Letter

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Close But Not Too Close? Optimal Copycat Strategies in the Light of Negative Publicity by the Original Product

Abstract: This paper contributes to the understanding of how brand scandals related to a brand leader's product affect the follower firm's choice between copycatting and independent product development. In a model of vertical product differentiation, we show that it is optimal for the copycatter to follow a 'safe distance' strategy which guarantees a certain degree of protection against the negative spillovers associated with a brand scandal to the leader. Nevertheless, when the follower firm can choose between copycatting and decoupling, it chooses a higher quality for its copycat product because of the lower development costs. The decision for or against copycatting thus depends on a trade-off between development costs and the possibility of negative spillovers. Finally, we show that the threat of a scandal can lead to an additional indirect welfare cost because it diverts the follower's choice away from a welfare-maximizing copycat strategy.

Keywords: vertical product differentiation; copycatting; brand scandals

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1 Introduction

Product imitation or copycatting is a widespread phenomenon that surrounds us in everyday life. It applies to areas as diverse as art, fashion, pharmaceutics, consumer electronics, and the wide range of private-label goods. Shenkar (2010), for instance, estimates that about 80 per cent of all key innovations are imitated.

Unlike exact replicas (counterfeits), whose suppliers usually depend on black markets, look-alike copycat products imitate key features of the original product but differ in minor characteristics and are sold under their own brand names. Hence, their suppliers do not have to fear prosecution because of alleged consumer deception (Van Horen and Pieters 2012). However, they can free-ride (to some extent) on the leader's product development and advertising costs.

In economic terms, the original product and its copycat are vertically differentiated products, so the seminal models by Mussa and Rosen (1978); Gabszewicz and Thisse (1979); Shaked and Sutton (1982) are most appropriate to examine their interaction. The pertinent literature has, however, primarily focused on the brand leader's optimal strategy. Purohit (1994), for example, shows in a formal model that brand leaders have an incentive to increase the quality of their products in the presence of a copycat. Less has been said so far about the optimal strategy of the follower firm, particularly its choice between copycatting and independent product development. Could it be that an as-close-as-you-can-get strategy is not always optimal?

The only study we know with such a focus is Braxton, Muehling, and Joireman (2019). In an online experiment, the authors investigate the scenario where the 'halo' generated by the original product loses shine due to a scandal or a strategic refocus of the brand leader. Their experiment suggests that consumers have a less favourable attitude towards the copycat product ('perverse halo') when they are exposed to negative news about the quality of the original product or its supplier. The spillover disappeared when the same product was presented without explicit reference to the original product. In sum, their findings suggest that a certain distance to the original product may be optimal for a firm that follows a copycat strategy.

In this paper, we examine this question in a formal model. Our focus is on two indirect effects of a potential brand scandal on the follower's strategy: first, the optimal quality distance to the original product in case of a copycat strategy and second, the choice between copycatting and independent development.

2 Model

Consider 'the market' to consist of two firms, S and A, located on a vertical line of length one measuring consumers' willingness to pay for the traded product. Each firm produces one variant of the product at constant marginal costs, which we normalise to zero. Consumers are uniformly distributed along the line. Consumer y has a willingness to pay for quality of $y \in [0, 1]$ and every consumer purchases at most one unit of the product. Brand leader S offers the original high-quality product which may be copycatted by Firm A.

The leader's product generates a gross utility Δy for a consumer of type y where $\Delta \in [0, 1]$ measures the quality of product S. Firm A can decide whether to develop its own product or to follow a copycat strategy. Copycatting product S is free of development costs (think of medical generics and entertainment technologies) but yields a product quality $\psi \Delta$ which is strictly smaller than Δ, that is, $\psi \in [0, 1)$. The closeness parameter ψ can be freely chosen by Firm A. Product development, by contrast, allows Firm A to become the market leader with a product quality of $\Psi \geq 0$. Yet, product development is associated with a cost of $K = k\Psi^2$, with $k \geq \frac{1}{8}$, which ensures that even a monopolistic Firm A prefers an optimal quality of no more than $\Psi = 1$.[1]

The main motivation for developing an independent product is that the leader's product quality, Δ, is subject to public opinion and might be shaken by a scandal. This turns Δ into a random variable, whereby we assume for simplicity that $\Delta = 1$ with probability ϕ and $\Delta = 0$ with probability $1 - \phi$. Firm A anticipates the possibility of a scandal, but the outcome of the random variable is only revealed after the firm has chosen to copycat or not.

The timing of the events is thus as follows: First, Firm A chooses its product strategy (own development vs. copycatting) and its product quality, ψ and Ψ, respectively. Then, the state of the random variable Δ is revealed. Finally, both firms choose the prices for their products.

3 Results

We first characterise the Nash equilibrium prices and the optimal product quality of Firm A when the firm follows a copycat strategy.

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1 A monopolistic Firm A has a profit of $\pi_A(p_A, \Psi) = p_A(1 - p_A/\Psi) - k\Psi^2$ (see Equation (8)). Maximization with respect to p_A and Ψ leads to $\Psi = \frac{1}{8k}$ and $p_A = \frac{1}{16k}$.

3.1 Copycat Strategy

Equilibrium prices. After the outcome of the random variable is revealed, the net utilities of a consumer of type y from buying product A, S, or nothing, respectively, are given by

$$U(y) = \begin{cases} \psi \Delta y - p_A & \text{buy A} \\ \Delta y - p_S & \text{buy S} \\ 0 & \text{don't buy} \end{cases} , \tag{1}$$

where p_A and p_S denote the products' prices.

This means that in case of a brand scandal (i.e. when $\Delta = 0$), any combination of positive prices can be supported in a Nash equilibrium because each firm's profit is zero in any case.

In the absence of a scandal (i.e. when $\Delta = 1$), by contrast, either one firm or both firms may be active in the market depending on the level of p_A, p_S, and ψ. However, throughout the following, we focus on the equilibria in the subgames where both firms are active. The reason is that for any level of $p_S > 0$, there is always a quality ψ high enough and a price p_A low enough such that Firm A can yield a positive market share, and a similar argument holds for Firm S. In particular, given the utilities in (1), the marginal consumer who is indifferent between buying products A and S, and the marginal consumer who is indifferent between product A and no purchase at all can be found at

$$y_{SA} = \frac{p_S - p_A}{1 - \psi} \tag{2a}$$

$$y_{AO} = \frac{p_A}{\psi}. \tag{2b}$$

This means that all consumers between 1 and y_{SA} buy product S, all consumers between y_{SA} and y_{AO} buy A, and the remaining consumers between y_{AO} and 0 do not buy any product.

The profit functions of firms A and S are thus given by

$$\pi_A(p_A, p_S, \Delta = 1) = p_A \left(\frac{p_S - p_A}{1 - \psi} - \frac{p_A}{\psi} \right) \tag{3a}$$

$$\pi_S(p_A, p_S, \Delta = 1) = p_S \left(1 - \frac{p_S - p_A}{1 - \psi} \right). \tag{3b}$$

Straightforward calculations lead to the unique Nash equilibrium prices

$$p_A^c(\Delta = 1) = \frac{\psi(1 - \psi)}{4 - \psi} \tag{4a}$$

$$p_S^c(\Delta = 1) = \frac{2(1 - \psi)}{4 - \psi}. \tag{4b}$$

Moreover, substituting (4a) and (4b) into (3a) gives the following state-dependent profit for Firm A: $\pi_A^c = \psi(1 - \psi)/(4 - \psi)^2$ when $\Delta = 1$ and $\pi_A^c = 0$ when $\Delta = 0$.

Equilibrium quality. Firm A's expected profit as a function of ψ is thus given by

$$\mathbb{E}_\Delta\left[\pi_A^c \mid \psi\right] = \phi \frac{\psi(1 - \psi)}{(4 - \psi)^2}. \tag{5}$$

The expression has an interior maximum because, on the one hand, Firm A has to provide some quality to be better than the outside option and, on the other hand, the firm does not want to offer a quality too close to the one of the brand leader's product because this would trigger a fierce price competition. Specifically, the first-order condition

$$\frac{d\,\mathbb{E}_\Delta\left[\pi_A^c \mid \psi\right]}{d\,\psi} = \phi \frac{4 - 7\psi}{(4 - \psi)^2} = 0 \tag{6}$$

delivers a 'safe distance' strategy of $\psi = 4/7$. The expected profit of Firm A is thus $\mathbb{E}_\Delta[\pi_A] = \phi/48$, which is linearly increasing in the no-scandal probability ϕ.

3.2 Decoupling Strategy

We now turn to the Nash equilibrium prices and the optimal product quality when Firm A develops its product independently.

Equilibrium prices. Similar to before, the net utilities from buying products A, S, or nothing, respectively, are given by

$$U(y) = \begin{cases} \Psi y - p_A & \text{buy A} \\ \Delta y - p_S & \text{buy S} \\ 0 & \text{don't buy} \end{cases}, \tag{7}$$

with the only difference that now the quality of product A is independent of the random variable Δ.

In fact, Firm A can now even become the market leader. This is the case when a brand scandal occurs ($\Delta = 0$), and Firm A thus serves the entire market between one and

$$y_{AO} = \frac{p_A}{\Psi}. \tag{8}$$

Maximization of gross profits before development costs,

$$\pi_A(p_A, \Delta = 0, \Psi) = p_A(1 - p_A/\Psi), \tag{9}$$

then yields a monopoly price of $p_A(\Delta = 0) = \frac{\Psi}{2}$ and a profit of $\pi_A(\Delta = 0, \Psi) = \Psi/4$.

When $\Delta = 1$, by contrast, one or both firms may be active in the market depending on the level of p_A, p_S, and Ψ. For similar reasons as before, we focus on the subgames where both firms are active in the market such that $\Psi < 1$ and the indifferent consumers are located at[2]

$$y_{SA} = \frac{p_S - p_A}{1 - \Psi} \tag{10a}$$

$$y_{AO} = \frac{p_A}{\Psi}. \tag{10b}$$

Hence, we get to the Nash equilibrium prices

$$p_A^d(\Delta = 1) = \frac{\Psi(1 - \Psi)}{4 - \Psi} \tag{11a}$$

$$p_S^d(\Delta = 1) = \frac{2(1 - \Psi)}{4 - \Psi} \tag{11b}$$

and a gross profit of

$$\pi_A^d(\Delta = 1) = \frac{\Psi(1 - \Psi)}{(4 - \Psi)^2}. \tag{12}$$

Equilibrium quality. Firm A′ expected net profit as a function of Ψ is thus

$$\mathbb{E}_\Delta[\pi_A^d \mid \Psi] = \phi\frac{\Psi(1 - \Psi)}{(4 - \Psi)^2} + (1 - \phi)\frac{\Psi}{4} - k\Psi^2, \tag{13}$$

which again has an interior optimum. Specifically, the first-order condition results in the following requirement for an optimal Ψ:

$$\frac{d\,\mathbb{E}_\Delta[\pi_A^d \mid \Psi]}{d\,\Psi} = \phi\frac{4 - 7\Psi}{(4 - \Psi)^2} + \frac{1 - \phi}{4} - 2k\Psi = 0. \tag{14}$$

As the derivative in the middle of the equation is strictly negative at the quality level that is optimal under the copycat strategy (i.e. $\Psi = 4/7$) and since $d^2\,\mathbb{E}_\Delta[\pi_A^d \mid \Psi]/(d\,\Psi)^2 < 0$, it follows that Firm A prefers a quality for its decoupled product that is strictly lower than $4/7$. In other words, Firm A would choose a quality for its copycat product that is closer to the brand leader's product. The reason

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2 The subgame with $\Psi = 1$ can also be ignored because this would yield a standard Bertrand competition with equilibrium prices $p_A = p_S = 0$, so Firm A would never choose $\Psi = 1$.

is the lower development costs. On the contrary, the advantage of the decoupled product is the opportunity of becoming the new brand leader.

Which of the two strategies is preferred by Firm A? Clearly, decoupling is the better option when the leader is shaken by a scandal with certainty ($\phi = 0$), while copycatting is superior when the probability of a scandal is zero ($\phi = 1$). This suggests that there is an interior cutoff $\bar{\phi}$ such that copycatting is preferred whenever ϕ is sufficiently large. Indeed, we have[3]

$$
\frac{d\,\mathbb{E}_\Delta\left[\pi_A^d \mid \Psi(\phi)\right]}{d\phi} = \frac{\Psi(\phi)(1 - \Psi(\phi))}{(4 - \Psi(\phi))^2} - \frac{\Psi(\phi)}{4} < 0
$$

$$
< \frac{\psi(\phi)(1 - \psi(\phi))}{(4 - \psi(\phi))^2} = \frac{d\,\mathbb{E}_\Delta\left[\pi_A^c \mid \psi(\phi)\right]}{d\phi}, \tag{15}
$$

and so we arrive at the following result:

Proposition 1. *There exists an interior cutoff $\bar{\phi} \approx 0.79$ for the 'no-scandal' probability such that decoupling (copycatting) is preferred by Firm A whenever ϕ is below (above) $\bar{\phi}$.*

3.3 Welfare

Figure 1 plots the ex-ante welfare generated by a copycatting and a decoupling strategy as functions of the no-scandal probability, ϕ, and assuming that $k = \frac{1}{8}$. Welfare is thereby calculated as the sum of the expected profits and the consumer surplus, which gives under copycatting
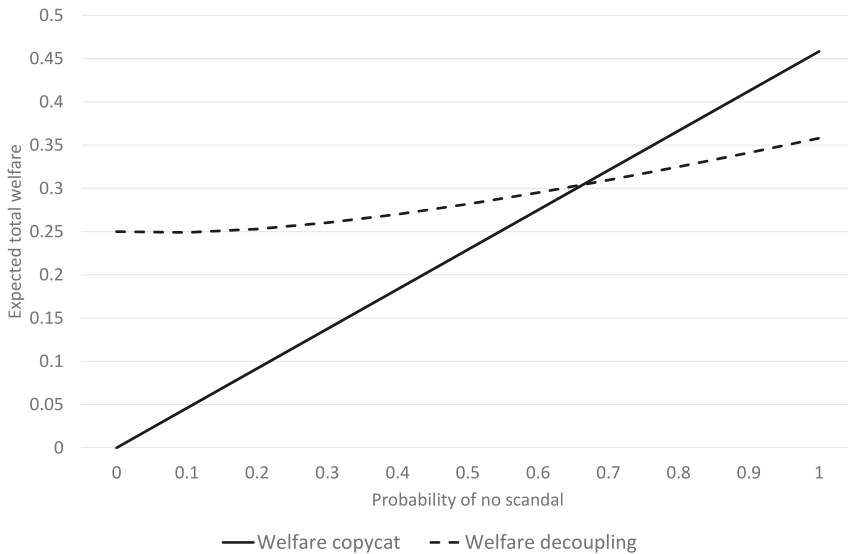
$$
\mathbb{E}_\Delta[W^c \mid \phi] = \phi\left(\int_{y_{SA}(\psi(\phi))}^{1} y\,dy + \psi(\phi) \int_{y_{AO}(\psi(\phi))}^{y_{SA}(\psi(\phi))} y\,dy \right) \tag{16}
$$

and under the decoupling strategy

$$
\mathbb{E}_\Delta[W^d \mid \phi] = \phi\left(\int_{y_{SA}(\Psi(\phi))}^{1} y\,dy + \Psi(\phi) \int_{y_{AO}(\Psi(\phi))}^{y_{SA}(\Psi(\phi))} y\,dy \right)
$$

$$
+ (1 - \phi)\,\Psi(\phi) \int_{y_{AO}(\Psi(\phi))}^{1} y\,dy - k\Psi(\phi)^2. \tag{17}
$$

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3 It follows here from the Envelope theorem that there is no indirect impact of a change in ϕ on Firm A's profit via a change in Ψ or ψ, respectively.

Figure 1: Welfare.

Figure 1 shows that welfare is higher under the decoupling strategy when ϕ is small because Firm A remains in the market even when a scandal shakes Firm S. On the contrary, welfare is higher under copycatting when ϕ is large because A's product quality is higher, and, at the same time, development costs can be avoided. We thus arrive at the following result:

Proposition 2. *There exists an interior cutoff $\phi^* \approx 0.65$ for the no-scandal probability such that decoupling (copycatting) generates a higher total welfare whenever ϕ is below (above) ϕ^*.*

Note that since $\phi^* < \bar{\phi}$, there is an intermediate range of probabilities, $0.65 < \phi < 0.79$, for which Firm A prefers decoupling, but copycatting is socially desirable. The intuition is as follows: The copycatting Firm A does not internalise the social returns from the higher quality of its product. Next to the direct benefits to the firm's own customers, there is also an indirect benefit to the customers of Firm S. As the quality upgrade makes Firm A a tougher competitor, Firm S has to lower its price, resulting in a larger share of consumers who can afford the leader's product.

4 Concluding Remarks

This article studies the effect of a brand scandal on the optimal product-development strategy of a follower firm in a market with a brand leader. In particular, we focus on the follower's choice between copycatting and independent product development. We show that in the light of a potential brand scandal surrounding the leader's product, it is optimal for a copycat firm to follow a 'safe distance' strategy that guarantees a certain degree of protection against the potential negative spillovers arising from the scandal. Nevertheless, when the follower can choose between copycatting and independent product development, it chooses a higher quality than under the product-development strategy because of the high development costs associated with the latter. The decision for or against copycatting, thus, depends on a trade-off between the lower development costs and the potential negative spillovers from a brand scandal. As a result, the follower only prefers a copycat strategy if the probability of a scandal is sufficiently low.

A welfare comparison reveals two welfare benefits associated with a copycat product: The follower's customers benefit from a higher product quality, and the brand leader's customers from a more intense price competition between the leader and the follower firm. For a competition authority, this suggests an additional indirect benefit from introducing a high-quality standard to safeguard against brand scandals: Next to the direct benefits to the leader's customers, brand stability also has an indirect impact on the strategic choices by potential follower firms because it increases the attractiveness of copycat products and thereby avoids wasteful duplication costs.

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