Veblen Institute for Economic Reforms

"The need for qualitative climate risk-supervision and a risk management based on the precautionary principle"[1]

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A contribution from:

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In response to the Consultative Document "Principles for the effective management and supervision of climate-related financial risks", issued for comment by Basel Committee on Banking Supervision.

Our reaction in short

The Consultative Document follows the dominant approach to climate-related financial risk, which consists in trying to develop methodologies to accurately calculate the financial risks generated by both long-term physical climate change and the shorter-term measures implemented to mitigate its effects. The underlying presumption is that prudential or other measures have to be made on the basis of such calculations. We think this approach leads to a deadlock and further delays the responses of central banks and financial supervisors to the climate crisis. Instead, we follow the precautionary approach developed by some researchers (Chenet et alli, 2020), which calls for a different strategy.

Many central bank publications (for instance many NGFS publications) demonstrate an understanding of the complexity of the problem. And yet, most of the proposals that emerge insist on calculating and quantifying climate risk in terms of financial losses and call for increasingly sophisticated modelling, while recognising their many profound limitations and without really proving their usefulness.

Why trying to measure "climate-related financial risk" leads to a deadlock

Most central banks are clinging to a purely "risk-focussed" outlook, wanting at all costs to calculate the financial risk associated with climate change before taking action. The underlying assumption here is that climate risk represents an identifiable and measurable financial risk; that it is simply a matter of developing adequate methodologies to capture (calculate) it and act accordingly, at the level of financial portfolios or bank balance sheets. However, these methodologies are in their early stages of development and are not currently operational; hence the constant calls for "more research" and refinement of the modelling exercises that abound in central bank publications.

[1] This response draws on a previous Veblen Institute paper, "Whatever it takes" climate strategy in central banking Wojtek Kalinowski, & Hugues Chenet, December 2020.

But it is a misunderstanding to think that the challenge is a methodological one. **Climate change does not have the characteristics of a quantifiable financial risk.**

Firstly, the calculation of a financial risk is typically based on probabilities established using data, both past and extrapolated into the future. This is the dominant approach to financial risk, the basis for almost all financing and investment decisions, based on the known, and therefore past, characteristics of various types of financial assets and products. The problem is that, when it comes to climate change, the past cannot be used to establish future probabilities. The nature and scale of the phenomenon is unprecedented in our economic history. There are no data or statistics from which to assess how climate change will affect the economy.

Secondly, it is the long time horizon of climate risk that poses a problem in itself: how should the economic performance of a company, the solvency of households or the borrowing capacity of a government be estimated over a period of twenty or thirty years or more? Yet this is the exercise in which both the financial profession and the monetary and prudential authorities are currently engaged.

Finally, the financial risk induced by climate change is not necessarily where we expect it to be. A company with a high-carbon business, but with sufficient capital and the right decarbonisation strategy, can manage the transition successfully and hope – as many oil companies do today – to be the one to "sell the last drop". From the financial analyst's point of view, this strategy may make the financial securities of the company in question financially attractive.

Climate change[2] does not present us with a risk but with radical uncertainty, due to the immense complexity of the mechanisms at work involving both socio-economic and natural systems and the multiplicity of futures possible over very long time horizons (Chenet *et al*., 2019). Contrary to Knight's notion of risk (1921), traditionally used in finance, the term "radical uncertainty" refers to situations where there is no calculable probability of a particular future occurrence. The future is unknown[3]. In other words, if radical uncertainty prevails, financial risk is not calculable. The whole logic of taking financial risk into account is then undermined[4].

Thus, we need another approach, one that recognises the uncertainty of the future and tries to imagine what might happen beyond what has already happened. The scenarios and stress tests developed in recent years by monetary and prudential authorities and market participants intuitively offer an attractive alternative.

Why a purely quantitative use of scenarios does not work

Scenario-based approaches are today used as prospective analysis tools by many companies as well as by governments. They allow us to imagine potential situations and futures and to analyse the impact and responses of the entity in question (project, company, country, etc.). Applied to the financial sector, these scenarios should represent the "state of the world" at different points in the future for a number of

[2] These remarks are valid for any major long-term system change, and are even more applicable to still more complex phenomena such as the decline of biodiversity (Kedward *et al*., 2020).

[3] We then talk about unknown unknowns (in the mathematical sense). In many "simple" computational situations (i.e. without chaotic system interactions), especially in the short term where the near future can be considered an extension of the present state, or in situations where physical laws and conditions are determined, one can indeed estimate the future in a relatively precise way: for example, one can calculate the duration of fall of an object with known characteristics, or predict the trajectory of a celestial object over millennia.

[4] To go further, see for example Aglietta and Espagne, 2016; Christophers, 2017; Thomä and Chenet, 2017; Ameli *et al*., 2019; Chenet *et al*., 2019; Kedward *et al*., 2020.

parameters useful for characterizing financial variables. Various agencies and institutions are working on developing scenarios that could serve as a basis for such exercises[5].

The use of scenarios does not presuppose the type of analysis conducted; it can involve mathematical models as well as qualitative data from, for example, expert panels. The point of the exercise is to move beyond the objective of a single forecast and to explore possibilities. In absolute terms, therefore, such an approach is particularly relevant to climate change. However, when monetary and prudential authorities invite the institutions within their jurisdiction to use it, it is mainly to conduct stress tests, i.e. as part of a purely quantitative exercise aimed at generating numerical estimates for 2030, 2040 or 2050. Designed on the model of "traditional" financial stress tests, climate stress tests are now being promoted as a new tool for the supervision of financial institutions (Bank of England, 2019; ACPR, 2020; NGFS, 2020d). The NFGS' work certainly suggests that scenarios can be used in qualitative approaches (NGFS, 2020d), but only quantitative approaches based on climate-economy-finance modelling have been promoted to date.

As no methodological framework has so far proposed a truly integrated analysis of the problem incorporating climate, macroeconomy, sectoral/regional levels and finance, modelling takes the form of a series of steps in which the outputs of the previous model become the inputs of the next model. A number of limitations and sources of uncertainty are associated with each of these steps, which then pile up on top of each other with each step of the modelling process. In the end, the scenarios do generate figures, but at the same time they suffer from thorny methodological problems, which are well-known and almost insurmountable. Let's look at the main ones.

- In order to calculate the "cost of inaction" or the present value of future losses relative to the costs of policies adopted today to avoid them, and as such the carbon prices needed to alter a particular economic trajectory, a discount rate must be set. This is an arbitrary choice that profoundly influences the final outcome and on which there will certainly never be a consensus among economists.
- Climate change risks are systemic and affect society as a whole. It is extremely complex to isolate its specific effects on individual companies and sectors. The analysis of these transmission channels and interaction networks, which largely ignores the – endogenous – reactions of consumers and possible changes over time, remains rudimentary, meaning that it is difficult to predict which sectors will be able to absorb a transition shock better than others.
- It is fundamentally difficult to **integrate climate and broader physical parameters into macroeconomic modelling**. Changes in climate or ecosystems are not linear and often prove irreversible; there are many points of no return and feedback loops can suddenly accelerate changes in unexpected ways. The damage functions used by economy-climate models cannot account for these phenomena.
- **Historical data reflecting comparable phenomena**, which could be used to test correlations between variables and corroborate or invalidate model predictions, **do not exist**.

[5] Recently, the Bank of England (Bank of England, 2019) and the Banque de France/ACPR (ACPR, 2020) have developed comprehensive and ambitious scenario analysis exercises. The ACPR generates three transition risk scenarios and one physical risk scenario from a stack of four different modelling layers: (1) an economy-climate model defining the levels of GHG emissions and carbon price levels corresponding to each trajectory, (2) a multi-country macroeconomic model (called NiGEM) illustrating the corresponding productivity shocks, in terms of macroeconomic variables (GDP, inflation, unemployment, etc.), (3) an internally developed sector-specific model that disaggregates these variables in terms of value added and turnover for 55 economic sectors, and (4) the financial layer itself, consisting of the Banque de France financial rating model giving the associated probabilities of default, and several financial modules giving stock market returns and corporate rate spreads for each scenario/sector/region (ACPR, 2020; Allen et al, 2020).

- **Technical progress**, modelled as a variable with an increasing trend within total factor productivity, is equivalent to assuming the emergence of "clean" alternative technologies thanks to the "price signal" of the carbon tax. This is a highly questionable hypothesis that can bias the results obtained, and ignores the role of public funding of innovation (Mazzucato *et al.*, 2018).

- Especially since we do not know which **technologies** will be the **"winners" and "losers**". For example, the risk of stranded assets may also affect "clean" technologies, the limits of which are being discovered (as in the case of agrofuels or the current batteries of electric vehicles), or because they will be competing with others as yet unknown or so far overlooked. At the level of economic sectors and the multitude of micro-sectors and companies within them, it is doubtful whether technologies such as carbon capture and storage or the storage of energy from renewable sources will offer solutions that can be generalised as extensively in reality as in the models, given other limitations that have not been taken into account (for example, the availability of mineral resources such as certain rare-earths needed to manufacture current batteries, or other possible obstacles of a geopolitical, sociological or institutional nature).

- **Another source of uncertainty is of a political nature: the "green paradox"** shows, for example, that a rise in the carbon price in fossil fuel-importing countries could cause a fall in prices in exporting countries, with ultimately a very limited effect on demand.

- Applying a shock or series of "shocks" to a financial asset or portfolio can make sense to simulate the effect of, for example, a carbon tax applied abruptly to an entire sector of the economy. On the other hand, it is much less suitable for representing a gradual decarbonisation of the economy, in part or as a whole over one or more decades, with all the structural modifications and adaptations that would accompany it (sociological, industrial, technological, etc.), according to linear or non-linear dynamics, unidirectional or with backtracking, regional bifurcations, etc. In addition to the concept of shock or succession of shocks, the only variable in the traditional stress test, we need to incorporate the more or less progressive and profound adaptation and transformation of the system, which is probably more representative of real processes.

- Similarly, the dynamics "easily" captured at the level of companies is only captured at a sectoral classification level that does not allow for differentiation between two firms within the same sector that might have totally different activities in terms of the transition (e.g. renewable electricity generation vs. coal, regional vs. international transport, livestock vs. crop agricultural production), or have varying exposures to climate change due to the geographical distribution of their productive assets or place of sale, etc. Thus, with no specifics in terms of companies or physical assets, the portfolios of two different banks with broadly the same sectoral exposures will show the same climate risk, while one may only finance/invest in transition-oriented and climate-resilient companies, and the other may have a high-carbon portfolio with a high level of physical risk. While this example is something of an exaggeration, the value of the information provided at sector level should be examined.

- Lastly, and more broadly, **the number and representativeness of the scenarios** selected should be questioned, since the feasibility of the exercise is based on the use of a small number of scenarios from among the infinite number of possible futures. How can we be sure that three or four scenarios adequately represent the universe of possibilities?

These limitations are so numerous and fundamental that one may wonder what the point of the exercise actually is. Surprisingly, the central bank documents explaining the climate stress test exercises largely repeat these various reservations and warnings concerning the significance of the hypotheses and the interpretability of the results. Most of the time, these limitations are listed at the end, after the entire exercise has been developed and detailed.

Our recommendations:

Experiment the potential of qualitative risk management

How, then, can we prevent financial risks that are completely beyond the reach of traditional risk management tools? In matter of banking and financial supervision, supervisor could look for "qualitative" methods used by some think tanks and consultants, which use a broad array of sources of information and take sufficient time to understand the underlying assets of a portfolio (firms industrial strategy, upcoming investments, etc).

Rather than remaining locked into calculation-based approaches that always seek the financial materiality of the risk, central banks could accept the state of scientific knowledge on climate as a sufficient basis for recognising that the climate crisis will undoubtedly have consequences for the financial system. Information that is not useful, or whose robustness and reliability cannot be estimated, should be ignored. Experience, interpretation and discernment must prevail over data and the alleged objectivism of the current paradigm, which is no longer relevant[6]. While some elements are certainly complex to determine, the calculation of financial risk will not help here, especially given the obstacles we have reviewed.

Central banks could draw inspiration from the so-called "no-regrets" strategies mobilised in climate change adaptation policies, both in the decision-making process and in the content of the decision itself[7]. Such an approach requires thinking about the future in qualitative terms. This "imaginative" process is the basis of scenario approaches – which should not be discarded – and constitutes the narrative framework of possible futures, which is as important, if not more important, than the quantitative (numerical) layer that accompanies it.

Prioritise speed over comprehensiveness

Action must be taken without delay, even if it means being content, in the short term, with the most obvious actions – exclusion of the most polluting assets from refinancing, higher capital requirements, etc. – in order to create some momentum[8]. In the face of the irreversible effects of the climate crisis, it is better to be approximately right than precisely wrong[9]. Instead of looking for an optimal solution, from an economists' perspective, we simply need to resort to a priori satisfactory measures, ground rules (or rules of thumb[10]) drawn from accumulated knowledge and experience of crisis management. An example of a rule of thumb would be to start by tackling the financing of the most harmful activities, where a broad consensus exists at least in some jurisdictions (coal-fired power plants, oil sands development, etc.), using the arsenal of tools available to central banks, including asset buybacks, eligibility of collateral, credit control, etc. For example, the Swedish central bank has just announced that it will only accept bonds issued by companies "deemed to comply with international standards and norms for sustainability[11]". The measure is quite modest and its effectiveness will depend on the concrete definitions and sustainability standards adopted, but it is nonetheless evidence of a move towards action in the right direction.

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[6] See King (2016); Kay and King (2020).

[7] See Hallegatte (2009) and Siegel (2011) and the methods for "Decision Making Under Deep Uncertainty", https://blogs.worldbank.org/ppps/embracing-uncertainty-better-decision-making

[8] "It is the problem of context – the impossibility of knowing all the feasible choices and the full detail of the environment in which these choices will take effect. The human brain is not a computer implementing an axiomatic decision-making process, and as a result is a better decision-maker in many complex situations." (Kay and King, 2020).

[9] Among the many users of this famous saying is, once again, Mervyn King, former Governor of the Bank of England, on the calculation of regulatory capital in a situation of uncertainty: "If the nature of the uncertainty is unknown... it is better to be roughly right than precisely wrong, and to use a simple but more robust measure of required capital" (King, 2016, chap. 4).

[10] https://en.wikipedia.org/wiki/Rule_of_thumb

[11] "Zero policy rate and extended asset purchases", Riskbanken, press release of 26 November 2020.

Develop adaptive strategies

The decision-making dynamic thus set in motion will necessarily be one of trial, error and adjustment. The complexity of the climate problem requires adaptive, flexible and iterative strategies, as opposed to a single, immobile strategy, fixed *ex ante* and offering no exit or possible deviation. The strategic review launched by the ECB in 2020 is the second in its history; the previous one took place in 2003. The climate strategy, on the other hand, needs to be reviewed very regularly.

The "learning-by-doing" model is particularly relevant in our case, where the urgency to act takes precedence over any other consideration. Rather than waiting to be certain of the right tool and the perfect calibration for an ideal intervention, it seems much wiser and more astute to take action without delay, starting with the decisions that make the most sense and are consistent with the objectives, and being ready to adjust them according to the effects and reactions they generate.

This is, moreover, how the ECB acted when faced with the Covid-19 pandemic. On 12 March 2020, it announced a massive €120 billion asset buyback operation on the markets. Faced with the negative reaction of stakeholders and the lack of confidence – which this announcement was supposed to restore –, less than a week later, on 18 March 2020, the institution multiplied the amount of its intervention by more than six, bringing it to €750 billion, and then extended it again (to €1.35 trillion to date). This is a particularly instructive example of a heuristic of action in a situation of radical uncertainty and emergency, based on learning by doing and the use of a certain amount of discretion. While it is conceivable that the first figure is the result of a modelling exercise, working in the dark in the context of a situation that was as new as it was radically uncertain, it is highly likely that the second figure of €750 billion was determined by quite different procedures. This pragmatic, humble approach, recognising trial and error but resolutely focussed on action, makes perfect sense. It is not the relevance of the intervention itself that is important here, but rather the ability, in a given situation, to mobilise a decision-making method that is totally contradictory to the one that has been used thus far in relation to climate risk. This highlights the importance of state of mind when it comes to decision making.

It can be argued that the comparison does not hold water, because in the case of the pandemic central banks are faced with financial variables that are collapsing or spiralling before their very eyes, going beyond acceptable limits. As the climate crisis has not yet been translated into financial variables, it might therefore seem important to wait. But this would be to forget that by the time the financial variables reflect physical realities, it will be too late: we must take precautionary action, which in this case means acting without delay.

Make a public commitment to a "whatever it takes climate" strategy

The more complex a situation is, the more we need a simple narrative and a concrete plan of action (Boyer, 2018[12]). At this point in the discussion, the narrative should be clear: recognising the power and position of the financial system in steering the economy, the challenge is to shape it to help move us closer to a +1.5°C trajectory, and to use all the means available to a central bank. In contrast to doom-mongering, "catastrophist" approaches, a precautionary approach informed by knowledge must lead to action, precisely to avoid the realisation of the catastrophic scenario (Dupuy, 2002; Dupuy and Grinbaum, 2005).

[12] "The higher the uncertainty and complexity, the more urgent the need for simple narratives" (Boyer, 2018).

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