

Pricing and Market Timing Flexibility in Product Launches

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1. Introduction

When launching a new product in the market, firms employ various pricing strategies. Consider, for example, the smartphone market. In 2012 Nokia, which was late to launch new smartphone lineups, set the price of its high-end smartphone lower than competitors. Due to slow sales, the firm further reduced the price in just three months after launching it (Chen 2012a, b). This pricing strategy is in sharp contrast to that of Apple, which consistently offers a new high-end smartphone at the same price, and maintains the price until launching the next generation. Smartphone manufacturers also adopt different strategies for product launch timing decisions. For example, Apple consistently meets a one-year product launch cycle, whereas other manufacturers show inconsistent launch cycles over different generations (Dou 2014). Why do firms employ different pricing and launch timing strategies? Which strategy is better given the characteristics of the new product and consumer market? What are the impacts of pricing flexibility on launch timing decisions? This research addresses these questions.

Although product launch timing and pricing decisions have been the main subject of several studies for the past few decades, these two decisions have been mostly considered in separate contexts and models. Both launch timing and pricing decisions affect the demand for a new product. Hence, the two decisions need to be made in coordination. However, little has been discussed about the interactions between them in the literature. Such knowledge is critical in determining and adopting the right strategy when releasing a new product in the market.

Our research contributes to the literature in three ways. First, we develop a general framework that jointly considers pricing and product launch timing decisions for a new product in a stochastic setting. The framework can describe various pricing and launch timing strategies that firms take in practice. Second, we investigate the interaction between pricing and launch timing decisions. We show how pricing flexibility affects launch timing decisions, and also show how timing flexibility affect pricing decisions. Third, we quantify the values of pricing and timing flexibility under various product and market characteristics. This result provides guidelines on which pricing and launch timing strategy to adopt in practice.

2. Model Description

We consider a firm that is launching a new product in the market. Prior to launching the product, the firm can improve the technology level of the new product by developing and adopting new technologies. The delay in the product launch, however, reduces the size of the potential market of the new product. We refer the stage at which the firm improves the technology level to the *design*

stage. After launching the new product, the firm sells the new product to the potential consumers. We refer this stage to the *sales stage*.

Technology improvements during the design stage involve uncertainties because the outcomes of research and development activities are highly unpredictable. The reduction in the market potential during the design stage also involves uncertainties because the firm is uncertain about when the competitors launch their new products. To capture these uncertainties, we assume that at each period of the design stage the technology level increases by a random amount, and the market potential decreases by a random amount. To ensure the generality of the model and result, we do not make any further assumptions on how the technology level and the market potential evolve over time.

The sales stage consists of two periods, and the firm may set different sales prices for the two periods. At each period of the sales stage, potential consumers arrive and purchase the new product if their valuations for the new product are greater than the sales price. The consumers' valuations for the new product increase as the technology level increases, but the firm is uncertain about the valuations. After observing the demand during the first sales period, the firm can learn these values.

The firm makes decisions on the two sales prices and the product launch timing in the presence of three sources of uncertainties: the uncertainty in technology improvements, the uncertainty in market potential reduction, and the uncertainty in consumers' valuations. Depending on when and how the firm determines the product launch timing with respect to these uncertainties, there are two different launch timing strategies. First, the firm can choose a fixed product launch timing at the beginning of the design stage, and launch the new product at this chosen time regardless of how the technology level and market potential are realized. We call this strategy the *static launch timing strategy*. Second, the firm can dynamically determine the time to launch the new product during the design stage while observing the evolution of the technology level and market potential. We call this strategy the *flexible launch timing strategy*.

Similarly, the firm can take three different pricing strategies, which differ from each other in terms of when the firm determines the two sales prices. First, the firm can determine the prices at the beginning of the design stage, and commit to them regardless of when to launch the new product. We call this pricing strategy the *price commitment strategy*. Second, the firm can determine the prices when launching the product, but do not adjust the second sales price after observing initial demands. We call this strategy the *responsive pricing strategy*. Finally, the firm can determine the first sales price when launching the product, and determine the second sales price after the first sales period. We call the strategy the *responsive & dynamic pricing strategy*.

3. Summary of Key Results

We first show how the flexibility to adjust the sales price after observing initial demands affects the product launch timing. This pricing flexibility enables the firm to correct the price during the sales stage if the consumers value the new product either higher or lower than expected. The benefit of being able to do so is greater when the size of the potential market is larger, i.e., when the firm launches the new product earlier. Hence, the optimal product launch timing under the responsive & dynamic pricing strategy is earlier than that under the responsive pricing strategy. This result holds under both the static and flexible launch timing strategies.

The flexibility to set the sales price when launching the product has different impacts on the product launch timing. We first consider how this pricing flexibility affects the timing decision when the launch timing is also determined flexibly. The consumers do not purchase the new product if its technology level is below the level at which their valuation for the new product is the same as the offered price. Hence, under the price commitment strategy, the firm needs to ensure that the technology level reaches a proper level for the committed price before launching the product regardless of how the market potential evolves over time. In contrast, under responsive pricing strategy the firm can launch the new product at any technology level by setting the price properly if the market potential evolves in a surprising way. Hence, under the responsive pricing strategy, the technology level and launch timing of the new product are more volatile than those under the price commitment strategy. The impact of responsive pricing on the launch timing is ambiguous when the firm employs the static launch timing strategy.

Finally, we quantify the values of pricing and timing flexibility under various conditions, which shows when each pricing and launch timing strategy is the most effective. When the technology improvements and the evolution of market potential are highly uncertain the value of timing flexibility is significant. The timing flexibility enables firms to respond to surprising market entry decisions made by competitors or unexpected results in technology development activities. The value of timing flexibility is, however, limited under the price commitment strategy. If the price is fixed, the firm needs to ensure that the technology level reaches a certain level before launching the product, which substantially deteriorates the timing flexibility. In other words, flexible launch timing and responsive pricing are strategic complements. Finally, the value of dynamic pricing is significant when the firm is highly uncertain about consumers' valuation.

References

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