

The Real Effect of Endogenous Digital Technology Adoption

Mengyuan Cai Guiying Laura Wu

(Click [here](#) for the latest version)

Abstract

We examine the choices and consequences of digital technology adoption at the firm-level, by modelling the adoption as the result of a firm's optimal decision. Using the endogenous treatment effect framework, we address simultaneously which firm characteristics are more likely to lead to adoption and what is the outcome of the adoption. We then apply the model to a panel of Chinese public listed firms. Different from existing literature on robots/automation and using firm-level data from advanced economies, we find evidence for a negative selection – on average it is those otherwise less profitable Chinese firms that adopted digital technology. The average treatment effect on the treated suggests digital technology has led to a 4% increase in profit for those adopted firms. They also gain market share, reduce production cost, enhance productivity, and substitute capital for labour. More interestingly, the average treatment effect on the non-treated predicts a potentially large gain for those non-adopted firms, suggesting on average the annualized cost of adoption for such firms should be at least 5% of their annual profit.

JEL Classification: O33, D24, C31

Key Words: Digital Technology Adoption, Endogenous Treatment Effect Model, Selection Bias, Textual Analysis

Acknowledgement

We would like to thank valuable comments from Tat-How Teh, Wu Zhu, Bo Li and Gong Jie. This research is supported by the Ministry of Education, Singapore, under its Academic Research

Fund Tier 1 (RG54/22). Cai and Wu are from Nanyang Technological University, Singapore. Emails: mengyuan002@e.ntu.edu.sg (M. Cai), guiying.wu@ntu.edu.sg (G. Wu).