J Econ Interact Coord (2011) 6:29–40
DOI 10.1007/s11403-010-0074-6

REGULAR ARTICLE

The role of executives in hostile takeover attempts

Mohd Irfan

Received: 20 April 2010 / Accepted: 12 October 2010 / Published online: 21 October 2010

Abstract This paper proposes a two-stage game theoretic model where the discretionary power of executives acts as an implicit defense against hostile takeovers. Following managerial enterprise models, this paper analyzes the effects of discretionary power of target's executives over R&D and advertising expenditures in defeating hostile takeover attempts. It is shown that in vertically differentiated industries, in equilibrium, target's executives keep low level of R&D and advertising expenditures to make their firm an unattractive target for hostile takeovers. The model reveals that executives are influenced by their self-interest of monetary and non-monetary benefits and this self-interest makes the industry more differentiated.

Keywords Executive discretion · Hostile takeovers · R&D · Advertisement · Vertically differentiated industry

JEL Classification D43 · G34 · L15 · M37

1 Introduction

Hostile takeover of firms is a common phenomenon in corporate world. During the period of 1991–1997, hostile takeover bids covered around 16.5% of total bids for public companies in UK (Deakin et al. 2001).The unprecedented economic recession which began in the first quarter of 2001 raised the number of such takeovers. The value of hostile takeovers in the US was around $95 billion in 2001 (Thornton 2002).

M. Irfan (✉)
Department of Humanities and Social Sciences,
Indian Institute of Technology Kanpur,
Kanpur, U.P. 208016, India
e-mail: irfan@iitk.ac.in

The crises motivated the industry leaders to acquire their rivals as a corporate growth strategy. Firms having adequate cash reserves or borrowing capability initiated forcible acquisition of weaker firms at discounted prices. As a consequence, distressed firms became more vulnerable to hostile takeovers attempts. However, favorable conditions were restored in 2004 where the hostile takeover attempts did not take off. In 2006, more than 100 hostile transactions valued over $520 billion were announced around the world (Ruud et al. 2007).

Hostile takeovers are public offer of specific price and are specially created to seek control directly from the shareholders of a target firm. Usually, a hostile takeover does not involve the target's executive team and thus challenges the strategic direction and leadership of the company. As a result, the hostile bids are unwelcomed by the target's executives (Pearce and Robinson 2004). In principle, executives are expected to support their firm's hostile takeover as the shareholders get premium over their stock prices in such takeovers. However, executives' concern is in saving their job and non-monetary benefits (i.e. number of staff, security, power, status and prestige) which they lose after a hostile takeover of their firm in most of the cases (D'Aveni and Kesner 1993; Franks and Mayer 1996; Krug 2003).

It turns out that executives face a situation where they have to choose between self-interest and shareholders' interest. According to Jensen and Meckling (1976), in such situations where self-interest is more influencing than shareholder's interest, executives follow their self-interest. Executives of a target firm have access to a variety of explicit defensive tactics to defeat hostile takeovers i.e. charter amendment, poison pills, golden parachute, litigation, green mail and standstill agreements (Pearce and Robinson 2004; Gaughan 2007). But these defenses are effective only in delaying the hostile takeovers rather than to keep the firm away from hostile takeover attempts (Jarrell 2008).

The acquirers' motivation for attempting a hostile takeover of their rival is backed by higher profit earnings achieved by expanding the product's breadth and customer base. If the takeover gains are not as per the acquirers' expectations, they give up their hostile takeover attempts. This suggests that hostile takeover attempts are directly proportional to the takeover gains. In other words, increase in takeover gains increases the firm's chances of being taken over.

The objective of this paper is to explore how the executives' discretion over R&D and advertising expenditures affects the hostile takeover attempts. A two-stage game theoretic analysis is conducted in which two executives compete a) for product qualities and then b) for a hostile takeover of each other. In the first stage, executives behave non-cooperatively and choose their product's quality. Then, having observed the quality differential, in the second stage of the game, firms decide to takeover their rival. The equilibrium is obtained by employing the backward induction method. A significant finding of this research is that to defeat hostile takeovers, executives tend to reduce their firm's R&D and advertising expenditures. That is, in equilibrium, executives are motivated to choose their product's quality which represents maximum differentiation. Consequently, the maximum differentiation reduces the takeover gains and finally makes the firm unattractive target for hostile takeovers. The reason behind this purposeful action of the executives is their monetary and non-monetary benefits. Further, because the executives have controlling power over the gains in hostile takeovers, the

hostile takeover attempts become an endogenous decision of executives. The rest of the paper is organized as follows: Section 2 is devoted for literature review, followed by the description of model in Sect. 3. Findings are concluded in the last section.

2 Literature review

The field of hostile takeovers has been extensively researched in past years and researchers have come up with various explanations for hostile takeover activities i.e., existence of synergy, economies of scale, disciplining the executives, unused tax benefits, loss carry-overs and so on (Berkovitch and Narayanan 1993; Grossman and Hart 1980; Manne 1965; Morck et al. 1991). The synergy motive is a term related to the economic gains accrued as a result of merging the resources of any two firms. Berkovitch and Narayanan (1993) examined the synergy motives of takeovers by studying 330 hostile takeovers made during the period of 1963–1988. They found that there is a positive correlation between takeover and total gains, and any increase in takeover gains makes a firm more likely of being taken over.

On the disciplinary role of takeovers, Grossman and Hart (1980) argued that when a firm's environment changes, the relationship between shareholders and executives becomes obsolete. In other words, executives get the opportunity to transfer some value to themselves. Hence, a takeover improves the efficiency of executives by enabling a third party (acquirer) to take control of the firm. Manne (1965) suggested that a takeover assures the progress in competitive efficiency of executives and thus saves the interests of scattered shareholders. Morck et al. (1991) in their analysis of 425 publicly traded firms found that hostile takeover attempts are motivated by the gains associated with disciplining poorly performing executives. Samuelson (1970) argued that the takeovers are nature's method of eliminating deadwood in firm's survival struggle.

In corporate governance literature, considerable attention has been devoted to the study of executives' action against the takeover attempts of their firm. Easterbrook and Fischel (1981) in their analysis found that executives resist hostile takeover attempt to preserve their firm's independence and thereby preserve their salaries and status. In addition, executives' self-interest is not only limited to monetary benefits i.e. salary and share in profits but also includes some other non-monetary benefits. The non-monetary benefits are material satisfaction including the number of staff, security, power, status, prestige and professional excellence. Williamson argued that

"As with the expansion of staff, the expansion of physical plant and equipment provides general opportunities for managerial satisfaction and for much the same reasons. (Williamson 1963, p. 1,036)".

There are many evidences suggesting that these benefits are lost by the target's executives after a hostile takeover as they are replaced by a new management team. Franks and Mayer (1996) examined the 33 hostile takeovers in UK and found that hostile takeovers were associated with high executive turnover. 90% of executives resigned after a successful hostile takeover of their firm. Similarly, Krug (2003) found that, on average, about a quarter of executives leave within the first year after their firm's hostile takeover and 15% of them depart in the second year. Besides, the executives' turnover rate in hostile takeovers is approximately double than normal turnover rate.

If the executives are concerned about losing some of their rent and perquisites, they may resist hostile takeover deals even though the takeover is profitable for shareholders (Schnitzer 1996). In addition, the ineffectiveness of popular defensive measures i.e., charter amendment, poison pills, golden parachute, litigation, green mail and standstill agreements (Jarrell 2008) motivated the executives to opt for some other defenses which should be implicit in nature and proven to be more effective. For example, issuing a high amount of debt in order to deter the takeover deal is an example of implicit defense and specifically related to the executives' discretionary powers (Harris and Raviv 1988; Shleifer and Vishny 1991).

Marris (1963) analyzed the impact of executive's discretionary power over R&D and advertising expenditures in maximizing the firm's growth rate. In theory, R&D allows a firm to improve the product's quality by real change and the improvement of quality by advertisements is imaginary; it changes the consumer preferences among the available brands (Deroian and Gannon 2006; Bloch and Manceau 1999). In addition, in a vertically differentiated industry, the product differentiation is effectively established only by R&D or advertising expenditures (Motta 1993). Therefore, one can say that in such industries, executives might also use their discretionary power over R&D and advertising expenditures to eliminate the firm's hostile takeover attempts. Though a vast literature exploring the various defensive measures against hostile takeovers are available the role of executive's discretionary power over R&D and advertisement expenditures has been neglected.

3 The model

We consider a two stage non-cooperative game, assuming that the executives have discretionary power in choosing the quality of their products. In order to set the quality of their product, executives use this power over the product's R&D or advertisement expenditures. Executives know their rival's product quality or the quality that is in common knowledge to everyone. In the first stage, executives behave non-cooperatively and choose their product's quality. This results in establishing a quality differentiation between their products. Then, having observed the quality differential, in the second stage of the game, firms decide to takeover their rival. The game clearly indicates that the takeover decisions of firms are influenced by the quality differential which has been established in the first stage. As a result, executives get the opportunity to distort their product's quality to achieve the equilibrium level of quality differential beyond which the firm's chances of being taken over becomes negligible. We solve this two stage game by employing the backward induction method to find the equilibrium level of quality differential.

To develop the model, we have adopted few aspects of the Income and Quality Purchase models (Gabszewicz and Thisse 1979; Shaked and Sutton 1982).[1] Let us suppose that we have a vertically differentiated industry; more specifically products are differentiated in terms of some quality related indexes. To avoid the complexities associated with cost, it is assumed that the cost of production is zero. On the demand

[1] A brief description is given in Tirole (1989), p. 296.

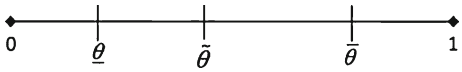

Fig. 1 Distribution of consumers

side, consumers are heterogeneous (i.e. different in their income level or willingness to pay). Consumers are identified by their income θ and they are uniformly distributed in the space [0, 1]. Each consumer occupies a unique place in this space according to his income. Consumers may purchase either single unit of the product from one of the firms or none at all if the prices are too high. The utility function for a consumer with $\theta \in [0, 1]$ is $U(\theta) = \theta s - p$ when he consumes a product of quality index s at price p with the given income θ.

As a matter of fact, in differentiated product markets, there are always some consumers who are located at the extreme points of the space [0, 1] (see Fig. 1). In other words, their elasticity of substitution between the products is either zero or infinite. These consumers are located at the extreme *left* and *right* part of the space and served by the firms producing inferior and superior quality products respectively. Low income consumers believe in quantity rather than quality because of their budget constraint, and thus the elasticity of substitution is infinite for them. High income consumers are always attached to the superior quality product because of their elite mindset and ability to pay. Hence, high income consumers have zero elasticity of substitution between the products. In Fig. 1, consumers with income less than $\underline{\theta}$ have the elasticity of substitution equal to infinite, and consumers with income more than $\overline{\theta}$ have the elasticity of substitution equal to zero. Between these two extremes, remaining market is $\overline{\theta} - \underline{\theta}$ where $\overline{\theta} > 2\underline{\theta}$.

It is assumed that there are two firms $Firm_1$ and $Firm_2$ producing distinct, substitute goods in the space $\overline{\theta} - \underline{\theta}$. These firms are competing with each other in product qualities. Firms are producing their products with a quality and price combination of (s_1, p_1) and (s_2, p_2) respectively where s is the exogenously determined product's quality index and $s_1 < s_2, (s_1, s_2) \in [0, 1]$. Accordingly, there shall be a consumer who is indifferent between these two products. We denote this marginal consumer by $\tilde{\theta}$ according to his income or location in the space $\overline{\theta} - \underline{\theta}$. This marginal consumer has the respective utility functions $U(\tilde{\theta}) = \tilde{\theta} s_1 - p_1$ and $U(\tilde{\theta}) = \tilde{\theta} s_2 - p_2$ for both products at the given prices, quality and income. By the definition of indifference, he satisfies the condition $\tilde{\theta} s_1 - p_1 = \tilde{\theta} s_2 - p_2$ and after solving this equality condition, income of this marginal consumer is:

$$\tilde{\theta} = \frac{p_2 - p_1}{s_2 - s_1} \tag{1}$$

Clearly, if the consumer's income is greater than $\underline{\theta}$ but less than $\tilde{\theta}$ he will buy the product from $Firm_1$. In the same way, if the consumer's income is less than $\overline{\theta}$ but greater than $\tilde{\theta}$ he will buy the product from $Firm_2$. Let $\varepsilon \equiv s_2 - s_1$ be a measure of quality differential between the firms' products. The identity indicates that a high ε is associated with a high level of differentiation and vice-versa. For example, any increase in quality due to the increase in R&D or advertising expenditures by $Firm_1$ (keeping s_2 fixed) decreases the ε and consequently makes his product a close substitute

of $Firm_2$'s product. In other words, this establishes a low level of differentiation. However, increase in R&D or advertising expenditures by $Firm_2$ (keeping s_1 fixed) increases the ε and consequently makes its product more unique or results in high level of differentiation. Accordingly, the demand enjoyed by $Firm_1$ and $Firm_2$ are $\tilde{\theta} - \underline{\theta}$ and $\overline{\theta} - \tilde{\theta}$ respectively and their profit functions are $\prod_1 = p_1(\tilde{\theta} - \underline{\theta})$ and $\prod_2 = p_2(\overline{\theta} - \tilde{\theta})$. Then, under the Bertrand competition, profit maximization yields the following profits as a function of the quality differential ε (derivations are given in Appendix A.1).

$$\prod\nolimits_1(\varepsilon) = \frac{1}{9}\left(\overline{\theta} - 2\underline{\theta}\right)^2 \varepsilon \quad \text{and} \quad \prod\nolimits_2(\varepsilon) = \frac{1}{9}\left(2\overline{\theta} - \underline{\theta}\right)^2 \varepsilon \tag{2}$$

3.1 Solution of the stage II

Now let us observe the takeover game. The backward induction method implies that we should first consider the second stage of the game. In the second stage, after observing the quality differential ε (established in the first stage), a firm decides to takeover its rival. We solve this stage to find out the level ε at which the target's takeover is possible. Let us assume that $Firm_2$ is interested in a hostile takeover of $Firm_1$ and the other way is also possible.[2] If the hostile takeover is successful, profits of $Firm_2$ would be $\prod_m(\varepsilon) = \frac{1}{4}\overline{\theta}^2 s_2$ as now it enjoys monopoly power in the space $\left[\overline{\theta} - \underline{\theta}\right]$ (derivations are given in Appendix A.2). The maximization problem is conceptually equivalent to the problem of a monopolist producing two different qualities (Hackner 1994). The overall net gain of $Firm_2$ from this hostile takeover is the difference between the monopolist profits and the non-cooperative profits:

$$G(\varepsilon) = \frac{1}{4}\overline{\theta}^2 s_2 - \frac{1}{9}(2\overline{\theta} - \underline{\theta})^2 \varepsilon \tag{3}$$

Higher gain in a hostile takeover allows $Firm_2$ to offer a high premium on the stocks of $Firm_1$. As a result, high premiums encourages the shareholders of $Firm_1$ to sell their stocks to $Firm_2$ and hence increases $Firm_1$'s possibility of being taken over.

Proposition 1 *The takeover gain $G(\varepsilon)$ is a function of the quality differential ε. Hence, there exists a critical limit ε_c for a hostile takeover beyond which it is unprofitable to takeover the target.*

[2] It is assumed that the takeover attempt is always hostile rather than friendly. Friendly takeover is an acquisition where the executives cooperate with the acquirer to save their job and non-monetary benefits. However, in the model of Schnitzer (1996), this assumption was relaxed to find out what makes a takeover attempt hostile or friendly. The model predicted that the choice between hostile and friendly takeover occurs when there is asymmetric information about the takeover gains. On the other hand, the present model assumes that there is no asymmetric information: everything is in common knowledge to everyone i.e. prices, quality, profits and takeover gains. Therefore $Firm_2$ is interested in a hostile takeover of $Firm_1$ rather than friendly takeover.

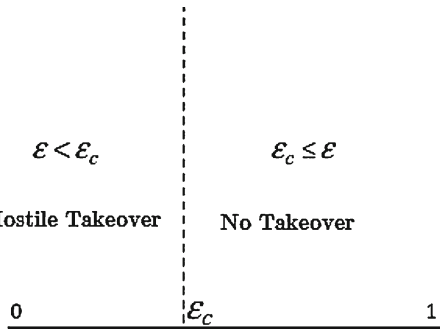

Fig. 2 Hostile takeover as a function of ε

Proof Hostile takeover of $Firm_1$ by $Firm_2$ is possible only when the takeover gain of $Firm_2$ is at least greater than zero, $G(\varepsilon) > 0$. Therefore, to find out the critical limit of the quality differential ε, we need to solve the following inequality.

$$\frac{1}{4}\overline{\theta}^2 s_2 - \frac{1}{9}\left(2\overline{\theta} - \underline{\theta}\right)^2 \varepsilon > 0 \tag{4}$$

The critical level of the quality differential ε_c is equal to $\frac{9}{4}\left[\frac{\overline{\theta}^2 s_2}{(2\overline{\theta}-\underline{\theta})^2}\right]$ (details are given in Appendix A.3). Now, $Firm_2$ attempts the hostile takeover of $Firm_1$ only when the level of quality differential ε is less than the critical level ($\varepsilon < \varepsilon_c$) as shown in Fig. 2.

Since we have had the possibility of $Firm_1$'s hostile takeover (solution of the stage II) in terms of the quality differential ε, we shall now move to the first stage of this game in which the executives of $Firm_1$ have a significant role to play. In the first stage of the game, problem of $Firm_1$'s executive is to establish a level of quality differential that eliminates his firm's possibility of being taken over. We assume that all executives have a homogenous utility function. To simplify the analysis, let us assume that there is only one executive in $Firm_1$. The utility function of this executive is $U(\varepsilon) = S + \psi \prod_1(\varepsilon) + B(1 - \varepsilon^2)$ and it is characterized as a function of the monetary benefits (fixed salary (S), fixed percentage (ψ) in firm's profits) and the non-monetary benefits B where $\psi \& B > 0$. Accordingly, to attain the optimal level of the quality differential ε_U, he would maximize his utility function as shown in Eq. (5).

$$\max_{\varepsilon} S + \psi \prod_1(\varepsilon) + B\left(1 - \varepsilon^2\right) \tag{5}$$

Solving this optimization problem gives the utility maximizing level of executive's quality differential, that is $\varepsilon_U = \frac{1}{18}\left[\frac{\psi}{B}(\overline{\theta} - 2\underline{\theta})^2\right]$ (derivation is given in Appendix A.4). This is one of the first best choice that the executive would like to maintain in the industry (see Fig. 3).

Proposition 2 *The executive's utility maximizing choice of the quality differential ε_U is inversely related with their non-monetary benefits. Any change in the non-monetary benefit (B) will change the choice of the level of ε_U.*

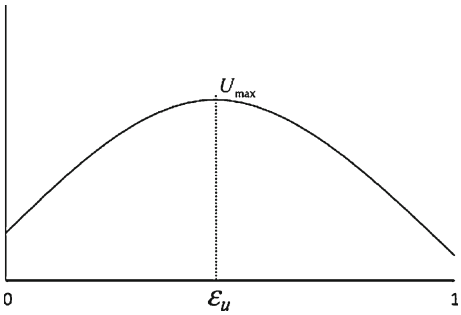

Fig. 3 Utility maximizing level of ε

Proof The first derivative of the optimal choice $\varepsilon_U = \frac{1}{18}\left[\frac{\psi}{B}(\overline{\theta} - 2\underline{\theta})^2\right]$ w.r.t ε is $-\frac{\psi}{18}\left(\frac{\overline{\theta}-2\underline{\theta}}{B}\right)^2$. The negative slope confirms that the utility maximizing choice of the quality differential ε_U is a decreasing function of B which implies that a change in the non-monetary benefits motivates the executives to distort their optimal choice of the quality differential (ε_U).

3.2 Solution of the stage I

The underlying fact is that the executive's objective is not only limited to maximizing his utility function but also to eliminate his firm's possibility of being taken over. In other words, executives want to eliminate their firm's hostile takeover attempts. Hence the equilibrium choice of the quality differential in the first stage depends on $Firm_1$'s possibility of being taken over in the second stage. The following proposition explains the equilibrium outcome of this takeover game.

Proposition 3 (a) *If $\varepsilon_u \geq \varepsilon_c$ then the equilibrium level of the quality differential (ε_m) is equal to the executive's optimal choice ε_U.*

(b) *If $\varepsilon_u < \varepsilon_c$ then the equilibrium level of the quality differential (ε_m) is equal to the critical level ε_c.*

Proof Figure 4 illustrates the equilibrium level of the quality differential (ε_m) of this two-stage game. The curves, $C1$ and $C2$, are two utility curves showing the utility maximizing choices of $Firm_1$'s executive. The executive knows that if the utility maximizing choice U_1 (*in* $C1$) is greater than the critical limit ε_c, his firm's $(Firm_1)$ possibility of being taken over is zero. Hence, the executive does not have any incentive to distort his optimal choice and the equilibrium level of the quality differential is established at this optimal choice $\varepsilon_m = \varepsilon_u$. However, in some instances where the utility maximizing choice U_2 (*in* $C2$) is less than the critical limit ε_c, the executive has strong incentive to distort his optimal choice. At this choice U_2, $Firm_1$ is more likely to be a takeover target and hence the executive invests less on R&D and advertising expenditures to increase the level of quality differential at least equal to the critical limit ε_c. Distorting the quality differential in the industry and setting it

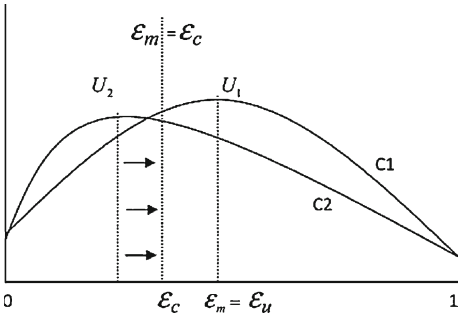

Fig. 4 Equilibrium outcome of the game

equal to the critical limit makes $Firm_1$'s possibility of being takeover equal to zero. Therefore, the equilibrium level of quality differential is established at the critical limit $\varepsilon_m = \varepsilon_c$.

Finally, preposition III summarizes our main findings: to defeat hostile takeovers, executives maximize the quality differentiation by reducing their firm's R&D and advertising expenditures. That is, in equilibrium, executives are motivated to choose their product's quality which represents maximum differentiation. Additionally, since the executives have discretionary power over R&D and advertising expenditures they use it as a defense against hostile takeovers. Thus it can be said that the hostile takeover attempts are endogenously determined by the target's executives. In other words, target's executives' decide whether their firm should be a hostile takeover target or not.

4 Conclusions

The executives' obligation is to get a good deal for shareholders which often imply allowing a hostile takeover of their firm. However, executives' self interest is to save their job and non-monetary benefits which they often lose after a hostile takeover. Hence, due to this self-interest-behavior, executives are motivated to defeat their firm's hostile takeover. Apart from the explicit defensive tactics against the hostile takeovers, executives also utilize their discretionary power over R&D and advertisement expenditures as an implicit defense against hostile takeovers.

This paper has conducted a two-stage game theoretic analysis in which two executives compete a) for product qualities and then b) for a hostile takeover of each other. The solution reveals that at equilibrium, executives keep low level of R&D and advertising expenditures to make their firm less attractive target for hostile takeover attempts. The reason behind this deliberate action of the executives is their monetary and non-monetary benefits. Moreover, executive's self-interest behavior makes the industry more differentiated. Further, as executives have control over the gains in hostile takeovers, hostile takeover attempts become an endogenous decision of executives. The validity of this model can be easily tested by using empirical data and econometric techniques. The model has hypothesized that an increase in R&D and

advertising expenditure tends to decrease a firm's likelihood of hostile takeover which shall be tested in future research.

Appendix A

A.1 Derivation of non-cooperative profits under the Bertrand competition

The demand enjoyed by $Firm_1$ and $Firm_2$ are $\tilde{\theta} - \underline{\theta}$ and $\overline{\theta} - \tilde{\theta}$ respectively and their profit functions are $\prod_1 = p_1(\tilde{\theta} - \underline{\theta})$ and $\prod_2 = p_2(\overline{\theta} - \tilde{\theta})$ where $\tilde{\theta} = \frac{p_2 - p_1}{\varepsilon}$. Then, individual firm's profit maximization under the Bertrand competition yields the following reaction functions.

$$p_1(p_2) = \frac{1}{2}[p_2 - \underline{\theta}\varepsilon] \quad \text{and} \quad p_2(p_1) = \frac{1}{2}[p_1 + \overline{\theta}\varepsilon]$$

The equilibrium prices are

$$p_1 = \frac{1}{3}\varepsilon(\overline{\theta} - 2\underline{\theta}) \quad \text{and} \quad p_2 = \frac{1}{3}\varepsilon(2\overline{\theta} - \underline{\theta})$$

and the corresponding profits are

$$\prod\nolimits_1(\varepsilon) = \frac{1}{9}(\overline{\theta} - 2\underline{\theta})^2\varepsilon \quad \text{and} \quad \prod\nolimits_2(\varepsilon) = \frac{1}{9}(2\overline{\theta} - \underline{\theta})^2\varepsilon$$

A.2 Derivation of the acquirer's profits after a hostile takeover

The maximization problem is conceptually equivalent to the problem of a monopolist producing two different qualities. Therefore, joint profits are

$$\sum \prod\nolimits_m = p_1\left(\tilde{\theta} - \frac{p_1}{s_1}\right) + p_2(\overline{\theta} - \tilde{\theta})$$

Setting the partial derivatives w.r.t. prices (p_1 and p_2) equal to zero yields the following corresponding prices.

$$p_1 = \frac{1}{2}\overline{\theta}s_1 \quad \text{and} \quad p_2 = \frac{1}{2}\overline{\theta}(s_1 + \varepsilon)$$

and the profit is

$$\prod\nolimits_m = \frac{1}{4}\overline{\theta}^2 s_2$$

A.3 Critical level of the quality differential for attempting the hostile takeover

The hostile takeover is profitable for the acquirer only when the below given condition is satisfied.

$$\frac{1}{4}\overline{\theta}^2 s_2 - \frac{1}{9}(2\overline{\theta} - \underline{\theta})^2\varepsilon > 0 \quad \text{Or} \quad \frac{1}{9}(2\overline{\theta} - \underline{\theta})^2\varepsilon < \frac{1}{4}\overline{\theta}^2 s_2$$

Or

$$\varepsilon < \frac{9}{4}\left[\frac{\overline{\theta}^2 s_2}{(2\overline{\theta} - \underline{\theta})^2}\right]$$

A.4 Executives' utility maximizing choice of the quality differential

Executive faces the below given optimization problem, in which the level of quality differentiation is determined by his choice of product's quality.

$$\max_{\varepsilon} S + \psi \prod\nolimits_1 (\varepsilon) + B(1 - \varepsilon^2)$$

Taking the derivative with respect to ε and setting it equal to zero yields the following first order condition.

$$\psi\frac{1}{9}(\overline{\theta} - 2\underline{\theta})^2 - 2B\varepsilon = 0$$

Thus, the executive's self-interest maximizing level of quality differential is

$$\varepsilon_u = \frac{1}{18}\left[\frac{\psi}{B}(\overline{\theta} - 2\underline{\theta})^2\right]$$

References

Berkovitch E, Narayanan MP (1993) Motives for takeovers: an empirical investigation. J Financ Quant Anal 28(3):347–362

Bloch F, Manceau D (1999) Persuasive advertising in Hotelling's model of product differentiation. Int J Ind Org 17(4):557–574

D'Aveni RA, Kesner IF (1993) Top managerial prestige, power and tender offer response: a study of elite social networks and target firm cooperation during takeovers. Org Sci 4(2):123–151

Deakin S, Hobbs R, Singer G (2001) Implicit contracts and corporate governance: the impact of the city code on takeovers and mergers. In: CMI Workshop paper. Cambridge University Press, Cambridge

Deroian F, Gannon F (2006) Quality-improving alliances in differentiated oligopoly. Int J Ind Org 24(3):629–637

Easterbrook FH, Fischel DR (1981) The proper role of a target's management in responding to a tender offer. Harv Law Rev 94(6):1161–1204

Franks J, Mayer C (1996) Hostile takeovers and the correction of managerial failure. J Financ Econ 40(1):163–181

Gabszewicz JJ, Thisse JF (1979) Price competition, quality and income disparities. J Econ Theory 20(3):340–359

Gaughan PA (2007) Mergers, acquisitions, and corporate restructurings. Wiley, New Jersey
Grossman S, Hart O (1980) Takeover bids, the free-rider problem, and the theory of the corporation. Bell J Econ 11(1):42–64
Hackner J (1994) Collusive pricing in markets for vertically differentiated products. Int J Ind Org 12(2): 155–177
Harris M, Raviv A (1988) Corporate control contests and capital structure. J Financ Econ 20:55–86
Jarrell GA (2008) Takeovers and leveraged buyouts. The concise encyclopedia of Economics. http://www.econlib.org/library/Enc1/TakeoversandLeveragedBuyouts.html. Accessed 12 May 2008
Jensen MC, Meckling WH (1976) Theory of the firm: managerial behavior, agency costs and ownership structure. J Financ Econ 3(4):305–360
Krug JA (2003) Why do they keep leaving? Harv Bus Rev 81(2):14–15
Marris R (1963) A model of the managerial enterprise. Q J Econ 77(2):185–209
Manne HG (1965) Mergers and the market for corporate control. J Polit Econ 73:110–120
Morck R, Shleifer A, Vishny RW (1991) Characteristics of targets of hostile and friendly takeover targets. In: Auerbach AJ (ed) Corporate takeovers: causes and consequences. University of Chicago Press, Chicago, pp 101–136
Motta M (1993) Endogenous quality choice: price vs. quantity competition. J Ind Econ 41(2):113–131
Pearce JA II, Robinson RB Jr (2004) Hostile takeover defenses that maximize shareholder wealth. Bus Horiz 47(5):15–24
Ruud JA, Näs J, Tortorici V (2007) Preempting hostile takeovers. McKinsey Quarterly (July)
Samuelson P (1970) Economics, 8th edn. McGraw-Hill, New York
Schnitzer M (1996) Hostile versus friendly takeovers. Economica 63(249):37–55
Shaked A, Sutton J (1982) Relaxing price competition through product differentiation. Rev Econ Stud 49(1):3–13
Shleifer A, Vishny RW (1991) Management buyouts as a response to market pressure. In: Auerbach AJ (ed) The economic effects of mergers and acquisitions. University of Chicago Press, Chicago, pp 87–102
Thornton E (2002) The bids sure are getting hostile. Business Week Online (14, January)
Tirole J (1989) The theory of industrial organization. MIT Press, Cambridge
Williamson OE (1963) Managerial discretion and business behavior. Am Econ Rev 53(5):1037–1057