

“Sleepwalking” Towards a Global Polycrisis?¹

By William White

The three words in the title for this session “Climate economics and governance” remind us that at least three conditions will have to be met to meet the global challenge of climate change. I refer to these as the should, could and would problems. Good policy begins with knowing what **should** be done – good analysis – the primary focus of this conference. In addition, however, power must be available to ensure that what should be done **could** actually be implemented. Finally, available power **would** actually have to be used, and that demands popular support for policies that threaten both conventional wisdom and current living standards. We are currently significantly deficient with respect to all three requirements.

Let me first begin with a few words about each of these current deficiencies. Then let me go on to conclude that recognition of these deficiencies also implies we face the danger of a polycrisis – a simultaneous crisis in many systems² – that could lead to dangerous, perhaps even uncontrollable, positive feedback effects. For example, growing economic and political fragilities threaten crises which undermine efforts to mitigate climate change which then fosters more economic and political fragility which etc.... Failure to recognize this possibility implies we are “sleepwalking” towards such an outcome³. I will finish by noting that research and the input of scientists and mathematicians is also needed to assess this broader threat of polycrisis.

A. What **should** be done? An **analytical** deficit?

Most scientists thinking about the environment see it as a complex, adaptive system with the associated characteristics of such systems: complex networks, non-linear cause-effect relationships, tipping points etc. Policies in such systems can have positive effects in the short term, but negative effects in the longer term.

¹ Notes prepared for a presentation at a workshop hosted by the University of Waterloo, Canada, on “Math for Complex Climate Challenges”, May 3, 2023.

² A first and crucial question is how to define the systems. In an article I wrote in *The International Economy* (Fall 2020) called “The Four Horsemen of the Apocalypse” I referred to the economic/financial, political, environmental and public health systems. The Cascade Institute in Victoria in recent publications distinguishes nine systems in three broader categories encompassing natural, technological and social phenomena.

³ Nor is this without precedent. See “The Sleepwalkers: How Europe Went to War in 1914” by Christopher Clark.

As well, policies intended to stabilize one system can have destabilizing effects in other, related systems. In spite of these powerful insights, there remain significant deficiencies in modeling both the effects of climate change and how to mitigate it. Let me give three examples.

1. IPCC warnings and their use of Integrated Assessment Models

These warnings have become ever more dire as time passes and the carbon budget gets smaller. But, in addition, there are grounds for belief that these models, largely created by economists, severely underestimate the damage likely to be caused by climate change. As pointed out in recent articles⁴, these models essentially ignore tipping point problems and assume that economic sectors not exposed to the weather are insulated from climate change. The idea that air-conditioned factories will operate as normal when the workers are subject to “wet bulb” heat and humidity conditions seems totally implausible.

2. Modelling the effects of climate change on the financial system.

I recently attended a meeting in Washington on the role of central banks and financial regulators in responding to climate change issues. Without going into these broader issues, what struck me was the extraordinary difficulty faced in estimating the risks posed to the financial system by climate developments. The difficulties compound through three levels of analysis.

First, individual companies borrowing from banks are expected to assess how climate change might affect their risk of repayment. They must estimate the physical losses they might face due to climate change, their transitional losses (for example, due to stranded assets) and also the legal liabilities they might face. Most companies lack the capacity to do so, and they also do not wish to do so because they fear the banks might punish them (by withdrawing credit) in consequence. Laws (as in Europe) to force companies to make such estimate cannot compensate for the incapacity to do so.

Second, individual banks must then use this faulty data to estimate how their overall portfolio exposure is affected, without having any historical data to inform them about the potential correlation between losses and the magnitude of overall losses. Two recent reports, from the FRBNY about “stress testing” of banks for

⁴ See for example, Keen, Grasselli et al “Economists erroneous estimates of damages from climate change”.

climate change, suggests there is a significant need for more research. Remaining questions include how banks' perceptions of climate exposure might affect lending, and thus the economy in turn? Is market pricing of climate risk adequate? How can banks assess overall expected losses when mitigation costs and adaptation costs are negatively correlated?

Third, regulators and central banks then have to look at the risks borne by individual banks and see what this means for systemic risk to the banking system as a whole. Unfortunately, there are no accepted models as to how such systemic risks arise⁵, and again there is no historical data to guide the analysis. Nor is there any understanding of how a systemic banking crisis might affect the real economy and then further harm the banks via non-performing-loans. Finally, in recent decades banks have become much less important in the financial system, and even less is known about the structure and potential behaviour of non-bank financial institutions.

3. Modelling the transition to net zero.

There continues to be great uncertainty about what needs to be done, physically, to get to net zero and what path countries intend to follow to do so. This has already had some undesirable consequences. Some combination of reduced demand for energy, together with increased supply from renewable energy, should already have led to a reduced need for fossil fuels. This has not happened, nor was this widely forecast, so the demand for fossil fuels has held up even as the supply has fallen due to reduced investment in recent years. The upshot is that prices have risen sharply (even before the invasion of Ukraine) with the possibility of still more price increase to come.

Another area of uncertainty has to do with the role of metals in electrification and the role of alternative sources of electricity to renewables. Given targets for Electric Vehicles, for example, what volume of metals will be needed for EVs, batteries and grids (to say nothing of skilled technicians) and of which sorts and when? Can mines be developed fast enough and profitably enough to allow these targets to be met? Will the continued use of nuclear power and natural gas be

⁵ The recent failure of SVB, First Republic and Credit Suisse were not foreseen by either the markets or the regulators. Astonishingly, they failed to foresee that interest rates could rise from historical lows. As well, they failed to foresee that market losses on long-duration assets could raise fears of bank insolvency and then prompt a run on deposits.

necessary during the transition and even beyond? Continued uncertainty about all these issues must surely lower the chances of a smooth transition.

B. What **could** be done? An **executive** deficit?

Even if you know what you should do to achieve your objectives, power must be available in the right places to make things happen. Again, at least three shortcomings can be identified.

1. Nation-states are getting in the way.

Climate change is a global problem, but there is no global government. Power lies with national governments. With respect to climate change, UN and global agencies (like the COP process and the Paris agreement) can lay out objectives and get commitments, but it is up to national governments to deliver. Moreover, there is no power of accountability to force them to meet their commitments.

I was recently at a conference, with many representatives of industry, where it was further contended that national governments are often a force impeding climate change mitigation. Reflecting a prevailing silo mentality, one government department recommends (or even demands) change while another one enforces existing regulations that prevent that change from happening. Similarly, national government were accused of enforcing national policies that impeded local authorities from better responses that reflected local conditions.

2. Geopolitical tensions.

The recent sharp division between the “democratic” regimes and “authoritarian” regimes will not be helpful to needed cooperation on climate change. While such cooperation need not be ruled out in principle, in practice it might not happen. As a member of the Canada-US Commission on China, I have heard many US participants contend that legislative proposals in Washington to “decouple” from China give scant attention to the economic costs involved. Janet Yellen’s recent speech⁶ explicitly stated that “national security is of paramount importance in our relationship with China”. None of this gives cause for optimism.

⁶ Remarks at Johns Hopkins University on “US- China Economic Relationship”

3. Divisions between Emerging Economies and Advanced Economies.

The emerging economies, including China, are now much more important than they were twenty years ago. They now account for a very large proportion of global GDP and global GHG emissions and simply cannot be ignored in efforts to mitigate climate change. Yet there are many sources of dispute about how the costs of climate change mitigation should be borne.

Advanced Economies point to the current **flow** of emissions and say Emerging Economies are largely responsible. Emerging Economies point out that the **stock** of GHG was produced by the Advanced Economies. They grew rich on the exploitation of fossil fuels and now wish to prevent poorer countries from doing the same; this is profoundly unfair. Moreover, for geographical reasons, the emerging economies in the southern hemisphere will likely face much higher costs in adapting to inevitable climate change and therefore will have fewer resources for mitigation. The failure of the Advanced Economies to fully honor pledges to assist emerging markets to meet transitional costs has also created a bad atmosphere. So too has the reluctance of rich countries to allow the Multilateral Development Banks to increase their capital and also to lever up their loans to poorer countries.

C. What **would** be done? A **democratic** deficit?

Other than in political regimes base on pure fear, those in authority must have the support of their people. Even in China, the implicit bargain is that the CCP exercises power in exchange for guaranteeing economic progress. In democratic regimes, with voting, the people must agree to policies that imply shorter term suffering for longer term benefit.

1. The current situation.

At the moment, doubts can be raised about the willingness of people to do this. Apparently, climate change issues have fallen down the list of concerns as potential growth has slowed in recent decades, and as rising inequality has eaten away at living standards for ordinary people. Moreover, the costs of climate change mitigation are substantial; the International Energy Authority estimates that meeting electrification targets alone will cost between 4 and 6 per cent of global GDP each year for the foreseeable future. To make such investments in a

world of constrained supply (in part due to actual climate change) will almost inevitably require a reduction in living standards whether in the form of higher taxes, or higher inflation (an implicit tax that particularly harms poor people). Politically, this will not be an easy sell.

2. The potential for economic crisis

This “selling task” would be made even harder were there to be an economic crisis of some kind in the near to medium future, and harder still if that economic crisis were to lead to political crisis as well. Unfortunately, there are good grounds for believing that both are likely.⁷

Beginning with economic issues, the global economy suffers from a number of harmful side effects of the ultra easy monetary policy that the advanced economies have been following for some decades. Since mainstream economics (and central banks) have not accepted that the economy is a complex, adaptive system, their policies have paid little or no attention to the possibility that they might have undesirable longer-term consequences.

First, easy monetary conditions led over time to massive increases in private sector debt of declining quality – the “search for yield”. Such debt makes debtors vulnerable both in good times (when inflation raises rates and debt servicing requirements) and bad times (when revenues to service debts fall). Today, the problem is inflation and the sharp increase in policy rates that it has prompted. And higher policy rates also threaten financial stability in a variety of ways as imprudent lending decisions are revealed⁸. Second, the easy availability of financing has led governments to increase their debt/GDP ratios to a level that investors are now beginning to question as “sustainable”. A higher risk premium for government debt, thus far viewed as “riskless”, would have immense implications for both the financial system and the real economy. Third, easy money has encouraged wasteful investments and resource misallocations, as well as more industrial concentration and reduced innovation. All of these developments reduce longer term growth potential.

⁷ For a fuller discussion, see my recent INET paper “What next for the post-covid global economy? Could negative supply shocks disrupt other fragile systems?”

⁸ The recent banking problems already referred to might mark the beginnings of a bigger process of value destruction as prices fall in many markets.

Economies with these harmful preconditions now seem likely to be hit by a number of negative supply shocks that will both reduce real growth and living standards and raise inflationary pressures. The previous **era of plenty** now seems likely to turn into an **era of scarcity**. For demographic reasons, workers will be in increasingly short supply. Deglobalisation (both to increase the “resilience” of supply chains and reflecting geopolitical concerns) could also have major economic costs. Military spending seems sure to rise. And then there is the shock of climate change itself, which raises the cost of both adaptation and of mitigation.

It is impossible to say precisely how all this will end up. What does seem likely is either a crisis of debt/deflation or much higher inflation, with perhaps the former then followed by the latter. Either outcome would have the potential to trigger political chaos, in countries already showing many signs of political stress.

3. The potential for political crisis.

In democracies there is a necessary and natural tension between the rights of individuals (the “I” society) and the public good (the “we” society). However, these tensions can be aggravated by economic difficulties which historically have led to political polarisation and extremism of one form or another. In practice, in many countries political fault lines are starting to show, with rising inequality one of the driving forces. This leads to anger and a decline in trust in both governments and elites. In turn this can be exploited by domestic forces that wish to gain from political turmoil (not least racists and potential “strong men”) and foreign forces ready to use hybrid warfare and dirty money to support their own national interests. In such an atmosphere, cooperative behaviour suffers, and this might be especially true for international cooperation. In such an environment, efforts to mitigate climate change (and for rich countries to help others adapt) would surely meet resistance.

D. The Growing Risk of a Polycrisis

The above arguments lead to a simple conclusion. The executive and democratic deficits we face could be as important impediments to meeting the challenge of climate change as the analytical deficit. This implies that research needs to be conducted into how best to deal with all three kinds of deficits.

It could also be argued that it is inadequate, indeed even dangerous, to treat all these challenges separately. Indeed, these different systems are all nested within one another such that problems in any one system could easily lead to problems in other systems. Indeed, with enough positive feedback between systems, the cascading effects could become uncontrollable and extremely detrimental to human life. Dirk Hebing (in an article in *Nature* in 2013) described this as “hyperrisk”. More recently Adam Tooze (the author of “*Crashed*”) has popularized this possibility under the name of “polycrisis”.

It also seems to be the case that the likelihood of a polycrisis emerging has been growing as individual systems have become more complex, more interconnected and faster moving. An example of the resulting problems could be seen in the recent failure of SVB bank which was triggered by \$46 billion of deposit outflows on one day over the internet. Moreover, the tendency to strip out redundancies and to introduce innovation to increase “efficiency” also comes at the cost of reduced “resilience”. We saw the results of such developments in the international supply chain problems that emerged in the early months of the covid pandemic.

Research into polycrises, and how to avoid them, has not kept up with their increasing likelihood. Indeed, Hebing (2013) observed, in light of the financial crisis that broke out in 2008, that “much of our theoretical knowledge has yet to find its way into real-world policies⁹. By assuming (wishful thinking?) that really bad things cannot happen, we are effectively “sleepwalking” our way into them materializing. Moreover, by neglecting the fact that policy “solutions” for one system can actually destabilize other, related systems, we may in fact be actively contributing to that happening.

A recent technical paper by the Cascade Institute in Victoria makes “A call for an international research program on the risk of a global polycrisis”. This persuasive paper was also the primary background document for a one-day conference on “Managing Compound Risk in a Polycrisis World” held at the Volatility and Risk Institute at the Stern School of Business (Columbia University) in New York.

⁹ For example, the need to help stabilize the financial system through introducing modularity and redundancy and the need to have higher capital requirements in the face of radical uncertainty rather than quantifiable risks.

The thrust of the recommendations is the need to identify the linkages between systems that could lead to positive feedback effects and disastrous outcomes. Then, we need to identify interventions that could lever the non-linear dynamics of such systems in the direction of more stability¹⁰. The global scientific community, including the Canadian community, might usefully contribute to this suggested research program.

¹⁰ This brings to mind a much earlier (1997) set of suggestions by Donella Meadows in “Leverage Points: Places to Intervene in a System”