Vertical Integration and Entry in Two-Sided Markets

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Abstract

The paper evaluates vertical integration in two-sided markets. Vertical integration can have anti-competitive effects driven by foreclosure and can have pro-competitive effects by eliminating double marginalization. In the two-sided market, vertical integration facilitates the expansion of product variety and the growth of the consumer base through indirect network effects. I develop a model of platform’s optimal pricing, third-party firms’ entry and pricing, consumer adoption and purchasing, and estimate using data on the single-served coffee industry. Counterfactual simulations show that, in the absence of indirect network effects, the platform’s optimal decision would be setting a ten times higher licensing fee where foreclosure effects dominate. Accounting for the indirect network effect and firms’ entry, vertical integration increases consumer welfare by 0.14% due to increased product variety.

Introduction

Economics theory suggests that vertical integration can result in anti-competitive consequences since the platform may foreclose rivals (Mathewson and Winter, 1987; Hart and Tirole; 1990; Rey and Tirole, 2007; Brennanhan and Levin, 2013). On the other hand, vertical integration has pro-competitive benefits which eliminates double marginalization (Spengler, 1950) and encourages investment (Marvel, 1982). Often the platform provides its own branded products to expand consumers’ choices and boost consumer participation (Cailaud and Jullien, 2003; Hagiu and Spulber, 2013). This paper focuses on the unique relationship between Keurig’s K-Cup system and partner coffee brands in the single-served coffee industry when Keurig gradually formed partnerships with over thirty brands and exploits the variation due to patent expiration on Sep. 2012. The market was barely growing in the United States until 2006 when several mergers and acquisition happened. Since then, single-served coffee pods have grown into a $5.7 billion industry in 2016. This paper aims to address the following questions: How does vertical integration affect consumer welfare in two-sided markets?

Methods and Materials

Empirical Model:
Products are grouped into 3 groups: g=1, K-Cup; g=2, Ground/Whole bean coffee; and g=0, No purchase. There are two types of consumers. Consumers who have adopted the Keurig brewer are denoted as K. The product profile for K-type consumers contains K-Cup, Ground coffee, and No purchase. The consumers who haven’t adopted the Keurig brewer are denoted as NK.

Consumer’s indirect utility for the platform (brewer) j:

\[ U_{jk} = \theta_k x_j + \alpha_k \delta_{jk} + \gamma_k \xi_{jk} + \epsilon_{jk} \]

\[ \theta_k = \theta + \theta^0 \] where \( \theta \) measures consumer’s responsiveness to attractiveness of the platform, \( x_j \) is the attractiveness of the consumable goods available in the platform, and \( \delta_{jk} \) are the observed quality valuation. \( \epsilon_{jk} \) represents the unobserved market size drawn.

Attraction of the consumable goods of the platform:

\[ x_j = x + \beta x_j \]

Firm’s entry decision for the consumable goods:

\[ \xi_{jk} = \xi_{jk} \]

Company’s payoff in a market is given by

\[ \Pi_j(x, \theta) = x_j \]

Assumption 1: After having entered, each firms knows the identities, cost of all firms in the market and plays a Bertrand-Nash pricing game.

Assumption 2: When making the entry decision, each seller knows its own type, cost, and other firms’ types, and costs. But the fixed cost draw is private information to the sellers and are independently and identically distributed draws.

Counterfactual Analysis-1

Given demand and supply estimates, I conduct counterfactual simulations to evaluate the effect of vertical integration in the single-served coffee industry. For the welfare analysis, all the numbers shown are the percentage differences relative to the “separated” (7) scenario.

- Column (1) shows that vertical integration increases producer surplus by $8.92K monthly in a city relative to the “separated” baseline and a comparison to (2) shows that price efficiency contributes 27% of the gain.
- A comparison between (1) and (3), or (5) and (7) shows that the indirect network effects help increase consumer welfare and increase third-party firms’ profit but reduce the platform’s profit.
- A comparison between (2) and (6) indicates that foreclosure effects are not the dominant factor. Overall, the gain from the price efficiency and cross-network effects are outweighed by the loss stemming from increased market power. This assessment is based on the evaluation of the outcome given the observed entry.

Counterfactual Analysis-2

The above counterfactual simulation keeps the entry outcome fixed. The table below shows the expected consumer surplus factoring in changes in entry decisions resulting from merger and licensing fees.

- The post-merger licensing fee would be 9.53% higher, reflecting the balance between indirect-network effects and foreclosure effects. And third-party firm’s entry probability increases by 5.28% after the merger because of more concentrated markets and higher profitability.
- The overall consumer welfare experiences an increase of 0.14%, compared to a 2.54% decrease in consumer surplus when entry is not factored in.

Conclusions

This paper evaluates vertical integration in the single-served coffee industry. The primary contribution of the paper is to assess the welfare effects in two-sided markets by incorporating firms’ entry decisions, their responses to the platform’s pricing, and consumers’ responses to product variety. I find that while vertical integration may result in higher licensing fees for third-party coffee makers but the overall harm to consumers is mitigated by increased market entries and a wider range of products provided by the platform in the market. On the one hand, the outcome is driven by the growing importance of indirect network effects as the platform’s profit becomes more reliant on market size. On the other hand, vertical integration solves the “chicken and egg” problems by increasing product variety in the consumable goods market to induce brevier adoption. Without vertical integration, third-party firms face the risk of exiting the markets. Failing to account for the benefits of increased entry and product variety leads to underestimating the benefit of vertical integration.

References


More references are cited in paper at the www.zheyunii.com.