

MITIGATING GLOBAL WARMING IS NOT OUR ONLY PROBLEM:

Are We “Sleepwalking” Towards a Global Polycrisis?

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INTRODUCTIONⁱ

At least three conditions will have to be satisfied to meet the global challenge of climate change, conditions often referred to colloquially as the “should, could and would” problems.ⁱⁱ Good policy begins with knowing what **should** be done – in short, good analysis. However, in addition, power must be available to ensure that what should be done **could** be implemented in practice- the capacity to act. Finally, assuming that power is available, it **would** actually have to be used – the will to act. We are currently significantly deficient with respect to all three requirements, especially the last. Meeting the global challenge of climate change will require popular support for policies that not only threaten conventional wisdom but also threaten current living standards. Neither outcome will be easily embraced.

Parts A to C below discuss in turn each of these current deficiencies impeding an appropriate response to the climate change problem. At each level of the “should, could, would” hierarchy, at least three impediments to good policy outcomes can be identified – nine in total. As a further

challenge, it is then pointed out that climate change is not the only systemic challenge we currently face. Our economic, political and public health systems (among others) are also under stress, and solutions in each case are also open to the “should, could and would” problems.

The paper ends with a brief discussion in part D of the danger of a polycrisis – a simultaneous crisis in many systemsⁱⁱⁱ – arising from dangerous and perhaps even uncontrollable, feedback effects between individual systems in crisis. For example, climate change could lead to political turmoil that impedes necessary economic policies that impede climate change mitigation. Similarly, an economic crisis could trigger political fault lines which undermine efforts to mitigate climate change which then foster more economic and political fragility which..... etc. Failure to recognize these possibilities implies that we might already be “sleepwalking” towards just such a polycrisis.^{iv} More research of a cross-disciplinary nature is required to identify the intervention points most likely to help us avoid such an outcome.

ⁱ This paper builds and expands upon a presentation at a workshop hosted by the University of Waterloo, Canada, on “Math for Complex Climate Challenges”, May 3, 2023.

ⁱⁱ In an analysis of the shortcomings of the euro area, Veron (2012) uses very similar terminology when he refers to the eurozone as having an “analytical deficit, an executive deficit and a democratic deficit”. White (2015) uses the same terminology in a subsequent article, applying it to both the global economy and the eurozone.

ⁱⁱⁱ A first and crucial question is how to define the systems. White (2021) refers to stresses in the economic/financial, political, environmental and public health systems and refers to them as the biblical “four horsemen of the apocalypse”. Lawrence et al (2022), distinguish eight global systems in three broader categories encompassing natural, technological and social phenomena.

^{iv} Nor is this without precedent. See Clark (2014).

The objective sought in identifying all these problems is not to say the global challenge of mitigating climate change is beyond our capacities. Rather, it is to underline the importance of identifying and removing existing impediments to progress and, above all, doing so on an urgent basis.

A. WHAT *SHOULD* BE DONE TO MITIGATE CLIMATE CHANGE - THE ANALYTICAL DEFICIT

Most scientists thinking about the environment see it as a complex, adaptive system with the associated characteristics of such systems;ⁱ 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. 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. Three examples suggest themselves.

A.1. IPCCⁱⁱ warnings and their use of Integrated Assessment Models (IAM)

The warnings issued by the IPCC have become ever more dire as time passes and the carbon budgetⁱⁱⁱ 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 articles,^{iv} these models essentially ignore tipping point problems and assume that

economic sectors not exposed to the weather are insulated from climate change. For example, the idea that air-conditioned factories will operate as normal when the workers are subject to “wet bulb” heat and humidity conditions^v seems totally implausible. The conclusion this leads to is that we need better scientific and economic models to estimate the costs of climate change if we are to respond in an appropriate and timely way. Underestimating the costs and the urgency of response implies underestimating the returns from investments to mitigate climate change.

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

If modelling the overall costs of climate change is difficult, modelling the incidence of those costs is even more difficult. Consider, for example, estimates of the risks posed to the financial system by climate developments, and therefore the need for policies to maintain overall financial stability in the face of such shocks. 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 (presumably using the flawed models^{vi} just discussed), their transitional losses (for example, due to assets stranded by mitigation efforts) and also the legal liabilities they might face (for example, class actions against oil companies). Most companies lack the capacity to do this,^{vii} and

i For a popular introduction see Ball (2012).

ii The Intergovernmental Panel on Climate Change (IPCC) was set up in 1988 by the UN and has since regularly reported on the status of the scientific work concerning climate change.

iii The carbon budget refers to the remaining amounts of fossil fuels that can be burned, releasing greenhouse gases, without causing the earth’s temperature to exceed a preset target (e.g., 1.5 degrees centigrade above the preindustrial average).

iv See for example, Keen et al (2021), Holder and Thomas (2023), Hodgson (2023) and Trust et al (2023). It is noted in this last paper (p5) that “current techniques exclude many of the most severe impacts we can expect from climate change, such as tipping points and second order impacts – they simply do not exist in the model.”

v A combination of high temperature and high humidity can prevent the human body from cooling itself through perspiration. Death soon follows.

vi Hodgson (2023) notes that many financial institutions make use of the models just criticized above and, as a result, “had reported that they would suffer minimal economic impacts if the world warmed by significantly more than 1.5C higher than pre-industrial levels”.

vii See the recent report by the European Central Bank, Emambakhsh (2022).

firms also might not wish to do so because they fear the banks might punish them (by withdrawing credit) in response to estimates of high exposure to losses. Laws (as in Europe) to force companies to make such estimates cannot compensate for their 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 individual company losses and the magnitude of overall losses. Two recent reports, from the Federal Reserve Bank of New York about “stress testing” of banks for climate change, suggests there is a significant need for more research.ⁱ 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 must 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 arise,ⁱⁱ and again there are 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 as increased regulation has diverted finance into non-banks. Unfortunately, even less is known about the structure and potential behaviour of non-bank financial institutions and the dynamics of opaque and specialized markets.

A.3. Modelling the transition to net zero

There continues to be great uncertainty about what needs to be done to get to net zero. It would be very helpful if governments could specify the policies needed to do so and, in broad terms, their sequence over time. Private investment will only occur if corporations feel reasonably certain about their longer-term profitability. Perhaps the greatest uncertainty surrounds government measures to influence the demand for fossil fuels, particularly the prospective role of carbon pricing. The fact that the EU and U.S. governments seem to have different views on this is not helpful.

The absence of a broad plan for the transition has already had some undesirable consequences. Some combination of reduced demand for energy produced from fossil fuels, together with increased supply from renewable energy sources, should already have led to a reduced need for fossil fuels. This has not happened, nor was this widely forecast. As a result, the demand for fossil fuels has held up even as the supply has fallen. In part, this latter development has been due to reduced investment in developing fossil fuel sources in recent years.ⁱⁱⁱ The upshot is that energy prices rose sharply, even before the invasion of Ukraine, contributing to an unwelcome inflationary surge almost everywhere. More recently, oil prices have fallen back under the influence of increased production from countries in the Gulf trying to impede investment in the production of oil and gas from shale. While lower prices help alleviate the problem of generalized inflation, it still leaves the world consuming more fossil-based energy than intended.

Another area of uncertainty has to do with the process of electrification. This process is currently highly fashionable since electricity produced from

ⁱ Acharya et al (2023) and Jung et al (2023).

ⁱⁱ The recent failures of SVB, First Republic and Credit Suisse were not foreseen by either the markets or the regulators. Astonishingly, both failed to foresee that interest rates could rise from historical lows. As well, both failed to foresee that market losses on long-duration assets could raise fears of bank insolvency and then prompt a run on deposits in spite of capital levels being well above statutory minima.

ⁱⁱⁱ This is understandable since the declining “carbon budget” implied by a net zero constraint raises the risk that new production capacities for fossil fuels might be “stranded” at great cost to the investor.

renewable energy sources is not a direct source of greenhouse gases (GHG). However, important uncertainties remain, not only about what is actually possible, but also about government commitment to the electrification process.

For example, given targets for electric vehicles (EVs), what volume of metals will be needed for EVs, batteries and transmission grids and of which sorts and when? Can mines be developed fast enough and profitably enough to allow these targets to be met? Given that most processing of the metals required is currently done in China, could geopolitical tensions impede the process?ⁱ How much greenhouse gas and other environmental problems will be created in the production of all this metal? Can existing grids be altered and new grids added quickly enough to distribute electricity from renewable sources? If not, there seems little reason for producing such power in the first place. In this respect, as in many others, the private sector must be reasonably sure of the public sector’s plans and commitments before it will direct substantial resources to the green transition.

At a still more macro level, it is not clear whether net zero can be attained by a combination of reduced emissions per unit of energy and reduced energy per unit of GDP. If not, then the risk remains that GDP might have to be sacrificed with unknown economic and political implications. Could the continued (or even expanded) use of nuclear power and natural gas help ease some of these constraints? Continued uncertainty about all these issues must surely lower the chances of a smooth transition.

B. WHAT *COULD* BE DONE TO MITIGATE CLIMATE CHANGE – THE EXECUTIVE DEFICIT

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

B.1. Nation-states are getting in the way

Climate change is a global problem, like pandemics and nuclear proliferation, but there is no global government. Power lies with national governments. With respect to climate change, UN and global agencies (such as COPs) can lay out objectives and get commitments, but it is up to national governments to deliver. Moreover, there is no power to hold national governments accountable.

Indeed, it is sometimes contended that national governments can be a force actively 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. Plans to build new electrical grids and onshore wind farms are particularly subject to NIMBY politics. Similarly, national government can be strongly influenced by national fossil-fuel producers intent on preserving traditional markets.ⁱⁱ Finally, national governments have been accused of enforcing national policies that impede local authorities from policy responses that better reflect local conditions.

i In July of 2023, China announced that it would in the future require licenses to export a number of “rare earths” required in the electrification process.

ii Ferguson (2023).

B.2. Geopolitical tensions

The recent sharp division between “democratic” regimes and “authoritarian” regimes will not be helpful to needed cooperation on climate change. Legislative proposals in Washington to “decouple” from China give scant attention to the economic costs involved. Indeed, in a recent speech by U.S. Treasury Secretary Janet Yellenⁱ she explicitly stated, “national security is of paramount importance in our relationship with China”. Jake Sullivan, U.S. National Security Advisor, also suggested recentlyⁱⁱ that national security, broadly defined, must take precedence over market forces. At the National Congress of the Chinese Communist Party in October 2022, President Xi Jinping expressed very similar views. In this environment of mutual distrust, the advantages to be achieved through intergovernmental cooperation on climate change mitigation seem unlikely to be given adequate attention.

While elements of recent legislation in the U.S. are clearly intended to support a green agenda,ⁱⁱⁱ the broader implications of a new “neo-mercantilist” agenda^{iv} have raised concerns. Europeans are worried that U.S. subsidies will support a redirection of investment from Europe.^v To offset this, subsidies will be required in Europe that could further aggravate existing fiscal problems. In addition to these trans-Atlantic frictions, studies by the International Monetary Fund^{vi} and the European Central Bank^{vii} indicate that foreign direct investment (FDI) fragmentation, induced by the China-U.S. conflict, could imply a

stagflationary combination of higher inflation and lower output growth. China-US conflict could have particularly damaging effects on emerging market economies. Faced with these and other medium term economic problems,^{viii} not least stagflation, the urgency of addressing climate change seems likely to be given lower priority.

B.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^{ix} 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 advanced economies. They grew rich on the exploitation of fossil fuels and now wish to prevent poorer countries from doing the same; this seems to them to be 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. As well, being generally poorer, emerging markets will have fewer resources for both mitigation and adaptation.

i Yellen (2023).

ii Sullivan (2023).

iii In particular, provisions in the Inflation Reduction Act that give tax credits for “green” investments.

iv The term is used by Hufbauer (2023) of the Peterson Institute of International Economics.

v More broadly, recent U.S. legislation attempts to use public money to lever up private sector involvement. Europe is threatened because they do not have similarly sized markets for private capital, especially venture capital. Emerging market economies could suffer even more.

vi See Chapter 4 of International Monetary Fund (2023).

vii Attenasi et al (2023).

viii White (2022).

ix World Economics has combined 24 countries to represent the emerging markets. Overall, these countries account today for 50% of global GDP and have accounted for 66% of global GDP growth over the past 10 years (2012-2022). It is estimated that emerging market economies today account for two-thirds of global greenhouse gas emissions.

The failure of advanced economies to fully honour pledges to assist emerging markets to meet transitional costs has created a bad atmosphere.ⁱ So too has the reluctance of rich countries to allow the multilateral development banks (MDBs) to increase their capital and also to lever up their loans to poorer countries through borrowing from market sources. Finally, border adjustment taxes (BATs), levied on imports from countries that do not tax carbon, are thought likely to affect countries in the southern hemisphere the most severely.ⁱⁱ

At the present time, it is hard to see where many emerging market economies, especially low-income economies, will find the resources for both climate change adaptation and mitigation. Interest rates are rising and the cost of capital for emerging market economies tends to be much higher than for developed economies.ⁱⁱⁱ Debt restructuring for highly indebted emerging market sovereigns would be very helpful in providing such resources, but there are no agreed principles on how and when this should be done.^{iv} Faced with a stark choice, emerging markets seem more likely to spend scarce resources on coping with climate change rather than mitigating it.

C. WHAT *WOULD* BE DONE TO MITIGATE CLIMATE CHANGE - THE *DEMOCRATIC DEFICIT*

Other than in political regimes based on pure fear, those in authority must have the support of their people. Even in China, the implicit bargain is that the Chinese Communist Party 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. Doubts can easily be raised about the willingness of people to do this.

C.1. The current situation

Apparently, climate change issues have already fallen down the list of concerns^v in recent decades; potential growth has slowed, and rising inequality has eaten away at living standards for ordinary people. Inflation has been a more recent problem for all.

Moreover, the costs of climate change mitigation are substantial; the International Energy Authority estimates that meeting electrification targets alone will cost between four and six percent of global GDP each year for the foreseeable future.^{vi} 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

i This is particularly the case since it comes on top of the failure of the advanced countries to meet pledges with respect to the provision of vaccines against COVID-19. Against this background, it is not surprising that many emerging market countries refused to endorse UN resolutions (sponsored by advanced countries) to condemn Russia for its invasion of Ukraine.

ii Assertions made in a final panel on “The macroeconomic implications of climate change” at a meeting held at the Peterson Institute in Washington on June 6, 2023.

iii See Grubb (2023) who suggests that developed economies could underwrite risk taking in green investments and “could completely change the game”.

iv Moreover, in recent years, the proportion of sovereign debt held by private creditors has risen sharply. Chinese entities are now major creditors as well and have until recently not being willing to accept some of the conventions that others have accepted (e.g., multilateral financial institutions are preferred creditors). All of these shortcomings have militated against orderly debt restructuring.

v Pew Research Centre (2022). American respondents ranked climate change as only the 14th most important priority for the U.S. government in 2022.

vi The McKinsey Global Institute (2023a) seems to have even higher estimates. They conclude that achieving net zero will require \$9.2 trillion of investment per year up until 2050. This compares to investment of \$3.5 trillion and global GDP of around \$100 trillion in 2022.

harms poor people), this will not be an easy thing to sell politically. Ferguson (2023) also reminds us that vested interest groups (especially producers of fossil fuels) will use popular discontent and “political money” to hurt efforts directed to climate change mitigation.

At the same time, there remain some grounds for belief that the general public can be convinced to make personal and current sacrifices for social and longer-term benefits. In virtually all countries, most people cooperated with the authorities in trying to reduce the impact and spread of COVID-19. In some countries, like the U.S., there has been some success in selling the energy transition as a means of creating higher quality jobs in urban areas (for wind and solar farms) that have thus far been relatively deprived. With committed political leadership, it might yet be possible to move society onto the “wartime footing” that is likely required.ⁱ

C.2. The potential for economic crisis

Convincing people of the need to make present sacrifices for future benefits would be made even harder were there to be an economic crisis of some kind in the near to medium future. And it would be 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.ⁱⁱ

Beginning with economic issues, the global economy suffers from several 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 required to service debts fall). Today, the problem is inflation and the sharp increase in policy rates that it has prompted. Moreover, higher policy rates also threaten financial stability in a variety of ways as imprudent lending decisions are revealed.ⁱⁱⁱ 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 “unsustainable”. 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 these developments reduce longer-term growth potential.

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 **age of plenty** now seems likely to turn into an **age of scarcity**^{iv}.

On the supply side, the number of available workers is already declining for demographic reasons. Deglobalization (both to increase the “resilience” of supply chains and reflecting geopolitical concerns) could also have major economic costs as noted above. And then there is the shock of climate change itself, which raises the cost of both adaptation and of mitigation. Finally, supply in the future will be constrained by four “heritage” problems; namely, underinvestment, malinvestment, hysteresis and

ⁱ See Strauss and Howe (1997) who paint a relatively optimistic picture of how societies have managed crises in the past and emerged stronger as a result

ⁱⁱ For a fuller discussion of both, see White (2023).

ⁱⁱⁱ The recent banking problems already referred to might mark the beginnings of a bigger process of value destruction as prices fall in many markets. The McKinsey Global Institute has hinted at this in a number of its recent publications. See McKinsey Global Institute (2023b).

^{iv} White (2022) and White (2023).

concentration. On the demand side, each negative supply shock raises the social rate of return on investment and encourages more such spending. Moreover, government spending on both “guns and butter” seems sure to rise. Indeed, military expenditures have recently risen sharply.

It is impossible to say precisely how all this will end up. What does seem likely is that the risk is rising sharply of either a crisis of debt/deflation or a crisis of much higher inflation, with perhaps the former then followed by the latter. Either outcome would have the potential to trigger political crisis, in countries already showing many signs of political stress. It is of course possible that technological developments, like Artificial Intelligence, might raise productivity levels high enough and fast enough to avoid economic crisis. However, as Brynjolfsson and McAfee (2016) remind us, such changes might well exacerbate social inequalities in ways that would make political crises more rather than less likely.

C.3. The potential for economic 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 polarization and extremism of one form or another.ⁱ 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 division (thus undermining “class” unity) or from political turmoil (not least racists and potential “strong men”) as well as 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 worrisome conclusion. The “could” and “would” deficits we face could be as important impediments to meeting the challenge of climate change as the “should” 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 the climate change challenge as a separate challenge. Mankind’s future depends on the efficient functioning of a number of different systems. Moreover, these different systems are all nested within one another such that problems in any one system could easily lead to problems in others. Indeed, with enough positive feedback between systems, the cascading effects could become uncontrollable and extremely detrimental to human life. Helbing (2013) described this process as “hyperrisk”. More recently, Tooze (2023) has popularized this concept under the name of “polycrisis”.

It does seem 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 can be seen in the recent failure of Silicon Valley Bank in the U.S., 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.

ⁱ Funke et al (2015) and Strauss and Howe (1997).

Research into polycrises, and how to avoid them, has not kept up with their increasing likelihood. Indeed, Helbing (2013) has observed that “much of our theoretical knowledge has yet to find its way into real-world policies”.ⁱ By assuming (wishful thinking?) that really bad outcomes are not possible, 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 (2022) makes a call (see Box 1) for an international research program on the risks of a global polycrisis. This persuasive paper was also the primary background document for a conference on “Managing Compound Risk in a Polycrisis World” held on April 28, 2023 at the Volatility and Risk Institute at the Stern School of Business (New York University).

The thrust of the recommendations made by the Cascade Institute 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 stability.ⁱⁱ Crucially, suggested policies must have multi-disciplinary support and review to ensure that they do not help stabilize one system only at the expense of destabilizing another. We must all, particularly economists, emerge from our silosⁱⁱⁱ and fully embrace the idea that our world operates as complex systems of interdependent, adaptive systems.

E. CONCLUSION

Closer examination of the “should” problem indicates the need for great urgency in addressing the problem of climate change. Our capacity to predict “tipping points” is very limited and the costs of waiting too long will be immense.

Closer examination of the “could” problem raises a question of global governance. Could the world’s major powers, even those competing politically, agree to accept the recommendations for climate action of an international body of national climate “experts” established for that purpose. For example, global agreement on the need for a carbon tax would be immensely helpful. Some experiences with international “soft law”, for example some of the successes of the Financial Stability Board, indicate that model might be further investigated.^{iv}

Closer examination of the “would” problem indicates that people already suffering economically must be asked to make still more sacrifices. Somehow, they must be convinced that there is no alternative and that the suggested distribution of costs is fair. In this endeavour, strong leadership will be required, both by authoritarian and democratic regimes.

Finally, all policies designed to address climate change must look at possible, longer-run side effects. Not least, they need to avoid destabilizing other nested systems (the polycrisis problem) that would inadvertently make the climate problem worse, not better.

ⁱ For example, we know that we could help stabilize the financial system through introducing modularity and redundancy. We also know that we need to introduce higher capital requirements when institutions face radical uncertainty (as they do) rather than quantifiable risks. Generally speaking, these insights have not led to changes in policy requirements.

ⁱⁱ This brings to mind a much earlier set of suggestions by Meadows (1997).

ⁱⁱⁱ White (2019).

^{iv} For a recent assessment, see Knaack P (2023).

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