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New and improved?[☆]



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ABSTRACT

Are new versions of products necessarily better? We analyze product innovation by a firm that engages in research and development designed to improve an existing product, the outcome of which is uncertain. If the firm adopts the innovation its modified product appears to consumers as “new and improved,” but consumers do not immediately know whether or how much the product is better. We find that new products are on average improved and therefore command a pricing premium. This induces some types to exploit the innovation signal by selling new versions that are only trivially different from their older version or that require inefficiently high upgrade costs. Nevertheless, the incentive to “show off” by introducing a new product may improve total welfare by inducing more innovation adoption and thereby mitigating the standard monopoly underinvestment problem. Firms benefit ex-ante from better consumer information about quality or from committing to not exploit their informational advantage.

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1. Introduction

How do consumers update their beliefs about a “new” or “improved” version of a product before purchase? For example, should a student buy the latest edition of a college textbook or get a used copy of an older edition? Would a consumer who is told “roads change by as much as 15% every year” be more likely to purchase a GPS device with an updated map? Or suppose a familiar household cleanser’s packaging states “WOW! Powerful New Formula,” but its price has increased by 10%. Is the touted improvement in performance worth the higher price?

In each of these examples consumers are likely unaware of the exact value offered by the “new” or “improved” version of the product. Facing perhaps thousands of such new products each year, consumers must discern major breakthroughs from the more common incremental improvements before making their purchase decision. For their part, although firms may devote significant resources to research and development the outcome of such efforts is highly volatile and often results in failure (Stevens and Burley, 1997). Firms must decide which research outcomes to implement and which to censor from the market, knowing that some consumers may not be willing or able to become immediately informed of the new product’s value.

This paper uses a signaling model to investigate the incentive of firms to introduce improved products and the welfare consequences of these introductions when consumers are uncertain of the quality of the improvement. Consumers form beliefs about quality knowing the product exceeds the firm’s minimal threshold for new product launch. We find this leads to a “newness premium” resulting from the information conveyed in equilibrium by the very existence of the new product version. This premium in turn incentivizes more upgraded products to be released and so has implications for profits and welfare.¹

We present a model in which a monopolist decides whether to adopt an innovation, the quality of which is the result of a stochastic research and development (R&D) process. The firm knows the true value of the innovation while consumers initially only observe the binary “innovation signal” of whether or not the product has been modified. Consumers form beliefs about product value and buy (or not) accordingly, and then learn from product trial and other sources such as product review websites so that they are more informed in the second period when they repeat their purchase decision. We find that consumers correctly expect the average quality of modified products to be higher, but because of this expectation, firms whose R&D has generated only a trivial improvement or even a harmful “improvement” have an incentive to present the product as new and improved. The result is a partial pooling equilibrium in which consumers are initially unsure whether modified products represent a genuine improvement. In making a trivial

¹ Note this information-based account differs from the marketing literature which has generally explained consumer attraction to new products by a desire for uniqueness, stimulation, or novelty-seeking (Roehrich, 2004; Hirschman, 1980).

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