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研究代表者

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研究成果の概要(和文)：This project provides an analytical framework to understand how the information access brought by the internet influences consumers' behavior, sellers' business strategy, and the speed of truth discovery, and further sheds light on how platforms design their review systems to improve efficiency.

研究成果の学術的意義や社会的意義

Papers studying social learning with online reviews indicate that online reviews help improve efficiency in social learning. However, the ease of information access also creates manipulations and generate additional costs. This project fills this gap between the existing literature and the reality.

研究成果の概要(英文)：Despite widespread use in online transactions, rating systems only provide summary statistics of buyers' diverse opinions at best. To investigate the consequences of this coarse form of information aggregation, we consider a dynamic lemons market in which buyers share their evaluations anonymously through a rating system. When the buyers have diverse preferences, the value of a good rating depends endogenously on the seller's pricing strategy, which in turn creates complicated dynamic interactions and results in stochastic price fluctuations. Occasional flash sales induced by the rating system yield a non-trivial welfare effect that stands in sharp contrast to standard adverse selection models: all buyers are weakly better off with information asymmetry than without. Incentivizing buyers to leave ratings may backfire by exacerbating the seller's strategic pricing incentives.

研究分野：Microeconomics

キーワード：rating system online platform adverse selection dynamic game

1. 研究開始当初の背景

The literature social learning, pioneered by Bikhchandani, Hirshleifer, and Welch (1992), Welch (1992), and Banerjee (1992), explores how agents acquire knowledge about the underlying state by observing the actions of other agents. Most studies on social learning examine scenarios in which agents possess private signals regarding the quality of a product. In addition to relying on their own signals, agents can also learn from other agents' signals by observing their past purchasing decisions. However, the learning process is often incomplete due to a phenomenon known as "herding," where agents disregard their own signals and make decisions solely based on the solidified public belief derived from a history of purchase decisions.

The aforementioned scenario reflects an environment in which agents visit physical stores and learn from the purchasing decisions of other customers. Nowadays, agents also engage in online purchases. Instead of observing other buyers' actions in person, agents learn from online reviews. A few studies have recognized this shift and investigated Bayesian social learning from online reviews. Acemoglu, Makhdoui, Malekian, and Ozdaglar (2019) demonstrate that herding does not occur in this context because reviews provide more accurate information about the product's quality, which remains unaffected by the public belief. The learning process is considered complete, provided that agents are sophisticated enough to account for the "selection effect," which entails considering that those who make purchases are selected based on their own taste parameters. Ifrach, Maglaras, Scarsini, and Zseleva (2019) explore a similar setting but with a focus on the seller's pricing.

2. 研究の目的

Existing literature suggests that online reviews contribute to improving efficiency in social learning. However, there are certain aspects missing from the current understanding. Firstly, users of online platforms may come from different locations and possess diverse traits. Consequently, users may vary to a greater extent compared to buyers in physical stores, potentially leading to misleading reviews. Secondly, it has become easier for sellers to modify product descriptions, prices, and other factors on online platforms, making manipulations more prevalent and capable of influencing reviews. In this project, I incorporate both of these aspects to examine how they impact the learning process.

3. 研究の方法

My coauthors and I develop a dynamic adverse selection model to examine this strategic incentive and its consequences on trading dynamics and welfare. The trading environment we consider consists of a long-lived seller and a sequence of short-lived buyers who arrive randomly over time. The quality of the good supplied by the seller is either high or low and is her private information. A crucial assumption of our analysis is that the buyers are also heterogeneous and have diverse preferences in that they are either price shoppers (who only care about price) or value shoppers (who also appreciate good quality). Upon arrival, a buyer observes the history of ratings left by previous buyers and the current price offer and decides whether to purchase the good given his belief. If he chooses to purchase the good, he learns its quality after consumption and leaves a good rating (with some positive probability) if he is "satisfied."

4. 研究成果

We developed several papers during the project period. The first one is "Social Learning and Strategic Pricing with Rating Systems." This paper is now under submission. Throughout the analysis of this paper, we focus on a natural class of equilibria, called monotone equilibria, and derive properties that hold robustly within this class. This class of equilibria exhibits an intuitive structure where both types of seller charge a higher price to extract surplus when the belief is relatively high, while they hold a flash sale to attract a broader customer base and garner good ratings when it is low. The seller's pricing strategy thus repeatedly and stochastically fluctuates between a high and a low price, giving rise to trading dynamics induced by the rating system. When the seller charges a low price, price shoppers are satisfied and leave good ratings which convey no information about the seller's quality. This strategic pricing introduces noise into the buyers' inference process, consequently slows down social learning, and cause inefficiency.

We examine how the efficiency is affected by changes in some underlying parameters of the model. We find that as the seller becomes less patient, the efficiency of social learning improves. This is because when the seller discounts the future payoffs more heavily, there is less incentive to offer a low price to garner good ratings. This result suggests a counterintuitive possibility that the high-quality seller is often made better off, while the value shoppers are worse off, as the market environment becomes more competitive with higher market exit rates. Also, when satisfied buyers leave ratings at a higher frequency, the seller's strategic incentive might intensify and slow down social learning. so much so that it outweighs the benefit brought by more information revelation. This means that although many platforms adopt various measures to encourage buyers to leave ratings, such an attempt might backfire and actually impede social learning.

In the paper “Reputation Concerns in Risky Experimentation,” we examine the observation that high-ability agents are more likely to achieve early success in risky experimentation, but learn faster that their project is not promising. These counteracting effects give rise to a signaling model with double-crossing property. This property tends to induce homogenization of quitting times between types, which in turn leads to some pooling in equilibrium. Low-ability agents may hold out to continue their project for the prospect of pooling with the high type, despite having a negative instantaneous net payoff. A war-of-attrition mechanism causes low-ability agents to quit only gradually over time, and to stop quitting for a period immediately before all agents exit. This paper was published in *Journal of the European Economic Association* in 2021.

In the paper “Signaling under Double-Crossing Preferences,” we provide a general analysis of signaling under doublecrossing preferences with a continuum of types. There are natural economic environments where the indifference curves of two types cross twice, such that the celebrated single-crossing property fails to hold. Our analysis shows that equilibrium exhibits a threshold type below which types choose actions that are fully revealing and above which they pool in a pairwise fashion, with a gap separating the actions chosen by these two sets of types. The resulting signaling action is quasiconcave in type. We also provide an algorithm to establish equilibrium existence by construction. This paper was published in *Econometrica* in 2022.

In the paper “Pioneer, Early Follower or Late Entrant: Entry Dynamics with Learning and Market Competition,” we provide a dynamic game of market entry to better understand the emergence of a market pioneer and its welfare implications. Timing of market entry is one of the most important strategic decisions a firm must make, but its decision process becomes convoluted with information and payoff externalities. We show that the threat of competition pushes firms to enter earlier to preempt their rivals while the possibility of learning makes them cautiously wait for others to take action. This combination amounts to a new class of timing games where a first-mover advantage first emerges as in preemption games but a second-mover advantage later prevails as in wars of attrition. Our model identifies under what conditions a firm becomes a pioneer, early follower or late entrant and provides efficiency implications by highlighting an elusive link between static market competition and dynamic entry competition. This paper was published in *European Economic Review* in 2023.

5. 主な発表論文等

〔雑誌論文〕 計2件（うち査読付論文 2件 / うち国際共著 0件 / うちオープンアクセス 0件）

1. 著者名 Chia-Hui Chen and Junichiro Ishida	4. 巻 69
2. 論文標題 A War of Attrition with Experimenting Players	5. 発行年 2021年
3. 雑誌名 Journal of Industrial Economics	6. 最初と最後の頁 239-269
掲載論文のDOI（デジタルオブジェクト識別子） なし	査読の有無 有
オープンアクセス オープンアクセスではない、又はオープンアクセスが困難	国際共著 -

1. 著者名 Chia-Hui Chen, Junichiro Ishida, and Wing Suen	4. 巻 19
2. 論文標題 Reputation Concerns in Risky Experimentation	5. 発行年 2021年
3. 雑誌名 Journal of the European Economic Association	6. 最初と最後の頁 1981-2021
掲載論文のDOI（デジタルオブジェクト識別子） なし	査読の有無 有
オープンアクセス オープンアクセスではない、又はオープンアクセスが困難	国際共著 -

〔学会発表〕 計7件（うち招待講演 7件 / うち国際学会 0件）

1. 発表者名 Chia-Hui Chen
2. 発表標題 Signaling under Double-Crossing Preferences
3. 学会等名 Concordia University（招待講演）
4. 発表年 2021年

1. 発表者名 Chia-Hui Chen
2. 発表標題 Social Learning and Strategic Pricing on Online Platforms
3. 学会等名 University of Tokyo（招待講演）
4. 発表年 2021年

1. 発表者名 Chia-Hui Chen
2. 発表標題 Social Learning and Strategic Pricing on Online Platforms
3. 学会等名 Research Center for Humanities and Social Sciences, Academia Sinica (招待講演)
4. 発表年 2022年

1. 発表者名 Chia-Hui Chen
2. 発表標題 Social Learning and Strategic Pricing on Online Platforms
3. 学会等名 Institute of Economics, Academia Sinica (招待講演)
4. 発表年 2022年

1. 発表者名 Chia-Hui Chen
2. 発表標題 Social Learning and Strategic Pricing on Online Platforms
3. 学会等名 National Normal University (招待講演)
4. 発表年 2022年

1. 発表者名 Chia-Hui Chen
2. 発表標題 Signaling under Double-Crossing Preferences: the continuous-type case and the discrete-type case
3. 学会等名 Waseda University (招待講演)
4. 発表年 2023年

1. 発表者名 Chia-Hui Chen
2. 発表標題 Signaling under Double-Crossing Preferences: the continuous-type case and the discrete-type case
3. 学会等名 Yang Ming Chiao Tung University (招待講演)
4. 発表年 2023年

〔図書〕 計0件

〔産業財産権〕

〔その他〕

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6. 研究組織

氏名 (ローマ字氏名) (研究者番号)	所属研究機関・部局・職 (機関番号)	備考
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7. 科研費を使用して開催した国際研究集会

〔国際研究集会〕 計0件

8. 本研究に関連して実施した国際共同研究の実施状況

共同研究相手国	相手方研究機関
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