Equity investors are not pricing the risks correctly. There is an urgent need for them to do it because climate change will only increase both the frequency and the impact of natural disasters. What measures can be used to assess the physical risks from climate change in a portfolio? Many innovative technique (CarbonDelta, 427, Carbon4Finance) but it is data-intensive. Is there a way to assess the risks from climate change in a portfolio in a different, more accessible way? Some talked about a carbon Beta, which would be the exposure of a given stock to transition risks. Following this idea, we develop a hazard risk beta. Idea: use the insurance stock market as a proxy for natural disasters. Then, if a portfolio has high ND beta, the investor should demand a risk premium.

1. Find if the insurance stock market is negatively correlated with the occurrence of natural disasters, and to what extent
2. Find if empirically, there is a risk-premium for this risk. i.e., regress the return of (what? A stock? Several stocks? The market) by adding this beta and the risk premium associated to it, and find if this beta is empirically statistically different from zero. To do so, use multi-factor CAPM, and find if the Beta is statistically different from zero (follow the same procedure as when they tried to see it there exists a carbon beta)
3. Try to implement a strategy using this new measure of risk : e.g., see if this multi-CAPM is more performant than a single-factor CAPM, or see if you can use ML to predict natural disaster, then short the insurance stock market, etc.

To assess that, calculate correlation between financial loss of large natural disasters at time t and insurance stocks prices at time t+1. Choose only highly expensive natural disasters to calculate the correlation (for example, take the N most expensive natural disasters per year).

Then, if we find that there is a stock/market that is a good proxy for natural disasters, we can say that the Beta of a given portfolio to this market is a good indicator of risk for natural disasters.

We can then try to see, following Chong, if

A strategy could consist on using ML to predict the occurrence of a natural disaster (or poisson model), then shorting the insurance market if our ML algorithm predicts imminent catastrophe. But one could also