

Technology Rivalry and Resilience Under Trade Disruptions: The Case of Semiconductor Foundries*

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October 21, 2024

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Abstract

This paper studies the impact of industrial policies on technology competition and consumer welfare amid rising global trade disruption risks. Distilling key empirical features from novel data on the semiconductor foundry industry, I develop and estimate a dynamic oligopoly model that integrates step-by-step innovation, trade disruption risk, and industrial policies. While distortions from market power and technological externalities justify subsidies, their optimal levels depend on the magnitude of trade disruption risk: when the risk is low, the optimal subsidy rate remains low, as the welfare benefits are distributed globally, but the costs are borne exclusively by the subsidizing government. My quantitative model shows that a 35% trade disruption risk makes the 25% investment subsidy under the US CHIPS Act optimal, resulting in a 6% welfare improvement for the U.S. The paper also analyzes the CHIPS Act's restrictions on investments in rival countries, intended to secure technological leadership against their firms. Its efficacy depends on the strength of technology spillover restrictions and the scale of the rival home market secured for rival firms.

Keywords: Industrial Policy, Technology Competition, Resilience, Trade Disruption

JEL classification: F13, F23, L13, O31, O38

*I am grateful to Laura Castillo-Martinez, Allan Collard-Wexler, Matthias Kehrig, Daniel Yi Xu, and Kei-Mu Yi for their constant guidance and support. I also thank Aaron Chatterji, Pietro Peretto, David Argente, Michael Plante, Dirk Krueger, Karel Mertens, Sewon Hur, Christoph Boehm, Ahmad Lashkaripour and seminar participants at Duke, Federal Reserve Bank of Dallas, and Triangle Micro Conference for helpful discussions. I benefit from conversations with Qiang Miao and Jingyan Zhang for institutional knowledge.

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