

## Climate Congress 2019: Global warming and the role of exogenous shocks in enhancing international cooperation: Are we there yet- Anna Malova- University of Glasgow, Scotland

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There are several well-established facts in the literature on climate change. First, is that international agreements are not able to sustain high levels of participation and deep emission cuts at the same time. Second, with appropriate use of sticks and carrots, they are. Third, that by deterring non-participation, we deter non-compliance as well. Fourth, from the story of the Montreal Protocol it follows that when necessary, countries can cooperate on the Pareto-efficient outcome of the underlying game. Lastly, climate change poses an existential threat to humanity and we do not have much time left to stop. Now, we nonetheless observe suboptimal levels of individual abatement and modest levels of cooperation. Thus, the purpose of this study is to establish the role of unilateral actions in the solution of the collective problem of climate change and to investigate whether external shocks can increase international cooperation. Using a game-theoretic approach a model was built which incorporates uncertainty in the form of damages from the natural disasters that have a certain probability of occurring and can be altered by the levels of players' abatement. There are three major findings: (1) No IEA will be stable unless it requires unilaterally chosen levels of abatement; (2) time-inconsistent players tend to procrastinate, but under certain values of parameters can turn into time-consistent due to higher perceived probability of future damages; and (3) time-consistent players can, on the contrary, become time-inconsistent and deviate from transition to business-as-usual over time. External shocks will have no effect on the chosen abatement levels unless politicians exhibit some form of statistical biases when estimating the probability of future damages. To increase global abatement, it is necessary that countries unilaterally set more ambitious targets. Otherwise free riding and non-compliance are unavoidable. A dangerous atmospheric deviation happens when carbon dioxide (CO<sub>2</sub>) and other air toxins and ozone harming substances gather in the environment and retain daylight and sunlight based radiation that have bobbed off the world's surface. Ordinarily, this radiation would escape into space—however these toxins, which can keep going for quite a long time to hundreds of years in the air, trap the warmth and cause the planet to get more sultry. That is what's known as the nursery impact.

In the United States, the consuming of non-renewable energy sources to make power is the biggest wellspring of warmth catching contamination, creating around two billion tons of CO<sub>2</sub> consistently. Coal-consuming power plants are by a wide margin the greatest polluters. The nation's second-biggest wellspring of carbon contamination is the transportation part, which creates about 1.7 billion tons of CO<sub>2</sub> emanations a year. Curbing risky environmental change requires profound cuts in discharges, just as the utilization of options in contrast to non-renewable energy sources around the world. Fortunately we've begun a turnaround: CO<sub>2</sub> emanations in the United States really diminished from 2005 to 2014, thanks to some extent to new, vitality effective innovation and the utilization of cleaner energies. What's more, researchers keep on growing better approaches to modernize power plants, produce cleaner power, and consume less gas while we drive. The test is to be certain these arrangements are put to utilize and generally embraced.

Researchers concur that the world's rising temperatures are energizing longer and more sultry warmth waves, progressively visit dry seasons, heavier precipitation, and all the more remarkable typhoons. In 2015, for instance, researchers said that a continuous dry spell in California—the state's most noticeably awful water lack in 1,200 years—had been strengthened by 15 percent to 20 percent by a dangerous atmospheric deviation. They additionally said the chances of comparative dry seasons occurring later on had generally multiplied over the previous century. Also, in 2016, the National Academies of Science, Engineering, and Medicine declared that it's presently conceivable to unhesitatingly quality certain climate occasions, similar to some warmth waves, legitimately to environmental change.

The world's sea temperatures are getting hotter, as well—which implies that hurricanes can get more vitality. So a worldwide temperature alteration could turn, say, a classification 3 tempest into a progressively hazardous class 4 tempest. Truth be told, researchers have discovered that the recurrence of North Atlantic tropical storms has expanded since the mid 1980s, just as the quantity of tempests that arrive at classifications 4 and 5. In 2005, Hurricane Katrina—the costliest tropical storm in U.S. history—struck New

Orleans; the second-costliest, Hurricane Sandy, hit the East Coast in 2012. The effects of a dangerous atmospheric deviation are being felt over the globe. Extraordinary warmth waves have caused a huge number of passings around the globe as of late. What's more, in a disturbing indication of occasions to come, Antarctica has been losing around 134 billion metric huge amounts of ice every year since 2002. This rate could accelerate on the off chance that we continue consuming non-renewable energy sources at our ebb and flow pace, a few specialists state, causing ocean levels to rise a few meters throughout the following 50 to 150 years.