Strategic Product Recalls

1. Introduction

With increasing product complexity and more stringent product safety standards, product-harm crises management has become an important part of product quality management. Product recalls are the most commonly used but double-edged tools for managing product-harm crises, as such recalls release bad signals on product quality and result in heterogeneous impacts on market demand for recalls released at different stages of market cycles. Based on a monthly sales dataset of 202 car models in the U.S. automobile market from 2012 to 2015, we find that a large recall (based on its severity) initiated at an early stage of a product market cycle has a significantly negative impact on future product sales, whereas a recall initiated at a later stage has an insignificant negative impact. A series of robustness tests confirm this finding.

Therefore, the timing of a product recall becomes a strategic decision for firms facing product-harm crises and deserves further investigation. Previous research has emphasized the effect of product recalls on firm values (Liu et al. 2017), product price (Hammond, 2013), and marketing effectiveness (van Heerde et al. 2007), but studies on demand consequences and recall timing decisions are still limited due to data availability and the lack of theoretical supports. This paper examines the timing of a recall as a strategic decision by using both the analytical modelling and empirical analysis approaches.

2. Research Methodology and Results

First, we develop a stylized model to depict the market cycle, and link it with the recall decision by incorporating a per-unit recall cost to fix defects and an additional penalty to delay a recall (proportional to the delayed duration). In this model, a monopoly offers a product to risk-neutral
consumers over an infinite (continuous) time horizon. In particular, at each time point, there is a unit mass of new-born consumers, who might purchase (at most) one unit of the product from the monopoly. Next, we assume that a product defect is exogenously identified at a certain time and is only observable to the firm, which then needs to make a decision on when to implement a recall. A recall is publicly announced and generates a disutility for future consumers who consider to purchase this product, thus leading to a sharp decline on the future demand. Therefore, if this firm initiates an instant recall, it will bear the loss of the current and future demand immediately. Whereas if it decides to delay the recall, although it can delay the instant demand loss, at the end, it still needs to bear a higher cost to fix the defects because more units were sold on the market, as well as a higher penalty for delaying the recall. For this profit-maximizing firm, we find that (1) if its product unit margin is sufficiently higher than its unit recall cost, it is always better to postpone the recall; (2) even if the unit recall cost increases, when the delay penalty is sufficiently low, it is still optimal to delay a recall given a defect is discovered at an early stage of the market cycle.

To validate our theoretical insights, we use the same monthly sales dataset of 202 car models from 2012 to 2015 to identify strategic recalls and investigate its effectiveness. We first find the dates of the mode of consumer complaints as the dates that the firm should initiate a recall. Then we compare the timing between this mode date and the actual recall date. If the interval of these two dates are more than 18 months, we define this recall as a strategic recall. (We have conducted various thresholds and results are largely consistent.) The result reveals that non-strategic recalls are associated with a significantly negative impact on future sales if these recalls are initiated at an early stage, whereas strategic recalls do not significantly affect product sales. Also, we find that for a luxury car model (i.e., relatively low unit recall cost to margin), it is more likely to delay a recall, and for a car model with high cumulative sales (i.e., relatively high delay
penalty), it is less likely for the firm to delay a recall, which are both consistent with the theoretical predictions. We further implement robustness tests to confirm the main result as well as to rule out alternative explanations, such as price adjustment and severity of recalls.

3. Summary

Our theoretical and empirical analyses make two contributions to the literature. First, the theoretical model, to our best knowledge, is the first one to depict the product market cycle embodying the occurrence of a product recall. Second, we provide implications for making product recall decisions. Specifically, when a product defect is discovered at an early stage of a market cycle, a firm could strategically delay the recall time to mitigate the negative shock evoked by this recall. This prediction has been confirmed by the data, which validates the effectiveness of a properly delayed recall on firm sales. Our theoretical results also suggest the proper timing to initiate the recall, based on recall-related costs. In sum, our findings provide managerial insights for firms to well manage product recalls so as to maximize their long-term profits over the entire market cycle.

References

