How will Green Technologies Surf the AI Wave? Technological Complementarities and Implications for the Green Transition

Pia Andres* Eugenie Dugoua† Marion Dumas‡

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Abstract

Transitioning away from dirty and towards clean technologies is critical to reducing the environmental impacts of economic activities. Green and dirty technologies compete in a "race" where their relative costs determine the extent of adoption and emission reductions. This race is not happening in a vacuum but under the backdrop of improvements in the next general-purpose technology: Artificial Intelligence (AI). Will AI create opportunities to lower costs in green rather than dirty technologies? Are policies needed to help green technologies best "surf" the AI wave? In this paper, we use an endogeneous growth model of directed technological change to illustrate how differences in absorptive capacity for a general-purpose technology can alter the equilibrium outcomes in the race between clean and dirty technologies. Second, we use patent data to investigate which green technologies rely more on AI than their dirty counterparts. Third, in a next step, we aim to empirically study what factors contribute to absorptive capacity and AI reliance, particularly the role of geographical and within-firm spillovers. We collect data from PATSTAT on worldwide patents filed between 1990 and 2016. We leverage previously-used keywords and CPC and IPC codes to classify patents as green, dirty, AI, transportation and/or electricity. We proxy AI reliance by the share of backward citations made to AI patents. Preliminary results show that patents on green transport (but not electricity) rely more on AI than dirty ones. We also find that citing AI patents is positively associated with a higher number of forward citations.

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*PhD Candidate in Environmental Economics, Department of Geography and Environment, London School of Economics. Email: p.andres@lse.ac.uk

†Assistant Professor in Environmental Economics, Department of Geography and Environment, London School of Economics. Email: e.dugoua@lse.ac.uk.

‡Assitant Professor, Grantham Research Institute, London School of Economics. Email: m.dumas1@lse.ac.uk.