Discussion
Attention to Global Warming

Wing Wah Tham

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In the East, it could be the COLDEST New Year’s Eve on record. Perhaps we could use a little bit of that good old Global Warming that our Country, but not other countries, was going to pay TRILLIONS OF DOLLARS to protect against. Bundle up!

10:01 AM - Dec 29, 2017

203K people are talking about this
Evidences of Climate Change
1. Idealistic response to dramatic climate change is to preserve the environment at all costs.

2. Trade-off between economic benefits and environmental costs
   - Need to price the environmental damage and evaluate the cost and benefit of each corporate and governmental policies
   - Coal-burning factories and alleviation from poverty trap through education and employment

⇒ Serious risks for corporations and capital markets
   - Changes in business risks
   - Regulatory uncertainty
   - Production cost uncertainty
   - But also provide opportunities for innovation
This Paper

Measures people's reaction to abnormally high local temperature via google search for keywords "climate change" and show that movements of "climate-sensitive" stock prices coincide with abnormal temperature
I Like This Paper

1. Contribute to debate among environmental economists by measuring the cost of a particular environmental damage across different firms
   - Will have important corporate and regulatory policy implications on environmental-related decisions

2. Providing potential evidence of experiential learning and decision making behavior in financial markets

3. Compile a comprehensive new data set on weather conditions mapping this to cities around the world, facilitating future weather-related research

- Accepted for the call for Climate Finance Research Proposals, in-principle acceptance in RFS - Well Deserved!!
Short Summary

Information Arrival (Public or Private), Climate Change @ time $t$

Systematic Risk - Bansal, Kiku and Ochoa (2016 a, b)

Production Cost, i.e. Paris Agreement

Constrained institutional investors - Hong & Kacperczyk, 2009

Frictions

Investor Inattention – obstruct information updates

On extreme temperature day, investors become attentive thru experiential learning. Search for information through Google and trade on climate sensitive stocks on time $t+N$

NCDC (ISD) and Google Search data

- Information gets impounded
- Climate sensitive stock returns decrease, and insensitive stocks increase
- Permanent information
- Happens post 2000

N days later
Clarify the Economic Mechanism

- This paper suggests that investors are distracted all the time but are reminded by extreme weather to monitor market information
  - Subtle difference from literature, where investors are attentive most of the time but are distracted occasionally

- Why are investors distracted all the time given that the monitoring cost is so low?

- What is the nature of the information environment here? Public versus Private information and information production

- Which type of investors in your mind is distracted? Sophisticated, retail or both?
Sophisticated Investors?

- Sophisticated investors are professionals and they do not Google search “global warming” whenever there is an abnormal temperature day.

- Media reports on climate change issues via newspapers, TV, Billboards, radio,...every single day.

- Information is public and the cost of monitoring is so low (google search).

- It takes some convincing to believe that distracted investors are professionals.
Retail Investors?

- Google search and psychological response to weather evidence suggests that individual investors are more likely to be the distracted investors.

- **Interesting and unexpected insights** - Individual investors are not noise traders and engage in information production but they are often distracted!

Some unresolved questions

- What kind of private information do individual investors have?

- If they do not have private information, why aren’t the sophisticated investors updating public news into asset prices?
Suggestions

- Clarify with a simple model or improve exposition of economic mechanism

- Narrow down to US for investors’ sophistication and better quality data such as Ancerno (or any other institutional investors) to check institutional investors’ distraction over cities like Amman, Lagos, Skopje...

- Do more microanalysis by studying price adjustments to climate news rather than long-short returns of climate sensitive stocks

- Combine it with daily Google Trend SVI data

- Use constituents of related ETFs for classifications of high emission firms
Human’s Thermoreceptors

• Do you know what is the difference in abnormal temperature between Singapore and Hong Kong now or this month?

• Can you feel the difference in temperature between yesterday and today?

What does it take to gather your attention?

• From distribution of abnormal temperature Table II, P10=-2.83, median=0.247, P90=3.45 degree Fahrenheit ⇒ 1-1.5 degree Celsius from expected temperature about 36°C

• From academic findings in somatosensory and thermal dynamics, human’s thermoreceptors is very sensitive when temperature changes very rapidly, 0.1°C/s and skin is in contact with object.

• If the temperature changes very slowly, for example at a rate of less than 0.5°C per minute, then a person can be unaware of a 4 – 5°C change in temperature.
• Relate to literature in somatosensory literature in determining the threshold (99.5%) for what the paper determines as abnormal temperature (use tail of abnormal temp distribution)

**Suggestions**

• Refine the abnormal weather measure

• NCDC climate data comes at daily level

• Use daily extreme rather than monthly average

• Use duration of successive extremes.

• Why not use information about extreme snow, wind days?

• Help readers overcome the question of how investors can detect $3^\circ C$ difference across cities, as it will earn them about 6% abnormal returns a year
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A More Plausible Story? - Reverse Causality

- Media may report newsworthy market developments and relate it to “juicy” explanation for readership

- \( \Rightarrow \) Stock prices movements + abnormal temperature \( \Rightarrow \) Google search by retail investors?

- Is this more plausible than retail investors are information producers and able to drive non-transient price changes?

- Do they google search for tickers of high Emission stocks with “global warming”?

- Why contemporaneous and predictive regressions have same num. obs.?
Few other Quibbles

- Clarify how you deal with missing SVI data of Amman, Belgrade, Bogota, Dhaka, Lagos, Lima, Muscat, Skopje, Karachi, Kiev among many? Shanghai is dropped but has SVI data.

- Are low emission firms associated with growth firms?

- Use risk adjusted returns over size adjusted returns. See Sohnke and Grinblatt or Fama-French Global factors

- How are your results related to underpricing for firms with litigation risk?
Conclusion

• Important questions with an interesting story.

• Wish I could have told such a story and have written such a paper

• Congrats to a fantastic publication!!