

# CLIMATE-RELATED FINANCIAL RISKS AS A GOVERNANCE CHALLENGE: AN INCLUSIVE INTERNATIONAL PUBLIC POLICY PROPOSAL

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## Abstract

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This study focuses on climate-related financial risks as a governance issue, which drives our attention to the quality of stakeholders' interactions. The theoretical approach is undertaken through the institutional literature lens, along with the works of Rawls (1971, 2001) and Sen (1992, 2000, 2009), and contributions from the conceptions of co-creation and inclusive development. The applied analysis is carried out by connecting climate change to financial risks under a scenario of uncertainty (Bolton, Despres, Pereira da Silva, Samama, & Svartzman, 2020; TCFD, 2017; Daniel, Litterman, & Wagner, 2019; Carney, 2016; Maier et al., 2016; NGFS, 2018, 2019). The core objective of this study is to present a public policy proposal that aims to support effective international climate-related agreements, from a procedural perspective. To this end, we start by presenting an institution, which is broken down into three propositions. This process enables us to undertake a critical analysis from a technical and normative standpoint. The latter is based on Bush (1987). The main contribution of this study is the rationale underlying that the best set of policies to face climate change issues is that representing agents' strong engagement and commitment. Finally, although the applied analysis focuses on climate change issues, the discussion conducted here can be reproduced in other areas.

**Keywords:** Climate Risk, Financial Stability, Governance, International Cooperation

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## 1. INTRODUCTION

Discussions on climate-related financial risks have received increasing attention over the years. The possible impacts of climate change on financial and price stability have caused concern, especially among central banks and supervisors. Basically, the drivers of connections between climate events and the economic context are represented by physical and transition risks (Bolton, Despres, Pereira da Silva, Samama, & Svartzman, 2020; NGFS, 2018; Villeroy de Galhau, 2019).

In addition to the complexities related to combating climate change risks *per se*, there are also reciprocal influences among technological, political, climate and economic arenas, which add a high level of uncertainty to future scenarios<sup>1</sup>. On one side, there is a need for stakeholders' action and, consequently, for change in consumption and production patterns, stemming from excessive greenhouse gas emissions (Bolton et al., 2020<sup>2</sup>); on the other, there are "risks associated with an abrupt adjustment to a low-carbon economy, such as rapid losses in the value of assets due to changing policy or consumer preferences" (TCFD, 2021, p. 4).

Hence, to address these issues from an international perspective, this study discusses climate-related financial risks through the lens of governance<sup>3</sup>. We use institutional economics and political philosophy literature (basically the works of John Rawls and Amartya Sen). Moreover, we consider the concepts of co-creation and inclusive development to support the applied approach. To this end, we retrieve the core theoretical approaches raised in this study from von Borowski Dodl (2020, 2021), in which the literature review was further developed. In addition, we undertake a similar methodology used by von Borowski Dodl (2021).

The applied analysis refers to climate-related financial risks under a scenario of uncertainty. Two decision centres are delimited for discussion: internal (national), and external (international). Because of that, we put forward a proposal in two stages, anchored on the premise that a cooperative international agreement will be necessary to tackle climate-related financial risks effectively. We examine the proposal by breaking down the institution of analysis into three propositions.

From the governance approach<sup>4</sup>, our argument is that a legitimate strategy involving stakeholders from the policy design to its implementation — an idea related to an 'inclusive decision hub' — holds the potential to promote effective results.

Thus, our objective in this study is to analyze a policy proposal regarding climate-related financial risks that bolsters agents' engagement and commitment, paving the way to consistent steps — from the national context to the international arena, towards a future of less instability.

Therefore, to carry out this qualitative analysis, we organize the remainder of this paper as follows. Section 2 presents the literature review, and Section 3 is related to the methodological aspects. Section 4 focuses on the discussion of climate-related issues, while Section 5 addresses the public policy proposal — which is conducted through critical questioning. Lastly, Section 6 concludes.

## 2. LITERATURE REVIEW

The objective of this section is to present the conceptual framework undertaken in the applied analysis. To this end, we base our references on von Borowski Dodl (2020, 2021), where the main definitions are discussed in more detail. Essentially, we rely on the works of Rawls (1971, 2001) and Sen (1992, 2000, 2009), institutional economics literature, and inclusive development and co-creation conceptions — which take us to the ideas of reciprocity, engagement, equity, learning and innovation.

Each subsection addresses a set of concepts, which will be applied in the critical analysis undertaken in Section 5. Here, we focus on conceptual understanding, without association with the concrete case under evaluation. Thus, our goal is to build a clear matrix of concepts that enables us to develop a robust rationale for the public policy proposal.

### 2.1. Procedures, legitimacy and informational base

We consider that, when we take on a challenge related to a collective issue, in which different points of view are involved, there are basically two possible ways to achieve a result: 1) imposing a solution or 2) reaching consensus. The former can engender instability to the environment, if there is the perception of unfair relations, producing dissatisfaction. On the contrary, if the agents<sup>5</sup> submitted to the decision understand that everyone is getting what was agreed upon previously — *reciprocity* (Rawls, 2001) — we argue that there tends to be stability.

Given the importance of *how* solutions are reached, when diverse interests are brought together, we highlight the role performed by procedures in Rawls. From his perspective, "pure procedural justice obtains when there is no independent criterion for the right result: instead there is a correct or fair procedure such that the outcome is likewise correct or fair..." (Rawls, 1971, p. 86). However, *what* is prioritized remains relevant — according to Sen (1992), "What is of direct interest is the plausibility of claiming that equal consideration at some level — a level that is seen as important — is a demand that cannot be

<sup>1</sup> For discussions on chain reactions promoted by climate change on different spheres and the deep uncertainty that comes with it regarding future scenarios, see Bolton et al. (2020); Ripple, Wolf, Newsome, Barnard, & Moomaw, 2020.

<sup>2</sup> According to Bolton et al. (2020), "Our current production and consumption patterns cause unsustainable emissions of greenhouse gases (GHGs), especially carbon dioxide (CO<sub>2</sub>): their accumulated concentration in the atmosphere above critical thresholds is increasingly recognised as being beyond our ecosystem's absorptive and recycling capabilities" (p. 5).

<sup>3</sup> In this study, our approach to governance refers to a system through which a project/an organization/a country achieves its objectives, and whose foundation is characterized by the relationships among stakeholders.

As a reference for this conception, we consider the concept used by IBGC (2015): "Corporate governance is the system by which companies and other organizations are run, monitored and encouraged, involving relationships between partners, the board of directors, the board of executive officers, the supervisory and control bodies and other stakeholders" (p. 20, translated by the author).

<sup>4</sup> "Climate change poses an unprecedented challenge to the governance of global socioeconomic and financial systems" (Bolton et al., 2020, p. 5).

<sup>5</sup> Throughout this paper, we take on the term *agent* as the stakeholders in each project. "I am using the term agent... in its oldest sense — and 'greatest' — of someone who acts and brings about change and whose achievements can be judged according to their own values and goals..." (Sen, 2000, p. 33, translated by the author).

easily escaped in presenting a political or ethical theory of social arrangements” (p. 18).

Consequently, we argue that *how* agreements are established and *what* is considered as equal consideration affect the legitimacy of the results. In this regard, it is worth focusing on the adequate informational base to undertake a project — in its full sense — from conception to implementation. As Sen (2000) stated, “The informational base of normative theories in general, and justice theories in particular, is of decisive importance, and can be the crucial focal point in many practical policy debates...” (p. 76, translated by the author).

Moreover, on the importance of information adequacy, “the character of the approach can be strongly influenced by insensitivity to excluded information” (Sen, 2000, p. 74, translated by the author). Therefore, we argue that, depending on who is left outside of the debate, the resulting bias may jeopardize the opportunity to solve a problem, timely and efficiently. In this regard, and summarizing this subsection, “So what is fairness?... central to it must be a demand to avoid bias in our evaluations, taking note of the interests and concerns of others as well... It can broadly be seen as a demand for impartiality” (Sen, 2009, p. 54).

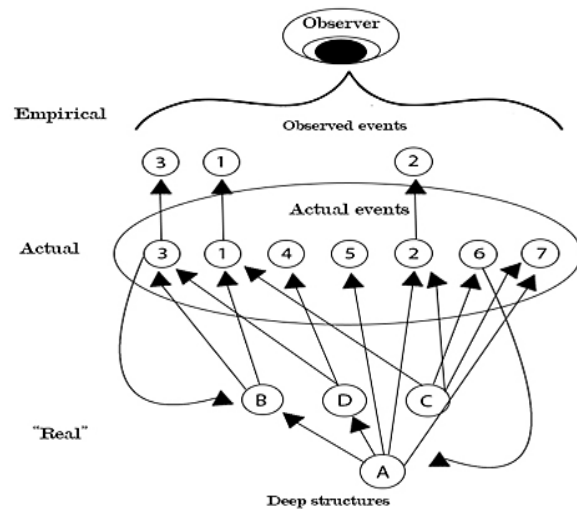
## 2.2. Institutional approach

Throughout our lives, we are taught values from family, communities in which we participate, and the society in which we live. We are raised to be compliant with our country’s culture and laws. Furthermore, each agent faces their own personal experiences. Thus, from these inner and outer inputs, each agent is a result of a unique matrix of information.

Consequently, we argue that promoting legitimacy — and engagement — within an institutional environment comprised of agents from diverse backgrounds demands a careful development process of commitment, coordination and cooperation among them<sup>6</sup> — we address these aspects in the next subsection.

Specifically, to support the approach undertaken in this study, we assume that an institution is a “structurally actualized emergent process” (Tauheed, 2013, p. 149), empirically perceived as rules in equilibrium<sup>7</sup>. Below, Figure 1 presents Bhaskar’s stratified ontology, “which conceptualizes reality as a composite of emergent *real*, *actual*, and *empirical* strata” (Tauheed, 2013, p. 148). In addition, Tauheed (2013) stratified the real stratum (deep structures) in: 1) social structure and 2) human agency<sup>8</sup>; and social structure in 1) resource structure; and 2) culture.

Figure 1. Bhaskar’s stratified ontology



Source: Tauheed (2013, p. 150).

Tauheed (2013) explained that r-structure “is the distribution of resources to agents as an outcome of past action” (p. 153) and culture “includes the ‘people’s’ technology (‘tools and skills’) and its ‘symbols, stories, rituals, and world-views,’ all developed from the collective experience in past problem solving used ‘to construct strategies of action’ for present problem solving (Swidler 1986)” (p. 153). Clarifying the former, Tauheed (2013) stated, “Resources may be material and/or ideational, natural and/or man-made, personal and/or social, public and/or private. The focus, in the r-structure sense, is on ‘who has what’” (p. 153).

Additionally, to achieve consensus on how to deal with collective issues, negotiations must happen through dialogue among different mental models, which means “the internal representations that individual cognitive systems create to interpret the environment...” (Denzau & North, 1994, p. 4). Agents have a subjective and imperfect capacity to process information, and this influences agents’ decision-making (North, 1990). Thus, the same external event can be interpreted differently by the stakeholders and hence their reaction to it will likely be divergent.

According to Denzau and North (1994), “The cultural heritage provides a means of reducing the divergence in the mental models that people in a society have and also constitutes a means for the intergenerational transfer of unifying perceptions” (p. 8). Moreover, based on the existing institutional matrix (formal and informal institutions) and its resulting incentives, organizations develop their strategies and abilities to operate within it, creating a dependence on the former (North, 1990)<sup>9</sup>. In this sense, culture can smooth out difficulties of communication and reaching consensus, while it can also hamper changes in dominant behaviours if these are to detriment of innovation.

Finally, we focus on Bush’s (1987) institutional change theory: “All inquiry involves interpretation, and interpretation requires judgement. When

<sup>6</sup> See World Bank (2017) on the importance of commitment, coordination and cooperation within an institutional context.

<sup>7</sup> Hindriks and Guala (2015) stated that “institutions are ‘rules in equilibrium’, where the rules are summarized by the agents using some kind of symbolic representation” (p. 468).

<sup>8</sup> Tauheed (2013) elucidated on agency, “involves concepts such as self-efficacy, which is ‘...It is concerned not with the skills one has [which is r-structural] but with judgments of what one can do with whatever skills one possesses’ (Bandura 2002, 94, emphasis added)... also relates to such concepts as: planful competence (the ability to make and maintain successful long-term plans), locus of control (the location of perceived responsibility for one’s behaviour, that is, internal or external), personal control (the ability to exercise control over one’s environment), and self-control (the ability to exercise control over one’s own actions)” (Bandura 1989; S. Hitlin and Elder 2007; S. Hitlin and Long 2009)” (p. 153).

<sup>9</sup> According to North (1990), organizations and institutions comprise the institutional context.

the subject matter under investigation is the value system of society, interpretations and their attendant judgments must be made about the value system” (p. 1078). The dynamics underpinning behaviours within the institutions assumes two natures.

The ceremonial value system is based on authority and absolute values, while the instrumental system is set according to proven capacity to solve problems. Thus, ceremonial values are not subject to critical questioning that could refute them; they provide support for power relations of one class over another, based, for example, on tradition — promoting privileges. Instrumental values, on the other hand, correlate behaviors based on critical, practical validation (Bush, 1987). “Instrumental values are not, however, fixed or immutable. The problem-solving processes of the community, being dependent on the processes of inquiry and technological change, are inherently dynamic, requiring changes in habits of thought and behavior” (Bush, 1987, p. 1080).

### 2.3. Inclusive development and co-creation conceptions

In this paper, the approach of inclusive development underscores the conception of bringing the stakeholders to effectively participate in the productive and distributive processes<sup>10</sup>. However, social inclusion must be addressed with caution, “For everyone to be included in everything is an absurd ambition... Transaction costs would be staggering... Inclusive development is a difficult and complex concept because inclusion has to come in the right amount and be of the right kind in order to promote development” (Johnson & Andersen, 2012, p. 59).

Here, we apply the idea of ‘inclusive process’ — co-creation — referring to decision-making environments based on different agents’ perspectives. It entails an approach to rights and responsibilities<sup>11</sup>. Furthermore, we highlight legitimacy as an important component to promote efficiency in collective initiatives: 1) agents that have their interests adequately considered in a project tend to engage more effectively in it<sup>12</sup>; 2) “other things equal, human beings enjoy the exercise of their realized capacities (their innate or trained abilities), and this enjoyment increases the more the capacity is realized, or the greater its complexity” — the Aristotelian principle (Rawls, 1971, p. 426); and 3) by committing themselves — allocating efforts into a project and expecting benefits from it — agents are better prepared to take on responsibilities.

In this sense, we argue that having concrete chances to discuss and deliberate<sup>13</sup> on collective

issues tends to decrease the possibility of being penalized for something inappropriate, while the learning opportunities increase. According to Rawls (1971), “a legal system should recognize impossibility of performance as a defense, or at least as a mitigating circumstance. In enforcing rules, a legal system cannot regard the inability to perform as irrelevant” (p. 237).

Additionally, “From the perspective of evolutionary economics, learning and innovation are the most important processes in development (Nelson, 2008). Including people in learning and innovation activities is thus a central part of inclusive development” (Andersen & Andersen, 2016, p. 3). Here, we emphasize that should agents deliberate on different aspects of a project, they need to understand each problem, the alternative ways to reach results, and possible consequences of specific choices.

Moreover, it is worth noting that, by including different mental models in a project, governance abilities are potentially broadened<sup>14</sup>, which does not mean that those models are immutable (Section 5 in this paper elaborates on this)<sup>15</sup>. Stakeholders can agree upon a proposal in order to cooperate, even keeping diverse preferences, but they can also see reality through new perspectives during the process and promote changes in their previous mental models.

Therefore, we highlight that legitimacy promoted by engagement throughout the process takes a core role in reaching results effectively. It is not just about fairness, but also about success. The report ‘*World development report 2017: Governance and the law*’ (World Bank, 2017) underlines the fundamental functions of institutions to advance effective public policies<sup>16</sup>: commitment, coordination and cooperation, “institutional trust, built by repeatedly delivering on commitments... is important because it strengthens the capacity to commit (outcome legitimacy), and ultimately it enables cooperation and coordination by inducing voluntary compliance...” (p. 55)<sup>17</sup>.

### 3. METHODOLOGY

We conduct a qualitative study using critical and normative perspectives. The literature review is focused on the main concepts underpinning the applied analysis and is based on von Borowski Dodl (2020, 2021), who presents the theoretical reference in more detail. We draw important concepts from the works of Rawls (1971, 2001), Sen (1992, 2000, 2009), as well as from the institutional literature — original and new institutional schools.

their consequences into consideration and, finally,... choosing among alternative courses of action” (p. 309).

<sup>14</sup> “Ramaswamy and Gouillart (2010) observed that among the returns obtained by co-creative enterprises are increased productivity-creativity and new business models” (von Borowski Dodl, 2020, p. 46).

<sup>15</sup> For more discussions on governance approaches and processes, see Grove, Clouse, and Schaffner (2018), Kim (2020), Moro Visconti (2019), and Yeung (2019).

<sup>16</sup> The World Bank (2017) pointed out “*commitment, coordination, and cooperation* as the three core functions of institutions that are needed to ensure that rules and resources yield the desired development outcomes. Policy effectiveness can be explained by whether and how well institutions are performing these functions” (p. 53).

<sup>17</sup> Drawing on World Bank (2017), “Commitment enables actors to rely on the credibility of policies so they can calibrate their behaviour accordingly” (p. 5). Coordination implies working together — in a synchronous manner towards the same direction; and cooperation entails contributing to the agreed upon collectively and not taking advantage of other agents’ efforts.

<sup>10</sup> On inclusive development, see van Gent (2017), Johnson and Andersen (2012), Gupta, Pouw, and Ros-Tonen (2015).

<sup>11</sup> Sen (2009) stated that “it would be a mistake to see capability, linked with these ideas of freedom, only as a notion of human advantage: it is also a central concern in understanding our obligations” (p. 271).

<sup>12</sup> In reference to Ramaswamy and Gouillart (2010), von Borowski Dodl (2020) pointed that “The co-creation paradigm refers to the participation of customers, employees, suppliers, and other stakeholders who can contribute to new solutions. Among the principles of co-creation are the need to generate value for all stakeholders — so that real engagement can occur...” (p. 46).

<sup>13</sup> The problem-solving behaviour approach in Katona (1953) is applied in this paper as deliberate decision-making: “the arousal of a problem or question,... deliberation that involves the reorganization and ‘direction’,... understanding of the requirements of the situation,... weighing of alternatives and taking

Additionally, we use relevant contributions from works addressing inclusive development and co-creation.

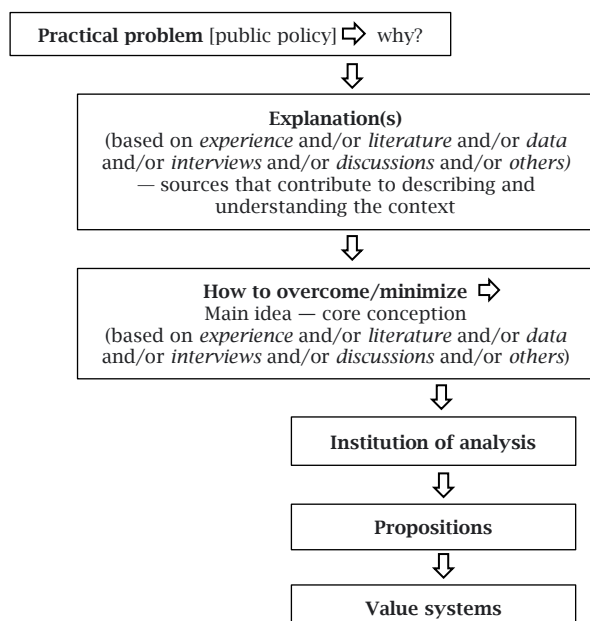
On the applied analysis, we focus on climate-related financial risks under a scenario of uncertainty (Bolton et al., 2020; TCFD, 2017; Daniel, Litterman, & Wagner, 2019; Carney, 2016; Maier et al., 2016; NGFS, 2018, 2019). We mention two types of climate-related risk: physical and transition and address the governance aspect based on co-creation and inclusiveness. Two arenas are specified for discussion: internal (national), and external (international). Therefore, we put forward a proposal in two stages, stemming from the point of view that a cooperative international agreement will be necessary to tackle climate-related financial risks effectively.

The governance perspective is developed through an institutional evaluation. Firstly, we define the empirically perceived institution of analysis — to be examined — and break it down into three propositions — this process is undertaken based on von Borowski Dodl (2021) and on the theoretical approach of Bush (1987). Regarding each proposition (A, B, and C), we critically analyse its rationale, contextualizing the institutional process through practical examples.

Secondly, we focus on value judgment — the normative content within the institution of analysis. By drawing on the predominant value system correlating the three propositions, we suggest a strategy to promote internal engagement and an effective international agreement. Furthermore, considering the embryonic nature of this study and the interconnections between the different areas, we reinforce the convenience of providing real situations — practical examples — as a way of constantly submitting the theoretical approach to reality. Even if the examples presented do not reproduce the exact relationships under scrutiny, they act as evidences for our questioning and critical perspective.

For the reproduction of the analysis, the researcher can use/adapt the following model:

Figure 2. Critical questioning



#### 4. DISCUSSION: CLIMATE-RELATED RISKS AND DISTRIBUTIVE CHALLENGES

In this section, we focus on the climate-related financial risks scenario — technical features and distributive conundrum. To this end, we briefly present some specific approaches based on recent literature addressing climate change and its connections with economic aspects.

##### 4.1. Climate-related financial risks

According to Bolton et al. (2020), “Climate change is a source of financial (and price) instability: it is likely to generate physical risks related to climate damage, and transition risks related to potentially disordered mitigation strategies”<sup>18</sup> (p. 1) (see also NGFS, 2019, Coeuré, 2018, Villeroy de Galhau, 2019).

By narrowing our analysis to governance aspects within climate-related risks, we do not mean to consider ‘nature’ as an exogenous factor. On the contrary, we assume it to be a major stakeholder in the process of reaching a consensus. Human beings figure as agents in climate change causes through their interactions with each other and their decisions towards nature. At the same time, they suffer and benefit from the consequences of this behavioural matrix. In other words, climate change is a governance challenge<sup>19</sup>.

Climate change risks have increasingly drawn the attention of agents due to potential harsh and uncertain results on society (Bolton et al., 2020; TCFD, 2021; Ripple et al., 2020; Carney, 2016)<sup>20</sup>. According to Bolton et al. (2020), “the complexity related to climate change is of a higher order than for black swans: the complex chain reactions and cascade effects associated with both physical and transition risks could generate fundamentally unpredictable environmental, geopolitical, social and economic dynamics” (p. 3)<sup>21</sup>. Additionally, NGFS (2018), in consideration of climate change effects on the global economy and financial system: “Exact pathways may be uncertain but it is foreseeable that financial risks will crystallize in some form through either the physical or transition channel, or some combination of them both” (p. 3).

Therefore, it is important for us to understand the concepts and relations underpinning the analysis. Firstly, we turn our attention to

<sup>18</sup> “...avoiding the worst impacts of climate change amounts to a massive, unprecedented, challenge for humanity. The planet is producing close to 40 gigatonnes (Gt) of CO<sub>2</sub> per year, and it is on track to double by 2050. We should reduce emissions to almost zero by then... in order to comply with the UN Paris Agreement of 2015 (UNFCCC (2015)), which set the goal of keeping global warming well below 2°C and as close as possible to 1.5°C above pre-industrial levels (defined as the climate conditions experienced during 1850–1900)” (Bolton et al., 2020, p. 13).

<sup>19</sup> In this paper, we understand climate change governance as an inclusive approach, involving all stakeholders. To emphasize the growing importance of the subject from a financial perspective, we put forward a TCFD’s (2017) excerpt: “There has also been increased focus, especially since the financial crisis of 2007–2008, on the negative impact that weak corporate governance can have on shareholder value, resulting in increased demand for transparency from organizations on their risks and risk management practices, including those related to climate change” (p. 1).

<sup>20</sup> Nelson (2008) stated that “I note here that Schumpeter’s concept of uncertainty is close to that of Frank Knight’s (1921): absence of sufficient relevant experience for the actor to estimate relevant probabilities reliably, or even to list in any detail the states of affairs that might materialize after an action is taken” (p. 11).

<sup>21</sup> The authors used the terms ‘green swans’ and ‘climate black swans’ in analogy to black swans. “Black swan events have three characteristics: (i) they are unexpected and rare, thereby lying outside the realm of regular expectations; (ii) their impacts are wide-ranging or extreme; (iii) they can only be explained after the fact. Black swan events can take many shapes, from a terrorist attack to a disruptive technology or a natural catastrophe” (Bolton et al., 2020, p. 3).

climate-related financial risks. Bolton et al. (2020) elaborated on physical and transition risks (see also Regelink, Reinders, Vleeschhouwer, and van de Wiel, 2017, NGFS, 2018, 2019, Villeroy de Galhau, 2019):

- *Physical*: “represent the economic costs and financial losses due to increasing frequency and severity of climate-related weather events (e.g., storms, floods or heat waves) and the effects of long-term changes in climate patterns (e.g., ocean acidification, rising sea levels or changes in precipitation)” (Bolton et al., 2020, p. 17).

- *Transition*: “associated with the uncertain financial impacts that could result from a rapid low-carbon transition, including policy changes, reputational impacts, technological breakthroughs or limitations, and shifts in market preferences and social norms” (Bolton et al., 2020, p. 18).

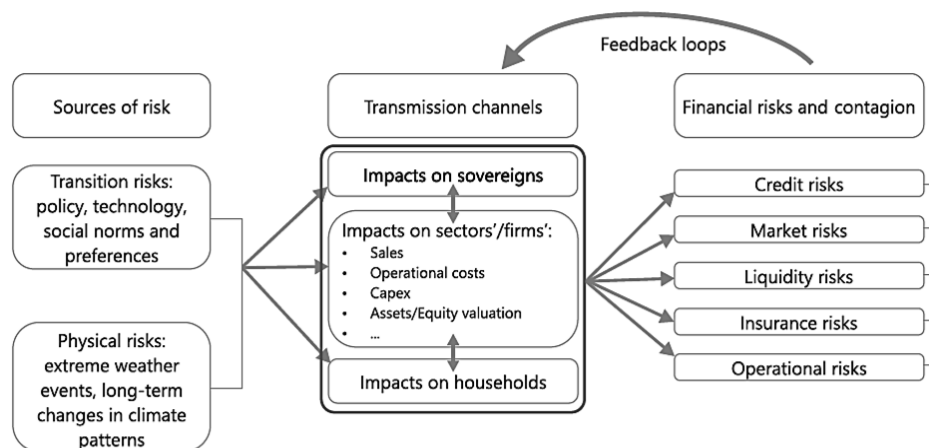
Furthermore, Carney (2016) referred to three channels through which financial stability is impacted by climate change: physical, liability and

transition risks. On the liability risk, he stated: “These stem from parties who have suffered loss from the effects of climate change seeking compensation from those they hold responsible” (p. 2) (Bolton et al. (2020) commented on this, “such costs and losses are often considered to be part of either physical or transition risk” (p. 17)).

Moreover, NGFS (2018) elaborated on the two types of physical risks: acute and chronic. The former is related to droughts, floods and other sudden and severe events, while the latter results from gradual climate change over time — an example of these are the rising temperatures. Furthermore, the report clarified that physical risks refer to the direct and indirect effects of these events.

Below (Figure 3), the connections between climate-related and traditional financial risks are presented, alongside the agents’ behaviours.

**Figure 3.** Channels and spillovers for materialisation of physical and transition risks



Source: Bolton et al. (2020, p. 20).

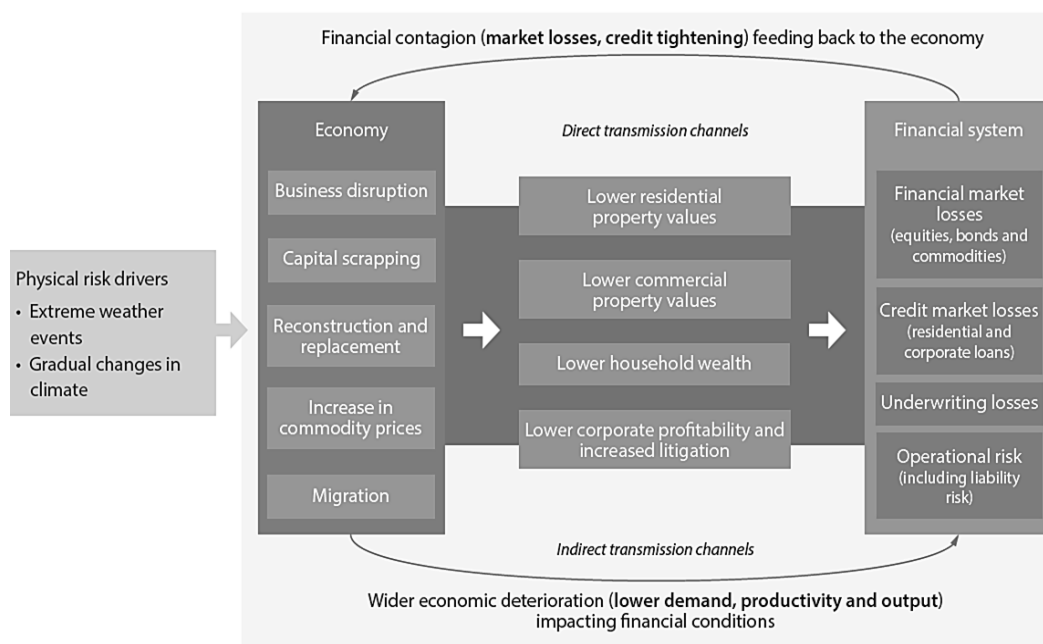
According to NGFS (2018), the macroeconomic context can be affected by physical and transition risks, considering both sides — demand and supply. Thus, for instance, household consumption and business investment can be decreased by extreme events impairing agents’ assets, and consumption can follow more climate-friendly preferences. From a business perspective, the negative impact could also be caused “by uncertainty about future demand and growth prospects” (NGFS, 2018, p. 5). In addition, by addressing physical risks, the report pointed that “The main *supply*-side shocks are represented by a shortage of availability of inputs produced locally or imported, by the volatility in import prices as a result of these shortages, and by the damages to the capital stock and infrastructure,

including through transportation disruption” (NGFS, 2018, p. 5).

Further, the report stated that “Physical risks can potentially result in large financial losses that can have micro as well as wider systemic impacts” (NGFS, 2018, p. 5). Regarding financial entities, these can be affected by physical risks, directly and indirectly, considering the possible effects, for example, on their own infrastructure or arising from the intensification of migratory movements that contribute to political instability (NGFS, 2018).

In the next figure (Figure 4), circular influences among agents are shown. In these relations, we highlight that climate and weather act as physical risk drivers. Putting it differently, we argue that human agents have an influence on these drivers but are not the ‘controllers’.

Figure 4. From physical risk to financial stability risks

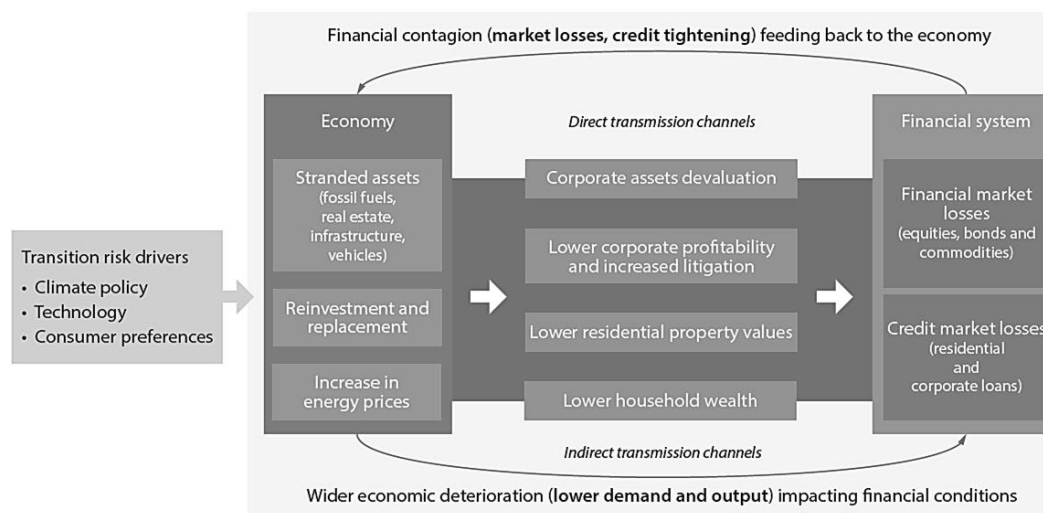


Source: NGFS (2019, p. 14).

On transition risks, NGFS (2018) addressed the effects that could be prompted if the transition process is not properly handled. “The impact of the transition risk may depend on the timing as well as the speed of the transition (early versus delayed transition and/or gradual versus abrupt transition)... Overall, if it is gradual and starts early, the macro-economic costs and risks to financial stability can be minimized” (NGFS, 2018, p. 6).

Subsequently, Figure 5 presents circular influences within the transition risks context. Focusing on transition risk drivers, we highlight the feature of preponderant human action. Retrieving what we observed concerning Figure 4, physical risk drivers are comprised of climate and weather. Although human action influences physical risks drivers, on transition risks, human agents are the ‘controllers’.

Figure 5. From transition risk to financial stability risks



Source: NGFS (2019, p. 17).

#### 4.2. The way forward and distributive challenges

The repercussions of climate change do not reflect similar perspectives of exposure and fragility between and within countries. Regardless of whether physical or transition risks are addressed, lower income countries and households are likely to be more vulnerable to the outcomes of both (Bolton

et al., 2020). “The cost of mitigation and adaptation might also be prohibitive for both groups” (p. 15).

Extensive literature has mentioned the uncertainty surrounding climate change scenarios (Bolton et al., 2020; Maier et al., 2016; Daniel et al., 2019; NGFS, 2018, 2019). According to Bolton et al. (2020), “integrating climate-related risk analysis into financial stability monitoring and prudential supervision is particularly challenging



because of the distinctive features of climate change impacts and mitigation strategies. These comprise physical and transition risks that interact with complex, far-reaching, nonlinear, chain reaction effects” (p. 1).

Consequently, based on uncertain future results and stemming from different possible interconnections among climate, political, socioeconomic and technological factors, analysing distributional aspects of public policies becomes a difficult task<sup>22</sup>. Furthermore, the existence of a trade-off between policies tackling physical and transition risks adds extra complexity to decision-making processes concerning collective agreements. In this sense, Carney (2016) specified that “Smooth adjustment is crucial because transition risks are how success could turn into failure. Specifically, sudden changes in policy, technology and physical risks could prompt a reassessment of asset values as costs and opportunities become apparent. In other words, an abrupt resolution of the tragedy of horizons is in itself a financial stability risk” (p. 7)<sup>23</sup>.

Finally, we underline that we must be careful in considering their cross-effects, deriving from policies focusing on physical and transition risks, along with their downstream chain effects. If the stakeholders just keep the same current consumption and production patterns, our societies could take on a dangerous position, promoting choices and outcomes that could turn to be irreversible. However, being in a rush to avoid future damages could also engender serious social, political and economic harm (Bolton et al., 2020; Regelink et al., 2017; NGFS, 2018).

## 5. PROPOSAL: A PUBLIC POLICY CONDUCTIVE TO LEGITIMACY

By drawing on uncertainty related to climate-related scenarios, we focus on a public policy proposal that devises a solution based on conceptions of co-creation-inclusion, reciprocity and legitimacy. “It has been recognized that the effectiveness — here understood as the implementation of policies, which is indicated by behavioural changes in actors — of policy depends to a large extent on the involvement of a broad range of actors in addition to those formally in charge” (Andersen & Andersen, 2016, p. 5).

In this subsection, we develop an exercise of institutional evaluation. This procedure implies the identification of values correlating the propositions supporting the institution of analysis. Consequently, it is an exercise of interpretation and judgment — through a normative perspective. The analytical process entails a first step assessing the rationale within each proposition, and a second one addressing the normative content underlying the set of propositions.

### 5.1. Discussion of propositions

We put forward a public policy proposal to tackle climate-related issues, which demand strong

legitimate commitment, mainly considering international coordination and cooperation. We work on the proposal from the idea of a procedural approach (following a Rawlsian perspective). In this sense, we focus our questioning on the process, not on the ‘right’ results.

Our objective is to evaluate an institution to provide the foundation for future decisions through a procedural framework. To this end, we start from what we call the empirically perceived institution of analysis, whose meaning expresses a behavioural content. Next, we address the rationale supporting the proposal by breaking down the institution of analysis into three propositions.

Empirically perceived institution of analysis: *effective international climate-related agreements as a result of inclusive internal discussions*. This statement expresses our conception that, at this moment, agents’ efforts should be allocated to governance agreements, in which stakeholders can calibrate intensity and speed. From this approach, the propositions underpinning the institution are as follows — within a political society (in this paper, we approach it as *internal*)<sup>24</sup>:

*Proposition A: Structured internal discussions, developed through interactions among stakeholders, enable legitimate strategy building and implementation.*

*Proposition B: Legitimate decision-making processes on climate-related financial risks underpin innovative and effective outcomes.*

*Proposition C: Co-creation of an effective international cooperative solution draws on a deliberate and legitimate internal ability to face climate-related issues.*

#### 5.1.1. Proposition A

Proposition A entails an inclusive process to afford deliberate decision-making. To this end, we point an important aspect underlying the contribution of the foresight approach. Andersen and Andersen (2016) stated that “Ministries of finance, industry or science and technology in developing countries often produce ambitious plans and related innovation policies for strengthening and connecting science and technology (S&T) and industry activities to support innovation systems. Too often, such strategic initiatives fail. We suggest that one important explanatory factor behind failed policies can be found in the design of the very process of generating them” (p. 3).

The foresight approach<sup>25</sup> is linked to agents’ participation and to different knowledge and experiences being added to the process of understanding the current context and analysing future scenarios (Andersen & Andersen, 2016). Further, the authors explained that “the purpose of foresight is thus to imagine different futures and their consequences and, on that basis, to engage in informed decision making. It is perceived as a process where new insights emerge and capabilities are built rather than a tool for prediction” (Andersen & Andersen, 2016, p. 6).

Below, Figure 6 features phases and interconnections within a foresight process.

<sup>22</sup> For discussions on the distributional effects of climate change, see Bolton et al. (2020), Ripple et al. (2021).

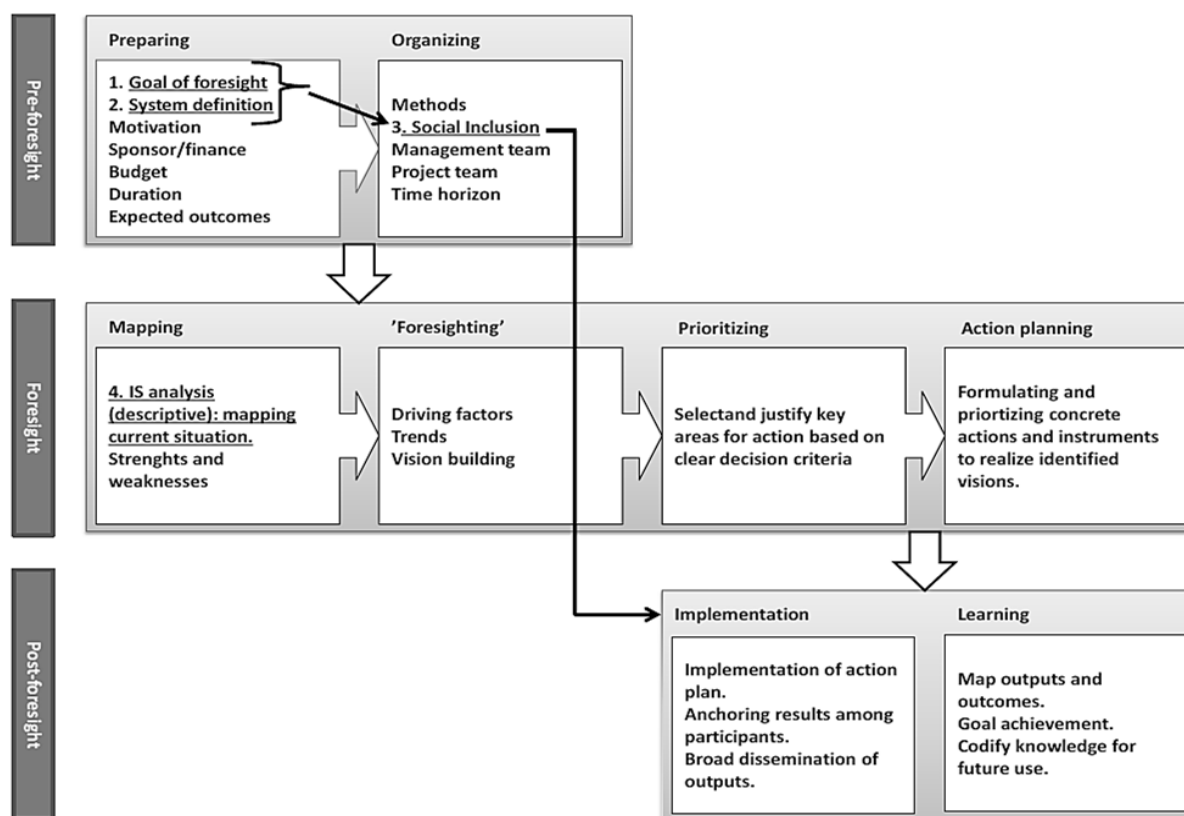
<sup>23</sup> Carney (2016) clarified that “climate change is a *tragedy of the horizon* [emphasis added] which imposes a cost on future generations that the current one has no direct incentive to fix. The catastrophic impacts of climate change will be felt beyond the traditional horizons of most actors including businesses and central banks. Once climate change becomes a clear and present danger to financial stability it may already be too late to stabilise the atmosphere at two degrees” (p. 1).

<sup>24</sup> We use the term ‘internal’ in reference to a sovereign political society — a country, for example.

<sup>25</sup> In this paper, we assume the conception of innovation system foresight (Andersen & Andersen, 2016).



Figure 6. Phases and steps in foresight



Source: Andersen and Andersen (2016, p. 10).

The agents' effective participation in devising and implementing collective projects holds the potential to add creativity and engagement to the latter. However, inclusiveness does not mean adding everyone to the discussion at the same time, which could harm an efficient cooperative process, burdening transaction costs. It is fundamental to carefully balance the value of new contributions against the cost of handling them. Although an inclusive and participatory process does not mean simply producing tangible results (Andersen & Andersen, 2016), these must also be considered in order to render working material for future implementation.

In addition to selecting who takes part in the process, it is worth assessing agents' preparedness to contribute to the discussions. We put forth a case in Brazil — Plano Estratégico Setorial (PES) in 2004–2008<sup>26</sup>. Andersen and Andersen (2016) reported that “The process was complicated, though. Firms insisted on solving short-term problems regarding interest rates and infrastructure and were not interested in or accustomed to long-term strategic thinking” (pp. 21–22).

The PES entailed a governance challenge, with stakeholders starting from different backgrounds and interests, but it was able to handle the divergences. “The ABDI invested significant resources in gradually trying to convince them [firms] (and government officials) about the usefulness of foresight via training and

workshops” (Andersen & Andersen, 2016, p. 22). Moreover, the authors mentioned, among the factors supporting ABDI's success, the implementation of consultancy projects — in order to solve short-term problems — carried out in parallel with the foresight process. The former comprised a small fraction of PES's budget, but this decision meant harmonizing interests.

Deepening our analysis, we underline subtler perceptions from the perspective of the observer (referring to the approaches linked to Figure 1 in this paper). We underscore that, whenever facing medium-long term issues, the planned use of an adequate informational base can broaden the range of solutions currently available (Andersen & Andersen, 2016). Elaborating on this assertion, we clarify that, besides information exchange through discussions, new connections can be brought within the real stratum.

To illustrate our argument, we state that agency enhancement can contribute to the effectiveness of results by increasing legitimate engagement. In this case, we highlight two aspects: 1) inclusive processes and sharing of perceptions and interests; and 2) the agency as a lever for change. Our point is that, besides understanding the problem and co-creating the solution from a larger perspective, from an inclusive and participatory process, there is also an opportunity for improvement within the individual reality.

We shed light on this conception through two different standpoints. Firstly, we focus on the agents' self-perception, by considering that they recognize themselves as more capable of dealing with inner and outer issues to drive their plans

<sup>26</sup> Andersen and Andersen (2016) presented two case studies concerning foresight processes — one in Brazil and another in South Korea. On foresight, also see Gudowsky and Sotoudeh (2016).

forward — both, individual and collective. This movement can generate a spiral of gains, in the sense that, by strengthening self-efficacy, personal control, and self-control, the individuals' commitment to the project tends to increase, once there is consensus over it and perceived benefits for those involved.

Secondly, on the connections within the real stratum, social structure (r-structure + culture) can undergo changes through agents' behaviours. We argue that from the planned use of a broader informational base — conducted by an inclusive process — it is possible, over time, to prompt modifications in the allocation of skills, knowledge and resources within a society, besides cultural enrichment.

At this point of our analysis, it is important to add a caveat. When we refer to an inclusive process, our conception considers representatives of groups, within which we assume similarities concerning mental models. Thus, we work with the idea of collective learning processes and spillovers of agency improvement effects to related parties (family, businesses, communities).

### 5.1.2. Proposition B

Proposition B stems from the conception of foresight approach and co-creation processes. It represents the collective agreement, considering an inclusive informational base, focusing on commitment-cooperation-coordination through the lens of learning and innovation. By using qualitative procedures, it is possible to take advantage of soft information, especially the one that come from experience, beliefs and values. This does not mean that values and beliefs are unchangeable and must be taken forward as they were learnt or conceived. Our point is that, by communicating different perceptions, their coordination enhances the feasibility of projects and new views may arise.

Precisely on climate-related financial risks, we face a collective problem that involves a stakeholder that does not negotiate with others. Climate — an 'insurgent agent' — will always challenge other stakeholders' actions, whenever these are against its sustainability standards. Furthermore, there are different aspects to be considered when analyzing climate-related risks — such as technological, political and socioeconomic — whose results are influenced by each other over time. Consequently, by assuming uncertainty as a clear-cut feature within this context, qualitative information takes on a relevant role.

Turning our attention to the intertwined effects of several areas, we highlight that, although our objective in this study is the relation between climate-related risks and financial ones, we understand that it is not possible to isolate both aspects from the context as a whole. For instance, at the moment, there are several innovations occurring, from which the results are not fully defined, even if we consider them individually or in association with other factors. Specifically, we set forth some movements within the financial system that have arisen over the recent years, which have not just brought innovation but also promoted new perceptions among agents.

We mention digital products/services/providers, such as cryptoassets; non-bank payment and credit operators, and smart contracts. In particular, there have been promising discussions around central bank digital currencies (CBDCs) among policymakers and international organizations — their implementation, among others, can promote financial inclusion and improve cross-border payments<sup>27</sup>. Additionally, technology-intensive business models have emerged, prompting new ways of providing services and impacting consumer experience.

We also underscore the implementation of open banking/finance systems<sup>28</sup>, which stand as a promise to increase competition among operators and to strengthen the human agency — regarding financial services consumers — over time. This strengthening can potentially foster changes in the institutional environment and modify the bargaining power relations.

Underpinning new trends of doing business and making decisions, there has been a variety of *enabling technologies* (Ehrentraud, Ocampo, Garzoni, & Piccolo, 2020), such as API (application programming interfaces), cloud computing, DLT (distributed ledger technology), and AI-ML (artificial intelligence-machine learning)<sup>29</sup>. Furthermore, considering all these dynamics in connection, concerns related to cyber security and privacy have increased.

These concepts have paved the way for relationships within the governance arena, whose final outcome is still far from clear. For example, it is challenging to predict the adaptability of low-income households and entrepreneurs facing rapid changes within their everyday environment. Elaborating on our reasoning, current examples of intersectoral impacts can be seen in the wake of the coronavirus pandemic.

Coexistence restrictions derived from a sanitation crisis triggered modifications in consumption patterns, household dynamics, public policies, sales channels, economic activities and workplaces, in addition to increased uptake of digital payments. Although it is early to confirm which conducts will remain in the future, it is difficult to imagine significant setbacks in areas such as e-commerce and payment.

Therefore, we argue that all these movements spurring changes in agents' behaviours (financial services providers, consumers, non-financial businesses, and regulators) can also imply new ways of thinking and behaving in other areas — a spiral of influences. In this sense, policymakers are requested to balance opportunities and risks that can be revealed to stakeholders, in order to coordinate a transition as smoothly as possible, without undermining the benefits. To this end, there are some useful and important measures, such as disclosure of information and stringent compliance requirements. However, in all of these initiatives, consumers remain in a passive position.

<sup>27</sup> For discussions on CBDCs, see Segal and Risberg (2020), BIS (2021), Deutsche Bundesbank Eurosystem (2020).

<sup>28</sup> On open banking/finance, see BCBS (2019), FCA (2019).

<sup>29</sup> Ehrentraud et al. (2020) put forward an interesting proposal to analyze the fintech scenario: "we propose a conceptual framework through which we analyse policy responses to fintech, referred to as the 'fintech tree'... The fintech tree distinguishes three categories: *fintech activities*, *enabling technologies* and *policy enablers* [emphasis added]" (p. 1).

To shed light on our point, we bring forward some concrete examples of positive performance regarding innovative approaches involving low-income agents, in different countries: 1) the uptake of smart cards using biometrics by microfinance customers (many of them illiterate) — FFP Prodem in Bolivia; 2) the fast growth of microcredit operations and low default rates — Banco Compartamos in Mexico; and 3) the high penetration level of M-Pesa services — Safaricom in Kenya<sup>30</sup>. All of these successful experiences represent case studies on governance since they are not the result of an isolated effort of creativity and commitment. Low-income consumers performed an important role within the initiatives.

Finally, we sum up the analysis of Proposition B pointing out that there have been fast innovations at different fronts that influence each other, not only through technical aspects but also through agents' behaviours. In other words, in spite of the relevance of technical content to drive efficient solutions forward (contributing to institutional development under the predominance of instrumental values), we defend that, in a scenario of great uncertainty, governance challenges must bring agents' behaviour and engagement to the centre of the approach.

### 5.1.3. Proposition C

Figure 3 in this paper features firms and households in the transmission channels between climate-related and financial risks. Based on this, we emphasize that, regardless of policymakers' efforts, climate change projects need support from agents throughout different regions, income levels and economic areas. Therefore, depending on consumers' preferences, for example, future scenarios can change and, not necessarily, in an organized and gradual way<sup>31</sup>.

According to Bolton et al. (2020), "Exceeding climate tipping points could lead to catastrophic and irreversible impacts that would make quantifying financial damages impossible. Avoiding this requires immediate and ambitious action towards *a structural transformation of our economies* [emphasis added], involving technological innovations that can be scaled but also major changes in regulations and social norms" (p. 1).

From this perspective, we argue that structural transformations in economic systems driven by climate change events, permeated with rapid technological innovations, should not be spurred by a top-down governance approach or through behavioural guidance established only by formal rules. Our point draws on the rationales addressed in Propositions A and B, which relate to legitimacy, engagement and commitment, along with creativity, learning and innovation.

Under climate-related challenges, potential governance gaps become even more clear. Considering the possible geopolitical and socioeconomic effects on different societies,

resulting from extreme weather events or mitigation policies in one country, or movements among regions (Bolton et al., 2020), lack of coordination can prompt negative chain reactions. Thus, to foster legitimacy and engagement in strategic plans at an international level, we highlight a key role for a level playing field among stakeholders — regarding countries and agent groups.

In order to engender an efficient coordinated process at an international level, we defend that inclusive internal deliberations must be conducted in advance. Specifically, on what Proposition C states, *deliberate and legitimate internal ability to face climate-related issues*, we mean the capacity to mobilize resources to reach a result. This implies proven skills in organization, discussion and engagement. Drawing a parallel with the Brazilian case mentioned in the analysis of Proposition A, to set a debate on future scenarios, it is necessary to have adequate preparation. From another perspective, our argument is that a level playing field among countries and stakeholders, regarding climate change issues, requires more than formal participation in the discussions.

To shed some light on the point, we put forth an example, considering climate-related financial disclosures. There is a need for transparency within the climate-related risks approach in order to provide consistent and comparable information to stakeholders (TCFD, 2017). However, considering the nature of risks, the broad scope of variables under scrutiny poses a strategic challenge. According to Carney (2016), "A mix of forward-looking, and sufficiently granular, qualitative and quantitative information is needed to offer real insight into how climate-related risks and opportunities may impact a firm's existing and future business lines. This could include information on governance and management of such risks, and on a firm's mitigation strategy and its financial planning, including capital expenditures and R&D" (p. 10).

In this regard, building an adequate informational base in relation to climate-related financial disclosures *per se* already represents innovative thinking<sup>32</sup>. Here, we underscore that, if our focus lies on developing new consumption and production paradigms — towards more sustainable standards within medium to long term perspectives — agents will face discussions on beliefs, preferences and distributive effects.

Consequently, a governance process with solid foundations is based on trust among stakeholders, which means expectations of reciprocity and commitment regarding the effective implementation of its agreements. In other words, considering the magnitude of the risks involved and the need for precision in each step — avoiding shortcuts — the governance of climate issues requires training and evidence of leadership capacity for each member (society). Additionally, "The process of policy experimentation should be guided by a deep understanding of current problems and by

<sup>30</sup> For information on these three experiences (FFP Prodem, Banco Compartamos and M-Pesa), see Hernandez and Mugica (2003), Chu and Cuellar (2008), Cook and McKay (2017) and von Borowski Dodl and Carvalho (2017).

<sup>31</sup> Based on new channels of communication and digital influence (internet and social networks), whose penetration with the public can reach scale and speed in a simple and affordable way, the dissemination of new proposals and standards can occur quickly.

<sup>32</sup> According to Bolton et al. (2020), "The 'green swan' concept used in this book finds its inspiration in... the 'black swan' developed by Nassim Nicholas Taleb (2007)... The existence of black swans calls for alternative epistemologies of risk, grounded in the acknowledgment of uncertainty... The use of counterfactual reasoning is another avenue that can help hedge, at least partially, against black swan events" (p. 3).

a systematic understanding of what the future might be” (Andersen & Andersen, 2016, p. 6).

Although it sounds challenging to address inclusive dynamics involving a broad spectrum of stakeholders, nowadays, policymakers (or those in charge of the projects), have useful tools at their disposal. Stakeholders can devise and test a large range of innovations within safe environments, considering mechanisms such as regulatory sandboxes, innovation hubs, and accelerators (for information on these, see UNSGSA and CCAF, 2019, Goo and Heo, 2020, Baker McKenzie, 2020). Moreover, in the wake of the pandemic, numerous online events have satisfactorily taken place, using digital platforms.

## 5.2. Value correlation within the institution of analysis and summary

In the previous subsection, we address a public policy proposal regarding climate-related issues, considering an international perspective. We focus on a procedural approach. Therefore, we concentrate our attention on the questioning of the process. By breaking down the institution of analysis into three propositions, we can assess the rationale supporting Propositions A, B and C, and the consequent connections among them. In addition, in order to provide a concrete foundation for the study, we put forth practical examples throughout the analysis. Consequently, based on the evaluation carried out, we argue that the propositions described within the institution are correlated through the predominance of instrumental values.

Specifically, on the application of the proposal to climate-related financial risks, our point is that, as the different areas — technological, political, economic, climate — co-evolve over time, and this adds a high level of uncertainty to the decision-making process, governance, and its emphasis on stakeholders’ relationships, takes on a central role for an effective strategy. Putting it differently, we state that agents comprise an ‘inclusive decision hub’ in this context. Considering climate change as a complex and intricate issue, we argue that deliberate decisions within the financial system should be taken with a focus on learning, reciprocity, trust-commitment, and planning-strategy.

There is a role to be performed by this inclusive decision hub. Co-creation — here represented by the participative process of decision and implementation related to collective projects — is the enabling instrument for this hub to drive actions, moving away from the idea of a reactive/defensive stance. For such, deliberate

planning is required under the responsibility of those involved, so that they can transmute the scenario of deep uncertainty. Therefore, we argue that different combinations of policies could represent the best option to address the trade-off between physical and transition risks in a consistent and efficient way, depending on the quality of agents’ commitment.

## 6. CONCLUSION

This study aims to put forward an effective international public policy to tackle climate-related financial risks through an adequate informational base — from a governance approach. We start from the relevance of climate change impacts on financial stability. Specifically, we focus on physical and transition risks. We also consider the interconnections among different arenas — such as technological, climate, political and economic — which co-evolve over time, adding a significant level of uncertainty to the prospective scenarios.

We highlight the two sides of the situation: 1) the need for action at the present and for change in consumption and production patterns; and 2) the required caution to address this process of change, in order to conduct an organized and smooth transition. From this background, we divide the approach into two stages, reflecting decision centres: internal (national) and external (international). Thus, we defend that, before discussing at an international forum, we should have a legitimate position on climate issues from each country’s stakeholders — arising from a deliberate decision-making process among agents.

The main contribution of our study, in relation to the practical case, is the rationale implying that the best combination of policies to face climate change and the trade-off between physical and transition risks translates a mix of different initiatives and conditions — such as trust and motivation. Consequently, the decisive point in this scenario entails legitimacy and intensity of agents’ engagement and commitment.

Additionally, we understand that, although this paper focuses on climate issues, it can also contribute to other areas through its structured process of analysis, which can be reproduced. However, this is an exploratory study and, therefore, represents a first step within the public policy and research agenda. Finally, we argue that this process of investigation and work benefits from the support and complement of other research methods, such as quantitative analyses. We defend that no agent or process generates long-term efficiency and consistency when implemented without synergies and questioning along the way.

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