Discussion of
Dissecting Climate Risks:
Are they Reflected in Stock Prices?
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Any views expressed in this discussion are those of the author and do not necessarily reflect the position of the European Central Bank or the SSM.

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Overview

▶ Research question
   - Are climate risks (physical risk and transition risk) priced in U.S. stocks?

▶ Methodology: Two–step approach
   1. Run two types of textual analyses to establish the risk factors
   2. Run “classic” CAPM/APT regressions to ascertain if the factors were priced

▶ Main results
   - Only one climate risk factor (U.S. policy actions and debate) is priced
     - Investors hedge against transition risk rather with investments in firms with a strong intention to become green than in already “green firms”
   - Neither the occurrence of natural disasters nor global warming as measures of physical risk are priced
   - International summits on climate are not priced either
My discussion

1. Research question is topical and relevant
   - Paper contributes to the literature by applying Latent Dirichlet Application (LDA) as a new textual analysis to finance subjects
   - Existant literature has found mixed results on impact from climate risks on asset prices

2. After brief recap of methodology I will focus on few general comments on ...
   - ... the use of LDA vs. narrative textual analysis
   - ... policy messages
   - ... potential avenues of further research
Methodology (1): Construction of climate risk factors via LDA

- Apply LDA (see Blei et al, JMLR, 2003) as an unobserved machine learning method (but cross check with narrative textual analysis)

- Climate-related data:
  - Refinitiv News Archive for sample period 1/1/2000 to 31/12/2018
  - Start with 13 million articles; Remove multiple versions: 7 million articles
  - Filter for containing “climate change” or “global warming”: 34,000 articles
  - Apply narrative analysis instead of LDA for U.S. climate-policy factor: 3,500 articles

- Four “topics” (or “climate risk factors) are identified (e.g. U.S. climate policy)

- Time series of share of a topic across all articles at time $t$, $t = 1, 2, ...$
  - Intensity of news coverage over time
  - Time series of respective climate risk factor
Methodology (2): When is a climate risk factor priced?

- Sort stocks based on sensitivity of the stock’s returns to the respective climate risk factor
- Compute returns of a long–short spread portfolio that is long in high climate beta stocks and short in low climate beta stocks, controlling for other risk factors
- Risk factor is considered “priced” if this long–short spread portfolio earns a statistically significant average return (positive alpha)
- Take U.S. climate policy as example: News coverage reassures investors that transition risks would not materialize
- Increase of this factor $\Leftrightarrow$ transition risk would not materialize
- Investors hedge against a decrease of the factor (adverse outcome) by buying stocks with negative climate betas and sell those with positive betas and long-short portfolio should return a positive alpha
- Test for positive alpha in CAPM and several Fama-French type extensions
Methodology (3): Central Hypotheses and outcome

<table>
<thead>
<tr>
<th>Topic</th>
<th>Impact</th>
<th>Significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural disasters</td>
<td>Negative</td>
<td>No</td>
</tr>
<tr>
<td>Global warming</td>
<td>Negative</td>
<td>No</td>
</tr>
<tr>
<td>U.S. Climate policy</td>
<td>Positive</td>
<td>Yes</td>
</tr>
<tr>
<td>International climate conference</td>
<td>Negative</td>
<td>No</td>
</tr>
</tbody>
</table>

- U.S. climate policy factor significant only in later subperiod (after Nov 2012)
- Positive impact of U.S. climate policy factor cannot be ascertained by LDA
  → Additional narrative textual analysis needed where direction of impact is beyond doubt
- How illuminating are the results of non-significance of the other three factors? → Next slide
Comments: Questions on the central hypothesis

► Why should international natural catastrophes or global warming news be reflected in U.S. stock price moves?
  - The natural disasters mostly happened far away (Figure 3(a))
  - Unless there is a direct impact on the U.S. economy, why should these natural(!) phenomena affect U.S. stock prices?
  - Is it a case of “investor myopia”?

► Impact of international summits on economy may be ambiguous:
  - The relatively long horizon of pledged actions
  - Perception about legally binding nature of summit outcome has evolved over time (and also depends on national legal framework)
  - A divergent impact on “brown” and “green” parts of the economy
  - Signals going out went in opposing directions (“success” or “failure”)

► By far most pronounced moves of the climate policy factor are observed between 2007 and 2011: Why is the factor not priced back then? (Only in the later period statistical significance is observed!)

► Is it conceivable that the climate policy factor has different sign of sensitivity before November 2012 (Figure 3(d))?
General comments: LDA vs narrative textual analysis

- Paper comprises two different methodological approaches to construct risk factors: **LDA textual analysis** and **narrative textual analysis**

- Narrative analysis allows to identify the direction of the factor impact by construction
  
  Example: Define transition risk factor by “manually” checking if an article on a relevant policy decision increases or decreases transition risk
  
  → “classic” narrative analysis appears superior in cases where the direction of impact is ambiguous

- Regime shifts (like in this paper prae vs. post Nov 2012) cannot be captured by LDA due to its **static approach**
  
  → Why not doing a period-by-period analysis from the start and not look at the total period?
Policy messages

- **Confirmation** of previous results:
  - Physical climate risk not priced
  - Transition risk *is* priced but only relatively recently

- Really **new** results:
  - Investors hedge against transition risk rather with investments in firms with a strong intention to become green than in already “green firms”
  - But **why**? Why do they take a bet rather than buying the “green stocks” directly which should offer a higher hedge efficiency?
Avenues of further research

▶ Has “investor myopia” regarding physical climate risk decreased recently (Newer data after 2018 may shed light)?
▶ Has physical climate risk become priced as a consequence of events in recent years (wild fires, drought)?
▶ Which role does the slow–burning nature of (physical) climate risk play?
  - Are investors sanguine because they expect technological innovation to mitigate this risk before it fully materializes?
  - Are the adverse outcomes expected to occur maybe beyond the typical investment horizon and portfolio will look very different when risks are expected to materialize?