

Discussion of: “Climate Risks and FDI”

by G.W. Gu and G. Hale

Victoria Nuguer

Department of Research and Chief Economist, Inter-American Development Bank¹

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¹The views expressed herein are those of the author and do not necessarily reflect those of the Inter-American Development Bank, their Management, or their Board.

Overview of Grace and Galina's paper

Question

Are multinational firms deciding their foreign direct investment taking into account climate (physical) risks and the associated policies (mitigation) that countries are implementing?

Message

Unfortunately, firms are not yet reacting to climate risks even-though the Paris Agreement was adopted by 196 entities in 2015

Main Contribution

The first paper to study the impact of both physical and transition climate risks on FDI using firm-level data

What does the paper do?

1. Constructs a rational-expectations model with a multinational firm that decides how much FDI and how many affiliates to allocate in a country
 - emissions are a factor of production
 - physical risks are expectations of future destructive events
 - transitions risks are policies that increase the cost of emissions
2. Tests if the data can replicate the findings of the model
 - tons of regressions at country-, firm- and industry-level
 - Physical risks - climate-related physical disasters data
 - Transitions risks - new emission-related policies from IEA

... very small effects and very little significance
3. Tests the endogeneity and the robustness of the econometric specifications

Looking at the dictionary (not a climate expert)

- **Adaptation** anticipating the adverse effects of climate change and taking appropriate action to prevent or minimize the damage they can cause, or taking advantage of opportunities that may arise. [...] **The process of adjusting to the current and future effects of climate change.**
- **Mitigation** making the impacts of climate change less severe by preventing or reducing the emission of greenhouse gases (GHG) into the atmosphere. [...] **A human intervention that reduces the sources of GHG emissions and/or enhances the sinks.**
- **Transition** the process or a period of changing from one state or condition to another. Transitioning to a cleaner, more resilient energy system.

Source: European Environment Agency, Oxford Dictionary, and U.S. Department of Energy

Looking at the dictionary (not a climate expert)

- **Climate change** refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, such as through variations in the solar cycle. But since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil, and gas.

Source: United Nations

- **Natural disasters** are catastrophic events with atmospheric, geological, and hydrological origins (e.g., droughts, earthquakes, floods, hurricanes, landslides) that can cause fatalities, property damage and social environmental disruption.

Source: International Journal of Disaster Risk Reduction

Summary of Comments

1. Expanding the theoretical model
2. “More” empirical exercises and endogeneity
3. Aligning firm’s incentives
4. In the search for greener technologies

Expanding the theoretical model

Minor additions in the rational-expectations model would make its scope wider

1. Capital as a factor of production

- allows cost-benefit analysis (i.e. firms invest until the marginal product of capital is equal to the costs of capital and climate risks)
- climate risks could be modeled through capital destruction
- makes firms' problem more realistic

2. Including total factor productivity

- permits heterogeneity between firms' technical capacity
- capture labor skills and technological disparities that limit foreign investment

“More” empirical exercises and endogeneity

- Event-studies – usually used in the natural disaster literature

“More” empirical exercises and endogeneity

1. Country level

- role of institutions (Bennassy *et. al*, 2007)
- balance of payments (Schneider and Frey, 1985)
- exchange rate regime and capital-flows management measures

2. Industry level

- human capital
- technology

3. Firm level

- investment returns
- geographical proximity

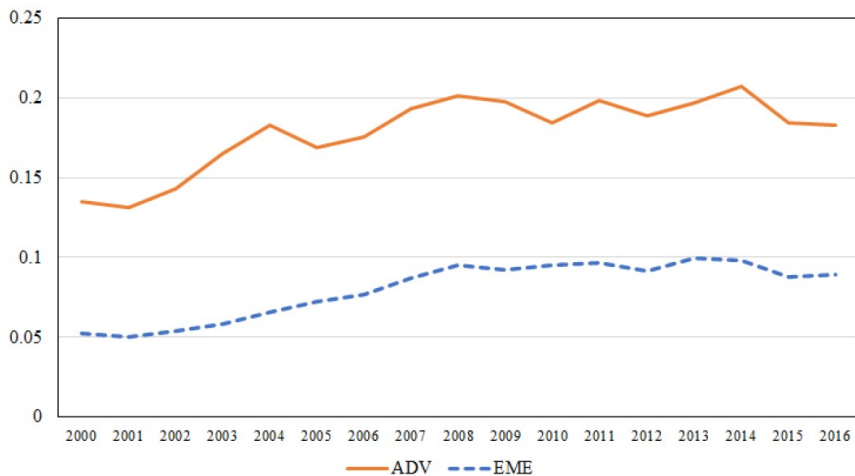
Aligning firms' incentives

- Firms are not necessarily socially responsible... unless they have the right incentives to do so
- Why would a firm care about climate change? (they maximize profits!)
- A firm chooses where to produce because it is more profitable, taking into account also the climate risks
- We need **policies** that correctly align the incentives, but do we want to stop production in the riskier climate-related places?

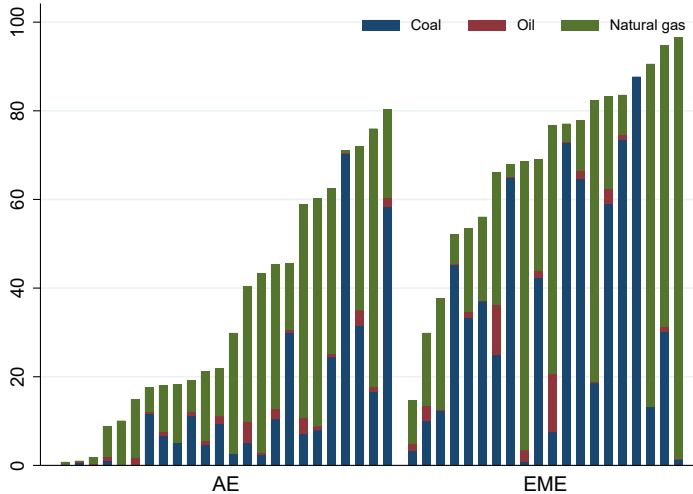
In the search for greener technologies

- The last section of the paper shows a very gloomy future
- Emission productivity hasn't improved... EMEs are not even close to AEs' productivity 22 years ago!
- When looking at electricity production by country the differences are not that striking but still show a big difference
- Again, **policies** need to play a key role in promoting the use of greener technologies

Emission productivity over time (Gu and Hale)



Electricity generation share by source (2019)



Source: International Energy Agency.

Notes: The difference with 100 corresponds to bio-fuels, other renewable, waste, nuclear, and hydro.

Conclusion

- Very nice paper! and a pleasure to read, though the results are pretty worrisome
- Interesting framework to think about policy questions and where should we focus the regulation
- Silver lining... greener transition with the right incentives!

Thank you for your attention!