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CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT: UNCERTAINTIES AND NARRATIVES

CAMBIO CLIMÁTICO Y DESARROLLO SUSTENTABLE: INCERTIDUMBRES Y NARRATIVAS

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Resumen / Abstract

The current warming trend of our planet is extremely likely to be the result of human activity since the mid-20th century. Changes in the climate will become more and more recurrent, which will bring increasing economic problems. Transposing Earth's boundaries, on the other hand, might lead climate as well as nature to unknown territories where the non-knowledge prevails. How to make decisions in this context? Radical uncertainty forces us to make decisions "in the dark", where narratives help us to anticipate an explanation for unexplained events.

Palabras clave: climate change; decision-making process; energy transition; narratives; radical uncertainty.

El actual calentamiento que padece nuestro planeta es, sin lugar a duda, resultado del accionar humano. Los cambios en el clima se volverán más recurrentes, y generarán problemas económicos más agudos. El traspasar los límites de la tierra, por otra parte, empuja al clima, así como a la naturaleza, a ámbitos desconocidos: territorios donde prima el no -saber. ¿Cómo tomar decisiones en dicho contexto? La incertidumbre radical nos obliga a tomar decisiones "en la más densa oscuridad", lugar donde las narrativas pueden proveernos de una explicación para los eventos que no pueden ser explicados.

Key Words: cambio climático; incertidumbre radical; narrativas; toma de decisions; transición energética.

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By "uncertain" knowledge, let me explain, I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty; nor is the prospect of a victory bond being drawn. Or, again, the expectation of life is only slightly uncertain. Even the weather is only moderately uncertain. The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention, or the position of private wealth-owners in the social system in 1970. About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know" John M. Keynes. The General Theory of Employment, Interest and Money.

"*In a world in which to list all possible outcomes, and their probabilities would be impossibly complex, narratives are an essential part of how we reason. But they are not just a way in which we provide ourselves with the "best explanation". They play a crucial role in how we communicate with each other and how we reach collective decisions. Narratives change and evolve over time, and need to be constantly challenged*". John Kay and Mervyn King. Radical Uncertainty: Decision-Making Beyond the Numbers.

"*Traditional economic approaches approaches fail to examine the role of public beliefs in major economic events—that is, narrative. By incorporating an understanding of popular narratives into their explanations of economic events, economists will become more sensitive to such influences when they forecast the future. In doing so, they will give policymakers better tools for anticipating and dealing with these developments*." Robert J. Shiller. Narrative Economics: How Stories Go Viral and Drive Major Economics.

Introduction

In September 2023, emissions reached 419 ppm, a value 69% above the safe value level passed in 1990. In the same month, a group of 28 scientists led by Johan Rockström of the Potsdam Institute for Climate Impact Research reported that humanity had just passed 7 out of 9 safe Earth boundaries (Rockström et al., 2023)[1]. The current warming trend of our planet is extremely likely to be the result of human activity since the mid-20th century (IPCC, 2014), directly and profoundly harming the planet and humanity (Cook et al., 2013, 2016; Goodwin et al., 2015), and directly associated with fossil fuel production (Grasso, 2019; Mann, 2021). Climate change is associated with the emergence of new physical risks, which will have an impact on the economy. Climate emergencies involve tornadoes, heavy rains, or droughts. Every extreme weather event causes death and destruction in its wake. Changes in the climate will become more and more recurrent, which will bring more acute economic problems with them.

Transposing earth boundaries, on the other hand, might lead nature and climate to unknown territories, "*moving rapidly away from the stable Holocene state of the past 12,000 years, which is the only state of the Earth system we have evidence of being able to support the world as we know it*" (Rockström et al., 2023). As the Earth system approaches these tipping points, fundamental or radical uncertainty follows. Long-term risks are likely to be missed under such a non-linear, non-cyclical context. Traditional risk management models are no longer capable of reflecting climate risks appropriately. Absent a proper guide to the future, a new narrative should emerge.

This new narrative should come and replace the current one, a traditional tail associated with the oil industry forces of denial, misinformation, inaction, and delay (Banerjee et al., 2015; Hansson, 2018; Brulle, 2018; Grasso, 2019; Lamb et al., 2020; Mann, 2021). The harmful effect of fossil fuel combustion has been recognized for years, although the oil industry ignored it for a long time, and then questioned the scientific evidence and the magnitude of the risk. Then, they tried to play down the magnitude of the problem to finally claim that global warming is irreversible. Fossil fuel companies´ message is constructed around techno-optimism, by promoting carbon capture technologies, even though these are certainly not viable alternatives, and necessitarianism or the notion that the industry provides a necessary service. In fact, oil companies want to set aside what was agreed in Paris. They know that fulfilling it implies abandoning most of the projects currently under discussion.

1. The boundaries were previously defined (Rockström et al, 2009), been the nine: climate change; biosphere integrity; land system change; freshwater use; vital phosphate and nitrogen flows; ocean acidification; and ozone depletion; as well as newly added measures of the levels of aerosols and chemical compounds, such as plastics and nuclear waste.

This essay describes climate change dynamics and the epistemological breakpoint introduced by this new normal. As uncertainty goes radical, traditional financing models are no longer valid. That opens the way to describe the power of narratives in economic policy and the advice to policymakers to have a proper one / how policymakers should be advised to have a proper one when the past no longer has predictive power.

Climate change and the epistemological breakpoint

Extreme weather events inducing heat domes, droughts, fires, floods, and cyclones, at any latitude, show that we are entering a new time: the boiling era has arrived (UN, 2023). Scientists have identified several potential regional and global thresholds, tipping points in the climate with huge economic and social consequences. If reached, then it would be impossible to revert, even if carbon emissions are rapidly reduced. The rise of volatility is a common sign which shows that complex systems are approaching tipping points and starting to flicker. This forces those trying to model climate change to take a new, and much more systematic approach, accounting for the unpredictable, "*green swans*" events (Bolton et al., 2020; Chenet et al., 2019; Kunreuther et al., 2012; Thomä & Chenet, 2017; Weitzman, 2009, 2011). Unpredictability should also influence policymakers' decision tools and macroeconomic models. As a result of deep uncertainty, the use of backward-looking events to project the likelihood of future scenarios is inappropriate (Andersson et al., 2016; Tragedy of the Horizon, 2017).

A consequence of this global warming qualifies as a systematic "*ruin*" event, with adverse outcomes extending all scheduled times and having unlimited costs. However, policymakers respond to the unpredictable or unknown – unknown climate related financial risks (CRFR) by trying to delineate new market-correcting strategies (Chenet et al., 2019) or by claiming for (financial market) governance and (informational) disclosure frameworks (Ameli et al., 2020). "*Radical uncertainty precludes optimizing behavior. In the world as it is, we cope rather than optimize*" (Kay & King, 2020, p. 320). All these flaws illustrate an epistemological breakpoint that calls for new, forward-looking alternatives (Bolton et al., 2020; Zenghelis & Stern, 2016).

Climate change exposes investors to massive losses and a new type of (physical) risk. A rapid transition, however, induces the likelihood of a (financial) risk. Physical and transition risks are strictly interconnected, although they generate diametrically opposite effects. Henceforth, policymakers are confronted with a decisional trade-off: a rapid phasing out of brown (or carbon-intensive) capital to minimize physical risks might heighten the transitional risk, while a delayed transition would reduce the financial fallout but expand real risks likelihood.

Transitional risks relate to the presence of the problem of stranded assets, reflecting a change in asset valuation. The University of Oxford's Stranded Assets Programme defines stranded assets as "*assets that have suffered from unanticipated or premature write-downs, devaluations, or conversion to liabilities*". In the specialized literature, the problem is said to relate to three different reasons: environmental, economic, or institutional (Caldecott, 2017; Caldecott et al., 2013). Alteration in value is associated with environmental reasons, as extreme events could induce the government to advance with mitigation actions. Economic factors could also be behind, as a sudden fall in the price of fossil fuel renders exploitation unprofitable. Stranded valuation might also relate to institutional factors (norms, laws, regulations), or respond to a change in consumer attitudes (if choosing new, renewable energies or e-vehicles). Henceforth, interest in traditional energy assets may dwindle, and investors may discontinue carbon-related project financing.

In a recent op-ed, Fatih Birol remarked the "*beginning of the end*" for fossil fuels (Birol, 2023). According to projections of the International Energy Agency (IEA), a series of technological, institutional, behavioral, and geopolitical circumstances are now accelerating the transition, and consumption will start to decline well before the next decade. Transition is under way, no doubt. Physical and transition risks, however, are subject to many unknowns – unknowns (feedback loops, tipping points, non-linearities, interactions, and timing) which prevent decision-makers from modeling financial risks.

Energy system transformation, which is needed for climate mitigation, requires not only an increase in renewable energy generation but also a parallel reduction in fossil fuel extraction and use. Henceforth, as mitigation-related investment advances, the asset value of oil and gas companies reduces. Recent research by Frederick van der Ploeg and Armon Rezai (2018) has demonstrated that the (stranded asset) problem aggravates as the closer we get to the peak warming target, the higher the climate sensitivity for cumulative emissions and the cheaper production

through renewable energy. Remarkably, all three conditions are now approaching but fiercely neglected by the fossil fuel lobby. Globally, the oil industry maintains assets for US $25 trillion, adding US $1 trillion per year (IRENA, 2019, p. 84) – an investment flow incompatible with what was agreed in Paris, 2015, no new gas, oil, or carbon development is needed. Therein lies the climate–financial risk: additional investments that will not be repaid, transformed into worthless assets (Carbon Tracker Initiative, 2019 and 2020).

Uncertainty, henceforth, reflects our incomplete knowledge of the world. How life on Earth would be if some tipping points were trespassed? Although the scientific community alerts us that the Amazon is close to its tipping point (Staal et al., 2020), on the verge of losing its distinct nature and switching from a closed canopy rainforest to an open savannah, nobody knows when this might be happening or what the effects of a reduced level of "atmospheric moisture recycling" would be on climate in the Southern Cone of America. Will the leading emitters accomplish their transition goals (Welton, 2022), will they maintain their compromises? If technological disruption and new regulations are hard to model due to uncertainty around their timing and magnitude, how a particular firm's cash flows would be affected? These are some examples of facts that affect the decision-making process in an unknown – the unknown environment. How to make decisions in a situation like this? In a recent book, John Kay and Mervyn King (2020) describe how people manage and make decisions under radical uncertainty. It follows that uncertainties are not experienced in the same way by different people: knowledge about the present and perspectives on the future are all constructed in particular contexts.

The case for a new narrative

Humanity is going through a critical moment; the incessant irruption of extreme events alerts us to a future of great or radical uncertainty. It resembles the unknown-an unknown situation, where policymakers are no longer able to delineate policies to anticipate the crisis. Moving from an economy anchored in fossil fuels to another in renewable energy is not simple. On the one hand, as already mentioned, the transition shows a non-linear dynamic trend. On the other hand, the process exceeds the technological sphere to involve institutional, political, and social aspects. Transition, in short, conveys a highly complex task for policymakers.

The current situation, where multiple and interconnected crises arise, pushes (policy advisors and managers alike) decision-makers towards unchartered waters. Radical uncertainty leads us to make decisions "*in the dark*", without a suitable understanding of the context we are facing or the future effects of our present actions. Many of the actions we take follow a narrative, as this allows us to anticipate an explanation for an event or series of events. For example, stocks or bonds are bought because investors believe that the prices of the assets they are buying will continue to rise. Robert J. Shiller, a 2013 Nobel Laureate in Economic Sciences, highlighted the importance of narrative in economic decision-making. He uses the term "*to mean a simple story or easily expressed explanation of events that many people want to bring up in conversation or on the news or social media because it can be used to stimulate the concerns or emotions of others, and/or because it appears to advance self-interest*" (Shiller, 2017, p. 4). Certainly, a narrative can lead us to wrong decisions, as Shiller puts it into relief when explaining financial exuberance. This does not invalidate the role of narrative, although it warns against those who propagate providential messages.

To deal with uncertainty, we ultimately build our actions around a certain referential narrative, an aspect also highlighted by Daniel Kahneman, winner of the 2002 Nobel Prize in Economic Sciences. In the absence of certainty, when no model can explain the reason for a situation, the narrative appears. However, it is also true that stories coexist, often contradictory, which are discussed at the family dinner table, in our circle of friends, and at work or in professional environments.

Economists should be honest and acknowledge the limitations as well as the flaws of their models. At all times, they [the models] should be used to understand reality, and not try to adjust it to the precepts dictated by the pseudo-theory. We must recognize the limits of the current canonical model and begin to understand the limits of the planet when making decisions. Fortunately, an important number of scientific articles are now available, demonstrating the flaws of the traditional literature (Weitzman, 2009, 2011; Kunreuther et al., 2012; Thomä & Chenet, 2017; Chenet et al., 2019; Bolton et al., 2020; Bingler & Senni, 2022).

In other scientific fields, the knowledge can be categorized as decisive, even if some speak of alternative stories. And it is also true that some narratives are certainly "*dishonest and manipulative*" (Kay & King, 2020, p. 315). This can be seen in the field of climate change dynamics: there is a direct relationship between greenhouse

gases released into the atmosphere (particularly carbon dioxide) and the increase in global average temperature. In the scientific field, the consensus is categorical. However, the oil industry denied this effect for years, then tried to hide its responsibility, and is currently trying to delay the transition with technological promises. Stories coexist, although scientific evidence supports one view. This forces us to recreate the climate narrative and strengthen our story so that it triggers change. The communication of the problem is essential. (Un)fortunately, the constant and increasing occurrence of phenomena that are becoming more extreme every day serves to highlight the scientific fundamentals of our narrative.

The presence of uncertainty also raises the importance of closer ties, the need to enhance altruism, foster camaraderie, and bet on common benefits. Such a situation contradicts the neoliberal model that shows a narrow vision of men as selfish and greedy beings, and of a society that does not exist. That is the message of M. Thatcher that still lingers in the minds of many leaders in our region. As many political scientists point out, it ended up inducing the rise of the extreme right in different corners of the world.

Stories, when unfounded, behave like fads. In a posthumous book, anthropologist David Graever (together with David Wengrow) documents the existence of camaraderie in the Upper Paleolithic period (30,000 to 50,000 years ago) and highlights the existence of a certain type of egalitarianism in those societies (Graeber & Wengrow, 2021). Other authors come to refute such a discovery. They told us, through their narratives, of primitive societies in which men were wolves to men. The possibility of facing uncertainty was one of the first reasons that explained the emergence of altruism, as different cultures began to reward those who behaved appropriately and punish those who did not. Every society, in short, is distinguished by the existence of groups of camaraderie, the search for altruism, and mutual benefit.

If we analyze the situation in the region, however, we observe the primacy of the extractivist discourse, be it neoliberal or neo-developmental; both deny the emergency of the moment. This justifies new oil industry projects, whether in the Ecuadorian Amazon or the depths of the Argentine Sea. According to the official story, for example, developing Vaca Muerta allows advancing towards a "clean" transition, ignoring, however, the multiple studies by the scientific community that warn about the pernicious effect of methane in the atmosphere: 80 times more powerful than carbon dioxide.

The countries of the region are not the main ones responsible for the greenhouse effect, but they are not minor players either. When comparing the total accumulated emissions, we see that countries such as Brazil or Mexico show relevant levels and, when we evaluate values per capita, Argentina holds an important place. We should also analyze the sectors that have benefited in Latin America, the scarce spilling that the extractive model has generated towards the most marginalized sectors of societies. We must move towards a new development model and begin to walk an energy transition that benefits those left behind the most and empowers society.

We are going through a time of emergency, as the time to limit the average temperature increase to 1.5 °C is running out. Under such a context "We *need to accept that we do not know and cannot know what is going to happen, and make plans accordingly; to practice resilience and acquire and retain as many options as possible*" (Kay & King, 2020, p. 425). In a recent report, leading scientist Johan Rockström (2023) highlighted the relevance of using the word "*emergency*". It denotes the presence of an unmanageable risk [although radical uncertainty fits better], the resolution of which requires more time than we have. If we do not act soon, by the end of the century, the average temperature will rise by 2.8 °C. We are heading for catastrophe, such as António Guterres´message at the UN climate conference that some political leaders prefer not to hear about (UN, 2022).

Concluding remarks

Climate change is already impacting daily life and future generations face substantial consequences if the status quo prevails. The magnitude of the physical risks remains unknown, but the economic hazards and financial risks continue to build up.

Unequivocally, the situation shows us the convenience of moving towards renewable sources, but the process is far from being risk-free. There is always an impact on the economy since the transition to a society with "low carbon combustion" implies simultaneous creation and destruction. It also involves going through uncertainty. Depending on one's situation, uncertainties may be embraced as an opportunity or encountered as a source of dread, fear, and anxiety.

It is remarkable how the narrative and discourse of some speakers can influence the behavior of others, independent of the validity of the message, vision, or ideology of the speaker. Unequivocal messages emerged from the Davos forum about the unequivocal messages about the irremediable nature of financial globalization and the benefits of the market, in short, about the dangers of public intervention.

But the world is changing, the discourses are different. One proof of this is the clamor for different state support schemes to finance the energy transition by the most important global CEOs gathered in Davos (Martin & Chassany, 2023). Another one is the demand by the Executive Director of the International Monetary Fund (IMF), Kristalina Georgieva, to leave old "ideologies" behind (i.e., opposition to subsidies) and thus quickly move forward with the transition. Or the remarks made by the governor of California, Gavin Newson, at the UN Climate Ambition Summit coupling the oil industry with the extreme events experienced by the State and reframing their lies "*For decades and decades, the oil industry has been playing each and every one of us in this room for fools"*. Undoubtedly, the discourses reflect a new normality, which also involves the irruption of new companies and new political actors, since the transition process not only implies a technological change but also affects the currently prevailing economic and political power scheme, with vast geopolitical consequences.

Fortunately, a new narrative is emerging everywhere, a vision that transcends the (false) rift. From the clamor of the population to the political tribunes, the environmental speech is gaining followers among the political class. New leaderships are emerging that combine the traditional clamor for social justice of the democratic left with respect for biodiversity and recognition of the limits of the planet. As Robert J. Schiller suggests it might become a contagious story that has the potential to change how people make economic decisions (Schiller, 2019). But, Will this narrative go viral? It might be the case, or it might not. As the recent U-turn on environmental policies produced by the UK Prime Minister, Rishi Sunak, the present is also being challenged by "*mainstream politicians [that] have embraced a convenient half-truth about climate change*" (Rachman, 2023). The advance of right-wing, climate-denial parties in Argentina, Germany and elsewhere demonstrates that green policies are under increasing contest. As transition remains unfair and distant, governments abandon the fight against global warming with no political costs.

It is time to move, to generate hope around a new narrative, recognizing the urgency of the moment and the need for inclusiveness. We should act now because: "*We don't know how long we can keep breaching these key boundaries before combined pressures lead to irreversible change and harm*" as Johan Rockström (2023) said.

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