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“Tis new to thee’: response to Gruenewald, Knijp, Schoenmaker, and van Tilburg

Dimitri Demekas* and Pierpaolo Grippa**

ABSTRACT

In ‘Embracing the Brave New World: A Response to Demekas and Grippa’, a response to our article ‘Walking a Tightrope: Financial Regulation, Climate Change, and the Transition to a Low-Carbon Economy’, both published in the Journal of Financial Regulation, Gruenewald, Knijp, Schoenmaker, and van Tilburg claim that climate risk is a clear and present danger to financial stability that justifies imposing higher capital requirements on supervised firms. Until the current prudential risk framework is revised to fully capture climate risk, they advocate ad hoc measures, such as adjustments to risk weights, which, they believe, would have the desired effect. In this article, we argue that these claims are misguided. Given the nature of climate risk, risk assessment models cannot provide a reliable basis for calibrating capital requirements. On the basis of the evidence, prudential tools would have only a negligible impact on the transition. And the idea of adjusting risk weights for climate exposures has been abandoned—for good reasons. Ultimately, there is nothing financial regulation can do about the energy transition that an appropriately designed carbon tax cannot do better. Central banks and financial regulators should resist the pressure to take on additional responsibilities that are essentially political and that they cannot properly discharge.

KEYWORDS: financial stability, financial regulation, climate change, central banking

1. INTRODUCTION

In their response¹ to our earlier article in this journal,² Gruenewald, Knijp, Schoemaker, and van Tilburg take issue with our conclusion that regulatory action to promote the transition to a low-carbon economy is unlikely to have a significant real-world effect while, at the same time, it would expose central banks and financial regulators to internal conflicts, criticism of mission

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** The views expressed in this article are those of the authors and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

¹ Seraina Gruenewald and others, ‘Embracing the Brave New World: A Response to Demekas and Grippa’ (2023) 10 Journal of Financial Regulation 127.

² Dimitri Demekas and Pierpaolo Grippa, ‘Walking a Tightrope: Financial Regulation, Climate Change, and the Transition to a Low-Carbon Economy’ (2022) 8 Journal of Financial Regulation 203.

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creep, and unintended consequences in financial markets. They agree that the role of central banks and financial regulators in the transition to a low-carbon economy is complementary to that of the government, but contend that these bodies can—and should—play a crucial role in the financial system, and that this role would make a significant contribution to the transition.

The contention made by Gruenewald, Knijp, Schoemaker, and van Tilburg rests on two lines of argument. First, climate risk is a ‘clear and present danger to financial stability’, and the current mandates of central banks and (micro- and macro-) prudential regulators compel them to act expeditiously by raising buffers and imposing capital charges on supervised financial firms to mitigate this risk. These regulatory tools would not only enhance resilience to climate risk but would also materially reduce the relative cost of capital of green activities, thus making a substantial contribution to emission reductions. Second, because climate risk is characterized by very long time horizons and radical uncertainty, it cannot be fully captured by the current prudential risk framework. Until this framework is fundamentally redesigned to be made fit for purpose, regulators should introduce ad hoc modifications, such as adjustments to risk weights or increases in macroprudential capital buffers, which would have the desired effect.

We remain sceptical about each and every one of these claims. We are also concerned that if central banks and financial regulators give in to pressure from politicians, academics, and NGOs to use their regulatory tools to promote the energy transition, the costs in terms of their ability to pursue their primary objectives, as well as in terms of their governance and accountability, will far outweigh the meagre benefits these tools could have on the transition. On that front, at least, our concern is assuaged by the fact that in the last few years, a succession of global economic shocks seems to have focused the minds of central banks and financial regulators on their primary objectives and to have made them more sensitive to the risks of taking on additional policy goals.

2. CLIMATE RISK ASSESSMENT

It has been received wisdom for a while now that climate change creates physical and transition risks for financial firms which, in principle, are within the mandate of financial supervisors. But since the ‘call for action’ in 2019 by the Network for Greening the Financial System (NGFS)³ cited by Gruenewald, Knijp, Schoemaker, and van Tilburg, the understanding of the nature and magnitude of these risks, as well as of the implications for financial regulators, has become more nuanced—thanks in part to the work of the NGFS itself. Attempts to estimate these risks through climate-related stress tests or scenario analyses by several major central banks since 2019 have demonstrated the formidable conceptual, analytical, and data challenges involved.⁴ To capture climate-related risk—especially physical risk—these exercises had to extend the time horizon to several decades into the future. It turns out that this has dire implications for the robustness of the results.

First, these time horizons exceed by far the average maturity of bank loans, which, for syndicated loans, is estimated at three to five years at origination in the USA⁵ and closer to five years in Europe.⁶ While loan rollovers are common, it is doubtful that banks will blindly continue for decades to roll over loans to firms or sectors that are negatively affected if climate

³ Network for Greening the Financial System, ‘A Call for Action: Climate Change as a Source of Financial Risk’ (April 2019) <https://www.ngfs.net/sites/default/files/medias/documents/ngfs_first_comprehensive_report_-_17042019_0.pdf>. All websites accessed 29 February 2024.

⁴ More than 20 jurisdictions have conducted climate-related stress or scenario analyses. For a recent comprehensive survey, see Viral V Acharya and others, ‘Climate Stress Testing’ (2023) 15 Annual Review of Financial Economics 291.

⁵ Kristian Blickle and others, ‘The Myth of the Lead Arranger’s Share’ (2020) Federal Reserve Bank of New York Staff Reports No 922 (May 2020, revised October 2022) <https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr922.pdf>.

⁶ Tobias Berg and others, ‘Mind the Gap: The Difference Between U.S. and European Loan Rates’ (2017) 30 The Review of Financial Studies 948.

shocks start to materialize. Indeed, there is some evidence that banks are already *shortening* loan maturities in order to lower their exposure to possible transition risk.⁷ It is therefore hard to take seriously future loss estimates derived on this assumption, and even harder to justify imposing capital charges on banks today for unexpected losses on loans that have not been made yet—and may never be made.

Second, over such time horizons, many of the routine working assumptions underpinning stress tests systematically overestimate the impact of climate risk on loan portfolios. For one thing, bank balance sheets need to be modelled dynamically, allowing banks to adapt their exposures to changes in climate risk. It is obvious that over the course of several decades, banks will reduce loan exposures to carbon-intensive sectors if transition risk materializes (eg if carbon taxes are increased). Yet despite the importance of incorporating dynamic lending responses, the large majority of climate-related stress tests undertaken so far have adopted the standard static balance sheet assumption, thereby substantially overestimating future climate-related credit losses.⁸ In addition, to fully understand the effect of climate risk on banks’ profitability over such long time horizons, it is necessary to take into account the effect of this risk not only on banks’ balance sheets but also on loan demand. But again, most climate-related stress tests so far do not incorporate such macro-financial feedback loops.⁹ Last but not least, several studies have documented that banks already price climate policy risk (transition risk) to some extent in their lending in a number of ways: by shortening maturities,¹⁰ raising loan rates to fossil fuel firms,¹¹ or shifting lending to high-emissions sectors into jurisdictions with less strict climate policy.¹² Overall, these adjustments to the quantity and price of lending to high-emissions firms, which are not typically incorporated in stress tests, have the potential to reduce banks’ credit exposure to transition risk—and associated losses—over the long term.

Of course, future climate-related shocks may affect bank balance sheets not only through credit losses but also through market losses in their trading books. If climate risk is substantially underpriced, changes in investor perception can lead to re-pricing of assets—and thus to market losses for asset holders, including banks—even if the true underlying probability of risk realization is unchanged. The empirical literature has shown that climate risk is at least partially priced across a wide range of asset classes.¹³ Assessing the magnitude of any residual climate risk underpricing (eg as a result of accelerated decarbonization) and thus the size of the related market risk requires understanding how different assets’ state-dependent cash flows are affected by climate change and climate policies. Given the radical uncertainty regarding climate and decarbonization pathways, as well as the fact that investors have heterogeneous climate beliefs and there is evidence of sorting between the climate beliefs of investors and the climate exposure of assets,¹⁴ this question remains very much open.

⁷ Ivan T Ivanov, Mathias S Kruttili and Sumudu W Watugala, ‘Banking on Carbon: Corporate Lending and Cap-and-Trade Policy’ (2024) 37 *The Review of Financial Studies* 1640.

⁸ Financial Stability Board and Network for Greening the Financial System, ‘Climate Scenario Analysis by Jurisdictions: Initial Findings and Lessons’ (15 November 2022) <<https://www.fsb.org/2022/11/climate-scenario-analysis-by-jurisdictions-initial-findings-and-lessons/>>.

⁹ *Ibid.*

¹⁰ Ivanov, Kruttili and Watugala (n 7).

¹¹ Manthos D Delis and others, ‘Being Stranded with Fossil Fuel Reserves? Climate Policy and the Pricing of Bank Loans’ *Financial Markets, Institutions, and Instruments* (forthcoming).

¹² Luc Laeven and Alexander Popov, ‘Carbon Taxes and the Geography of Fossil Lending’ (2022) *European Central Bank Working Paper No 2762* <<https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2762~7dd527635f.en.pdf>>.

¹³ For an extensive review covering equities, sovereign, municipal, and corporate bonds, and real estate, see Stefano Giglio, Bryan Kelly and Johannes Stroebel, ‘Climate Finance’ (2021) 13 *Annual Review of Financial Economics* 15. For a more recent survey, as well as a discussion of the analytical challenges involved in pricing climate risk, see Egemen Eren, Floortje Merten and Niek Verhoeven, ‘Pricing of Climate Risks in Financial Markets: A Summary of the Literature’ (2022) *BIS Papers no 130* <<https://www.bis.org/publ/bppdf/bispap130.htm>>.

¹⁴ Laura A Bakkensen and Lint Barrage, ‘Going Underwater? Flood Risk Belief Heterogeneity and Coastal Home Price Dynamics’ (2021) 35 *The Review of Financial Studies* 3666.

None of the above invalidates the climate-related stress tests or scenario analyses undertaken so far by central banks and regulatory agencies, but it explains why these exercises have not been used to adjust regulatory capital requirements. It is not just because the current Basel capital framework has a short time horizon, as Gruenewald, Knijp, Schoenmaker, and van Tilburg claim. It is mainly because the results are not robust and, given the simplifying assumptions these exercises had to incorporate, likely to lead to grossly inaccurate estimates of the actual impact of climate risk on bank losses. They are nonetheless still useful as techniques to approximately gauge the potential long-term climate impact on bank balance sheets, and to examine how banks expect to adjust their business models to this impact and what the collective effect of these adjustments might be.¹⁵

3. WHAT ABOUT ‘DOUBLE MATERIALITY’?

If current estimates of future climate-related bank losses do not provide regulators with sufficient grounds to increase capital requirements, could ‘double materiality’ do the trick? ‘Double materiality’ in this context is the idea that regulators should try to capture not only the ‘inward’ risk for banks arising from climate change and climate policies but also the ‘outward’ risk that banks’ activities generate for climate through contributing to greenhouse gas (GHG) emissions and rising global temperatures. To the extent that this outward risk in turn feeds back into higher climate-related risk for the banks’ balance sheets, it falls within the scope of prudential regulation and supervision. Gruenewald, Knijp, Schoenmaker, and van Tilburg seem to believe that capturing this feedback loop would lead to better (higher) loss estimates and strengthen the case for more drastic action. They also believe that ‘double materiality’ provides a justification for supervisors to require financial firms to prepare transition plans, and to ensure that these are consistent with ‘decarbonization pathways’—presumably targets established by the government.

Regardless of ‘double materiality’, we agree it makes sense for financial firms—and non-financial firms, for that matter—to prepare transition plans consistent with national climate targets, provided these targets are credible and backed by appropriate policies (eg carbon taxes). We think there is merit in the idea that supervisors ensure that the entities they supervise have transition plans in place to mitigate the transition risk stemming from climate mitigation policies and verify adherence to such plans. This seems a more flexible and less distortionary way for regulators to help supervised entities address transition risk than one-size-fits-all regulatory capital measures: it establishes a dialogue through which the supervisors can get a better understanding of the business outlook and risk profile of financial institutions, and leaves some margin for financing currently ‘brown’ firms that have credible plans to decarbonize.¹⁶ However, formally incorporating transition plans in financing decisions—and, for regulators, in supervisory action—is fraught with formidable challenges: it would require all bank relationship managers to evaluate clients’ transition plans (and supervisors to oversee the effectiveness of this

¹⁵ Bank of England, ‘Results of the 2021 Climate Biennial Exploratory Scenario (CBES)’ (May 2022) <<https://www.bankofengland.co.uk/stress-testing/2022/results-of-the-2021-climate-biennial-exploratory-scenario>>.

¹⁶ That would also shield—at least partially—financial institutions and regulators from the accusation of indiscriminately rationing credit and financial services to all firms in high-emitting sectors. See European Banking Authority, *Report on the Role of Environmental and Social Risks in the Prudential Framework*, EBA/REP/2023/34 (October 2023) <https://www.eba.europa.eu/sites/default/files/document_library/Publications/Reports/2023/1062711/Report%20on%20the%20role%20of%20environmental%20and%20social%20risks%20in%20the%20prudential%20framework.pdf>>: ‘[A]djustment factors may fail to support the transition especially if they apply to already green exposures and disregard the transition finance needs of companies active in currently high-emitting sectors. Conversely, increased capital requirements could constrain the flow of capital required to enable the transition towards sustainability of eg, hard-to-abate sectors and regions. This could in turn lead to significant negative social consequences in certain industry sectors and geographical regions.’

process) when, as Gruenewald, Knijp, Schoenmaker, and van Tilburg acknowledge, there are no guidelines on what a good corporate transition plan might look like. It would also leave banks and their clients ample room for gaming (eg the bank financing a ‘green’ project while the firm receives funding from a non-regulated entity to support its ‘brown’ activities). Finally, we doubt that financial regulators should be in the business of enforcing compliance with government climate targets—and we return to this point in the final section.

Moreover, there is no basis for the claim that accounting for ‘double materiality’ can lead to better (higher) loss estimates and therefore a stronger case for regulatory action. Even if, despite the lack of reliable estimates, one is convinced that the ‘inward’ impact of climate risk on banks’ future losses is certain and sizeable, the incremental ‘outward’ impact of current lending by each individual bank on global temperatures would be negligible—except, at the margin, for the largest global banks.¹⁷ Attempting to estimate the feedback of individual bank loans on future climate risk through ‘double materiality’ and using this estimate to calibrate bank capital requirements today does not seem a promising way forward.

‘Double materiality’ may be a useful device to sensitize—through their disclosure obligations—financial and non-financial corporates to the broader social and environmental impact of their business decisions. This is the goal of the EU’s Corporate Sustainability Reporting Directive (CSRD) although, given that the CSRD has just started being gradually phased in, it is too early to judge its effectiveness. However, ‘double materiality’ is of no practical value for the capital regulatory framework, and we are not aware of any financial regulators, including in the EU, seriously considering incorporating it in their risk assessment toolkit.

Against this background, it is not surprising that regulators have not used the results of climate-related stress tests, much less the argument of ‘double materiality’, for setting capital requirements. Far from timidity and lassitude, as Gruenewald, Knijp, Schoenmaker, and van Tilburg imply, this shows justified caution (in part to avoid getting caught in political controversies) and an appreciation of the limitations of their analytical tools.

4. CLIMATE RISK AND THE PRUDENTIAL FRAMEWORK

Let us assume, nevertheless, that regulators decide—perhaps on the grounds of the ‘precautionary principle’—to throw caution to the wind. What prudential tools can they use to mitigate climate risk for banks? The answer depends on how exactly climate risk affects the loss-generating process. To illustrate, if historical losses are determined by the business cycle and idiosyncratic factors as a variable X with a mean $E(X)$ and a variance $V(X)$, and climate-related losses reflect a new variable Y with its own mean and variance, then future losses are determined as:

$$\text{Expected losses} = E(X) + E(Y).$$

$$\text{Variance of losses} = V(X) + V(Y) + 2Cov(X, Y).$$

Consistent with the Basel capital framework, expected losses should be covered by loan loss provisions, while capital should cover unexpected losses. Hence, it is important to understand in what way the correlation between climate-related losses and historical (business cycle and idiosyncratic) losses is going to change the distribution of future total losses. Regulators would also need to decide which specific component of the capital ‘stack’¹⁸ should cover the additional future unexpected losses.¹⁹ Without answers to these empirical questions—which, to our knowledge, are not at hand—regulators cannot decide whether and by how much loan loss

¹⁷ Kevin J Stiroh, ‘Climate Change and Double Materiality in a Micro- and Macroprudential Context’ (2022) Federal Reserve Board Finance and Economics Discussion Series No 2022–066 <<https://www.federalreserve.gov/econres/feds/climate-change-and-double-materiality-in-a-micro-and-macroprudential-context.htm>>.

¹⁸ Minimum requirement, capital conservation buffer, countercyclical buffer, systemically important buffer, or Pillar II add-on.

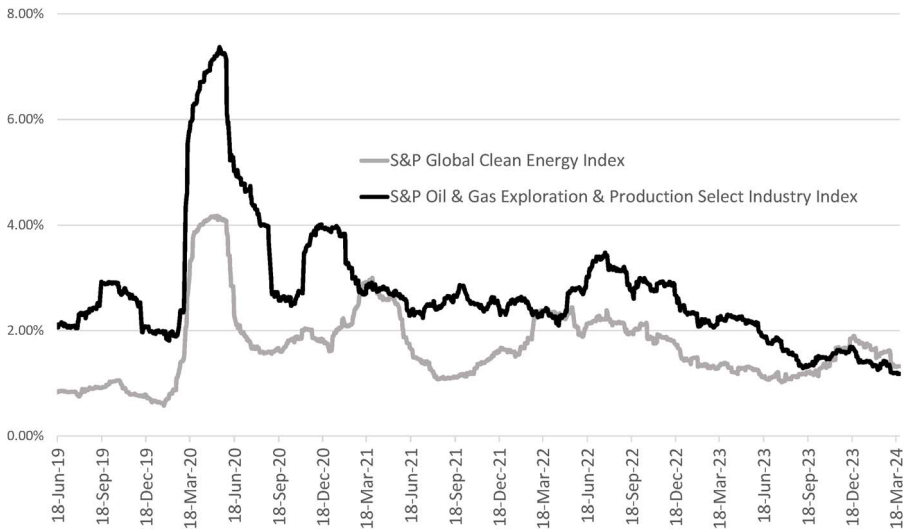


Figure 1. Volatility of returns (60-day moving window). *Source: Authors' calculations based on S&P Dow Jones Index data.*

provisions or bank capital should increase as a result of climate risk and, if the latter, which specific component of the capital 'stack' should be altered.

It should be stressed that these questions are unrelated to the time horizon: they reflect the fundamental design of the Basel capital framework. Even if regulators managed to tackle the intractable analytical challenges of extending their risk assessment models several decades into the future, they would still need to address these questions before using Pillar I to mitigate climate risk.

Gruenewald, Knijp, Schoenmaker, and van Tilburg do not engage with these questions. Instead, they propose that until the Basel capital framework is somehow 'redesigned' to overcome these challenges, regulators should introduce ad hoc adjustment factors to risk-weighted assets (RWA) to encourage (through lower risk weights) bank lending to 'green' activities and penalize lending to 'brown' activities.

The idea of a 'green supporting factor' (GSF) and a 'brown penalizing factor' (BPF) is not new.²⁰ Adjusting RWA would be appropriate only if climate risk changes the relative riskiness of specific asset classes, and assuming that we have an empirically driven approach for calibrating these changes. However, as we documented in our earlier article, there is no conclusive evidence that 'green' assets are less risky than 'brown' assets. In fact, in the current environment of increasing interest rates and energy insecurity, the volatility of 'green' asset prices has been increasing and, at least for some asset classes, is now identical to that of 'brown' assets (Fig. 1).²¹

In addition, calibrating BPF/GSF for each asset class to account for transition risk requires a comprehensive taxonomy of economic activities. Gruenewald, Knijp, Schoenmaker, and van

¹⁹ For a more detailed discussion, see Michael Holscher and others, 'Climate Change and the Role of Regulatory Capital: A Stylized Framework for Policy Assessment' (2022) Federal Reserve Board Finance and Economics Discussion Series No 2022-068 <<https://www.federalreserve.gov/econres/feds/climate-change-and-the-role-of-regulatory-capital.htm>>.

²⁰ Valdis Dombrovskis, 'Greening finance for sustainable business' (Speech by the Vice President of the European Commission, 12 December 2017) <https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_17_S235>.

²¹ Charlotte Gardes-Landolfini and others, 'Energy Transition and Geoeconomic Fragmentation: Implications for Climate Scenario Design' (2023) IMF Staff Climate Note 2023/003 <<https://www.imf.org/en/Topics/climate-change/staff-climate-note-s#16>>.

Tilburg acknowledge the limitations of ‘green/brown’ taxonomies (their static nature, lack of transparency and consistency, openness to political interference, and evidence of pervasive ‘greenwashing’),²² but instead of drawing the logical conclusion (ie that such a taxonomy is not likely to provide a credible basis for calibrating BPF/GSF), they suggest that it should nonetheless be used at least for economic activities with no ‘credible decarbonization pathway’. Even assuming that it will be possible to identify such ‘hopeless’ sectors, who should take the responsibility of such identification? And who should address the ultimate economic and social impact of cutting them out of the financial system? This is not a task for central banks and financial regulators. The government should take responsibility for the decision on which sectors (if any) should be targeted, as well as for the measures to mitigate the impact of such a decision.

A quote by former US Secretary of State Dean Rusk is apt at this point: ‘Ideas are not policies. Besides, ideas have a high infant mortality rate.’²³ This is what seems to have happened to the idea of adjusting RWA for climate risk: after a brief initial excitement, it has been dropped. The Basel Committee’s recent guidance on climate risk does not call for any changes in RWA or, more broadly, in Pillar I standards.²⁴ Even in the EU, the European Banking Authority’s latest report explicitly recommends avoiding both BPF and GSF in Pillar I capital requirements.²⁵

Even if we were to set aside all these questions regarding the appropriateness and feasibility of using Pillar I tools for climate risk, how effective are these tools likely to be in helping to ‘green’ the economy? Gruenewald, Knijp, Schoenmaker, and van Tilburg quote one study showing that ‘green central banking’ tools can reduce the cost of capital of ‘green’ activities by about 100 bps, thus making a substantial contribution to economy-wide emission reductions.²⁶ This finding, however, is subject to four important caveats. First, the study simulates the possible impact of a package of instruments which, in addition to Pillar I capital requirements (the topic of our debate), includes central bank collateral frameworks, asset purchase programmes, and refinancing operations. Second, in gauging the impact of this package of instruments on the cost of bank capital, the authors refer to other empirical studies and opt for the upper bound of *the sum* of the estimated impact of each instrument, although—as they acknowledge—there is no reason to assume these impacts are additive. Third, to generate a *sustained* reduction in the cost of capital for ‘green’ activities of 100 bps, all four of these instruments must be activated continuously throughout the transition period (assumed to reach until 2050), although—as the authors again acknowledge—unconventional monetary policy instruments, like asset purchase programmes, can obviously not be extended for decades. Fourth, the authors assume the full and immediate pass-through of the lower (higher) cost of capital to ‘green’ (‘brown’) borrowers. This is an extremely simplistic assumption, as a profit-maximizing bank has several different options to react to a change in its cost of capital, including changing retained earnings, adjusting loan terms other than the rate, partial pass-through, changing the funding mix, etc, depending on market conditions. Nevertheless, if we disregard these four caveats, accept the authors’ estimates

²² In addition, all taxonomies of economic activities face major conceptual and analytical design problems, which are often overlooked. For an in-depth discussion, see Sebastian Steuer and Tobias H Tröger, ‘The Role of Disclosures in Green Finance’ (2022) 8 *Journal of Financial Regulation* 1.

²³ Quoted in Thomas W Zeiler, *Dean Rusk: Defending the American Mission Abroad* (Rowman & Littlefield 2000) 35.

²⁴ Basel Committee on Banking Supervision, *Principles for the Effective Management and Supervision of Climate-Related Financial Risks* (Bank for International Settlements 2022) <[https://www.bis.org/bcb/publ/d532.htm#x003E](https://www.bis.org/bcb/publ/d532.htm#x003E;); and Basel Committee on Banking Supervision, *Frequently Asked Questions on Climate-Related Financial Risks* (Bank for International Settlements 2022) <<https://www.bis.org/bcb/publ/d543.htm>>.

²⁵ European Banking Authority, *Report on the Role of Environmental and Social Risks in the Prudential Framework*, EBA/REP/2023/34 (October 2023) <https://www.eba.europa.eu/sites/default/files/document_library/Publications/Reports/2023/1062711/Report%20on%20the%20role%20of%20environmental%20and%20social%20risks%20in%20the%20prudential%20framework.pdf>.

²⁶ Moutaz Altaghlib, Rens van Tilburg and Mark Sanders, ‘How Much of a Help Is a Green Central Banker?’ (2022) *Sustainable Finance Lab Working Paper* <<https://sustainablefinancelab.nl/nl/paper/how-much-of-a-help-is-a-green-central-banke-r/>>.

at face value, and focus solely on the impact of a one per cent increase in RWA, the cost of capital would rise by only 2.5–20 bps. This is comparable to the estimates cited in our earlier article,²⁷ on the basis of which we concluded that the impact of changes in RWA would be too small to stimulate a sizeable reorientation of bank lending from ‘brown’ to ‘green’ projects. This conclusion is also corroborated by the experience of the EU’s small and medium enterprise (SME) supporting factor, which was supposed to promote SME lending in a similar fashion. Although Gruenewald, Knijp, Schoenmaker, and van Tilburg cite the SME supporting factor in support of their argument, the European Banking Authority has concluded that it has had no material influence on lending prices or volumes to SMEs.²⁸

Finally, regulators need to carefully ponder the potential unintended consequences of any revision of capital requirements for climate-related risks, especially those that reach beyond the financial sector. For example, increasing risk weights on low-rise properties in flood-prone areas could cause a significant drop in house prices in these areas,²⁹ with significant social and political repercussions that go beyond the scope of financial regulation and become the responsibility of other policymakers.

We are more sympathetic to the idea that the macroprudential toolkit may be more appropriate for climate risk, given its systemic nature and the fact that, as discussed above, microprudential tools would not be effective mitigants. But again, turning this idea into policy is more challenging than Gruenewald, Knijp, Schoenmaker, and van Tilburg seem to believe. Increasing the systemic risk buffer would, other things being equal, increase the resilience of the financial system to all systemic shocks, including climate-related shocks. However, as section II has made clear, there is no reliable way to calibrate a systemic buffer add-on to the size of prospective system-wide losses from climate risk. Moreover, such a—presumably permanent—add-on would create trade-offs with elements of the microprudential capital framework. More importantly, for a systemic risk buffer (or for concentration limits/surcharges) to go beyond resilience and start reducing system-wide climate risk by changing bank exposures, the application would need to be differentiated by bank, be dynamic over time, and its scope narrowed to the firm or project level.³⁰ This, however, would make these tools hostage to the shortcomings of taxonomies discussed above. It is not clear how exactly Gruenewald, Knijp, Schoenmaker, and van Tilburg propose to overcome these challenges.

5. CONCLUDING REMARKS

The discussion so far has focused on the appropriateness and likely effectiveness of using the prudential regulatory framework to mitigate climate risk for banks. We have explained why we are sceptical on both counts. But this focus is too narrow: one also needs to consider what would be the effects of regulatory action beyond the immediate impact on banks. What if, for example, regulators were to apply the extreme proposal of a 150 per cent risk weight for new fossil fuel loans,³¹ which Gruenewald, Knijp, Schoenmaker, and van Tilburg quote approvingly,

²⁷ Benjamin Chamberlin and Julie Evain, *Indexing Capital Requirements on Climate: What Impacts Can Be Expected* (Institute for Climate Economics (I4CE) 2021) <<https://www.i4ce.org/en/publication/indexing-capital-requirements-on-climate-what-impacts-can-be-expected/>>.

²⁸ European Banking Authority, *EBA Report on SMEs and SME Supporting Factor*, EBA/OP/2016/04 (23 March 2016) <<https://www.eba.europa.eu/sites/default/documents/files/documents/10180/1359456/602d5c61-b501-4df9-8c89-71e32ab1bf84/EBA-Op-2016-04%20%20Report%20on%20SMEs%20and%20SME%20supporting%20factor.pdf>>.

²⁹ See ‘Accounting for flood risk would lower American house prices by \$187bn’ *The Economist* (25 April 2023) <<https://www.economist.com/graphic-detail/2023/04/25/accounting-for-flood-risk-would-lower-american-house-prices-by-187bn>>.

³⁰ Rodrigo Coelho and Fernando Restoy, ‘Macroprudential Policies for Addressing Climate-related Financial Risks: Challenges and Trade-offs’ (2023) Bank for International Settlements, Financial Stability Institute Brief No 18 <<https://www.bis.org/fsi/fsibriefs18.pdf>>.

or even ban such loans altogether? Such a step could have two possible outcomes. If it were effective in curbing the overall availability of finance to fossil fuel producers, investment in these sectors would decline. Given that, under a baseline scenario, demand for fossil fuels will continue increasing for years,³² this would result in spiking fossil fuel prices, undermining the process of orderly transition. Alternatively, and more likely, this step would shift fossil fuel financing to banks in jurisdictions that do not apply such an extreme measure or outside the banking system altogether—a phenomenon that is already happening.³³ In this case, the result would be to ‘green’ a few bank balance sheets but do nothing about ‘greening’ the economy.

Ultimately, there is nothing that financial regulators can do about the energy transition that an appropriately designed carbon tax cannot do better. It was not the withdrawal of bank financing from the tobacco industry that deterred smoking, but the high taxes imposed on cigarettes. The problem is that governments are unwilling or unable to impose carbon taxation, and when they do, it is unambitious, riddled with exemptions, and accompanied by fuel subsidies for certain sectors. This is largely self-inflicted: instead of being transparent about the costs and dislocations it will cause, politicians have presented the energy transition to voters ‘if not as pathways of roses, at least as a rather benign endeavor’, making unpopular measures even more difficult to implement.³⁴ Against this background, shifting some of the responsibility for unpopular measures to unelected bureaucrats in central banks must appear very appealing to politicians.

It would not be the first time this happened. In the aftermath of the global financial crisis, the eurozone crisis, and the Covid-19 pandemic, central bankers and financial regulators were pushed, cajoled, and in some cases volunteered to take on additional responsibilities of an essentially political nature. In our earlier article, we presented in detail the theoretical and practical arguments why this is almost always misguided, and ultimately undermines the effectiveness, governance, and accountability of these independent agencies, so we do not need to repeat them here.³⁵ Here, we would only add that, no matter how appealing certain solutions may appear in theory, they need to prove practical and viable in the long term from an economic, social, and political perspective—especially for processes spanning decades, like the transition to a low-carbon economy. Otherwise, central banks and regulators will be exposed to accusations of overreach and political attacks, undermining their independence and ultimately constraining their ability to make even the modest contributions to the transition that are within their power.

In their response to our earlier article, Gruenewald, Knijp, Schoenmaker, and van Tilburg enjoy us—and financial regulators—to overcome our reservations, ‘embrace the brave new world’, and use the regulatory framework actively to promote the ‘green’ transition. The ‘brave new world’ first appeared in Shakespeare’s *The Tempest*, which inspired the title of the famous book by Aldous Huxley.³⁶ In Act V of *The Tempest*, innocent Miranda, aged 15, upon meeting the party of the King of Naples, the first men other than her father whom she has ever seen

³¹ Benoit Lallemand and Thierry Philipponnat, ‘Open Letter to EU Policymakers to Close the “Climate Finance Doom Loop” through CRR, Solvency II Upgrades’ Sustainable Finance (4 May 2021) <<https://www.finance-watch.org/policy-portal/sustainable-finance/letter-to-eu-policymakers-to-close-climate-finance-doom-loop-through-crr-solvency-ii-upgrade-s/>>.

³² International Energy Agency (IEA), *World Energy Outlook 2023* (IEA 2023) <<https://www.iea.org/reports/world-energy-outlook-2023>>.

³³ Sustainable Fitch, ‘Shifting Ownership Patterns of Fossil Fuel Assets and Decarbonisation: Private Equity Markets Are Increasingly Filling the Financing Gap for Fossil Fuel Projects’ Sustainable Insight (25 May 2021) <https://www.sustainablefitch.com/_assets/special-reports/shifting-ownership-patterns-of-fossil-fuel-assets-decarbonisation.pdf>.

³⁴ Jean Pisani-Ferry, ‘Climate policy is macroeconomic policy and the implications will be significant’ (2021) Peterson Institute for International Economics Policy Brief 21–20 <<https://www.piie.com/sites/default/files/documents/pb21-20.pdf>>.

³⁵ See Demekas and Grippa (n 2). For an exposition of these arguments specifically in relation to ‘green central banking’, see Jean Tirole, ‘Socially Responsible Agencies’ (2023) 7 *Competition Law & Policy Debate* 171. See also the excellent review in Olivier Blanchard, Christian Gollier and Jean Tirole, ‘The Portfolio of Economic Policies Needed to Fight Climate Change’ (2023) 15 *Annual Review of Economics* 689.

³⁶ *The Tempest* (1611), act. 5, sc. 1, l. 183.

on the island where she has lived all her life, exclaims: 'O wonder! How many goodly creatures are there here! How beauteous mankind is! O brave new world, That has such people in't!' Her father Prospero, the former Duke of Milan, however, knowing these people and their evil nature, responds curtly: "Tis new to thee.' We hope that central banks and financial regulators prove wiser than Miranda this time.