



**CEPR-TFI Online Webinar Event:  
Climate Change: Financial Implications for Households?**

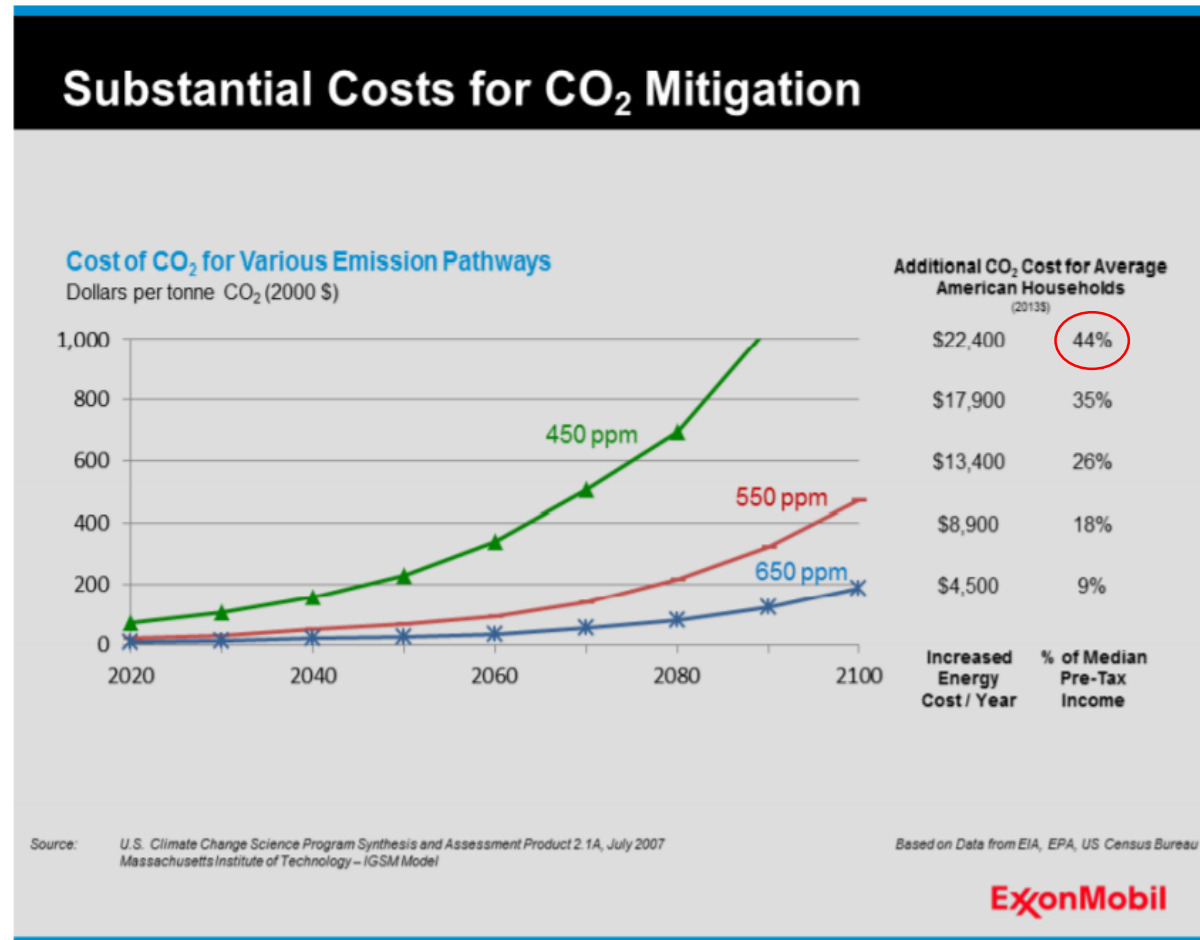
**September 9, 2020 – Bob Litterman**

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## Transition risk for households?

Carbon price paths are usually assumed to start low and increase at a fixed growth rate over time



In 2014 Exxon argued that the valuations of its reserves could not be at risk.

The required carbon pricing would eventually **cost the average American household 44% of their income**, and governments would never do that

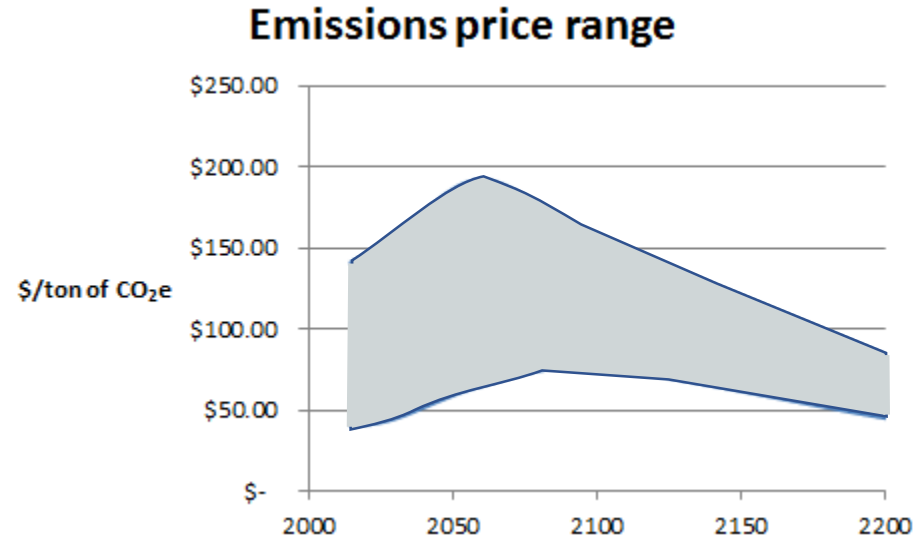
The argument was ridiculous:

- these are not realistic price paths
- emissions WILL respond to prices
- 44% = future \$ / current income ???
- they got the sign wrong:  
if future costs to reduce emissions would be too high, should we pollute more today, or less?

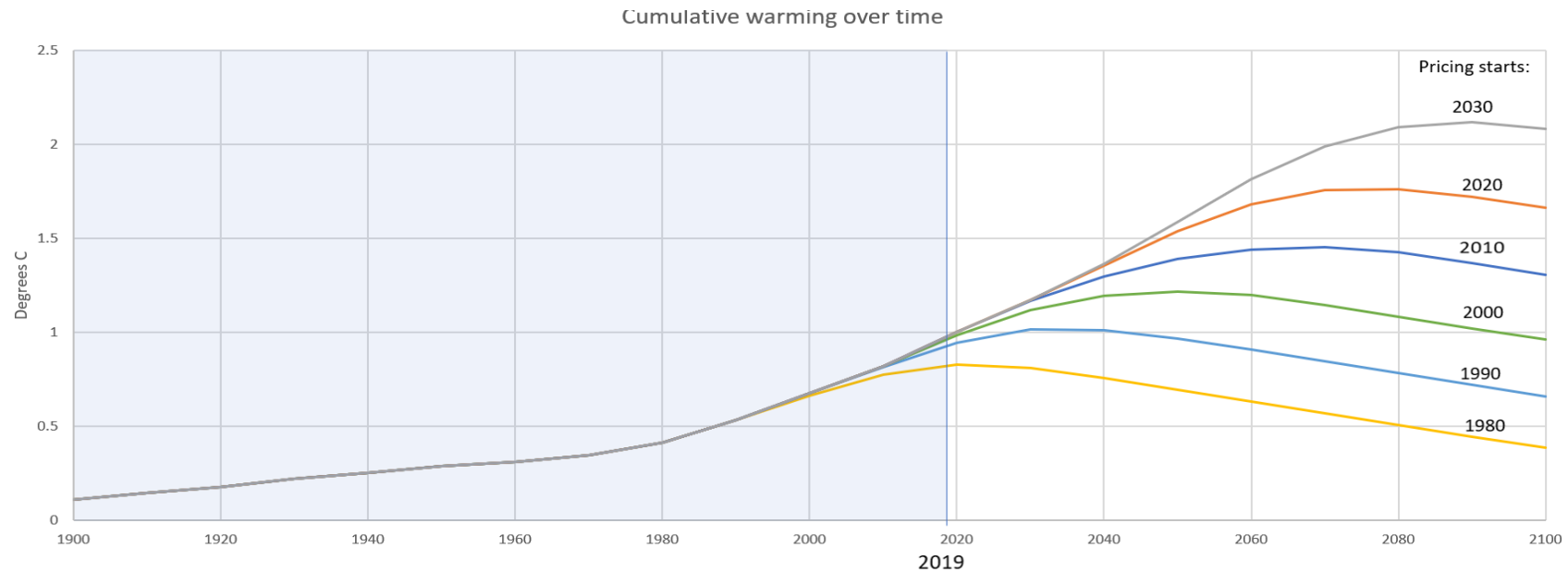
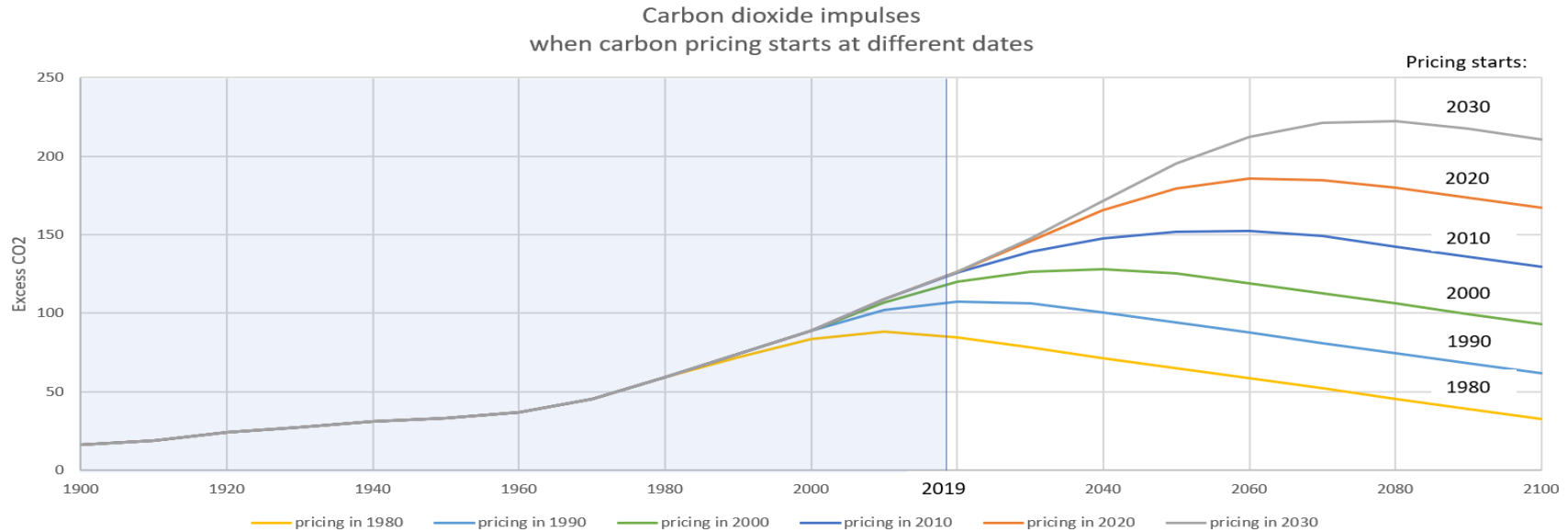
## What is the Right Pricing Path for Carbon Emissions?

Risk is what we measure; uncertainty is what we manage

- Larger uncertainty and higher risk aversion both result in higher emissions prices
- This graph illustrates an expected range, but emissions prices should be determined by science and economics
- Over time prices will be driven primarily by the revealed fragility of the environment and the rate of technological change

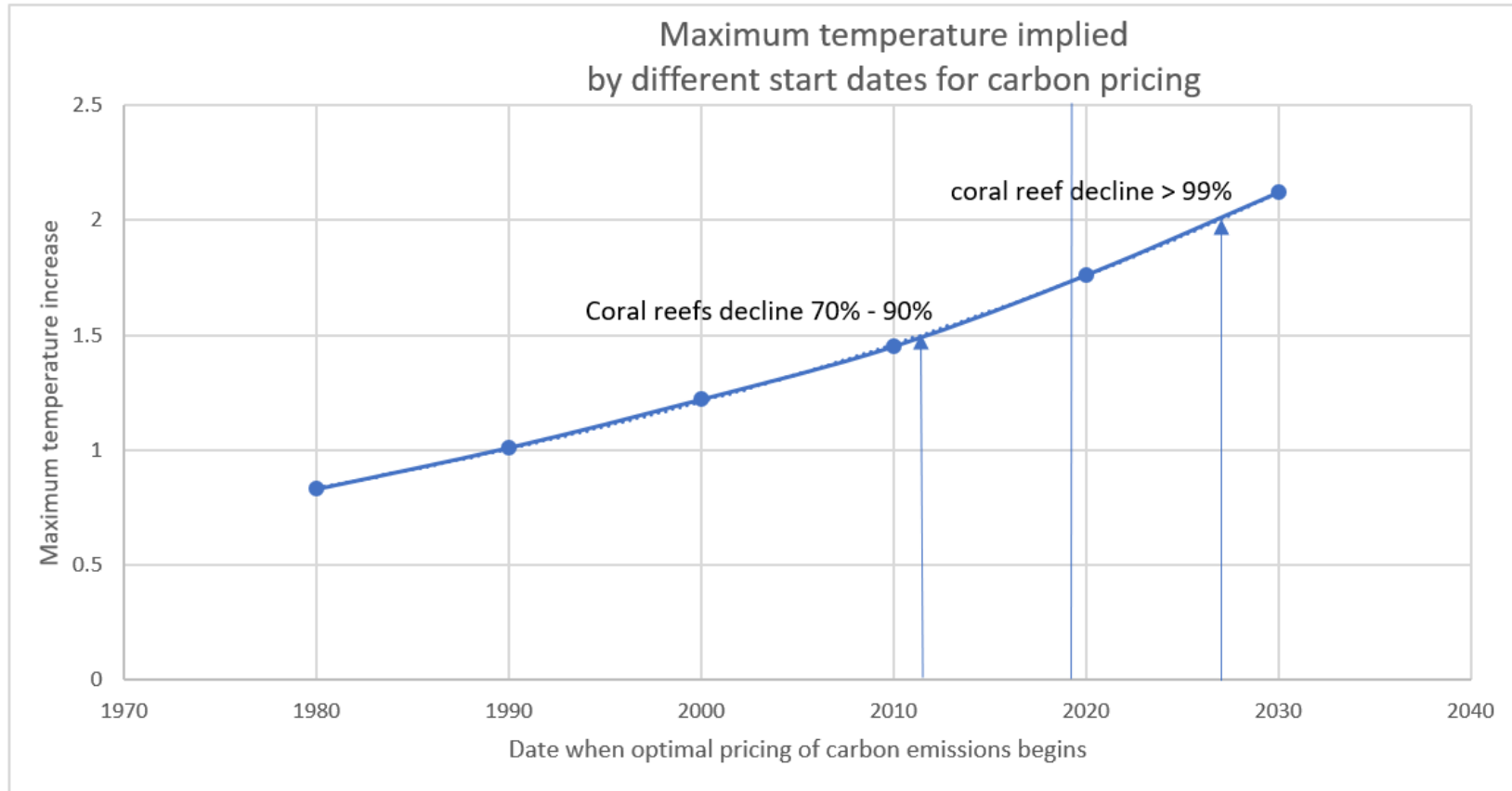


# Understanding the Cost of Delay



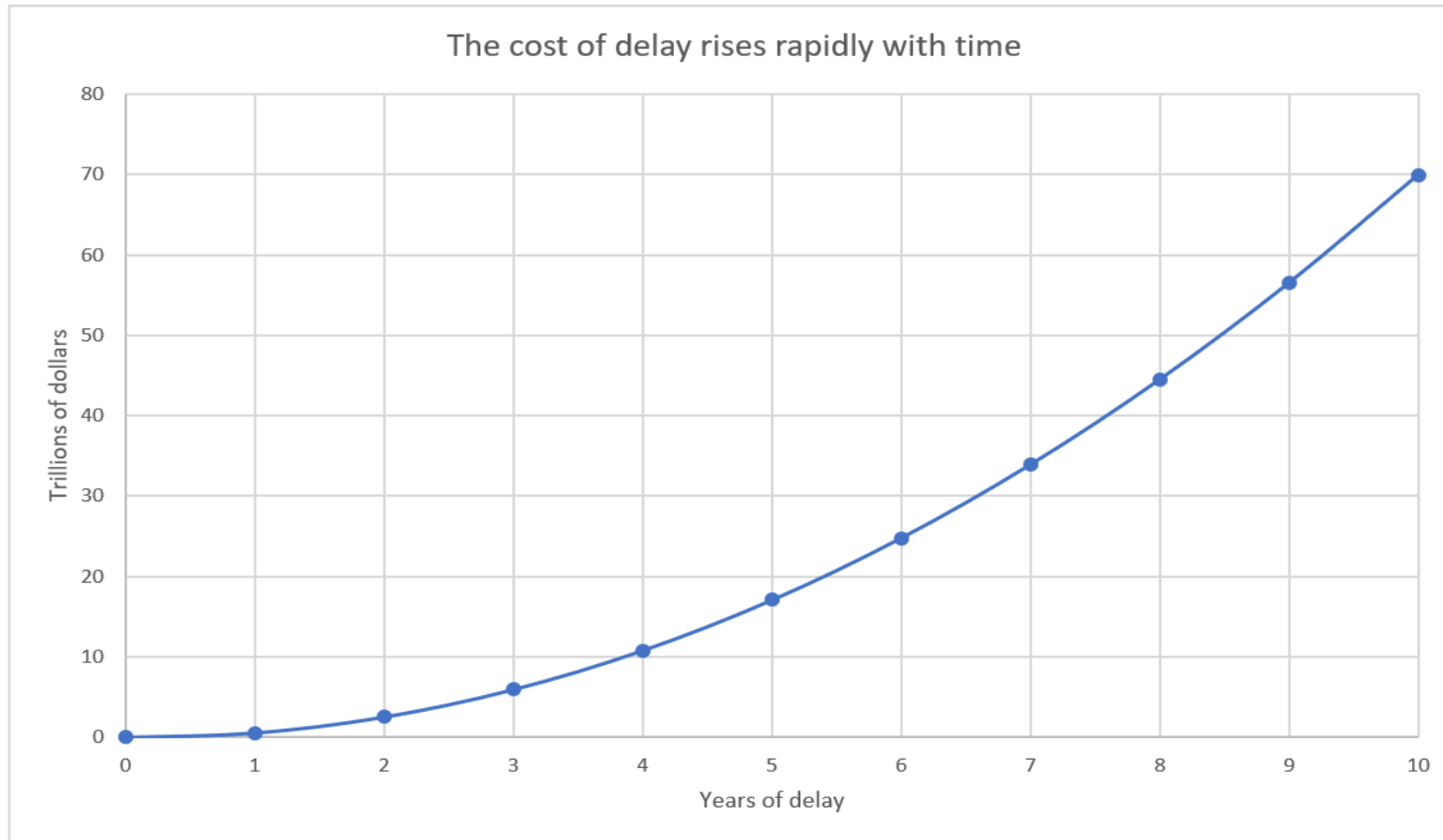
These charts are generated using the model in Daniel, Kent, Robert Litterman and Gernot Wagner, "Declining CO2 Price Paths," 2019, Proceedings of the National Academy of Sciences, October 15, 2019, 116 (42) 20886-20891.

**As emissions increase,  
the maximum temperature experienced by the planet inevitably increases**



This chart is generated using the model in Daniel, Kent, Robert Litterman and Gernot Wagner, "Declining CO2 Price Paths," 2019, Proceedings of the National Academy of Sciences, October 15, 2019, 116 (42) 20886-20891.

**In a model, we can translate the deadweight loss created by a delay in pricing into the dollar equivalent impact on utility**



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