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SIHANG CAI

EDUCATION

Ph.D. Economics, Peking University Guanghua School of Management, 2021-2025 (expected)

M.A. Economics, University of Michigan, 2017-2019

B.A. Applied Mathematics & Economics (High Honors), UC Berkeley, 2011-2015

WORK EXPERIENCE

2019-2021 Policy Researcher, Department of Big Data Development, State Information Center, Beijing, China

2015-2017 Research Assistant to Professor Amy Finkelstein, NBER and J-PAL NA, Cambridge MA, United States

COMPLETED PHD COURSES

Peking University

Advanced Microeconomics, Topics in Advanced Microeconomics, Advanced Macroeconomics, Topics in Advanced Macroeconomics, Advanced Econometrics I, Advanced Econometrics II, Frontiers in Applied Microeconomics, Selected Frontier Topics in Macroeconomics, Optimization in Economics and Finance, Topics in Industrial Economics, Game Theory and Information Economics

University of Michigan

Mathematics for Economists, Microeconomic Theory I, Microeconomic Theory II (Game Theory), Microeconomic Theory III (General Equilibrium Theory), Microeconomic Theory IV (Information Economics and Mechanism Design), Macroeconomic Theory I, Macroeconomic Theory II, Econometric Analysis I, Econometric Analysis II, Government Revenues, Government Expenditures, Game Theory

University of California, Berkeley

Public Economics

FIELDS

Industrial Organization, Information Economics, Digital Economics

RESEARCH INTERESTS

The digital economy encompasses innovative business models centered around four key elements: traffic, data, innovation, and personalization. I develop theoretical models to characterize these elements individually and in their interaction to examine the implications for market outcomes and welfare. In the early stages of the digital economy, firms make decisions amidst a complex mixture of barriers and incentives that shape the industry landscape, which greatly motivates my research. I collaborate closely with business practitioners and policymakers to understand the true decision-making process, identify the latest trends, and address the bottlenecks on the ground. My aim is to use theoretical analysis to shed more light on improving market efficiency while continuing to be driven by questions arising from the industry for theory development.

Digitalization

In "Digital Transformation, Data Market, and Growth", I investigate firms' decision on digital transformation when facing the tradeoff between fixed costs and productivity. The analysis suggests that a data market can enhance firms' value through data aggregation, thereby providing greater incentives for them to bear fixed costs for the transformation. Therefore, policymakers should carefully consider the sequence of policies regarding the establishment of a data market and the adoption of digital technology. The existence of an equilibrium without any digital transformation suggests that the government's open data initiative will alleviate coordination failures in the data market. Comparative statics indicate that policies aimed at reducing entry barriers, improving data quality, and supporting R&D of algorithms can effectively complement digital transformation in promoting growth.

Platform Traffic and Data

In my job market paper "The Design of Platform Traffic and Data Services", I investigate the value of platform traffic and data when a platform is capable of providing both services. The model uses mechanism design to depict the interaction between the platform and the seller, both with and without information asymmetry. Results indicate that the value of both services combined exceeds the sum of their individual values, making it optimal to include both on the platform service menu as frequently as possible. Furthermore, providing traffic service alone is inefficient because it is more prone to incentive problems compared to data analytics. Incorporating data analytics can be useful in screening different types of sellers and improve market efficiency. Welfare analysis suggests that policy makers need to balance the distribution of welfare among consumers, sellers, and platforms by regulating the disclosure of seller information depending on the priority at hand.

Elaborating on the results of the aforementioned research, I investigate ways to unlock the potential of platforms in enhancing levels of digitization and data utilization to achieve a greater impact on welfare in general. In an ongoing study named "Digital Transformation and Platform Services", I consider various sequences of the game and examine their consequences. Preliminary results indicate that sellers are more motivated to undergo digital transformation when platforms offer contracts without observing the sellers' decisions; otherwise, a hold-up problem may arise, impeding transformation. The presence of positive information rents could be crucial for sellers' participation in the digital economy and for generating higher values in the long run.

Innovation

In another work in progress titled "Data as Input and its Implications for R&D and Marketing", I construct a model to describe the situation when firms face the decision of using data as an input either in marketing or R&D based on the monopolist competition framework. I am interested in the following questions: Do firms have less incentive to innovate with data when they can easily profit from its use in marketing? If so, would there be gains in welfare if the government imposes policies that direct the use of data from marketing to research? When the sale of data is allowed, can data holding companies make more profits by enabling more companies to thrive? Does data hoarding lead to inefficiency because companies are forgoing long-term profits by clinging onto low-hanging fruits?

Going forward, my plan is to employ industrial organization theory and information economics to investigate major challenges in the digital economy such as indirect and direct sale of data. I aim to maintain collaborations with firms and policymakers while seeking research opportunities for conducting field experiments and structural estimations. I am also open to exploring new research areas and actively seeking coauthors for collaboration.

RESEARCH

The Design of Platform Traffic and Data Services (Job Market Paper)

Digital Transformation, Data Market, and Growth (Working Paper)

Digital Transformation and Platform Services (Work in Progress)

Data as Input and its Implications for R&D and Marketing (Work in Progress)

DISSERTATION TITLE

Essays on Barriers and Incentives in Digital Transformation: A Perspective of Platform-Firm Interaction

Advisor: Xi Weng

COMMITTEE MEMBERS

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POLICY RESEARCH PROJECTS

2022-2024 State Administration for Market Regulation, Department of Internet Transaction Administration

Research on the Business Performance of Large Online Platforms

Research on Platform Traffic and the Development of Small and Micro Enterprises

Drafted "Guidelines for Promoting Platform Traffic to Play an Active Role in Supporting the Development of Small and Micro Enterprises"

Principal Investigator: Xi Weng

2021-2022 China Association for Science and Technology, Service Center for Enterprise Innovation

Research on Stimulating Innovation and Entrepreneurship Vitality through the Establishment of the Data Factor Market

Principal Investigator: Xi Weng

2019-2021 The National Development and Reform Commission, Department of Innovation and High-Tech Development

Research on the Fundamental Theory and Institution System for Establishing the Data Factor Market

Co-drafted "20 Measures to Build Basic Systems for Data"

Principal Investigator: Shiyang Yu

CONFERENCE PRESENTATIONS

2024 China Information Economics Society Annual Meeting (Central University of Finance and Economics), National Academic Conference on Digital Economics (Nanjing University), Digital Economy Symposium (Tsinghua University), Theoretical Foundation of Digital Economics Forum (Renmin University)