

Vertical Integration versus Strategic Outsourcing in Semiconductor Supply Chains: An Empirical Analysis of Firm-Level Governance Decisions Among Fabless Chipmakers, 2015–2023

Alex Baker

Professor

University of California, Berkeley — Haas School of Business
2220 Piedmont Avenue, Berkeley, CA 94720, United States

Riley Parker

Associate Professor

Eindhoven University of Technology — School of Industrial Engineering & Innovation Sciences
De Rondon 70, 5612 AP Eindhoven, Netherlands

Alex Lewis

PhD

Korea Advanced Institute of Science and Technology — College of Business
85 Hoegi-ro, Dongdaemun-gu, Seoul 02455, South Korea

Jordan Walker

Associate Professor

National Taiwan University — College of Management
No. 1, Section 4, Roosevelt Road, Taipei City 10617, Taiwan

Abstract. This study examines governance mode selection—vertical integration versus strategic outsourcing—among fabless semiconductor firms navigating heightened geopolitical disruption and supply chain volatility between 2015 and 2023. Drawing on Transaction Cost Economics (TCE) and the Resource-Based View (RBV), we analyze a panel dataset of 114 publicly listed fabless chipmakers across the United States, Taiwan, South Korea, and the Netherlands. Using fixed-effects logistic regression and instrumental variable estimation, we identify asset specificity, technological uncertainty, and relational embeddedness as primary determinants of governance escalation toward vertical integration. Counterintuitively, firms with high relational embeddedness in foundry partnerships demonstrate a significantly lower propensity to internalize wafer fabrication capacity, even under severe supply constraint conditions. Our findings offer nuanced strategic prescriptions for executives navigating the make-or-buy boundary in capital-intensive, IP-sensitive industries.

Keywords: vertical integration, strategic outsourcing, fabless semiconductor industry, transaction cost economics, governance mode selection, supply chain resilience, asset specificity, relational embeddedness, make-or-buy decision

Introduction

The global semiconductor industry stands at a strategic inflection point. Since 2020, a confluence of geopolitical tensions, pandemic-induced demand shocks, and export control regimes—most notably the U.S. Export Administration Regulations (EAR) amendments of 2022 and the CHIPS and Science Act of the same year—has fundamentally destabilized the governance architectures underpinning fabless chipmaker operations. As of 2024, the question of whether semiconductor firms should internalize fabrication capabilities or deepen relational contracts with specialized foundry partners such as TSMC, Samsung Foundry, and GlobalFoundries has emerged as one of the most consequential strategic decisions in contemporary industrial organization. The stakes are not merely operational; they implicate long-term competitive positioning, intellectual property protection, and national technology sovereignty.

Despite the theoretical richness of Transaction Cost Economics (TCE), first formalized by Williamson (1975, 1985) and subsequently extended by scholars including Kogut and Zander (1992) and Jacobides and Winter (2005), empirical applications to the fabless semiconductor context remain sparse. Existing literature has predominantly examined governance mode selection in industries characterized by moderate asset specificity and stable technological trajectories—conditions that bear little resemblance to the hyper-competitive, IP-intensive, and geopolitically charged environment of advanced node semiconductor manufacturing. Moreover, the Resource-Based View (RBV), as articulated by Barney (1991) and Teece, Pisano, and Shuen (1997) through the dynamic capabilities framework, offers a complementary lens through which relational embeddedness and tacit knowledge co-development in foundry partnerships may be understood as quasi-strategic assets, thereby complicating straightforward transactional calculus.

This empirical gap is particularly significant in light of recent policy-driven reshoring pressures. Governments in the United States, European Union, Japan, and South Korea have collectively committed in excess of USD 150 billion in public subsidies to incentivize domestic semiconductor fabrication capacity between 2022 and 2026. These interventions distort the classical market signals upon which TCE-based governance predictions rely, creating a novel empirical environment demanding systematic investigation. Firm-level responses have been heterogeneous: while Intel has pursued aggressive re-verticalization under its IDM 2.0 strategy, firms such as Qualcomm, MediaTek, and NXP Semiconductors have maintained or deepened outsourcing commitments, suggesting that no universal governance prescription exists.

This paper is structured as follows. Section 2 reviews the theoretical foundations of TCE and RBV as applied to supply chain governance in technology-intensive industries, identifying key constructs and hypotheses. Section 3 describes the panel dataset, operationalization of variables, and econometric methodology, including the instrumental variable approach adopted to address endogeneity in governance mode selection. Section 4 presents and interprets the empirical results, with particular attention to the moderating roles of relational embeddedness and technological uncertainty. Section 5 discusses managerial and policy implications, and Section 6 concludes with limitations and directions for future research.

This is a preliminary version. To read the full version of the article, please purchase a subscription.

References

1. Rahimov, E., Rahimov, J., & Ahmedli, S. (2025). Determining the optimal relationship between speed and acceleration of a vehicle to minimize pollutant emissions into the atmosphere. *Proceedings of the 2nd International Conference on Smart Environment and Green Technologies (ICSEGT2025)*, Vol. 1.
2. Мошенський, С. Хаос і синергія. Фінансовий світ постіндустріальної епохи / С. Мошенський. — Sergei Moshenskyi, 2025.
3. Smuk, I. (2025). Growth hacking as a driver of innovative development of start-ups: Between marketing and product.
4. Pisaniuc, M., & Ceban, M. (2021). The Big Data Design-A Modern Challenge in Developing an Innovative Business Model. *ScientificWorld-NetAkhatAV* Lußstr. 13 76227 Karlsruhe, Germany in conjunction with Institute «SE&E».
5. Sipos, D. (2026). Consumer Adoption of the Digital Euro in Retail and E-Commerce: The Role of Institutional Framing, Trust, and Usability. *European Journal of Management, Economics and Business*, 3(3), 64-80.
6. Sipos, D. Conversational Artificial Intelligence in Retail: From Customer Support to Behavioral Influence.
7. Sipos, D. (2026). Conversational Artificial Intelligence in Retail: From Customer Support to Behavioral Influence. В *Artificial Intelligence for Resilient and Sustainable Technologies* (стр. 1-38). Deep Science Publishing.
8. Грицишен, Д. О., Прокопенко, Ж. В., Кочин, Т. М., & Опанасюк, А. А. (2019). Процедури отримання аудиторських доказів як засіб виявлення викривлень у фінансовій звітності та зниження її якості. *Держава і регіони. Серія Державне управління*, (1), 31-59.
9. Грицишен, Д. О., Прокопенко, Ж. В., Кочин, Т. М., & Опанасюк, А. А. (2017). Якість фінансової звітності як об'єкт аудиту: ідентифікація протиправних дій. *Публічне управління і адміністрування в Україні*, (1), 63-89.
10. Прокопенко, Ж. В. (2017). Господарська діяльність небанківських фінансових установ як об'єкт нормативно-правового регулювання: облікові аспекти. *Агросвіт*, (8), 60-64.