Essays on Competition Policy: Ownership, Pricing, and Sustainability

A THESIS
SUBMITTED IN THE PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE DOCTORAL PROGRAMME IN MANAGEMENT

INDIAN INSTITUTE OF MANAGEMENT INDORE

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December, 2025

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Abstract

This thesis comprises three self-contained essays that examine recent policy debates in the field of competition policy.

In the first essay (Chapter 2), we examine the competitive effects of vertical ownership overlap between a monopolist supplier and a buyer in a supply chain. For this purpose, we identify the variation in the equilibrium outcome as the combined result of *downstream competition effect* and *supply chain coordination effect*. The supplier's strategy choices aim to improve supply chain coordination, which depends on the pass-through rates (and hence, demand curvature), whereas the downstream output and competition depend on the downstream elasticity. We show that a foreclosure equilibrium (in which the buyer who is not part of the ownership overlap ceases to operate in the market) is possible for demand with high concavity and high elasticity. Further, for a non-foreclosure equilibrium, an increase in vertical ownership overlap is welfare-enhancing only for a demand with high convexity and high elasticity; otherwise, it is welfare-reducing. These results are robust even in the presence of network externality. However, the introduction or an increase in network externality may change the type of equilibrium. Moreover, for a large set of demand curvature, as consumer awareness in the network market increases with the evolution of the product life cycle, welfare first improves, then worsens.

In the second essay (Chapter 3), we examine the equilibrium pricing strategies and welfare effects when firms can employ personalized pricing (first-degree price discrimination) in the presence of overlapping ownership. We find that at equilibrium, firms choose asymmetric pricing strategies and multiple equilibria exist, such that the firm choosing

personalized pricing becomes the dominant firm. In contrast, the firm that opts for uniform pricing becomes the fringe firm with consolatory market share and may even cease to operate at a higher level of overlapping ownership. Thus, overlapping ownership and personalized pricing can be used together to establish market dominance, which is detrimental to welfare. Our findings are robust to a stricter privacy regime or costly price personalization.

Welfare effects of *sustainability agreements* among competitors are widely debated. Recent literature has shown that when consumers value sustainability, *sustainability agreements* have an adverse effect on investment in sustainability and consumer welfare compared to the *competitive benchmark*. On the contrary, in the third essay (Chapter 4), we demonstrate that investors incentivize managers to be more aggressive in the presence of *sustainability agreements*, which may lead to increased investment in sustainability. Further, in the presence of such delegation, *sustainability agreements* are always beneficial for consumers as compared to the *competitive benchmark*. We use two types of managerial incentive structure, sales delegation and sustainability delegation. We also demonstrate that delegation enhances both sustainable investment and consumer welfare, and is the dominant strategy for firms. Thus, this study indicates that a more accommodating outlook towards *sustainability agreements* among competitors may be required.

Acknowledgements

It still feels slightly unreal to be writing this section. The journey has been long, demanding, and mostly powered by caffeine, stubbornness, and questionable life choices. Yet here I am, grateful, humbled, and surprisingly intact.

First, I would like to extend my heartfelt appreciation to my institute, including the DPM office. Being part of this academic community has been a privilege. The environment, resources, and fellow colleagues have shaped me as a researcher.

I owe special thanks to my supervisor, Prof. Ajay Sharma, whose guidance, patience, and invaluable freedom to pursue my own research curiosities made this thesis possible. Your trust allowed me to fail, learn, and ultimately grow with your support. Thank you for introducing me to intellectually stimulating research topics and guiding my academic journey with your insights and advice. To the other members of my committee, Prof. Karthikeya Naraparaju and Prof. Sutirtha Bandyopadhyay, thank you for your teachings, feedback, encouragement, and for challenging me in the best possible ways. I am also grateful to other professors in my department for engaging and insightful classes.

To my friend Priti, thank you for the conversations, collaborations, timely distractions, moral support, and for pretending to understand my research even when it seemed mind-numbingly boring. You made the journey lighter and infinitely more memorable. I hope the numerous research ideas we discussed along the way eventually find their well-deserved fruition.

To my family, especially my parents—you are the reason behind every ambition I chase. Your unconditional love, sacrifices, and belief in me have been my foundation.

Everything I achieve—now and in the future—will always be dedicated to you.

To my wife, Aarya— thank you for being the calm in every storm, the voice of reason when motivation wavered, and the unwavering support behind every chapter of this thesis. Your patience, love, and sacrifices carried me through the hardest moments of this journey. This milestone belongs to you as much as it does to me. Finally, to my son, Ivaan — you are the chapter I never expected but now treasure more than any I have written. May this work stand as a reminder to you that dreams take time, effort, and resilience, but they're always worth pursuing.

To all of you—thank you.

Table of Contents

*

List of Tables

*

List of Figures

Bibliography

Aguirre, I., Cowan, S., and Vickers, J. (2010). Monopoly price discrimination and demand curvature. *American Economic Review*, 100:1601–15. https://DOI:10.1257/aer.100.4.1601.

Azar, J., Raina, S., and Schmalz, M. (2022). Ultimate ownership and bank competition. *Financial Management*, 51:227–269. https://doi.org/10.1111/fima.12368.

Azar, J., Schmalz, M., and Tecu, I. (2018). Anti-competitive effects of common ownership. *The Journal of Finance*, 73:1513–1565. https://doi.org/10.1111/jofi.12698.

Baumol, W. and Ordover, J. A. (1994). On the perils of vertical control by a partial owner of a downstream enterprise. *Revue d'économie Industrielle*, 69:7–20. https://doi.org/10.3406/rei.1994.1534.

Bresnahan, T. and Salop, S. (1986). Quantifying the competitive effects of production joint ventures. *International Journal of Industrial Organization*, 4:155–175. https://doi.org/10.1016/0167-7187(86)90028-7.

Chen, L., Matsumura, T., and Zeng, C. (2024). Welfare consequence of common ownership in a vertically related market. *Journal of Industrial Economics*, 72:996–1004. https://doi.org/10.1111/joie.12380.

Choudhary, V., Ghose, A., Mukhopadhyay, T., and Rajan, U. (2005). Personalized pricing and quality differentiation. *Management Science*, 51:1120–1130. https://doi.org/10.1287/mnsc.1050.0383.

Cuñat, V. and Guadalupe, M. (2005). How does product market competition shape incentive contracts? *Journal of the European Economic Association*, 3:1058–1082. https://doi.org/10.1162/1542476054729437.

Cuñat, V. and Guadalupe, M. (2009). Globalization and the provision of incentives inside the firm: The effect of foreign competition. *Journal of Labor Economics*, 27:179–212. https://doi.org/10.1086/599817.

Economist, T. (2021). An eco-wakening: Measuring global awareness, engagement and action for nature. Technical report, The Economist. https://impact.economist.com/sustainability/ecosystems-resources/an-eco-wakening-measuring-global-awareness-engagement-and-action-for-nature.

Ederer, F. and Pellegrino, B. (2021). A tale of two networks: Common ownership and product market rivalry. *SSRN Electronic Journal*.

Elmachtoub, A., Gupta, V., and Hamilton, M. (2021). The value og personalized pricing. *Management Science*, 67:6055–6070. https://doi.org/10.1287/mnsc.2020.3821.

Fershtman, C. (1985). Managerial incentives as a strategic variable in duopolistic environment. *International Journal of Industrial Organization*, 3:245–253. https://doi.org/10.1016/0167-7187(85)90007-4.

Fershtman, C. and Judd, K. (1987). Equilibrium incentives in oligopoly. *American Economic Review*, 77:927–940. https://www.jstor.org/stable/1810218.

Flath, D. (1989). Vertical integration by means of shareholding interlocks. *International Journal of Industrial Organization*, 7. https://doi.org/10.1016/0167-7187(89)90004-0.

Freeman, K. (2025). Overlapping ownership along the supply chain. *Journal of Financial and Quantitative Analysis*, 60:105–134. https://DOI:10.1017/S0022109023001266.

Ghose, A. and Huang, K. (2009). Personalized pricing and quality customization. *Journal of Economics and Management Strategy*, 18:1095–1135. https://doi.org/10.1111/j.1530-9134.2009.00239.x.

Ghosh, A. and Morita, H. (2017). Knowledge transfer and partial equity ownership. *The Rand Journal of Economics*, 48:1044–1067. https://doi.org/10.1111/1756-2171.12213.

Gilo, D. (2006). Partial cross ownership and tacit collusion. *The RAND Journal of Economics*, 37:81–99.

Hart, O., Tirole, J., Carton, D., and Williamson, O. (1990). Vertical integration and market foreclosure. *Brookings Papers on Economic Activity. Microeconomics*, pages 205–286. https://doi.org/10.2307/2534783.

Hunold, M. and Stahl, K. (2016). Passive vertical integration and strategic delegation. *The RAND Journal of Economics*, 47:891–913. https://doi.org/10.1111/1756-2171.121582000.

IBM (2023). Ceo decision-making in the age of ai. Technical report, IBM. https://www.ibm.com/thought-leadership/institute-business-value/en-us/report/2023-ceo.

Katz, M. L. and Shapiro, C. (1985). Network externalities, competition, and compatibility. *American Economic Review*, 75:424–440. http://www.jstor.org/stable/1814809.

KPMG (2025). Incentivizing long-term value creation: Linking sustainability metrics to board members' pay. Technical report, KPMG. https://assets.kpmg.com/content/dam/kpmgsites/xx/pdf/2025/03/incentivizing-long-term-value-creation.pdf.coredownload.inline.pdf.

Lestage, R. (2021). Input price discrimination and non-controlling vertical shareholding. *Journal of Regulatory Economics*, 59:226–250. https://doi.org/10.1007/s11149-021-09431-6.

Levy, N., Spiegel, Y., and Gilo, D. (2018). Partial vertical integration, ownership structure, and foreclosure. *American Economic Journal: Microeconomics*, 10:132–80. https://DOI:10.1257/mic.20160058.

Li, X., Wang, X., and Nault, B. (2023). Is personalized pricing profitable when firms can differentiate? *Management Science*, 70. https://doi.org/10.1287/mnsc.2021.02740.

Lim, W., Mak, V., Tang, C., and Raghabendra, K. (2018). Adopting cost transparency as a marketing strategy: Analytical and experimental exploration. *Working Paper*. https://anderson-review.ucla.edu/wp-content/uploads/2021/03/Lim-Mak-Tang-Raghabendra_2018_SSRN-id3252823.pdf.

Lin, C., Lin, P., Song, F., and Li, C. (2011). Managerial incentives, ceo characteristics and corporate innovation in china's private sector. *Journal of Comparative Economics*, 39:176–190. https://doi.org/10.1016/j.jce.2009.12.001.

Liu, Y. and Zhang, Z. (2006). The benefits of personalized pricing in a channel. *Marketing Science*, 25:97–105. https://doi.org/10.1287/mksc.1050.0120.

Loecker, J., Goldberg, P., Khandelwal, A., and Pavcnik, N. (2016). Prices, markups and trade reform. *Econometrica*, 84:445–510. https://doi.org/10.3982/ECTA11042.

López, A. L. and Vives, X. (2019). Overlapping ownership, r&d spillovers, and antitrust policy. *Journal of Political Economy*, 127:2394–2437. https://doi.org/10.1086/701811.

Lømo, T. (2024). Overlapping ownership and input prices. *International Journal of*

Industrial Organization, 94:103067. https://doi.org/10.1016/j.ijindorg.2024.103067.

Malueg, D. (1992). Collusive behavior and partial ownership of rivals. *International Journal of Industrial Organization*, 10:27–34. https://doi.org/10.1016/0167-7187(92)90045-Z.

Matsumura, T. and Matsushima, N. (2015). Should firms employ personalized pricing? *Journal of Economics and Management Strategy*, 24:887–903. https://doi.org/10.1111/jems.12109.

Mohan, B., Buell, R., and John, L. (2020). Lifting the veil: The benefits of cost transparency. *Marketing Science*, 39:1105–1121. http://orcid.org/0000-0002-0928-6493.

Mrázová, M. and Neary, J. (2017). Not so demanding: Demand structure and firm behavior. *American Economic Review*, 107:3835–3874. https://doi.org/10.1257/aer.20160175.

Newham, M., Seldeslachts, J., and Banal-Estañol, A. (2018). Common ownership and market entry: Evidence from pharmaceutical industry. http://dx.doi.org/10.2139/ssrn.3194394.

NielsenIQ (2022). Sustainability: the new consumer spending outlook. Technical report, NielsenIQ. https://nielseniq.com/wp-content/uploads/sites/4/2022/10/2022-10_ESG_eBook_NIQ_FNL.pdf.

Ordover, J., Saloner, G., and Salop, S. (1990). Equilibrium vertical foreclosure. *The American Economic Review*, pages 127–142. https://www.jstor.org/stable/2006738.

Papadopoulos, K., Petrakis, E., and Skartados, P. (2022). The ambiguous competitive effects of passive partial forward ownership. *Southern Economic Journal*, 89:540–568. https://doi.org/10.1002/soej.12599.

Park, C. and Lee, S. (2023). Emission taxation, green r&d, and managerial delegation contracts with environmental and sales incentives. *Managerial Decision Economics*, 44:1821–2515. https://doi.org/10.1002/mde.3822.

Poyago-Theotoky, J. and Yong, S. K. (2018). Managerial delegation contracts, "green" r&d and emissions taxation. *The B.E. Journal of Theoretical Economics*, 19:20170128. https://doi.org/10.1515/bejte-2017-0128.

Reynolds, R. and Snapp, B. (1986). The competitive effects of partial equity interests and joint ventures. *International Journal of Industrial Organization*, 4:141–153. https://doi.org/10.1016/0167-7187(86)90027-5.

Salinger, M. (1988). Vertical mergers and market foreclosure. *The Quarterly Journal of Economics*, 103. https://www.jstor.org/stable/1885117.

Schinkel, M. P. and Spiegel, Y. (2017). Can collusion promote sustainable consumption and production? *International Journal of Industrial Organization*, 53:371–398. https://doi.org/10.1016/j.ijindorg.2016.04.012.

Schinkel, M. P., Spiegel, Y., and Treuren, L. (2022). Production agreements, sustainability investments and consumer welfare. *Economics Letters*, 216:110564. https://doi.org/10.1016/j.econlet.2022.110564.

Schinkel, M. P. and Treuren, L. (2024). Corporate social responsibility by joint agreement. *Journal of Environmental Economics and Management*, 123:102897. https://doi.org/10.1016/j.jeem.2023.102897.

Seeley, E. and Kesselheim, A. (2017). Outcomes-based pharmaceutical contracts: An answer to high u.s. drug spending? Technical report, The Commonwealth

Fund. https://www.commonwealthfund.org/publications/issue-briefs/2017/sep/outcomes-based-pharmaceutical-contracts-answer-high-us-drug.

Shaffer, G. and Zhang, J. (2002). Competitive one-to-one promotions. *Management Science*, 48:1143–1160. https://www.jstor.org/stable/822606.

Spiegel, Y., Hunold, M., Jullien, B., Peitz, M., Rey, P., Roger-Son, B., Shapiro, J., Stahl, K., Vettas, N., and Whinston, M. (2013). Backward integration, forward integration, and vertical foreclosure. http://www.tau.ac.il/~spiegel.

Thisse, J. F. and Vives, X. (1988). On the strategic choice of spatial price policy. *American Economic Review*, 78:122–137. https://www.jstor.org/stable/1814702.

Tian, H., Wang, J., and Wu, S. (2024). Supply chain vertical common ownership and cost of loans. *Journal of Corporate Finance*, 89:102677. https://doi.org/10.1016/j.jcorpfin.2024.102677.

Vickers, J. (1985). Delegation and the theory of the firm. *The Economic Journal*, 95:138–147. https://doi.org/10.2307/2232877.

Vives, X. (2001). *Oligopoly Pricing: Old Ideas and New Tools*. MIT Press, Cambridge, MA.

Weyl, E. and Fabinger, M. (2013). Pass-through as an economic tool: Principles of incidence under imperfect competition. *Journal of Political Economy*, 121:528–83. https://DOI:10.1257/aer.100.4.1601.

Xing, M. and Lee, S. (2024). Cross-ownership and green managerial delegation contracts in a mixed oligopoly. *Journal of Environmental Economics and Management*, 126:102993. https://doi.org/10.1016/j.jeem.2024.102993.

Xu, L. and Lee, S. (2023). Cournot–bertrand comparisons under double managerial delegation contracts with sales and environmental incentives. *Managerial Decision Economics*, 44:3409–3421. https://doi.org/10.1002/mde.3887.