Exploring the Effectiveness of Climate Change Deals through Behavioral Game Theory

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Environmental Economics and Climate Change Agreements

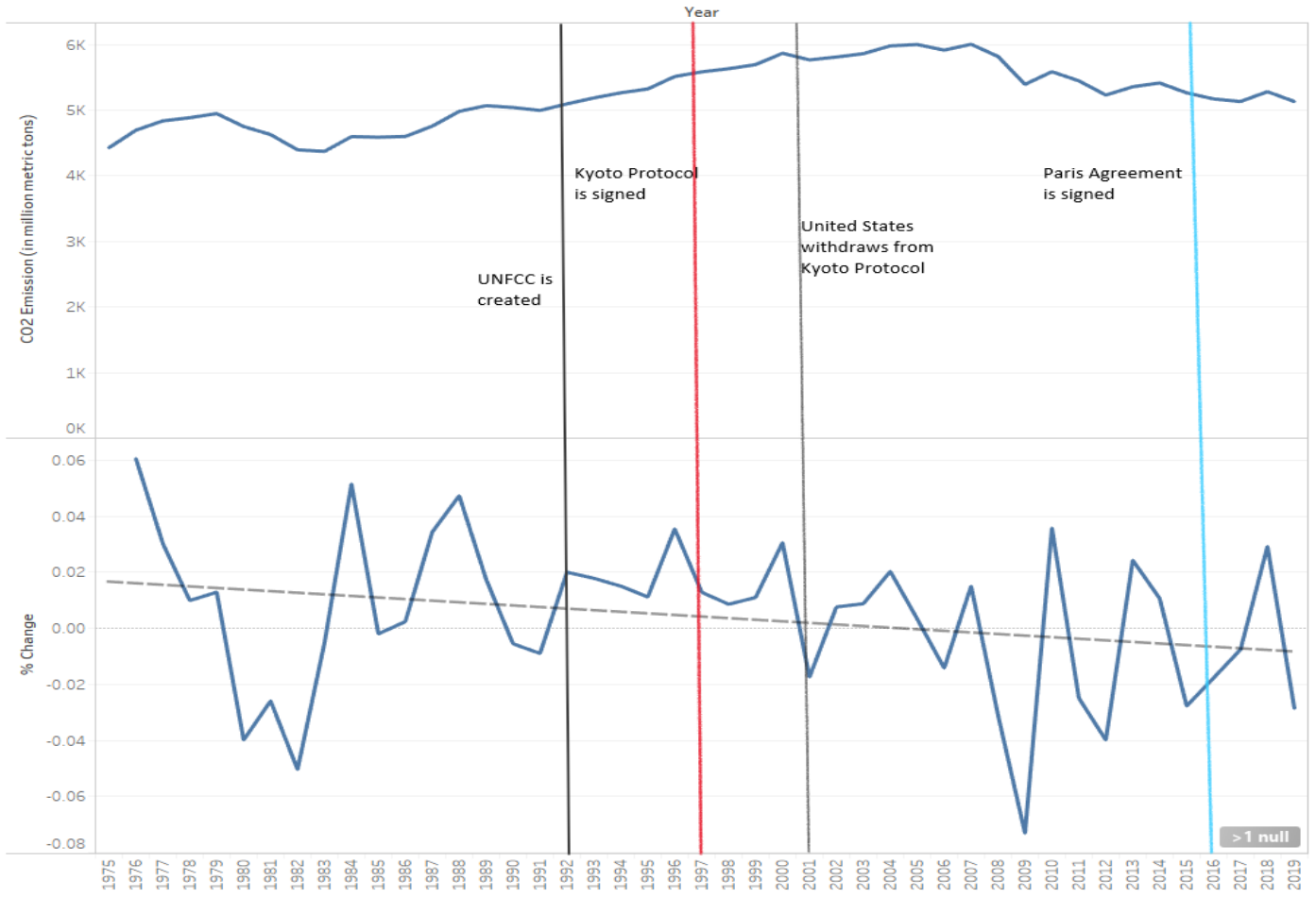
- Climate change is a politicized issue, so traditional economic theories don't work was well in real life scenarios

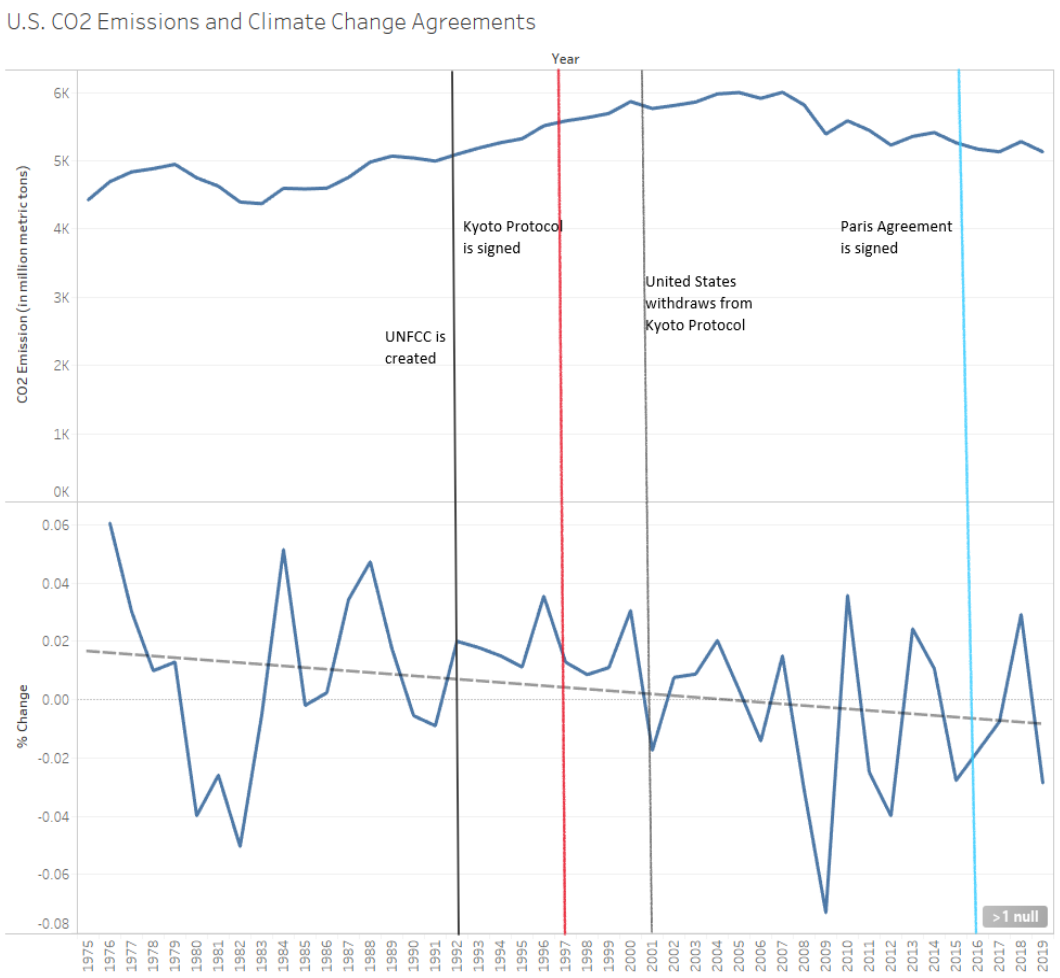
- This research approaches the question of effectiveness of international change agreements through a study of behavioral economics

Kyoto Protocol

- One of the most notable climate change agreements in history
- Operationalized the United Nations Framework Convention on Climate Change
- Technically legally binding, but there was no real enforcement

U.S. CO2 Emissions and Climate Change Agreements





Why did the U.S. withdraw from the Kyoto Protocol?

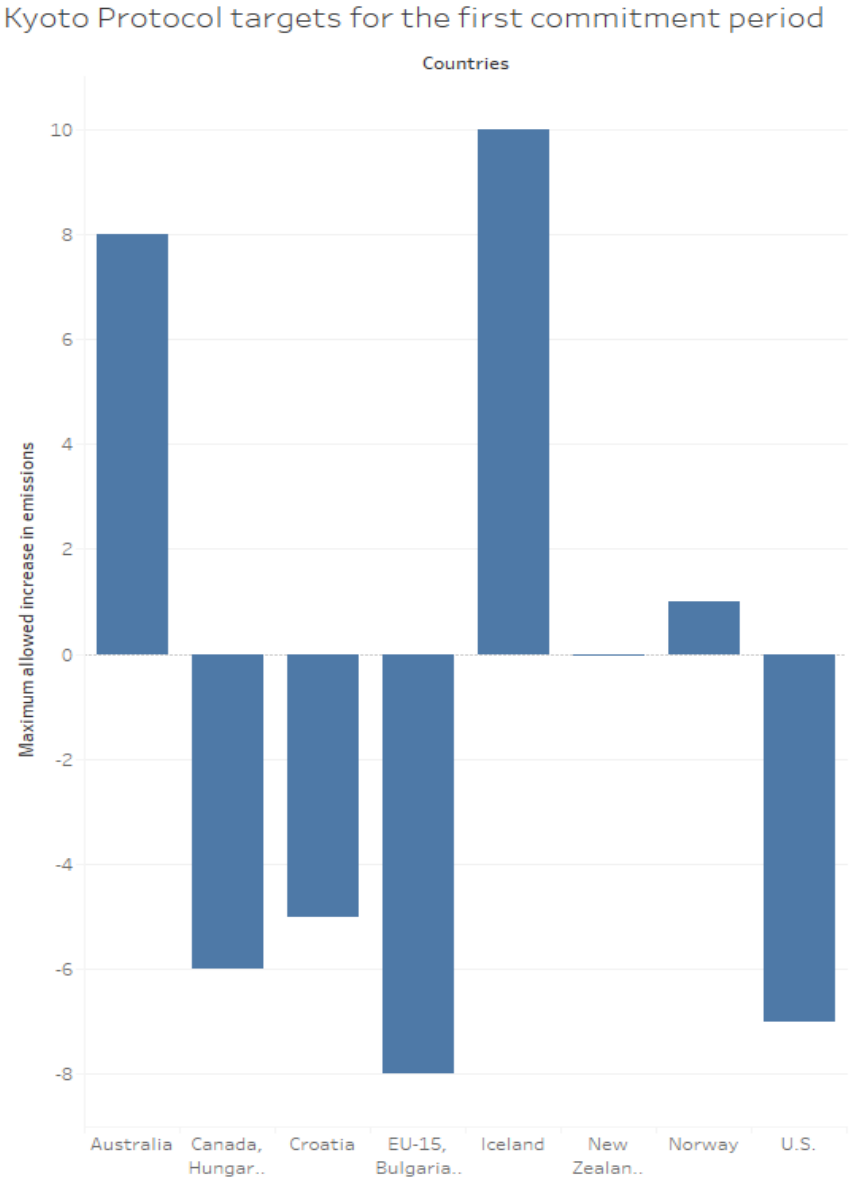
Why did emissions decrease after the U.S. withdrew?

Behavioral Game Theory

- Behavioral game theory is a subset of behavioral economics which studies the choices that lead to weakened rationality assumptions
- Scenarios typically involve 2 or more self-interested parties that attempt to find their ideal outcome
- Conclusions don’t guarantee a particular outcome, they just show ideal choices

Ultimatum Bargaining Game

- 2 individuals are bargaining for something of value, and one of them makes a take-it-or-leave-it offer
- This is a simplified version of how bargaining actually works, but data on how individuals act can be extrapolated to more complex scenarios, within reason
- Bargaining games help measure how individuals feel about the allocation of money between themselves and others



- Developed nations are burdened with a lower emissions target
- The U.S. was expected to decrease emissions by 7%, which would have required significant, and possibly unfair, changes to the economy relative to other countries
- This was a major reason why the U.S. chose to withdraw from the Kyoto Protocol

Bargaining in Climate Change Agreements

- Negative reciprocity is a characteristic that is often seen in bargaining games, where individuals incur substantial cost to themselves out of concern for fairness and equality
  - This is contrary to the rational decision that game theory predicts an individual would make
- The U.S. did not give in to negative reciprocity, and withdrew from the Kyoto Protocol because of perceived unfairness
- Countries like Bulgaria, Czech Republic, and other smaller Eastern European countries accepted the full -8% emissions target, which was an example of negative reciprocity

Explanations for Negative Reciprocity

- Cultural differences
  - What's fair to one country might not be fair to others - the U.S. is more individualistic than Bulgaria
- The "winner's curse" in game theory is a situation where a party overpays for something of value – the countries with the lowest emissions percentage target accepted this because it was valuable to them

Conclusion

- The ultimatum bargaining game can attempt to explain strategic decision-making behind international climate change
- Game theory is a useful tool to study country-level decision making, but actions vary depending on a nations global influence
- The U.S.'s choice to withdraw was in line with game theory, but other countries incurred more relative cost

Conclusion

- With no pressure from the U.N. since withdrawal in 2001, the U.S. has decreased emissions
  - There have been many bills passed that help prevent climate change, but agreements like the Kyoto Protocol have less evidence of success
- Future climate change agreements, like the Paris Agreement (created in 2016) do little to directly influence a country's decision making
- These agreements may indirectly affect nations by increasing public awareness, which in turn pushes politicians to take action, but awareness of climate change is already well established

U.S. Climate Change Bills

- **2003-2007: Bipartisan bills in the Senate**
- **2007: Congress mandates emissions reporting**
- **2008–2010: Cap-and-trade legislation passes the House**
- **2012: Clean Energy Standard**
- **2015: Extension/phasedown of renewable energy tax credits**
- **2016: Formation of the Climate Solutions Caucus**
- **2018: Tax credits and carbon pricing**
- **2019: Renewed interest in Climate Change**

Real change happens on the fiscal policy level

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