The Impact of Boundedly Rational Consumers on the Strategic Decision of Two Competing Firms

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ABSTRACT

Consider two production competing firms offering vertically differentiated products to strategic consumers who are the boundedly rational consumer surplus maximizers. Distinguishing three settings of production capacity commitment, pricing optimization and dynamic production capacity management, we show how consumer behavior resulting from bounded rationality impact pricing and production capacity decisions of firm. In this study, we follow the $S(1)$ and $S(K)$ model to analyze that consumers strategize over which product to purchase under two scenarios where two firms enter the same market simultaneously or successively. In either model, consumers have to rely on anecdote reasoning or word-of-mouth to infer the product information of both firms. Due to this bounded rationality, firms dynamically adjust their strategic decisions to maximize profits. In this study, we prove that it is not always optimal to the production capacity decisions no matter under one anecdote or multiple anecdotes in either scenario, and the fill rate of regular product increases as the level of product environmental protection increases, then the profit of corresponding firm might increase. We show that the result of production capacity decisions of both firms being not always optimal is robust to the heterogeneous sample size, price optimization and discounted valuation.

KEYWORDS

Anecdote Reasoning, Consumer Bounded Rationality, Production Capacity, Production Competing, Vertical Differentiation

INTRODUCTION

Consumer rationality, consumer social responsibility and dynamic pricing have gained an increasing popularity and have engendered a body of academic research (e.g. Mark & Bettina, 2015; Bitran & Caldentey, 2003). Inter alia, much attention has been concentrated on how consumers make response to the company strategies. Historically, consumers are considered as the entirely rational buyers who can perfectly know the product characteristic and anticipate the company’s strategies. Given the boundedly rational consumers, strategic decisions of companies should be focused on the profit maximization based on the optimal capacity size. Due to the information asymmetry between consumers and firms, consumer cannot obtain complete knowledge about the firm’s product, thus consumer learns about the fill rate of company via anecdotal reasoning (Huang & Liu, 2015). Actually, there exist plenty of homogeneous firms and alternative products in the market, based on this situation, companies face the question about how to price the product and decide fill rate to achieve the goal

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of profit maximization when consumers have boundedly rational expectations. This study scratches
the surface of this question from the specific perspective of consumer bounded rationality resulting
from anecdote reasoning.

Vertical product differentiation leads to different procedure cost for firms and then the competing
firms vary prices in order to manage demand and increase profits. Consumers with high expected
value and environmental consciousness purchase green products at higher prices, low expected
value consumers without environmental protection preference purchase regular products at low
prices. Faced with dynamic pricing and vertical product differentiation, strategic consumers (who
choose the best purchasing time to maximize their utilities when facing the general price reduction)
carefully consider which products to purchase through anecdote reasoning. When making strategic
decision, a firm needs to consider both consumer behavior and competitor’s decision, capturing their
joint effects on competing firms’ production capacity and pricing strategies. This is the focal point
of our study. Particularly, this paper makes an attempt to unravel the impact of consumers bounded
rationality on the production capacity and dynamic pricing of two competing firms offering green and
regular products respectively. Consumers have private and heterogeneous expected value on product
characteristic. Firms determine prices simultaneously or successively in each season to maximize their
respective profits. Consumers have boundedly rational expectation of firms’ product characteristic,
production capacity and prices.

Consumers who act as the user and feedback-rater of the products cannot decide which type of
products provided by different firms they should purchase and don’t know the product characteristic
through repeat purchasing behavior, especially for products with long life cycle, such as purchasing
cars, a focus on the repeat purchasing behavior rooting in long-run learning maybe not always
assured (Camerer & Lowenstein, 2003). While consumers can choose which company they purchase
goods from through the consumer-generated quality information which is transmitted via Internet,
Twitter, word-of-mouth and so on, considering price, the impact of products on environment and
consumer surplus. In this analysis, we show the interplay between the strategic decision of firms and
consumer’s level of bounded rationality, and indicate how the enterprises achieve profit maximization
in the competitive market. In this paper, two key factors that determine the firms’ strategic decisions
are consumer bounded rationality measured by anecdote reasoning and the level of environmental
protection measured by consumer environmental preference.

Recently, the research about strategic consumer behavior is increasing, however, how consumers
form rational expectations remains unclear in the existing literature. Some scholars propose
consumers’ rational expectations can be formed via repeated purchasing behaviors, however, in some
cases, consumers have rare opportunities to obtain the product information (Spiegler, 2006b). Such
information is relevant to the company who learn from consumer experiences and allow company to
price the product and improve its profits (Man Yu et al., 2016). This study discusses the purchasing
decisions made by consumers who are strategic and forward-looking but boundedly rational to the
firms’ strategy. These consumers may free ride on the information about the product characteristic
through other consumers who bought earlier and then make their purchasing decisions. In other
words, consumers will infer from anecdotes reasoning. The previous literature about the interaction
between firms’ strategic decision and consumers’ strategic behavior with respect to consumer’s
bounded rationality has an underlying assumption that the firm is monopolistic, in other words,
there is no research that consumers obtain product information from both other consumers and
competing firms, and firm learns from both consumers and its competitor simultaneously. This study
first proposes when two firms exist in the same market simultaneously, how consumers choose to
purchase products of either firm with respect to their bounded rationality, and how both companies
adjust their pricing strategy dynamically when consumers choose other firm’s product after knowing
the product information via feedback from the previous customers.

In our overall analysis, we solve four questions as follows:
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