Artificial Intelligence and Firms' Systematic Risk

Tania Babina[a], Anastassia Fedyk[b,], Alex He[c], James Hodson[d]

[a]*Columbia University, New York, NY, USA, NBER, and CEPR*
[b]*University of California, Berkeley, Berkeley, CA, USA*
[c]*University of Maryland, College Park, MD, USA*
[d]*AI for Good Foundation, Berkeley, CA, USA*

Abstract

We leverage comprehensive data on firm-level AI investments to examine how firms' systematic risk changes with the advent of artificial intelligence (AI) during the 2010s. Firms that invest more in AI see increases in their systematic risk, measured by equity market beta. A one-standard-deviation increase in firm-level AI investments translates into a 0.05 increase in market beta. This result is unique to AI: robotics, IT, and general R&D investments do not display similar results during the sample period. We show that the increased market beta of AI-investing firms is not explained by leverage, asynchronous trading, increased correlation with the tech sector, within-industry concentration, or correlated investor flows. Instead, our results are consistent with AI investments creating new growth options for firms: AI-investing firms become more growth-firm-like, and the effect on market betas is twice larger on the upside than the downside. Overall, our findings provide direct evidence that firms' investments in new technologies such as AI create growth options and affect the composition of the firms' risk profiles.

Keywords: Artificial intelligence, technology, systematic risk, market beta, asset pricing, growth options, cost of capital

JEL: D22, E22, J23, J24, L11, O33

*The first draft is November 18, 2023. We are grateful to Kent Daniel, Andrea Eisfeldt, Andrei Gonçalves, Leonid Kogan, Serhiy Kozak, Eben Lazarus, Martin Lettau, Semyon Malamud, Tano Santos, Mike Simutin, David Sraer, Paul Tetlock, Laura Veldkamp, Johan Walden, and seminar participants at Arizona State Univeristy, Columbia University's Women Applied Micro Seminar, UC Berkeley, University of Delaware, and University of Toronto for helpful comments. We thank Andrei Gonçalves for sharing his equity duration data. All errors are our own.

Email addresses: tania.babina@gsb.columbia.edu (Tania Babina), fedyk@berkeley.edu (Anastassia Fedyk), axhe@umd.edu (Alex He), hodson@ai4good.org (James Hodson)