

# What if central banks took Paris seriously?

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## **Abstract**

As we approach the ten-year anniversary of Paris, its 195 signatories have seen a build-up of financial instability resulting from the climate transition of approximately one third. To reach legally required net-zero targets by 2050 in a path commensurate with the highest level of financial stability requires the financial sector to decrease financed emissions by 4% annually. However, since Paris global emissions have increased. EU emissions have decreased marginally but banks have not fully internalised the costs of transitioning to net-zero. We argue that treating climate as an endogenous transition rather than an exogenous risk is a necessary foundation for a supervisory framework. Central banks should take a macro approach towards managing the build-up of climate-related transition imbalances in the financial system. We explore how hard limits on banks, that have been reluctant to hive off profitable high-emitting loans, could be implemented to achieve financial stability.

## 1. Introduction

As we approach the ten-year anniversary of the Paris Climate Agreement (UNFCCC, 2015), we take stock of the financial sector response with a particular focus on central bank supervision. Favourable developments include improved methods to calculate and report on financed carbon emissions, the practice to treat climate risk as a financial risk, and the general understanding that central banks have a greater role to play. Nevertheless, over the period emissions globally have increased (UNEP, 2023). Within the Europe, EU27 emissions have decreased only marginally and the ECB assesses that "the euro area banking sector shows substantial misalignment" (ECB, 2024).<sup>1</sup> Moreover, financial institutions globally have over the same period issued \$7 trillion of fossil fuel loans.<sup>2</sup> With less time on the clock to achieve net-zero ambitions by 2050 one can only conclude that central banks have presided over an increase in instability in the financial system resulting from climate transition.

The most obvious impact is that Paris is first and foremost an endeavour to avoid climate catastrophe and its effect is to decrease physical risk. Perhaps counterintuitively Paris has also resulted in a decrease in transition risk, if the risk is understood to be a disorderly transition to a low-carbon economy. By making the net-zero goal clear, explicit and enshrined in international treaty, Paris should make the transition to a low carbon economy more orderly and predictable than if no such agreement had been made. In other words, for all the 195 signatories of Paris, climate is no longer just an exogenous risk but also an endogenous transition commitment.

Viewed through this lens, the source of instability that Paris has introduced into the financial system is therefore not the result of climate as a risk, but is the result of the climate transition cost that has been imposed on the financial sector. Vast portfolios of existing business comprise financing of assets in companies that will soon by definition become stranded assets.<sup>3</sup> Profitable sources of new carbon-intensive business will have to be foregone. Potential new 'green' business has not yet always been available in sufficient quantity to make up the shortfall.

Much of the academic literature correctly focusses on the complexity of integrating climate into financial stability monitoring. The seminal book, Green Swan, states that it "is particularly challenging because of the radical uncertainty associated with a physical, social and economic phenomenon that is constantly changing and involves complex dynamics and chain reactions". Within their mandates, supervisors also find it difficult to make trade-offs between shorter and longer term financial stability objectives. Carney wrote in 2016 that: "rapid and ambitious measures may be the most desirable from the point of view of climate mitigation, but not necessarily from the perspective of financial stability over a short-term horizon."

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<sup>1</sup> The ECB 2024 assessment indicates that among the 95 significant institutions analysed, a staggering 90% are found to be misaligned.

<sup>2</sup> According to the Fossil Fuel Finance 2024 Report by Banking on Climate Chaos. Within the European Union, the ECB 2024 assessment finds that "while for the oil and gas sector, production is declining within the euro area, banks are continuing to finance the expansion of production outside the euro area"

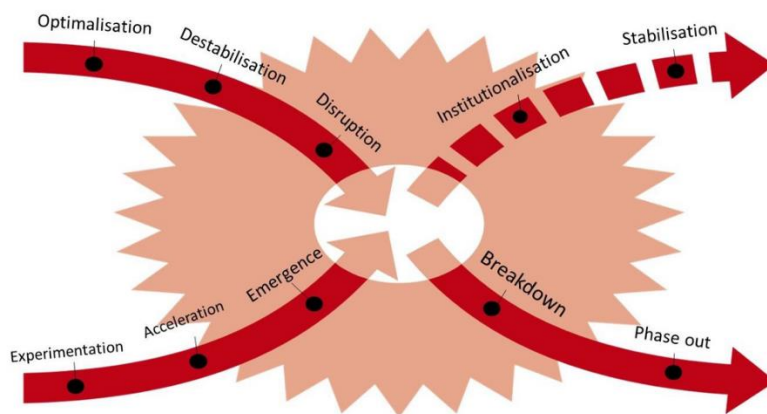
<sup>3</sup> The UNEP 'Emissions Gap Report 2023: Broken Record' (2023) states that: "Avoiding new fossil fuel capacity will limit the existing infrastructure that must be retired early to achieve Paris Agreement goals".

To date, the presence of such uncertainty has held central banks back from acting more decisively on climate. However such limitations are all predicated on a treatment of climate as exogenous, a variable that may have to be dealt with at some point. This article proposes an alternative and more limited approach: to take the complexity of climate as a risk out of the equation and instead focus more narrowly on the certainty of climate as a transition. Central banks should take a macro approach towards managing the build-up of climate-related transitions imbalances in the financial system. This article postulates the characteristics of the climate transition commensurate with the highest amount of financial stability. This article asks: ‘what if central banks took Paris seriously?’

## 2. Transition and financial stability in context

The climate transition which Paris requires will be a process of creative destruction. New technologies and business models will have to replace the old ones (Schumpeter, 1942). Figure 1 depicts the dynamics of socio-technical transitions as iterative processes of build-up and breakdown over a period of time (Loorbach, Frantzeskaki and Avelino, 2017). In a changing climate context, optimised carbon-intensive businesses will be disrupted as ‘green’ or low-carbon businesses will have to emerge. The actual transition is disruptive as carbon-intensive businesses that do not transform are broken down and phased out.

**Figure 1** The x-curve of transition dynamics



Source: Adapted from Loorbach, Frantzeskaki and Avelino (2017).

To serve this ‘real economy’ transition, banks<sup>4</sup> will have to get better at two things. First, they need to get better at financing the new green economy. This is hard. Banks’ risk models make low-carbon financing opportunities more expensive because of the newness and uncertainty related to the green economy. Moreover, data from the European Banking Authority shows that existing financial accounting frameworks might inadvertently be creating disincentives for investments in low-carbon assets, as banks are accounting for nearly double the loan loss provisions for lending to low-carbon sectors as compared with

<sup>4</sup> Banks are taken as the focus for this analysis but a similar logic can be applied to all regulated financial entities - pension funds, insurance companies and investment funds – as argued in Section 5.

high-carbon sectors (Gasparini et al, 2024). Although recent research indicates that banks on average discount lower emission firms by 14 basis points (Altavilla et al., 2024), generally speaking companies and propositions in the ‘experimentation’ through the ‘emergence’ phase have a harder time getting financed than those which are currently ‘optimised’ (ECB, 2024).<sup>5</sup>

Second, banks need to absorb these expected transition losses related to the carbon-intensive economy. Schoenmaker and Schramade (2022) have developed a model that formalises such transition losses. A key variable in this model is the probability of transition over a certain time period, which differs by sector. However, even if some variables feeding into this probability are exogenous (technology or customer preferences), we argue that the Paris commitment should be included as endogenous.

Over the last few years, banks have made important advances in terms of being able to better account for climate in their risk models. However, no bank yet completely incorporates the ECB recommendations on the integration of climate risks (Elderson, 2024) Moreover, the enthusiasm with which new carbon-intensive loans continue to be issued is testimony to the fact that these capabilities are not being used to inform financing or pricing decisions. There is in fact a strong disincentive for banks to do so. Including climate transition costs would have the net effect of decreasing the apparent profitability of banks’ carbon-intensive portfolios. The market is not yet mature enough to value the increase in expected transition losses of carbon-intensive loans. This means there is a first mover disadvantage problem to overcome. The first bank to include climate transition costs will price itself out of the market and decrease market share.

### **3. Maintaining financial stability under Paris**

The policy aim of any climate transition supervisory framework should be to maintain financial stability during that transition. Here it is best to start with knowns and to build uncertainty and risk into the framework after. Known is that that policy makers have legally determined that the net-zero needs to be achieved by 2050<sup>6</sup>. With the destination and the timeframe essentially fixed, the only uncertainty is when to take the hit: go early, go late or go steady. That the speed of transition is inversely correlated to financial stability is intuitively understood. An abrupt reallocation of assets from high-carbon to low-carbon assets leaves the real economy less time for adaptation and the financial sector with more stranded assets. As Mark Carney puts it: “too rapid a movement towards a low-carbon

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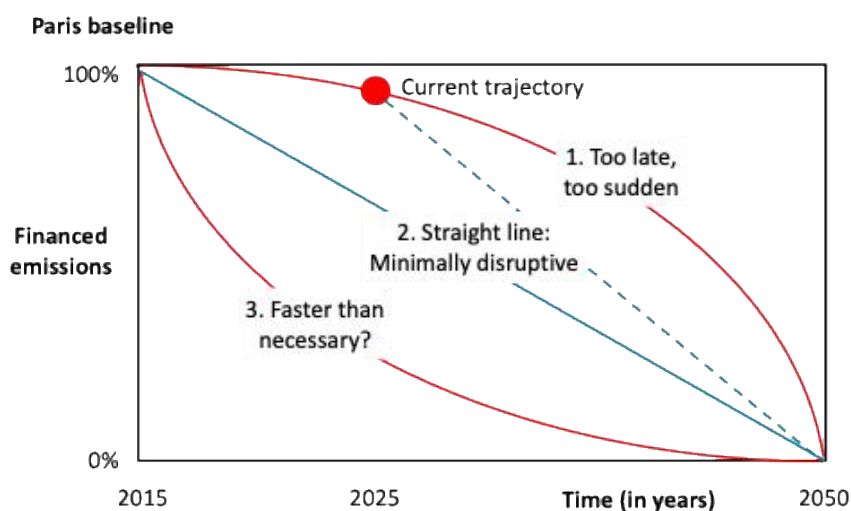
<sup>5</sup> The ECB 2024 assessment find that “banks are providing larger loans to misaligned corporations with the average size of the exposure to a misaligned corporation being more than double that of an aligned corporation”.

<sup>6</sup> Note: this article uses net-zero 2050 as short hand for Paris. In fact, net-zero 2050 is a further detailing of Paris that is not in the original agreement but has become common parlance. Globally, the guidance from policy makers is more complex. The Agreement at Glasgow (COP26) in November 2021 is not binding but “*urges parties... of the Paris Agreement towards just transitions to net zero emissions by or around mid century*” (paragraph 32). In the EU the expectation of policy makers is unambiguous. Article 2.1 of the European Climate Law ( REGULATION (EU) 2021/1119) stipulates that “*Union-wide greenhouse gas emissions and removals regulated in Union law shall be balanced within the Union at the latest by 2050, thus reducing emissions to net zero by that date*”.

economy could materially damage financial stability” (Bolton et al., 2020). This will be just as true in 2049 as it is now.

We therefore postulate that, other things being equal, the path towards net-zero commensurate with the highest amount of financial stability is the most gradual one. Visually represented in Figure 2, at any point in time the straight line path towards the Paris net-zero objective will result in the least amount of financial instability. We are currently, however, on the ‘too late, too sudden’ pathway 1 (ASC, 2016). We are delaying the internalisation of the cost of Paris. In other words, we are trading an illusion of financial stability now for a more rapid transition with an increased amount of financial instability later.

Figure 2: Financed emissions pathways and financial stability



Had we followed the ‘minimally disruptive’ pathway 2 starting in 2015, the annual percentage point decrease in financed emissions would have needed to be approximately 3% (100% divided by 35 annual steps towards 2050). As we approach 2025 (the red point in Figure 2), with little to show for it, the annual percentage point decrease is now approximately 4%. Following this logic is, the inaction which has allowed to persist under the current supervisory framework since 2015 has caused a build-up of financial instability by a third (i.e. the difference between 3% and 4%), resulting from Paris since 2015. Should the next five years towards 2030 prove as ineffectual as the last decade, the annual percentage point decrease in financed emissions would have to increase to 5%, another increase in financial instability by one quarter.

Note that Figure 2 is a deliberately limited abstraction of the impact of climate transition on financial stability. It only focusses on the known policy dimension of the Paris treaty requirement to achieve the 2050 goal, not on physical and transition risks associated with climate. The unknown tipping points and feedback loops which may result from ‘physical’, ‘social’ or ‘economic’ phenomena add more complexity.

Technological innovation reducing the cost of renewables is the most likely candidate to justify a slower pathway 1 towards Paris. This argument would make the case that green economy alternatives take time to develop and it therefore makes sense to delay transition until they are mature. The speed of technological innovation however is not independent of the amount of finance dedicated towards it. And this article will reason below, that the absence of hard carbon ‘budget’ constraints will inhibit the finance available for low-carbon technology development. At any rate, depending on unproven technology as a foundation for a supervisory framework to preserve financial stability seems reckless to say the least.

On balance the argument to move faster seems stronger. Overall there are likely to be more downside than upside risks. Climate tipping points, like permafrost collapse, icesheet loss and rainforest dieback, are already accelerating physical climate events (e.g. major floods, droughts or storms) in the run up to 2050 causing both human tragedy and financial losses. This in turn may trigger a disorderly transition.

Accounting for these certainties and risks, central banks should take action. First, central banks could apply the precautionary principle: scientists argue to stay within the safe operating space of the earth system, as there are many uncertainties on climate effects (Richardson et al., 2023). The best proxy for measuring financial instability currently available is the annual required decrease in financed emissions in excess of 4% (represented by the dotted line in Figure 2). Note that steering on net-zero 2050 has an advantage over steering on 1.5°C. It has the merit that it is measured in real time, is not dependent on the less certain impact of a natural phenomenon, and will not be called into question as we are on track to fail at achieving the 1.5°C ambition. Over time, as climate risks become better understood as financial risks, they must be added to the model.

#### **4. Central bank instruments**

How central banks measure, manage and if necessary enforce financial stability objectives in line with the climate transition is far from settled. The Green Swan book (Bolton et al., 2020) comments on the tension on central bank supervisory mandates. On the one hand there is a recognition that central banks must do more and that they “may inevitably be led into uncharted waters.” But on the other hand also that central banks “can only do so much” and that they should avoid the “risk of overburdening existing mandates.” This section reasons nevertheless that the treatment of climate as a transition allows central banks to do more within their existing financial stability mandate.

##### **Measure**

Although the methodologies are generally available to be able to measure financial stability related to climate transition, they are not universally applied. Our point of departure is that what should be known isn’t – both the baseline for financed emissions as well as absolute targets to achieve net-zero are partial. Consequently, central banks are partially blind to the build-up financial instability resulting from climate transition. And this is something central banks have to redress at both the macroprudential (i.e. systemic) level as well as the microprudential (i.e. bank) level if they are to provide effective supervision.

A number of industry led standards could be built upon to achieve this goal. For example, the Partnership for Carbon Accounting Financials (PCAF)<sup>7</sup> is an industry-led initiative which, amongst other things, allows banks to understand their financed emissions and related exposure to climate transition risk. Across seven asset classes it has developed methods to apportion emissions between debt and equity. The Science Based Targets initiative (SBTi) is currently piloting a Financial Institutions Net-Zero (FINZ) standard that provides banks with a framework to set science-based near term and net zero targets on their Scope 3 Category 15 emissions in a manner that is consistent with the temperature goals of the Paris Agreement (SBTi, 2024).<sup>8</sup> The open-source Paris Agreement Capital Transition Assessment (PACTA) methodology enables supervisory authorities to evaluate whether corporations are transitioning towards lower-carbon production. The technological (mis)alignments from PACTA can be aggregated to present a net alignment rate for each bank (ECB, 2024).

In the EU, the Corporate Sustainability Reporting Directive (CSRD) requires companies, including banks, to disclose absolute values for financed emissions and to set targets. First disclosures will be in 2025 over the financial year 2024. However, many banks are expected to use the allowed phase-in period to delay full target setting and may use a mix of partial portfolio disclosures and relative targets for the time being instead. Moreover, financial sector-specific guidance is still some years away. The result is that availability of complete and accurate information to measure climate transition as a financial stability issue is still some years away.

Given the importance to financial stability, there is a strong argument for central banks to have a greater role in requiring banks to apply internally and disclose externally metrics and targets related to financed emissions. There is more work to do also to clarify the treatment of financed emission in certain circumstances. For example, central banks should have a view on how they will adjust baselines and targets in the event of a merger, acquisition or disposal of certain books of business.

## **Manage**

Of course, government regulation and taxation, such as carbon taxes, are first best. Tirole (2023) is in favour of appropriate government policies (subject to the democratic process) and argues that “the central bank can act as a ‘climate-change fighter of last resort’” (Tirole, 2023, p. 172). Following from their financial stability mandate, the question for central banks (as policy takers) is what they should do to minimise financial instability when policy makers have determined a clear outcome (net-zero).

The main macroprudential instrument to date has been climate risk stress tests. While climate risk stress tests are a useful tool to make potential financial losses in the financial system transparent, they do not reduce financed emissions by themselves. Moreover, current climate stress tests give a false sense of security, because these tests underestimate

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<sup>7</sup> See <https://carbonaccountingfinancials.com/>

<sup>8</sup> Category 15 of Scope 3 refers to investments and includes equity, debt, project finance, and managed investments and client services (GHG Protocol: <https://ghgprotocol.org/sites/default/files/2022-12/Chapter15.pdf>).

the size of climate shocks and the impact of climate shocks on the financial system (ignoring feedback loops) (Reinders, Schoenmaker and Van Dijk, 2023).

Another recent prudential instrument is the development of bank transition plans, as required by the latest revision CRD VI of the Capital Requirements Directive (CRD/2013/36/EU). Banks should assess and embed forward-looking climate (and other ESG) risks considerations in their strategies, policies and risk management processes through transition planning considering short-, medium- and long-term time horizons (the new Article 76 of the CRD). Banks should show their overall resilience towards climate risks. Smoleńska and Van 't Klooster (2022) argue that bank transition plans are a hybrid instrument half-way between risk management (internal to banks) and guided transition from supervisors. The ECB, as banking supervisor of the euro-area banks, could implement guided transition by requiring banks to include annual reductions of financed carbon emissions in their prospective transition plans, as supervisors (including the ECB) will be entitled to assess the robustness of banks' transition plans under the new Article 87a(4) of the CRD).<sup>9</sup>

There is a need for further policy tools that require banks (and other financial institutions) to reduce financed emissions in line with Paris. The preferred instrument of many macroprudential policymakers is imposing systemic risk buffers. The ECB/ESRB report (2023) proposes a systemic risk buffer (called concentration charges) for climate-related concentration risk. If and when carbon-intensive exposures exceed a concentration threshold, the systemic risk buffer kicks in, as higher concentrations are associated with higher bank losses.

The main challenge is to set the appropriate height of the systemic risk buffer. First, estimates from the impact of 1 percentage point increase in capital requirements on aggregate credit growth vary from a 1 to 10 percentage points decrease in credit growth (ECB/ESRB, 2023). This large variance in expected impact makes it difficult to calibrate the exact height of the systemic risk buffer. Second, policymakers have a tendency to set capital buffers at the lower level making them less effective. A case in point is the countercyclical capital buffer, implemented after the global financial crisis, which is not regarded as sufficiently high to be able to counter the credit cycle when activated. Third, the size of the buffer has to be high enough to tilt the balance from carbon-intensive to low-carbon loans (Oehmke and Opp, 2023). In the current outlook with energy shortages and high interest rates, fossil-related loans are more profitable than loans for renewable energy projects, which need high upfront investment at the currently high interest rates. So, just like the counter cyclical capital buffer, a systemic risk buffer for climate concentrations is likely to have limited effect, unless it is set at a variable and sufficiently high level (which is unlikely to happen because of political economy reasons).

An alternative to buffers (which are basically pricing tools) is to cap financed carbon emissions via a large exposure rule limit (Schoenmaker and Van Tilburg, 2016). Such a hard budget constraint would directly 'limit' the amount of financed carbon emissions in an

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<sup>9</sup> Moreover, Article 104(1)(e) CRD, as revised by CRD VI, will grant supervisors the power to "restrict or limit the business, including with regard to the acceptance of deposits, operations or network of institutions or to request the divestment of activities that pose excessive risks to the soundness of an institution".



effective way. Building on Janos Kornai (1986): “the softer the budget constraint, the weaker the compulsion to adjust demand to relative prices ...demand management works only if it is associated with sufficiently hard budget constraints. This is one of the important relationships between macro- and microeconomics.”

Given the limitations of buffers, we explore the possibility of applying bank-specific macro limits for financed emissions, starting with a baseline and applied forward towards 2050. Bank-specific means a limit based on a bank’s absolute financed emissions, taking into consideration the actual portfolio baseline at a certain date. And macro means that the aim of the limit is to reduce financed emissions in the wider financial system. Within the constraints of such hard limits, a price of financed emissions will emerge. This helps banks steer towards Paris-aligned loan and investment portfolios that limit bank-specific and systemic losses resulting from the climate transition. Limits beat buffers on efficacy, even if they require central banks to align more with policy makers to implement and enforce.

## **5. Calibrating the guided transition**

There is no reason why central banks shouldn’t and couldn’t require better measurement of climate transition immediately. While there may be work to do to develop standards for financed emissions accounting, existing methodologies and industry-led initiatives are sufficiently well advanced to allow for quick implementation. Quality of disclosures should improve rapidly over time as financed emissions accounting will fall under assurance by auditors. Nevertheless, central banks should be mindful of banks seeking to game the system. Existing supervisory instruments could be deployed to close loopholes. The proposal for guided transition to manage and enforce a hard limit on financed does require urgent work to develop and operationalise. Our recommendations include:

### **1. Design of the guided transition instrument**

Hard limits on financed carbon emissions to reach net zero in 2050 could be designed top-down from a system perspective. As indicated in Figure 2, the starting point is the amount of today’s financed emissions as percentage of bank capital. This prudential limit should be tightened to achieve absolute emission reduction of 4 percentage points per year in comparison to the base year 2025.<sup>10</sup> Given this tightening, banks have an incentive to lend to companies that adapt to greener business models as they will contribute to reduced financed emissions (Schoenmaker and Schramade, 2022). Lending to companies that do not adapt will be hard to come by as these companies will never contribute to reduced financed emissions. The aim should be to achieve timely reductions, not to punish high-carbon companies that are on a credible and timely path to reduce carbon emissions.

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<sup>10</sup> 100% divided by 25 annual steps towards 2050. So, we get a prudential limit of 100% (of 2025 emissions) in 2025, 96% (of 2025 emissions) in 2026, 92% (of 2025 emissions) in 2027 up to 0% in 2050. The annual 4% reduction of the starting limit should be adjusted for increases in aggregate bank capital. So, in case bank capital grows with 10% (in comparison to the bank capital in the starting year), the annual reduction should increase to 4.4% ( $4\% \cdot 1.1$ ).

The aim of the prudential limit should be to steer the climate transition in an even-handed way to net zero by 2050, across time and across banks.<sup>11</sup> All banks, no matter what their baseline of financed emissions, will have to set annual steps towards net zero. Under the auspices of the European Systemic Risk Board, limits could be set for all regulated financial entities: pension funds, insurance companies and investment funds. The result of the limit will need to be a decrease of finance to companies which are unable to adapt and thus prevent climate transition losses to the financial system.

## **2. Clarification of the legal basis**

We have argued that central bank action to guide the climate transition stems from their financial stability mandate. The imposition of a 4% percentage point annual reduction in financed emissions will nevertheless result in some market upheaval. It is important to understand this as part of a process of internalising Paris in the most gradual possible way: upheaval now to avoid greater financial instability later.

In the EU, the new bank transition plans under CRD VI provide a good legal base. The ECB, as banking supervisor of the euro-area banks, could implement guided transition by requiring banks to include annual reductions of financed carbon emissions in their prospective transition plans, as supervisors (including the ECB) will be entitled to assess the robustness of banks' transition plans under the new Article 87a(4) of the CRD.<sup>12</sup> European Banking Authority draft guidelines (EBA, 2024) provide some guidance to the financial sector as to the contents of these transition plans but will require future clarifications on time-horizons and treatment of financed emissions.

## **3. Mitigation of global leakages**

Although climate is a transition that will need to happen globally, it is important to mitigate leakage to foreign financial institutions and opportunities for arbitrage between supervisory jurisdictions. This is perhaps the greatest challenge. The instrument may well be successful at improving the Paris-alignment of European banks' portfolios, but will fail at improving alignment of the real economy if corporates finance their high emitting activities elsewhere. Solutions could be found in making the prudential limit location based, just like the countercyclical capital buffer. Non-EU institutions operating in the EU would then also fall under the prudential limit. To prevent international leakage, these prudential limits would have to be implemented at the global level through the Financial Stability Board and the G20.<sup>13</sup>

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<sup>11</sup> The design of the instrument has to consider accounting rules which need to be developed to deal with the complexities of mergers and acquisition and consideration needs to be given to the financing of transitional activities and interim measures for high-impact sectors.

<sup>12</sup> Moreover, Article 104(1)(e) CRD, as revised by CRD VI, will grant supervisors the power to "restrict or limit the business, including with regard to the acceptance of deposits, operations or network of institutions or to request the divestment of activities that pose excessive risks to the soundness of an institution".

<sup>13</sup> If international coordination is not possible from the start, further mitigation actions aimed at European companies could be implemented to prevent them splitting up to evade the prudential limits.

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Operationalising the framework will require an effort that is formidable but should not be insurmountable. The infrastructure to deal with issues is much stronger now than it was a decade ago. At the international level, Financial Stability Board, G20 and annual COP conference are opportunities to clarify international treaty requirements and to overcome collective action problems. Knowledge networks such as the Network for Greening the Financial System (NGFS), the European Systemic Risk Board and the Glasgow Financial Alliance for Net Zero (GFANZ) can be mobilised to detail our recommendations.

## **6. Conclusions**

To many professionals working on sustainability at banks and the companies they finance, it feels like an enormous amount of effort has been undertaken in the years since Paris. From stress-testing to disclosure, from changes in governance to development of green finance offerings, much has been achieved. Yet, globally financed emissions have not come down. Difficult decisions have not yet been made resulting in a more disorderly transition as we approach 2050. Sceptical readers may surmise that 2050 is a long way away and that 'something' will be sorted out to avoid crisis. Perhaps Paris objectives will be relaxed or their non-compliance will go unenforced. Or alternatively we may be saved by some yet-to-be-invented miracle technology.

But this can hardly be the basis for a supervisory framework. It is time to flip the default around and, until we are being told otherwise, treat the Paris commitment as the will of policy makers and manage financial stability accordingly with guided transition.

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