14 Vestergaard (2024, p. 928) argues that 'disciplinary mechanisms operating on a continuum are likely to have greater systemic effects on collateral hierarchies than binary ones (inclusion vs exclusion)'. He therefore advocates a continuum of haircuts according to environmental impact of the asset used as collateral, to rework the hierarchy of assets' perceived quality so that assets with a lower environmental footprint are viewed as safer forms of collateral.

15 This additional framework is needed because the minimum capital requirements of the Basel risk-based capital framework does not consider concentration risk in its capital requirement calculations (See BCBS 2014a).

16 The Development Bank of Southern Africa is owned by the government of South Africa and operates in South Africa and all other Southern African Development Community countries. Its approach and funding structure appears to be much closer to a Multilateral Development Bank than a SIB.