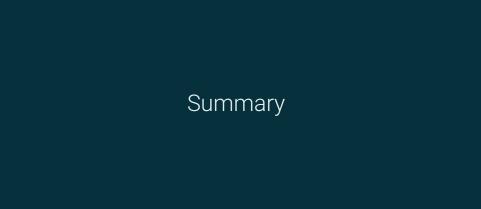
Discussion of: Financing the Adoption of Clean Technology by A. Lanteri and A. Rampini Finance and Productivity (FINPRO) Workshop 2023 Banca d'Italia

C. Cantore¹ 8/6/2023

¹Sapienza University of Rome

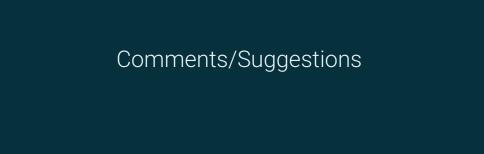


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- Question: What are the equilibrium patterns of clean-technology adoption when firms are heterogeneous in their financial resources?
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Results:

- → If interior solution: investment in clean capital must require more financial resources, because clean capital must be more expensive.
- → ⇒ financially constrained firms optimally invest in dirty new technologies as well as in older technologies which generates a positive relation between firm size and energy efficiency.



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- I especially like the rationalization of the following two facts: 1) clean capital more expensive & 2) financing clean teachnology is harder.
- I'll focus my discussion on:
 - 1 Is commercial shipping the right sector for empirical evidence?
 - 2 Relationship between firm size and investment in clean capital in the literature
 - 3 Role of price of energy in the GE model.
 - 4 Minor points

Comment 1a: Is shipping representative?

- Can we generalize this evidence from such a specific sector to the whole economy?
- What about sectors where a more complex production structure makes transitioning to clean capital more difficult?
- Hard to abate industries: steel, cement, and petrochemicals.
 - → Each uses carbon as an integral part of their process, and altogether account for about 30% of the world's greenhouse gas emissions. (IPCC (2022))

Comment 1b: First best benchmark in GE model

- Without financial constraints, firms are indifferent to investing in the two types of capital ⇒ all firms would invest only in clean capital.
- What would happen if, for some firms, it's cheaper to continue using less sustainable capital even in the absence of financial constraints?

Comment 2: firm size and investment in clean capital

- Looked at the relationship between age/size of firms and investment in new/clean capital in the literature.
- Noailly and Smeets, 2015: innovative clean firms tend to be rather small and lack long-standing relationships with banks, which renders securing debt financing more difficult.
- Could this be a sector specific result? Otherwise more evidence to support this prediction of the model is needed in my view.

Comment 3: The role of price of energy

- There's no role for the price of energy in the firms' investment choices here. It's the units of energy needed to operate the capital that matter.
- Possible extensions (for future research)
 - 1 Endogenise p_e
 - 2 Cross-country comparison between energy producers (low p_e) and importers (high p_e)
 - 3 Allowing for two types of energy (renewable vs fossil) and their relative price to change.

Comment 4: Minor points

- In this model, cleaner capital uses less energy. There's no consideration of emissions. It would be good to see an extension where cleaner capital produces fewer emissions.
- Consider using the GE model to produce more in-depth quantitative analysis: policy counterfactuals, optimal policies, carbon tax, etc.
- Related paper by Campiglio et al. (2023) on innovation in clean technology and endogenous financing costs you might want to look at.