Intergenerational Climate Change Burden Sharing: An Economics of Climate Stability Research Agenda Proposal

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Received: 14 December 2015 Accepted: 3 January 2016 Published: 15 January 2016

Abstract

The implementation of climate stability accounts for the most challenging contemporary global governance predicament that seems to pit today?s generation against future world inhabitants. In a trade-off of economic growth versus sustainability, a broad-based international coalition could establish climate stability. As a novel angle towards climate justice, this paper proposes to search for a well-balanced climate mitigation and adaptation public policy mix guided by micro- and macroeconomic analysis results, and a new way of funding climate change mitigation and adaptation policies through broad-based climate stability bonds that also involve future generations that complement taxation and emission trading system solutions. Contemporary climate stability financing strategies are discussed in order to derive recommendations how market economies can be brought to a path consistent with prosperity and sustainability.

Index terms— climate bonds, climate change, climate change adaptation and mitigation, climate justice, climate stability, intergenerational burden sharing, interte

1 Introduction

limate change accounts for one of the most pressing problems in the age of globalization as for exacerbating more risks than ever before in terms of water crises, food shortages, constrained economic growth, weaker social cohesion and increased security risks (Centeno and Tham2012; The World Economic Forum Report 2015). While classic economics portrayed balancing the interests of different generations as ethical problem of competitive markets requiring governance for intergenerational transfers and some economists even opposed discounting of future utilities (Allais 1947;Harrod 1948;Ramsey 1928); climate change has leveraged intergenerational equity as contemporary challenge of modern democracy and temporal justice an ethical obligation for posterity.

In general, resources are balanced across generations by social discounting to weight the well-being of future generations relative to those alive today. Regarding climate justice, current generations are called upon to make sacrifices today for future generations by mobilizing low-carbon energy to cut carbon emissions to avert global warming (Sachs 2014). Climate change mitigation at the expense of lowered economic growth seems to pit the current generation against future ones. Costly climate change abatement prospects are thus hindering currently necessary action on climate change given a shrinking time window prior to reaching tipping points that make global warming irreversible (Oppenheimer, O'Neill, Webster and Agrawal, 2011). As a novel alternative, Sachs (2014) proposes to fund today's climate mitigation through intertemporal fiscal policy, climate bonds financed through taxation faced by future generations. Shifting the ultimate costs of climate change aversion to later generations appears as powerful strategy to instigate immediate climate change mitigation in an overall Pareto improving crisis for all generations.

2 Mitigation and adaptation policies against climate risk:

Recent Intergovernmental Panel on Climate Change (IPCC)research, international conferences on climate change and fund raising activities to combat global warming stress now that it is advisable to pursue both mitigation as well as adaptation policies. While climate stability will require both, climate change mitigation and adaptation, concurrently, no macroeconomic model exists to date that considers both approaches at once. In addition, we lack information on the possible interdependencies, tradeoffs and reciprocal influences between climate change mitigation and adaptation. Therefore, the climate change mitigation and adaptation practices that are already in place -or are planned to be established -that help to buffer climate risk arising from weather extremes such as sea level rise, flooding, severe droughts, desert formation, storms, and hurricanes will be captured and analyzed in order to derive real-world relevant public policy recommendations on climate justice implementation.

3 Climate

justice and burden sharing: While intergenerational burden sharing on climate change is a novel economically superior strategy and real-world relevant emergent risk prevention means (Centeno et al. 2013); we currently lack information on the impact of climate mitigation through debt on economic growth and the model's sustainability over time. At a unique time, when 40% of all world's GDP is produced in countries with negative interest rates, the time is ripe to explore the possibilities to finance climate change abatement through green bonds. Starting with a recent paper by Jeffrey Sachs (2014), a novel angle towards climate justice is introduced in order to find a behavioral economics solution to elicit future-oriented loss aversion.

Sachs' (2014) intergenerational burden sharing idea by presenting a 3-model climate change burden sharing through fiscal policy with bond issuing in order to reflect the implementation regarding contemporary finance and growth models with respect for maximizing utility of the model. In an overlapping-generations type model, research should elucidate climate change abatement and mitigation policies to lead to a fairer solution across generations. The current generation mitigates climate change and provides infrastructure against climate risk financed through climate bonds to be paid by future generations. Since for future generations the currently created externalities from economic activities -the effects of C0 2 emissionsare removed, this entails that the current generations remain financially as well off as without mitigation while improving environmental well-being of future generations.

As Sachs (2014) shows, this intergenerational tax-and-transfer policy turns climate change mitigation and adaptation policy into a Pareto improving strategy. IShifting the costs for climate abatement to the recipients of the benefits of climate stability appears as novel, feasible and easilyimplementable solution to nudge many overlapping generations towards future-oriented loss aversion in the sustainability domain.

4 II.

5 Climate Justice

Society as a whole outlasts individual generations. Pareto optimality for society over time differs from the aggregated individual generations' preferences. As the sum of individual generations' preferences does not necessarily lead to societally favorable outcomes over time (Bürgenmeier 1994;Klaassen and Opschoor 1991), discounting based on individual generations' preferences can lead to an unjust advantage of living generations determining future living conditions (Rawls 1971). In general, intergenerational balance is therefore accomplished through individual saving decisions of the present generation (Bauer 1957).

Policies curbing preferences and taxes distributing welfare between the present and future generation may, however, decrease economic growth.

In order to avoid governmental expenditure on climate change hindering economic growth (Barro 1990); Sachs (2014) introduces financing climate change mitigation through debt to be paid back by future generations through taxation as a novel means to amend individual saving preferences in favor of future generations. Sachs (2014) proposes to mitigate climate change by debt to be repaid by tax revenues on labor income in the future.In a 2-period model, one generation works in period 1 and retires in period 2. Part of the disposable wage income is saved for consumption in the second period. CO 2 emission mitigation imposes immediate costs onto current generations and reduces wages. Greenhouse gas concentrations in period 2 are determined by the emissions in period 1. Wages of the young in the second period are reduced by climate change dependent on greenhouse gas levels. Disposable labor income of the young equals market wage net of taxes. Leaving the current generation with unchanged disposable income allocates the burdens of climate change mitigation across generations without the need to trade off one generation's well-being for another's.While today's young generation is left unharmed, the second period young generation is made better off ecologically. Taxes on later generations are justified as for the assumed willingness of future generations to avoid higher costs of climate change prevention and environmental irreversible lock-ins. Overall this tax-and-transfer mitigation policy is thus Pareto improving across generations. All generations are better off with mitigation through climate bonds as compared to the business-as-usual (BAU) nonmitigation scenario (Sachs 2014). While future generations enjoy a favorable climate and averted environmental lock-ins; the current populace does not face drawbacks on economic growth.

Since here borrowing equals loans or issuing of bonds to be paid back by future generations, the government must pay back debt plus interest payments by raising taxes. Countries must check whether fiscal policies are such that they fulfill the inter-temporal budget constraint, whereby per-capita government debt at time zero must equal the discounted stream of future primary surpluses. Sustainability is ensured if the government adjusts the primary surplus to GDP ratio to variations in the debt-GDP ratio -a test independent of the interest rate conditions. Bohn (1998) suggests to test whether the primary deficit-to-GDP ratio is a positive linear function of the debt-to-GDP ratio. Testing a no-Ponzi game condition, public (net) debt at time zero must equal the expected present value of future primary surpluses.

Building on models of economic costs and benefits of public investment in climate change-adaptive infrastructure outlining the trade-off between mitigation and adaptation; research should model real-world climate change mitigation and adaptation trade-offs. The link of climate change mitigation and adaptation initiatives at the regional level helped develop real worldrelevant climate change policy prescriptions for governments, private sector stakeholders as well as IPCC executives. Using macro-and microeconomic modeling, the outlined costs and benefits of mitigation and adaptation strategies are key in determining security strategies for vulnerable cities, communities and countries and protect them from the variegated climate change risks. Future research endeavors should help multiple stakeholders shape economic growth with respect for sustainable development on the basis of climate change burden sharing through bonds.

6 III.

7 Climate Justice Financing

In order to implement an intergenerationallyharmonious solution to ensure climate stability, a threemodel approach is proposed. Thereby early climate change prevention activities of current generations are instigated by shifting the current costs of climate change abatement to future generations through bonds to be financed by taxing future generations. Though future generations will face some tax, they will also benefit in the sense that the externalities from CO_2 emission and climate change are removed. A simplified model version can be sketched as following. Model 1 without mitigation effort is called business-asusual (BAU). The model economy features households with production that choose consumption in order to maximize a discounted stream of utility subject to their budget constraints. Economic households maximize the discounted stream of utility arising from per-capita consumption, C, times the number of household members subject to the budget constraint. Utility is maximized by:V max ? e ?? U(C)dt T t=0 (1.1) in which ? is the discount rate defined as ? = (? ? ? n) (1.2)

and C consumption and U the utility of the socially optimal solution. The utility function is assumed logarithmic and defined asU(C) = ln C (1.3)

which results inV max ? e ?? L 0 lnCdt T t=0 (1.4)

with L 0 being the labor supply at time t = 0 (Greiner, Grüne and Semmler2009). Economic activities generate emissions of greenhouse gases, as a by-product of capital used in production and expressed in CO_2 equivalents. Environmental economics implies that a higher capital stock goes along with higher emissions (Hettich 2000;Smulders 1995).

Emissions of greenhouse gases indirectly affect the climate of the earth leading to higher surface temperature and weather extremes, like flooding, heat waves, storms, desert formation and so on.

In the model 1, the BAU approach, no climate change mitigation effort A is employed. It is a laissezfaire solution, in which there is environmental damage and no climate change mitigation. The evolution of percapita capital over time is thereby determined by the following differential equation that gives the budget constraint of a household:K ?= D * Y ? C ? (? + n)K, K(0) = K 0 (1.5)

with the per-capita production Y accounting for environmental damage D being reduced by consumption C and per-capita capital K accounting for the depreciation of capital ? and population growth n.

In the BAU model, there are no climate change abatement activities.

Yet, environmental damage reduces output byD(?) = (a 1 * M 2 + 1) ?? ,**(1.6)**

with a 1 > 0, being a function that negatively depends on the temperature on earth as deviations from the equilibrium average surface temperature have feedback effects that influence the reflection of incoming energy (e.g., snow and ice reduction and water evaporation lead to a smaller amount of solar radiation tending to increase the earth temperature even further),? > 0 and M being the greenhouse gas concentration in the atmosphere (Henderson-Sellers and McGuffie 1987; Nordhaus 2008; Schmitz 1991). The effect of emissions to raise the greenhouse gas concentration, M, in the atmosphere is determined by? = ?E ? ?M (1.7)

in which emissions E factored by ? ? (0, 1), which is the part of greenhouse gas emissions that is not taken up by oceans, are reduced by ? ? (0, 1) as the inverse of the atmospheric lifetime of greenhouse gases or decay rate of greenhouse gases in the atmosphere assumed at 0. As in model 1, the greenhouse gas emission M is determined by (1.7). In K (1.5) the production function Y denoting per-capita output is given byY = A ? K ? ,**(1.9)**

with ? ? (0, 1) being the capital share and A ? being an efficiency index constant normalized to 1. The greenhouse gas emissions are, as in Model 1, described by (3.8) but with A>0.

In model 2 bonds are issued from period 1 up to period N arising? = r * B + gB(0) (1.10)

public debt g, where r is the interest rate paid on climate change abatement bonds. B(0) denotes the starting point of public debt at time 0. We now have a model with three state variables and the abatement cost being reimbursed by the issuing of public bonds. Note that in this earlier period the government subsidizes early generations to compensate for the upfront costs of climate change mitigation. The government reimburses climate change aversion up to point N until a regimechange switching, when taxes become positive and later generations pay for earlier climate change abatement through taxation. The later generations are assumed to be willing to pay to avoid the higher costs of climate change relative to a BAU path. In Model 3, when no further climate change abatement costs exist and the debt of bonds is to be repaid from period N on, after switching to the model 3, we then have in addition to equation (1.7):? = r * B -T N (1.11)

whereby T N = ?Y N is used for the repayment of bonds.

From period N on the capital stock over time, K, is also reduced by T N inK ? = Y (1 -? N) -C -(? + n) K (1.12)

Note that in the model 3 neither an externality effect, D (?), nor climate change abatement cost, A, are present. There is no environmental damage but taxation for climate change abatement bonds repayment. Only the previously raised bonds of equation (1.10) will have to be repaid by the generation existing from period N on. These future generations will benefit from the absence of damages from externalities of previous periods. The negative externalities are removed by agents from the previous periods.

Solving the economic growth versus sustainability predicament that pits today's against future generations based on Jeffrey Sachs' (2014) a novel angle towards social environmental justice is proposed. An overlapping-generations model coupled with continuous time will study climate change abatement and propose climate change mitigation policies as fairer and socially more just climate stability solution across generations. In the model, the current generation mitigates global warming through climate stability bonds to be financed by future generations. While the current generation remains financially as well off as without mitigation, the future climate stability for posterior generations is ensured and thus well-being improved. The theoretical model and solution techniques thereby leads to an innovative and feasiblyimplementable climate change growth model that can nudge overlapping generations towards future-oriented loss aversion in the sustainability domain. Concretely, climate change bonds help instigate action now for current climate change mitigation and future irreversible environmental damage reduction through bonds repayments in the future.

Unsolved remain practical and ethical questions regarding the fairness and economic viability to let future generations pay for climate change stability. While prevention is argued to face more resistance than cleanup of damages in public given a loss averse world, the rational is to avert future environmental lock-ins and irreversible global warming tipping points at the expense of reversible over indebtedness (Kahneman and Tversky 1979). While capital is a replaceable asset and over indebtedness raises questions of temporal governmental austerity constraints and economic soft or hard landing scenarios, an irreversible global temperature rise and climate imbalances would result in unforeseeable threats to future generations. Imposing the financial costs of climate mitigation onto future world inhabitants for the trade-off of a decent world temperature may thus be justified in the light of the complete replaceability of capital and its non-perishable nature in contrast to natural tipping points and irreversibility of climate change that have been outlined by climate change experts (Oppenheimer et al. 2011). Avoiding to pit one generation after the other, earlier generations can enjoy economic growth, while their descendants will benefit from a favorable climate mitigation policies and infrastructure.

IV. A currently-economically unhindered generation implementing climate change prevention immediately is believed to live in harmony with its posterity as for ensuring their descendants to continuously enjoy environmentally stable beneficial world conditions.

8 Climate Justice Policy Mix

The burden of climate change mitigation is unevenly heavy on current generations. Intertemporal burden sharing may thus be integrated into a model of infrastructure against climate risk comprising of a harmonious climate change mitigation and adaptation mix.

Climate change presents specific risks and challenges associated with system failure. The very logic of increasing globalization carries problems that demand for a redesigning of governance structures and institutional arrangements that reduce the probability of such dangers arising (Centeno et al. 2013). For this, we first need to understand the nature of the danger. Fragile environmental conditions due to a missing information of systemic risks of climate change underline the importance of a whole-rounded understanding of climate change mitigation and adaptation to overcome future socio-economic losses and avert irreversible tipping points.

Up to date there is no comprehensive definition of climate change mitigation and adaptation efforts as well as no information on the interdependencies of these efforts. As a real-world relevant means to prepare mankind in the light of global warming, we first need a more stakeholder-specific view of what climate change risks mean in order to derive recommendations on what institutions and how these climate stability regimes could harmoniously implement climate change mitigation and climate adaptation concurrently on a global basis.

A further literature review and studies should be undertaken on the current discussion on sustainable finance and the diverse methods of funding of mitigation and adaptation policies. Particular emphasis will be given to the already existing literature, experiences and practices of issuing climate bonds.

V.

9 Discussion

A preliminary literature review revealed a rising but limited scientific investigation of climate stability solutions as well as climate change mitigation and adaptation strategies. Holistic systemic risk studies in the climate justice domain are rare. Addressing these detected deficiencies and in order to gain a multifaceted risk description of climate stability upfront, an extensive literature review could innovatively encompass different climate stability risk levels in order to prepare for a well-tempered climate stability policy mix recommendations.

Future research may thus explore how to avert the global risk of climate change by grounding the concept theoretically and macroeconomic models in order to derive climate change mitigation and adaptation recommendations. One may capture systemic risks emerging in human-made systems that were caused unintentionally but impose endogenous threats to mankind. Thereby society may better understand the structure, nature, and challenges of these complex interaction and feedback systems of climate stability, climate change mitigation and adaptation choices. Climate change risk mitigation and adaptation means should be derived on the micro level between individuals and on the macro level through systemic risk analysis that extends among countries. After a clear definition and delineation of the concepts climate change risk, climate stability, climate change mitigation and adaptation, interaction effects of these concepts should be studied. The complexity and number of interactions will also require a qualitative analysis how to study this novel phenomenon. Stakeholder viewpoints will depict a variety of climate change mitigation and adaptation strategies within large networks and institutional frameworks. The underlying complexity but also threshold and feedback effects that multiply or even exponentially magnify the risk of climate change or could implement climate stability will qualitatively be addressed. By also capturing and mapping what regulatory and policy solution exist throughout various regulatory regimes in response to climate crises, recommendations how to create more robust environmental climate systems will be retrieved. The planned analyses will involve the climate change monitoring, inspection, and surveillance as well as climate change adaptation. The broad and diverse spectrum of climate change preferences described and empirically captured will lead to public policy recommendations for the secure implementation and meaningful enforcement of climate stability regulations.

The future research outlooks may combine theoretical and empirical research featuring qualitative Overall future open research questions should investigate the nature of systemic risk in the environmental sustainability domain and propose to study solutions to ensure climate stability over time. The structure of increasingly fragile environmental conditions could be captured in order to derive real-world relevant implication show to improve environmental systems through the understanding of climate change mitigation and adaptation as well as the interdependency of these sustainability approaches. Thereby future research projects could comprise of a literature review, qualitative examination of climate risk mitigation and quantitative modelling of climate change risks prevention means.

Future research should strengthen the research and design of climate stability, encourage interdisciplinary exchange on the contemporary complex climate agenda in strategic partnerships, as well raise awareness and engage the broader international public on multiple climate stability regimes.

As a first step, preliminary research may provide a climate stability risk overview. The field-specific perspectives include nomenclature creation, literature reviews, quantitative and qualitative methods, and public policy information of experts and institutions. Thereby the goal should be to develop our understanding of climate change risk through the analysis of specific climate stability threats. The task should be approached by case studies and expert interviews with the goal of developing a multidisciplinary methodological analysis of global climate risks to be proposed to be alleviated through financing solutions as well as recommendations of harmonious climate change mitigation and climate stability adaptation strategies.

As our knowledge of climate change mitigation and adaptation interdependencies remains an open research gap important to be investigated in the eye of climate stability threats with enormous global impact. As we think about this topic, no single vantage point is sufficient by itself, and a genuine understanding of the problems and the possible solutions will require knowledge, expertise, and experience from multiple fields. The research endeavors should begin by analyzing climate change risks inherent in global environmental conditions.

Qualitative research aims at gaining climate change burden sharing strategies with focus on climate stability funding coupled with quantitative research focusing on climate change mitigation and adaptation strategies and interdependencies.Community research will present field-specific perspectives on systemic risk mitigation in the finance sector. Expert interviews will allow retrieving aspect of climate change bond strategies that stakeholders find most relevant. Case studies on global climate risk mitigation will portray climate change abatement with attention to particular stakeholder perspectives in order to retrieve a real-world relevant climate stability strategy.

A stakeholder-nuanced literature review could coverpublic and private, organizational and societal stakeholders to retrieve notions on global warming risks and climate change mitigation and adaptation in the international arena with a special focus on climate stability funding as well as bond solutions as innovative solutions to carbon trading schemes and carbon taxation. Expert interviews could gain a stakeholderspecific definition of climate change, climate risk, climate mitigation and adaptation as well as climate change bond strategies in the finance sector in order to collect information on climate change risk mitigation and adaptation strategies with a special emphasis on the finance sector. The acquired information will present stakeholder-specific contemporary notions of climate change, climate change mitigation and adaptation efforts as well as their interdependencies.

Revealing the common sense, but also stakeholder-specific nuances of climate change risk perceptions with a special focus on climate change mitigation solutions of the finance sector offers an invaluable opportunity to highlight unknown climate stability implementation strategies. This working part should also include a meta-analysis of risk and its various meanings held by different constituency groups in order to provide the basis for global governance and public policy recommendations how to mitigate and adapt to global warming.

The knowledge and understanding of theories and methodology is meant to evolve over the course of the first year in order to help synthesize and assimilate the findings. A vital research exchange and scholar transfer at conferences and workshops -featuring external quality control and results presentations -will help discuss risk definitions with colleagues prior to continuing to develop ideas and combine the lessons learned in the community. The information retrieved will also help create a coherent set of papers on systemic climate change risks, mitigation and adaptation as well as policy reflecting the different academic disciplines and viewpoints but also allowing to flash out a set of papers to address unknown facets of global mitigation and adaptation interdependencies.

Intergenerational climate change burden sharing through intergenerational fiscal policies and sustainable finance methods, such as climate bonds, is a novel approach to implement intergenerational climate justice. In an overlapping-generations model paying attention to climate stability and economic growth, climate change mitigation is proposed to be financed through bonds that allow current world inhabitants to remain economically prosperous, while future generations benefit from ecological stability. This intergenerational equity implementation turns climate change mitigation into a Pareto improving strategy. Future research could target at analyzing the dynamics of this climate change burden sharing model capturing the social maximization of the optimal policy implementation. The prospective findings would open up avenues for climate justice research -such as, for instance, investigating whether it is ethical to impose financial debt onto future generations for the benefit of potential future climate stability.

The global systemic climate change risk analysis may target global networks and flows in the fragility of the global environmental systems. Thereby, a further in-depth scrutiny of stakeholder-specific perceptions of systemic risks in the climate justice domain will be sought.Specific case studies could survey the current scholarship on current climate stability policies (e.g., cap & trade, carbon tax, green energy) as well as climate change mitigation and adaptation strategies in order to prepare multidisciplinary theories and methodologies of systemic climate risk and climate stability analysis in the following.

Climate stability emerges in the wake of social, environmental and political efforts in the international arena.As the complexity of efforts to interactions makes any kind of conventional analysis impossible; complementary research should explore climate change risk mitigation and adaptation efforts and their interdependencies by the help of quantitative governance databases. Mapping crisis risk mitigation policies and practices on an international scale with large-scale mapping globalization methods will help outline contrasts in risk mitigation strategies and harmoniously couple these efforts with climate change adaptation strategies. Comparisons of climate change risk reduction means on the international level will help derive insights for global governance experts on how to implement climate justice.

In addition to the qualitative investigation, systemic climate change risk market data should be collected via international online market databases (e.g., COMPUSTAT) for investigations of global outlooks in order to retrieve cutting-edge information on contemporary climate change risk mitigation and adaptation approaches. The data should be quantitatively analyzed by descriptive and multivariate methods in order to scrutinize the international climate risk mitigation and adaptation means. Network analyses will capture climate mitigation and adaptation differences to derive climate justice implementation recommendations.

In order to unravel climate change risk mitigation and adaptation success factors, economic market data could be retrieved from international online market databases (e.g., COMPUSTAT) to be analyzed by descriptive and multivariate methods in order to derive an online interactive computer simulation tool.Using Mapping Globalization tools such as gap minder, network analysis will allow investigating risk mitigation factors and climate adaptation interdependencies following the greater goal to outline prescriptive public policies to enhance climate stability. The analysis of climate change risk mitigation means will help develop recommendations on regulatory schemes including carbon trading and taxation. Coupled with the study of climate change adaptation strategies and climate change burden sharing finance strategies by institutions, industry actors and policy makers, the results will lead to practical guidelines on how to implement environmental sustainability.

The gained insight on climate mitigation and adaptation as well as the expert discussions and scholarly exchange on how to prevent systemic risks should be disseminatedin an open access interactive online climate change simulation to map the contemporary climate stability efforts and regimes on a global scale. Scholarly products will also include a website, journal articles, and contributions to an edited book that will serve to publicize the findings and provide a possible avenue for future work.

Overall, the research should will innovatively develop new interpretations, understandings and concepts of climate risks but also help deriving balanced approaches to implement climate stability and adapt to global warming. In compiling scholarship and theories on risk mitigation strategies in the climate action domain as well as by bringing together experts on climate risk from Europe and North America coupled with the financial sector insights on how to finance climate stability, the a central reference point and resources on aggregate information on the implementation and sophistication of climate justice will be retrieved.

All these endeavors will elevate the importance of climate justice scholarship whilst deriving implications for climate stability. Emphasizing areas where to apply climate mitigation and where to promote climate adaptation strategies will help deriving practical implications for the private industry and public policy sector. Understanding the different climate risk attitudes but also shedding light on previously unknown climate mitigation and adaptation interdependencies will aid environmental sustainability to ensure a future mankind. For practitioners the results will help lowering institutional downfalls of increasingly interconnected and fragile global networks. For academia, the interdisciplinary research could spearhead information on climate justice in academic journal articles, literature compilations and documentaries and other resources on systemic risk with short-term innovative and longterm historic value.Policy makers will directly benefit by policy briefs alongside the scientific publication dedicated to the development and implementation of novel approaches to face climate change. As a practical outcome, a climate change online simulation interactive graphic could help individuals visually understand how climate change mitigation and adaptation regimes work and interact with another. This online tool is targeted at further aiding the dissemination of the findings on a global scale. The graphic will create social media presence to help individuals visually map and understand mitigation and adaptation patterns and how these model approaches can be harmonized for the greater good. The tool will grant the general public to intellectually engage with a global network of scholarly insights on climate change regimes in order to form a critical opinion and make better informed decisions. The public will thereby be enabled to engage in the broader discussion about social justice and sustainable development. All these research endeavors are aimed at supporting individual academic scholarship, advances the scientific field and fosters dialogue for new knowledge creation and creative solution finding on one of the most complex contemporary challenges for mankind. Overall, research in this novel domain may embark on alleviating the most pressing contemporary global challenges will aid to bring together public, private and academic leaders breaking down barriers between nations and disciplines in solving global predicaments for the common greater good. [1] [2] [3]

Figure 1:

[2]Intergenerational Climate Change Burden Sharing: An Economics of Climate Stability Research Agenda Proposal

1 multiplied by climate change mitigation efforts M
(Intergovernmental Panel on Climate Change 2001).
According to the IPCC, ? is 0.49 for the time period 1990
to 1999 for CO 2 emissions (IPCC 2001).
The greenhouse gas emissions are described by
E = (aK) ? ? 1 ? ? (1.8)

dA
+p

with K being the stock of capital, ? > 0 representing the
exponential growth rate in the emission function and the
parameter a > 0 as constants. Emissions are a function
of per-capita capital, K, relative to per-capita climate
change abatement activities A as indicated by the
efficiency factor ? 1 ?

dA
+p

[Note: ? , whereby d and p are parameters (Greiner et al. 2009; Greiner, Grüne and Semmler 2012). During BAU, the abatement A is 0. The technology index a describes how polluting a given technology is insofar]

Figure 2:

[World Economic Forum ()] , *World Economic Forum* 2015. (World Economic Forum)

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