

Essays on Two-sided Market, Product Quality and Welfare

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Two-sided platforms have become a centre point of discussion for its rapidly growing industry and huge contribution on retail growth. Many factors such as lower transaction costs, easy connectivity between members sitting on different continents, introduction of internet, have contributed to offer platform industry a prime place among all the market structures. The presence of two distinct sides leading to indirect network effects has instituted two-sided platform economics to a separate branch from array of markets. Many significant issues concerning platforms recently emerged that have motivated us to present in-depth analysis of different facets of platform markets. The present dissertation deals with three important issues that either have not been evaluated in existing literature or have been investigated only in a limited extent. These issues have been exhaustively discussed in the thesis in the following chapters.

The first chapter of the thesis provides a concise discussion on the emergence of two-sided platforms and builds a fundamental premise for the present study. It outlines the recent global trend of online platforms with carefully explaining the motivation of the present thesis. The second chapter presents a detailed review of existing studies concerning discounting strategy of platforms, taxation on platform ecosystem and channel coordination decisions relating to platforms members. These are the three significant issues relating to two-sided platforms which the thesis wishes to present in the three ensuing chapters. Based on the detailed review of existing literature, research gaps have been identified which embark the foundation of each of our research questions. In the following three chapters, three theoretic models have been advocated to examine the different strategies of two-sided platforms and analyze key findings. The last chapter summarizes the crucial findings and sets off the avenues for future research endeavours.

The third chapter models the optimal business strategies of a two-sided monopoly platform where the monopoly platform provides product discount to buyers by analyzing a similar framework adapted following Rochet and Tirole (2003). In this model, advertising tool plays a pivotal role in channeling information about discount to consumers. Platform provides different day-to-day services to buyers such as return and replacement services, exchange services, delivery services. The potential utility from transaction is attained through the successful interaction between two sides, buyers and sellers. The chapter considers the effects of indirect network externality originating through the participation of opposite group members. One of the identifying features of this chapter is that discount provides utility to buyers in two forms--monetary gain from paying less for purchasing a product and psychological benefit for obtaining the product at a reduced price. We derive the optimal value of service quality and advertisement under monopoly platform equilibrium and then obtain the effect of discount variation on model variables through comparative static exercise. We observe that price paid by sellers to platform is affected by discount because of the presence of cross-group network externality. This chapter makes significant contributions to the existing literature. The one of the important innovations in result suggests that service quality strongly falls with increase in discount, a finding that is particularly pertinent in reality. Many consumers complains about the degraded services of platforms in period of discounts. The intuition derived from the previous result proposes that quality-conscious buyers may devalue platform's quality in the period of high discounts and as a result, platform may lose buyer base significantly. Platform needs to be careful enough before devising such business strategy as the long term effect can be detrimental. Analytical finding observes that rise in the level of discount reduces the level of advertising at equilibrium. Welfare analysis has been conducted to compare the market equilibrium with the social optimum case.

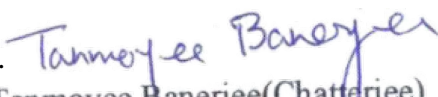
The fourth chapter devises the role of imposition of two forms of taxes--- a tax levied on platforms' revenues and an ad valorem tax on consumers' access fees, on platforms' businesses characterized with cross-side effects. Differing from the third chapter, here the competition between duopoly platforms has been analyzed. We develop and incorporate an element, informative advertising in our two-sided duopoly platforms model which aims to increase the probability of matching between the registered economic agents of two distinct sides on each platform. To reflect reality, we here assume multi-homing by sellers whereas buyers participate and purchase products only from one platform. Platforms charge fixed membership or participation fees to its buyers and per-transaction fees to sellers. The stage game is answered using the backward induction and the stages of the game are---platforms determine the level of informative advertising simultaneously in the first stage; each platform simultaneously chooses the fees to be imposed on consumers and sellers in the second stage; lastly consumers and sellers form their participation decisions. We derive the optimal values of fees and the level of informative advertising by using a simple theoretical model for both tax regimes. Sensitivity analysis has been conducted for each tax regime. One of the key findings of the chapter indicates that each platform reduces its investment on the informative advertising in response to increase in tax rate. Tax levied on consumers is partially shifted to opposite side, sellers. Both kinds of taxes generate adverse impacts on profits of platforms and consumers surpluses for both platforms. Both taxes impact negatively the welfare of the society as well. A numerical comparison between two tax regimes based on certain parameter values indicates that tax on platforms should always be preferred compared to the tax on consumers as a tax on platforms produces less welfare loss than the tax on consumers. The effect of strength of the cross-group externality has been derived on model variables and it shows that both platforms increase the level of informative advertising in response to increase in the degree of cross-side effects.

After bringing forth some of the relevant issues revolving around the digital economics in the last two chapters, the fifth chapter of the dissertation spells out the channel coordination problem that has been solved with the help of contract theory. Unlike the plethora of articles focusing on coordination problem in supply chain economics, this chapter elaborates and analyses the situation of two-sided platform when it suffers from the hidden information about the quality cost incurred by the seller. To ensure that the seller truthfully disclose his/her nature of quality cost, the platform enters into a contract with seller. We assume per unit price charged is influenced by the seller's product quality and platform's service quality. The contracts we consider in our model are---revenue-sharing and cost-sharing contracts. The chapter observes that platform offers better service quality when it is certain about the type of the seller than the asymmetry information case for both type of contracts. One of the impressive results that set apart our model from the conventional one-sided market is that with endogenously determined service quality, optimal product quality for high type seller is significantly lower in presence of asymmetric information than the first-best product quality. Moreover, second-best profit is lower for platform than the first best level to extract the hidden information about the type of seller. Comparison between two forms of contract reveals that cost-sharing contract is preferable as it motivates the each agent of online platform to exert better quality performance. Then the model has been extended to take into account the possibility of advertising and it finds that the platform sends higher level of advertising when it is certain about the seller' type than when it is not sure about the true nature of seller.

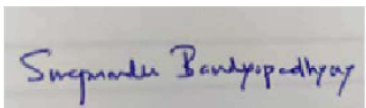
The sixth chapter of dissertation offers a brief and succinct summary of model findings on two sided markets based on some emerging and exceptional issues that either went completely unnoticed in the existing literature or gained minimum focus. The present dissertation studies in-depth analysis of business strategies concerning the agents of two-sided platform ecosystem. The innovative results on each chapter will make significant contributions in the

existing literature. The study can be further extended by considering the preferential treatment exercised by platforms towards its sellers through the preferential-listing of platforms' own brands. Also, the competition between platforms can be a potential extension for better understanding of channel coordination problem. Therefore, our study formulate the technical foundation of two-sided online platform for executing new facets for future research.

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