Can Banks Foster Green Innovation?

Eyes on Green Marks*

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Short summary

The UN Climate Change Paris conference in December 2015 proposed a limit of 1.5 ◦C increase in average global temperatures compared to those prevailing before the Industrial Revolution. To reach this goal, it is necessary to reduce the carbon emission to zero, resulting in so-called "net zero" target emerged in recent years. Both non-financial sectors and financial sectors should take actions and accelerate the transition to a net zero economy (or green economy)—it is the "green transition" that policy makers desire to find solutions to combat climate changes.

In general, there are two different green transitions: (1) reducing economic activity to cut back on CO2 emissions (e.g., 2020 Covid Lockdown reduced CO2 emissions by 5.8%); (2) developing green technology (e.g., renewable energy technology). Banks are major funding providers for non-financial firms' real investments; essentially, they can influence green transitions toward reducing economic activities or enhancing green technologies. It is crucial to understand which channel banks drive green transitions, given that the former may harm a society welfare and the latter is often viewed as the best solution to combat climate change while maintaining (or even boosting) economy activities.

In this study, we investigate the bank-level commitments to carbon neutrality to proxy for changes in banks' green preferences, and empirically examine whether bank green commitments lead a shock to firms with previous credit from these banks. Then, we investigate whether these borrowing firms respond to the bank credit shock by changing their green innovation activities.

In theory, it is arguable whether firms create more green innovations, consistent with the committed banks' green preference? On the one hand, firms affected by committed banks have significant incentives to become relatively greener, as this grants easier access to bank financing. On the other hand, the tightening of credit standards

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might limit their ability to invest in green technology or it may be costly to do so. Also, firms may want to reduce their investment/assets in segments/projects that are not necessarily brown if the brown sectors have higher profit margins.

The novelty of our study is to use the detailed information of a firm's trademark applications in the United States Patent and Trademark Office (USPTO) and identify *green trademarks*, which we use to measure a firm's green innovation. Whenever a firm conducts environmentally themed businesses, products, and technology, the firm would obtain legal protection by applying for a trademark the USPTO in the U.S. market.[1] The trademark application is officially examined by USPTO with its description on that mark; the description of trademark application presumably matches the actual business activities. In addition, EUIPO points out that trademark data is a "valid indicator of innovation" and an important tool for policy makers.[2]

We find that firms with higher greenhouse gases (GHG) emission[3] and affected by banks making commitments (specifically on Science Based Target initiate (SBTi) commitments) subsequently receive less bank credit. The reduction in bank lending to high-GHG firms triggers the incentives these firms' green innovation, as we find these high-GHG firms apply for significantly more green trademarks in USPTO. Our results suggest that firms indeed respond bank pressure toward greenness by shifting their business operations to be greener.

Overall, our results suggest that bank affect green innovation via credit reallocation (from high-GHG firms to low GHG firms), which incentives high-GHG firms produce green products and services. Given that high-GHG firms are primary green innovation inventors, our study has an important policy implication on bank green commitments that affect real green innovation in the real economy.

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[1] In addition, consumers are also playing an important role in promoting firms to file more green trademarks. Consumers' eco-awareness are shaping the era of consumeristic, augmented environmental sensitivity over the world. The power from consumers urges firms to cultivate their green brands and eco-marks—trademarks, service marks, and certification marks that communicate environmentally friendly products, services. See: https://www.inta.org/perspectives/can-trademarks-ever-be-green-the-line-between-green-branding-and-greenwashing/

[2] https://www.worldtrademarkreview.com/governmentpolicy/the-rise-of-green-trademarks-euipo-reveals-how-global-sustainability-drive-transformed-register

[3] We collect air pollution data to measure greenhouse gases level. The reasoning is that air pollution and GHG are often released from the same sources, reducing air pollution is an effort to cut greenhouse gases and thus slow climate change. See: https://www.niehs.nih.gov/research/programs/geh/geh_newsletter/2013/12/spotlight/reducing_greenhouse_gas_emissions_can_improve_air_quality_and_save_lives_.cfm