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## Management takeover battles and the role of the golden handshake

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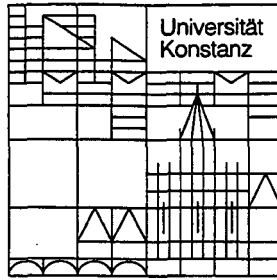
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'Golden Handshake'**

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Diskussionsbeiträge

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Management Takeover Battles and the Role of the  
'Golden Handshake'

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### **Abstract**

#### **Management Takeover Battles and the Role of the 'Golden Handshake:'**

The effect of severance pay on management behavior during a takeover battle is generally ambiguous. Yet, the severance payment completely restraining all influence activities always constitutes a "golden handshake." The manager leaving office still benefits from the increase in the merged firm's total value. Moreover, given that the managers are compensated according to an identical linear incentive scheme, the optimal shareholder policy always entails a corner solution. Managers will either receive no severance pay, or the payment will be chosen such that their influence activities equal zero. Relatively strong incentive intensities and low synergy gains then imply that offering no severance pay dominates.

**Keywords:** mergers, contests, "golden handshakes"

**JEL classification:** G34, M120

## 1 Introduction

The takeover of Germany's *Mannesmann* by British-based *Vodafone-Airtouch* in February 2000 not only marks the largest merger ever. Despite the obvious differences in their historic firm profiles, there also exist striking similarities in the respective strategic approaches of the two rivaling firms. This applies to both the intentions to develop their telecommunications businesses through M&A-activities prior to the merger and the behavior during the negotiation process<sup>1</sup>. Although *Vodafone's* bid clearly initiated the takeover battle, both sides actually entered the contest on equal terms. In particular, suppose that *Vivendi's* pivotal support decision would have favored *Mannesmann* instead of *Vodafone* during the takeover battle. Then, *Mannesmann* could have well succeeded in taking over *Vodafone*. Hence, the question arises whether the outcome of such a contest is merely coincidental, or determined by technological and institutional factors.

Merging two firms is an economic activity that requires the investment of economic resources. Depending on the incentive structures these influence activities differ in quality. If the merger is unanimously supported by the managements and shareholders of both firms, the resources necessary for a successful merger simply reflect the investments in time, effort, and capital necessary to create the new institutional structure. Yet, if the merger lacks unanimous support by the relevant actors, part of the total resources invested is most likely unproductive. Moreover, when (a) the top management of one of the firms has to leave office in case of a merger and (b) the management has discretionary power in its operative and strategic decisions, the process of merging the two firms resembles a contest between both managements.

In this paper we develop a model of a symmetric contest that reflects these crucial elements of a takeover battle between two top managements. Both managements can draw on firm resources in order to finance defensive or offensive actions at their discretion. Shareholders must only agree to the final offer. In particular we are interested in the relationship between the compensation scheme of the managers and their behavior in the contest. It is assumed that they are compensated according to a linear incentive scheme that consists of a fixed-salary part and a performance-dependent part. The performance pay would be sufficient to align the interests of the shareholders and the manager as long as the management engages only in activities that cause the internal growth of the company. However, the contest winner's incentive scheme is also transferred to the merged firm. Then, given that the firm's development is also affected by mergers, this incentive scheme does not ensure efficiency. The managers' risk of being laid off constitutes an externality. Yet, a credible severance pay offer may constitute a means

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<sup>1</sup>Compare the brief case-study provided in Appendix 1.

to internalize it.

However, the effect of severance pay on management behavior during a takeover battle is generally ambiguous. Nevertheless it can be shown that a severance payment that completely crowds out all influence activities always constitutes a “golden handshake.” The manager leaving office still benefits from the possible synergies associated with merging the two firms. In the special case of identical management compensation schemes, the optimal shareholder policy is always associated with a corner solution. Managers will either receive no severance pay, or the payment will be chosen such that their influence activities are equal to zero. Relatively strong incentive intensities and low synergy gains then imply that offering no severance pay dominates.

The model closes a gap in the existing literature on mergers and acquisitions, which either analyzed the bidding process during the takeover battle or the design of the management incentive scheme. Only the bidding process and the resulting share prices have so far been analyzed by using contest models of takeover battles<sup>2</sup>. Stulz (1988) was the first to explicitly examine the effect of manager-owners in target firms. Block-holdings by management induce defensive actions. The increased aggressiveness of the outside bidder then induces “over-bidding”<sup>3</sup>. Burkart (1999) – also, providing an extensive survey – then concludes that all defensive measures by a target firm’s management should first be approved by the shareholders<sup>4</sup>. Following this argument, the EU Takeover Directive – proposed in summer 2001, but voted down – required that a target firm’s management must consult its shareholders before taking defensive action<sup>5</sup>.

The above argument rests on the assumption that defensive actions are observable and verifiable by the shareholders. The fact that the top management of target firms is likely to employ such defensive measures is well documented in empirical studies. In addition to investor relations activities, the target firm’s top management often restructures such as to decrease the synergetic value of the merger. This applies to both, the ownership and the asset structure<sup>6</sup>. Moreover, Mikkelsen and Partch (1995) suggest that a significant portion of the potential synergy gains associated with a

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<sup>2</sup>Compare the survey by Hirshleifer (1995).

<sup>3</sup>The “over-bidding”-analyses of Burkart (1995) and Singh (1998) emphasize a different effect. They show that the bidder’s aggressiveness increases when purchasing a block-holding prior to the actual takeover attempt. According to Chowdhry and Nanda (1993), “overbidding” may also arise due to the existence of large debtors. Finally, Cornu and Isakov (2000) demonstrate that cash offers signal a stronger commitment of the bidder than equity or debt.

<sup>4</sup>Cramton and Schwarz (1991) even suggest that – whenever there are more than two bidders – the Board of Directors of the target firm should conduct a share auction.

<sup>5</sup>EU Commission (2001).

<sup>6</sup>Compare Dann and DeAngelo (1988), Denis (1990), and Denis and Denis (1991), for instance.

merger is actually generated through replacing the management. This adds to the disciplinary virtue of the turnover threat as emphasized by Martin and McConnell (1991), Denis and Denis (1995), Denis and Serrano (1996) and Sudarsanam (1995), for instance.

Since defensive actions reduce the shareholders return, the level of takeovers in the economy may then be inefficiently low. Clearly, stock or stock-option plans are regularly used to align the interests of management and shareholders. In particular, such plans also provide incentives to actively pursue M&A-activities. However, according to Bolster, et al. (1996), these incentives are reduced by the availability of executive swaps. The respective empirical evidence is split. Most studies emphasize the lack of effective incentives for the management<sup>7</sup>. Yet, Bertrand and Mullainathan (1998) demonstrate that M&A-regulation affects management compensation. Explicitly accounting for the effect of defensive restructuring on the possible synergy gain, Chakraborty and Arnott (2000) then finally show that management incentive pay can also imply an inefficiently high frequency of takeovers.

Canoy et al. (2000) already analyze a two-stage game between the acquiring firm, the target management, and the target firm's shareholders over the potential surplus of the merger. Managers anticipate their shareholders' decision and can draw on firm resources to carry out efficiency-enhancing R&D-investments. Conditional on the bargaining powers, this can imply either over- or underinvestment of the target firm's management prior to the takeover. If the bargaining power is concentrated on the target firm's management, it will also demand a severance pay – called “golden parachute” – in order to leave the firm.<sup>8</sup>

Such studies of management behavior in takeover situations typically assume the firm's management *à priori* to be either in a defensive or an offensive position. It then chooses its action given exogenous takeover risks or opportunities. Yet, the *Mannesmann-Vodafone* case has actually matched up two managements characterized by histories of very successful M&A-activities for their own and their shareholders' benefit. Hence, the takeover battle was management-initiated and resulted in a contest between the two Boards of Directors. Shareholders were only *ex-post* able to agree or disagree to the proposed merger. Also, *Vodafone* offered a compensation in shares, not in cash. Thus, the process rather resembled a typical proxy contest<sup>9</sup>.

<sup>7</sup>Compare Jensen and Murphy (1990a,b) and Yermack (1995) and , more recently, Goldstein (2000).

<sup>8</sup>The term “golden parachute” appears to refer to a severance pay that is requested by the management whereas a golden handshake is a severance payment offered by the shareholders. This distinction, however, is of no importance for the analysis to follow.

<sup>9</sup>According to Sridharan and Reinganum (1995), the board of management-controlled firms can choose between a tender offer and a proxy contest when attempting an acquisition. Given a proxy contest, management draws entirely on internal resources to finance the takeover. Shareholders then only expect to benefit from the resulting increase in the

The paper proceeds as follows. We introduce the model in Section 2. Section 3 analyzes the relationship between contest behavior and the managers' incentive schemes. We discuss the general as well as the case of identical incentive schemes. A summary and conclusions are provided in Section 4.

## 2 The model

Consider two firms, 1 and 2, each owned by risk-neutral shareholders. Each firm is led by a single person, the risk-neutral manager. The managers are currently paid according to a compensation scheme which entails a fixed salary part,  $a_i \geq 0$ , and an incentive intensity,  $b_i$ , with  $0 < b_i < 1$  for  $i = 1, 2$ . The incentive intensity ties the management compensation to the present discounted values of future business operations. For symmetry and simplicity, the *pre*-contest present-discounted value (PDV) of each firms' business operations is normalized to equal unity, which implies the restriction  $a_i + b_i \leq 1$  for the managers' compensation schemes.

Thus, *pre*-merger management incomes are given by  $w_i = a_i + b_i [1]$ . The analysis does not address the issue of optimal compensation scheme design. The particular schemes may be chosen for internal incentive reasons to align management and shareholders' interests in the two *pre*-merger firms. The PDVs of future business operations reflect the total firm values – gross of the manager compensation – prior to a possible takeover battle. Hence, if merging the two firms did not constitute an option, the manager could only profit from increasing the value of her original firm.

Both firms' managers can invest part of the PDVs of the firms to influence the probability that their old firm will be successful in taking over the other firm. If successful, the newly created firm will adopt the incentive scheme of the successful old firm. The shareholders of the potential new firm have to agree to the proposed merger plan, and decide on the chief executive officer (CEO) of the newly created firm.

The defeated manager must leave the new firm. If manager  $i$  loses the contest and has to leave office, she may receive a severance pay  $f_i$ . On the other hand, if she succeeds and remains in office, her original compensation scheme is transferred to the newly created, merged firm. In this case, she earns  $w_i^m = a_i + b_i[V - f_j]$ ,  $i, j = \{1, 2\}$  and  $i \neq j$ , where  $V$  is the PDV of the merged firm gross of severance payments.

Hence, the severance pay is covered by drawing on firm resources as well. This implies that each manager also participates in the costs of removing her rival from office. The manager does not receive the severance pay if she decides to quit voluntarily. This setting resembles the important facts of empirical mergers in a stylized but sufficiently realistic way.

We analyze the problem as a game with three stages.

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share price following the successful acquisition.



- At *stage 0* the shareholders of the (separate) firms can credibly commit to a severance payment,  $f_i, i = 1, 2$ , that is paid to its CEO in case she has to leave office.
- At *stage 1* the managers of the two firms can (simultaneously) invest in activities  $R_1, R_2$  in order to influence the outcome of the merger process. These include public and investor relations activities, investments in forming strategic alliances with third parties, as well as direct restructuring of the original firms. These so-called influence activities take place simultaneously. The managers can draw on firm funds to finance their activities. For analytical simplicity we assume that the managers act in the interest of the shareholders in case of indifference.
- At *stage 2* the shareholders decide whether they agree to the proposed merger plan,  $s = 1$ , or not,  $s = 0$ . We have to distinguish between two cases. (1) Either manager initiated the contest ( $R_i > 0$  for at least one  $i = 1, 2$ ). If the shareholders agree, the manager of the successful firm becomes the CEO of the newly created firm, if not, the merger fails and both managers remain in office. (2) No manager initiates the contest ( $R_1 = R_2 = 0$ ). In this case either  $s = 1$  or  $s = 0$  yields the shareholder payoff of the separate firms.<sup>10</sup>

We solve the game by backward induction.

Let  $R_i \geq 0, i = 1, 2$ , denote both, the costs and the level of the influence activities generated by manager  $i$ . Following the literature on rent seeking and conflict the decision procedure that links  $\{R_1, R_2\}$  with the final outcome of the game is not modeled explicitly. Instead we assume that the influence activities affect the probability of success of the managers. Specifically, the probability of success  $p_i$  is given by a Tullock contest-success or conflict function

$$\begin{aligned}
 p_1(R_1, R_2) &= \begin{cases} \frac{R_1}{R_1 + R_2}, & R_1 > 0 \vee R_2 > 0, & i = 1, 2 \\ 0, & R_1 = R_2 = 0, & i = 1, 2 \end{cases}, \\
 p_2(R_1, R_2) &= \begin{cases} \frac{R_2}{R_1 + R_2}, & R_1 > 0 \vee R_2 > 0, & i = 1, 2 \\ 0, & R_1 = R_2 = 0, & i = 1, 2 \end{cases}. \quad (1)
 \end{aligned}$$

Expression (1) captures the idea that at least one manager has to act in order to induce a merger. An increase in the level of influence activities then *ceteris paribus* increases the probability to win the contest.<sup>11</sup> The

<sup>10</sup>This assumption implies that the managers have to become active in order to make a merger possible. The specification of shareholder payoffs for every  $s$  chosen completes the game in the most convenient way possible.

<sup>11</sup>See Tullock (1980). This function is extensively used in the literature on rent seeking. Grossman (2001) introduces a variant of this function when modeling appropriation and defense. Its properties have been analyzed by Hirshleifer (1989) and Nitzan (1994).

influence activities,  $R_i, i = 1, 2$ , reflect the wasteful investments associated with the contest.

The *post*-contest present-discounted value of future business operations for the merged firm is denoted by  $V = g(V_1 + V_2)$ ,  $g \geq 0$ , where  $g$  reflects a synergy parameter net of the administrative costs necessary to merge the firms. The costs of influence activities reduce the *post*-contest values,  $V_i$ , of the original firms. Recalling that *pre*-merger firm PDVs equal 1 for both firms, this yields  $V_i = 1 - R_i, i = 1, 2$ . Obviously, the managers' influence behavior then also adversely affects the total value of the merged firm  $V$ .

Assuming that the shareholders agree to the proposed merger plan, the expected (stage 1) income of the two managers can then be derived as

$$\begin{aligned} E[w_i(R_1, R_2)] &= p_i w_i^m + (1 - p_i) f_i \\ &= \frac{R_i}{R_1 + R_2} (a_i + b_i [g(2 - R_i - R_j) - f_j]) + \frac{R_j}{R_1 + R_2} f_i \end{aligned} \quad (2)$$

since  $p_i = (1 - p_j), i, j = \{1, 2\}$  and  $i \neq j$ . If the shareholders do not agree to the proposed merger plan, however, the income is equal to

$$w_i(R_1, R_2) = a_i + b_i(1 - R_i). \quad (3)$$

From the point of view of the shareholders, the expected *post*-contest value of the merged firm equals

$$\begin{aligned} E[V^{SH}] &= p_i [V - w_i^m - f_j] + p_j [V - w_j^m - f_i] \\ &= V - E[w_1] - E[w_2]. \end{aligned} \quad (4)$$

We analyze a situation where shareholders cannot prevent the takeover contest. They are only asked for their *ex-post* agreement to the proposed merger. Taking the *post*-contest perspective of shareholders, the merger option therefore adds value of

$$E[\Delta V^{SH}] = E[V^{SH}] - \sum_{i=1}^2 [V_i - w_i^m]. \quad (5)$$

Hence, if

$$E[\Delta v^{SH}] = E[\Delta V^{SH}]/2 > 0, \quad (6)$$

there always exists some distribution of shares of the merged firm over the shareholders of the two original firms such that each shareholder's wealth can increase.

Moreover, (6) also implies the possibility of a Pareto-improving cash payment to one of the two shareholder groups in return for taking over their firm. Yet, the current analysis neither addresses the issue of determining the medium nor the terms of exchange applied to shares when merging the firms. For simplicity, it is assumed that the shareholders will agree to the proposed merger if (6) holds. In addition it implies that the shareholders do not have conflicting interests in the determination of the severance payments at stage 0.

### 3 The takeover battle

We solve the game by backward induction starting at stage 2.

*Stage 2:* Expression (6) provides the *ex-post* participation constraint of the shareholders. The optimal policy defines a function  $s(\{a_i, b_i, f_i, R_i\}_{i=1,2}, g)$  such that

$$s(a_1, a_2, b_1, b_2, f_1, f_2, R_1, R_2, g) = \begin{cases} 1 & \Leftrightarrow E[\Delta v^{SH}] \geq 0 \\ 0 & \Leftrightarrow E[\Delta v^{SH}] < 0 \end{cases}, \quad (7)$$

where we have assumed that the shareholders will accept the plan in case of indifference. Expression (7) implicitly defines a critical value of synergies,  $\bar{g}$ , which is necessary for the acceptance of the merger plan,

$$\begin{aligned} g \geq \bar{g} = & \frac{(a_2 + b_1 + b_2 - 2 + (b_1 - 1)f_2)R_1 + (b_1 - 1)R_1^2}{(2 - R_1 - R_2)((b_1 - 1)R_1 + (b_2 - 1)R_2)} \\ & - \frac{(a_1 + b_1 + b_2 - 2 + (b_2 - 1)f_1)R_2 + (b_2 - 1)R_2^2}{(2 - R_1 - R_2)((b_1 - 1)R_1 + (b_2 - 1)R_2)} \\ & + \frac{(b_1 + b_2 - 2)R_1 R_2}{(2 - R_1 - R_2)((b_1 - 1)R_1 + (b_2 - 1)R_2)}. \end{aligned}$$

Obviously, for the special case of a symmetric equilibrium without severance payments,  $a_1 = a_2 = a$ ,  $b_1 = b_2 = b$ ,  $f_1 = f_2 = 0$ ,  $R_1 = R_2 = R$ , the above condition simplifies to

$$g \geq \bar{g} = 1 - \frac{a}{2((1-b)(1-R))}.$$

If the managers received a wage equal to zero and abstained from influence activities, this condition would be equal to  $g \geq \bar{g} = 1$ , which simply guarantees the existence of technological synergies. Given that the managers receive a positive fixed wage,  $a$ , the second term is positive as long as  $R < 1$ , and the critical level of synergies is smaller than 1. This rather surprising finding reflects the fact that merging the two firms can reduce their wage bill because one of the managers is laid off.

Alternatively, for the symmetric case the *ex-post* participation constraint can be expressed in terms of  $R_1 = R_2 = R$ :

$$R \leq \bar{R} = 1 + \frac{a - (1-b)f}{2(1-b)(g-1)}.$$

Hence, the shareholders' agreement to the merger plan depends on the amount of resources wasted in the merger contest. If the amount of resources invested exceeds  $\bar{R}$ , it is no longer profitable for the shareholders to accept the merger plan even though the rejection leaves them with a reduced PDV.

For the case of a general incentive scheme,  $E[\Delta v^{SH}] = 0$  implicitly defines a functional relationship  $\bar{R}_2 = R_2(R_1)$  between both influence activities such that

$$R_1 + R_2 \leq R_2(R_1) + R_1$$

has to be satisfied in order to guarantee acceptance.

*Stage 1:* Anticipating the *ex-post* decision of the shareholders, the managers maximize their expected income by choice of the influence activities. A Nash equilibrium of the subgame of stage 1 constitutes a set  $\{R_i^*\}$  which satisfies<sup>12</sup>

$$\begin{aligned} R_1^* &\in \arg \max_{R_1} \{s(R_1, R_2^*)E[w_1(R_1, R_2^*)] + (1 - s(R_1, R_2^*))w_1(R_1, R_2^*)\}, \\ R_2^* &\in \arg \max_{R_2} \{s(R_1^*, R_2)E[w_2(R_1^*, R_2)] + (1 - s(R_1^*, R_2))w_2(R_1^*, R_2)\}. \end{aligned}$$

In order to solve this optimization problem we begin by assuming that  $R_1^*$  and  $R_2^*$  are such that the shareholders will always accept the proposal at stage 2,  $R_1^* + R_2^* \leq R_2(R_1) + R_1$ . Subsequently, we will examine if this conjecture is in fact correct.

With this assumption, the managers' optimization problems can yield both interior and corner solutions with respect to the influence activity levels. Interior solutions must satisfy the necessary conditions:

$$\begin{aligned} \frac{\partial E[w_1]}{\partial R_1} &= \frac{\partial p}{\partial R_1} (a_1 + b_1(g(V_1 + V_2) - f_2)) - pb_1g - \frac{\partial p}{\partial R_1} f_1 \quad (8) \\ &= \frac{(a_1 - f_1)R_2 - b_1(f_2R_2 + g(R_1^2 + 2R_1R_2 - R_2(2 - R_2)))}{(R_1 + R_2)^2} = 0, \end{aligned}$$

$$\begin{aligned} \frac{\partial E[w_2]}{\partial R_2} &= \frac{\partial p}{\partial R_2} f_2 - (1 - p)b_2g - \frac{\partial p}{\partial R_2} (a_2 + b_2(g(V_1 + V_2) - f_1)) \quad (9) \\ &= \frac{(a_2 - f_2)R_1 - b_2(f_1R_1 + g(R_2^2 + 2R_1R_2 - R_1(2 - R_1)))}{(R_1 + R_2)^2} = 0. \end{aligned}$$

For interior solutions, conditions (8) and (9) implicitly define reaction functions  $R_i(R_j)$  for the two managers. The simultaneous solution of (8) and

<sup>12</sup>For simplicity we suppress  $a_i$ ,  $b_i$ , and  $f_i$ ,  $i = 1, 2$  whenever is possible.

(9) yields the unique stage 1 Nash-equilibrium conjecture:<sup>13</sup>

$$R_1^* = \max \left\{ 0, \frac{b_2(-f_2 + a_2 + b_2(-f_1 + 2g))(-f_1 + a_1 + b_1(-f_2 + 2g))^2}{g(b_1(f_2 - a_2) + b_2((1 + b_1)f_1 - a_1 + b_1(f_2 - 4g)))^2} \right\}, \quad (10)$$

$$R_2^* = \max \left\{ 0, \frac{b_1(-f_2 + a_2 + b_2(-f_1 + 2g))^2(-f_1 + a_1 + b_1(-f_2 + 2g))}{g(b_1(f_2 - a_2) + b_2((1 + b_1)f_1 - a_1 + b_1(f_2 - 4g)))^2} \right\}. \quad (11)$$

*Stage 0:* At stage 0 the shareholders maximize their expected income by the choice of a severance-payment package  $\{f_1, f_2\}$ . They anticipate the behavior of the managers at stage 1 and their own final decision at stage 2. We neglect the complication of setting a strategic severance payment. Instead, we assume that  $\{f_1, f_2\}$  is chosen cooperatively as to maximize the ex-post shareholder value. This implies

$$\{f_1^*, f_2^*\} \in \arg \max_{f_1, f_2} E[\Delta v^{SH}(a_1, b_1, f_1, a_2, b_2, f_2)]. \quad (12)$$

### 3.1 Identical management compensation schemes

We start the discussion with an analysis of identical manager compensation schemes,  $a_i = a$ ,  $b_i = b$ ,  $f_i = f$  for  $i = 1, 2$ . The equilibrium stage-1 influence-activity levels given the equilibrium conjecture can then be derived as

$$R_1^* = R_2^* = \max \left\{ 0, \frac{2bg + a - (1 + b)f}{4bg} \right\}. \quad (13)$$

The following proposition follows:

**Proposition 1:** If  $g \geq 1$ ,  $s = 1$  in equilibrium.

**Proof.** Without loss of generality assume that  $R_2 = 0$ . If  $R_1 = 0$ , no merger is initiated and manager 1 receives  $a + b$ . If  $R_1 = \epsilon$ ,  $\epsilon > 0$ ,  $\epsilon \rightarrow 0$ , manager 1 receives  $a + b(2g - f)$ . The latter is larger than the former if and only if  $2g \geq 1 + f$ . If this inequality is not satisfied the managers will not

<sup>13</sup>The sufficient conditions at this point are

$$\begin{aligned} \frac{\partial^2 E[w_1]}{\partial R_1^2} &= -2b_1g^2 \left( \frac{b_2}{b_2(2g - f_1) + a_2 - f_2} + \frac{b_1}{b_1(2g - f_2) + a_1 - f_1} \right), \\ \frac{\partial^2 E[w_2]}{\partial R_2^2} &= -2b_2g^2 \left( \frac{b_2}{b_2(2g - f_1) + a_2 - f_2} + \frac{b_1}{b_1(2g - f_2) + a_1 - f_1} \right), \end{aligned}$$

which are smaller than zero for an interior solution.

invest in the conflict, which makes  $s = 1$  rational for the shareholders. If the inequality holds it is never rational for both managers not to invest in the contest as long as  $s = 1$ .

*Stage 0:* Given (13), (6) is equal to

$$E[\Delta v^{SH}] \geq 0 \Leftrightarrow a + (b - 1) \left( f - \frac{(g - 1)(-a + f + bf + 2bg)}{2bg} \right) \geq 0. \quad (14)$$

For  $s = 1$  it follows that

$$\begin{aligned} \frac{\partial E[\Delta v^{SH}]}{\partial f} &= \frac{(b - 1)(1 + b + (b - 1)g)}{2bg} \geq 0 \\ &\Leftrightarrow (1 + b) + (b - 1)g \leq 0 \\ &\Leftrightarrow b \geq \tilde{b} = \frac{g - 1}{g + 1}, \end{aligned} \quad (15)$$

from the point of view of the shareholders. Inequality (15) implies that for all incentive intensities  $b \geq \tilde{b}$ , the shareholders would like to reduce the severance payment to zero. In contrast, they would like to pay a positive severance payment for  $b < \tilde{b}$ . It follows immediately that it cannot be optimal for the shareholders to pay the managers more than the amount necessary to reduce their investments to be equal to zero and  $\epsilon > 0, \epsilon \rightarrow 0$ . This severance payment is given by

$$\tilde{\Phi} = \frac{2bg + a}{1 + b}. \quad (16)$$

To summarize, for every incentive scheme  $a, b$ , severance payments  $\frac{2bg+a}{1+b} \Leftrightarrow b < \tilde{b}$  and  $0 \Leftrightarrow b \geq \tilde{b}$  are optimal from the point of view of the shareholders.

Then, assume that the severance payments are optimal and let  $b < \tilde{b}$ . In this case, (14) simplifies to

$$E[\Delta v^{SH}] |_{f=\tilde{\Phi}} \geq 0 \Leftrightarrow \frac{2}{1+b} ((1-b)(g-1) + b(1+b)), \quad (17)$$

which is greater than zero for  $g \geq 1$ .

Now let  $b \geq \tilde{b}$ . Then, (14) simplifies to

$$E[\Delta v^{SH}] |_{f=0} \geq 0 \Leftrightarrow \frac{2(-1 + b(a + b - g) + g)}{1 + b} \geq 0. \quad (18)$$

We have to show that (18) is greater or equal to zero for all  $g \geq \tilde{g}$ . In order to do so we proceed in three steps. First, we demonstrate that (18) is satisfied for  $b = \tilde{b}$ . Second we show that (18) is satisfied for  $b = 1$  and that  $\partial E[\Delta v^{SH}]/\partial b < 0$  at  $b = 1$ . This information and the continuity of (18) in  $b$  implies that there must be at least two values for  $b \geq \tilde{b}$  such that  $\partial E[\Delta v^{SH}]/\partial b = 0$ . This would be necessary for  $E[\Delta v^{SH}] < 0$ . Hence, finally we prove that this cannot be the case.

1. If  $b = \tilde{b}$ , (18) simplifies to

$$E[\Delta v^{SH}]|_{f=0} \geq 0 \Leftrightarrow 2 + a - \frac{a}{g} - \frac{4}{1+g} \geq 0. \quad (19)$$

This condition is equal to zero if  $a \leq -2g/(g+1) < 0$ . In addition,

$$\frac{\partial E[\Delta v^{SH}]|_{f=0}}{\partial a} = 1 - \frac{1}{g} \geq 0 \Leftrightarrow g \geq 1. \quad (20)$$

Both findings imply that  $E[\Delta v^{SH}]|_{f=0} > 0$ .

2. If  $b = 1$ , the budget constraint implies that  $a = 0$ , and (18) simplifies to

$$E[\Delta v^{SH}]|_{f=0} = 0. \quad (21)$$

In addition,

$$\frac{\partial E[\Delta v^{SH}]|_{f=0}}{\partial b} = (1-g) \leq 0 \Leftrightarrow g \geq 1 \quad (22)$$

at  $b = 1$ .

3. From the continuity of  $E[\Delta v^{SH}]|_{f=0}$  in  $b$ , the shareholder surplus can become negative for  $b \geq \tilde{b}$  only if there exist at least two values for  $b$  such that  $\partial E[\Delta v^{SH}]|_{f=0}/\partial b = 0$ . Hence,

$$\frac{\partial E[\Delta v^{SH}]|_{f=0}}{\partial b} = 0 \Leftrightarrow b \in \left\{ -\frac{\sqrt{a}}{\sqrt{2}\sqrt{g}}, \frac{\sqrt{a}}{\sqrt{2}\sqrt{g}} \right\}. \quad (23)$$

The first element of the above set is always smaller or equal than zero, which implies that it can never be in  $b \geq \tilde{b}$ . Thus, the conjecture has been proved. ■

Proposition 1 has several interesting implications. It shows that positive synergies ( $g \geq 1$ ) are in fact a sufficient condition for the *ex-post* acceptance of the merger plan. However, as can be seen from the proof of Proposition 1, positive synergies do not constitute a necessary condition. Expression (17) reveals the following:

**Corollary 1:** For ‘small’ values of  $b$  ( $b < \tilde{b}$ ) the shareholders are willing to accept a merger plan even with negative synergies,  $g < 1$ .

**Proof.** It follows from (17) that the shareholders accept the merger if

$$(g-1) \geq -\frac{b(1+b)}{(1-b)}.$$

The right-hand side of this condition is smaller or equal to zero, which proves the claim. ■

Simply laying off one of the two managers potentially reduces the total wage bill of both firms. In this case, the shareholders accept the proposal even with negative technological synergies.

Another implication of Proposition 1 is summarized as:

**Corollary 2:** There exists a critical value for the incentive intensity,

$$\tilde{b} = \frac{g-1}{g+1},$$

with the following property: for all incentive intensities  $b < \tilde{b}$ , the optimal shareholder policy implies rewarding the minimum severance payment,  $f^* = \frac{2bg+a}{1+b}$ , which just induces the managers to avoid all influence activities. Given incentive intensities  $b > \tilde{b}$ , the optimal severance payment equals zero,  $f^* = 0$ .

This corollary follows directly from the proof of Proposition 1. Figure 1 illustrates the contingency of the critical severance payment  $\tilde{b}$  on the possible synergies which can be realized by merging the two firms.

Insert Figure 1 about here!

Corollary 2 implies that the direct incentive part  $b$  and the severance payment  $f$  are to some extent substitutes from the point of view of the shareholders. The variable compensation component always induces the manager to internalize at least part of the impact of her influence activities on the post-merger firm value. Clearly, the degree of internalization increases with  $b$ . For sufficiently high-powered management-compensation schemes, severance pay becomes obsolete. The effect of the severance payment in inducing less aggressive contest behavior does not compensate for the cost of this payment itself.

Note that the same argument can be made for increases in the synergy gains. Given the incentive intensity  $b$ , an increase in  $g$  implies more gains from the merger which are internalized via the manager's compensation scheme upon retention as the contest winner. Thus, "golden handshakes" only improve the expected surplus of the shareholders, if the management compensation scheme does not induce an appropriate sensitivity with respect to the effect of influence activities on the future firm values. Severance payments and incentive intensities both constitute instruments to control management behavior in a takeover battle.

Next we can compare the income levels of the successful and the defeated manager. The severance payment necessary to induce  $R_i^* = 0, R_j^* = \epsilon$  yields the effective wage  $a + b(2g - f) = (2bg + a)/(1 + b)$  for the contest winner. This wage income equals the severance payment of the defeated manager.

**Corollary 3:** For 'low' values of  $b$  ( $b < \tilde{b}$ ) the severance payment  $f^*$  is a "golden handshake" in the sense that each manager would be equally well off if being in office or being laid off. For 'high' values of  $b$  ( $b \geq \tilde{b}$ ) the severance payment  $f^*$  is equal to zero and therefore does not constitute a "golden handshake," the successful manager is better off ex post than the defeated manager.



In the symmetric case the existence of a golden handshake not only implies that each manager is indifferent between being laid off and being in office. Also both, the successful and the defeated manager are equally well off.

Having established the existence of a merger equilibrium we can finally analyze its structure in greater detail. The comparative static analysis of (13) further allows to obtain insights into the possible effects of the compensation scheme on management behavior in contest equilibrium. Given an interior solution,<sup>14</sup>

$$\frac{\partial R_i^*}{\partial a} = \frac{1}{4bg} > 0, \quad (24)$$

$$\frac{\partial R_i^*}{\partial b} = \frac{f-a}{4b^2g} \begin{matrix} \leq 0 \\ \geq 0 \end{matrix} \Leftrightarrow f \begin{matrix} \leq \\ \geq \end{matrix} a, \quad (25)$$

$$\frac{\partial R_i^*}{\partial g} = \frac{(1+b)f-a}{4bg^2} \begin{matrix} \leq 0 \\ \geq 0 \end{matrix} \Leftrightarrow (1+b)f \begin{matrix} \leq \\ \geq \end{matrix} a. \quad (26)$$

Clearly, from the point of view of each manager an increase in the salary part  $a$  of his compensation increases the attractiveness of remaining in office. The managers are induced to increase their influence activities. Moreover, with higher incentive intensities the retained manager benefits more strongly from the possible merger synergies. However, the direction of the respective impact on the managers contest behavior depends on the benefit of remaining in office relative to leaving office. Obviously, a similar trade-off applies to variations of the synergy parameter  $g$ . Using the optimal severance payment  $f^*$ , however, we get

$$\frac{\partial R_i^*}{\partial b} = \begin{cases} -a/(4b^2g) < 0, & b \geq \bar{b} \\ \frac{4g+a}{4gb(1+b)} > 0, & b < \bar{b} \end{cases},$$

$$\frac{\partial R_i^*}{\partial g} = \begin{cases} -a/(4bg^2) < 0, & b \geq \bar{b} \\ 1/g > 0, & b < \bar{b} \end{cases}.$$

This finding is intuitive: for large values of  $b$  the managements sufficiently internalize the adverse effects of their contest behavior on the future firm values. Hence, increasing the incentive intensity leads to an even more effective internalization. By the same argument, an increase in synergies increases the potential loss of influence activities. This effect is negative from the point of view of a manager given that his incentive intensity is sufficiently high. On the other hand, starting from a low level of incentive intensity increasing this intensity and the synergies increases influence activities even with optimal severance payments.

<sup>14</sup>We include  $f = f^*$  in the term 'interior solution' because the right partial derivative of  $R_i^*$  is meaningfully defined at that point.

### 3.2 Powered vs. non-powered severance payments

Given the managers' compensation schemes, the optimal shareholder policy defined in Corollary 2 requires a severance payment

$$f^* = \begin{cases} \tilde{\Phi} & \text{if } g \geq \frac{1+b}{1-b} \\ 0 & \text{if } g < \frac{1+b}{1-b} \end{cases}$$

Severance payments in terms of shares may be more effective than monetary payments because they vary with the PDV of the merged firm, which in turn depends on the influence activities of the managers. In order to investigate the effects of such a "powered severance pay" the attention will be restricted to symmetric compensation schemes which only offer variable pay. Hence,  $a = 0$ ,  $i = 1, 2$ , in the following. Then, let

$$f^d = \frac{b}{d}V \quad (27)$$

be the severance payment as a fraction of the variable income the manager would have earned if he had been successful. The parameter  $d \in [0, \infty)$  can be set by the shareholders at stage 0. The decision problem of stage 2 is not affected by this modification. Maximization of the managers' expected incomes at stage 1 yields

$$R_1^* = R_2^* = \frac{g}{2} \left( 1 + \frac{1}{b-d} \right) \quad (28)$$

as the candidate for an interior equilibrium. Hence, the influence activities,  $R_i^*$ , are increasing in  $d$  and decreasing in  $b$ . A reduction in the "poweredness" of the severance payment induces more aggressive behavior of the managers, since winning the contest becomes more attractive. At the same time, an increase in  $b$  enhances the internalization of the adverse effects of the influence activities. Thus, it also induces more aggressive behavior. The following can then be shown.

**Proposition 2:** The total monetary severance payment necessary to induce the managers to completely withdraw from influence activities is independent of the "poweredness" of the severance pay.

**Proof.** Setting (28) equal to zero in order to investigate the corner solution  $R^* = 0$  yields  $\tilde{d} = 1 + b$ . It is then easily obtained that (recalling  $a = 0$ )

$$f_{d=\tilde{d}}^d = \frac{b}{1+b}V = \frac{2bg}{1+b} = \tilde{\Phi}. \quad (29)$$

Thus, the actual value of the "powered handshake" is exactly the same as under the fixed severance pay solution discussed before. ■

Hence, the medium of the severance payment – lump sum or related to the PDV – is not decisive for the behavior of the managers as long as  $a_i = 0$ . Rather, management behavior only depends on the absolute value of this payment. The shareholders cannot economize on payments by promising shares of the merged firm as a compensation for the losing manager.

### 3.3 The general case

In this section we turn to the case of general incentive schemes  $\{a_1, a_2, b_1, b_2, f_1, f_2\}$ . However, a complete characterization of the equilibrium is impossible. The problem structure is too complex to allow for the determination of a closed-form solution. Yet, differences in the wage structure of the managers can be shown to constitute an important factor in explaining different contest behaviors. We therefore assume that the manager behavior at stage 1 is compatible with the *ex-post* participation constraint of the shareholders. This allows to focus on some general patterns of management behavior in case of asymmetric incentive schemes.

First, the severance payment that induces the managers not to invest in the contest will always constitute a “golden handshake.”

**Proposition 3:** The minimum severance payment which induces each manager to completely withdraw from influence activities guarantees that the manager incurs no income loss if leaving office, hence it is a “golden handshake.” Stronger synergies associated with merging the two firms yield a higher benefit for the manager leaving office.

**Proof.** Analyzing conditions (10) and (11) reveals minimum severance payments for manager  $i$  conditional on the respective severance pay offer for manager  $j$ , such that the respective influence activities become zero. These minimum payments values are given by

$$F_i(f_j) = a_i + b_i[2g - f_j], \quad i, j = \{1, 2\}, \quad i \neq j. \quad (30)$$

It follows immediately that they are equal to the income of the manager if maintaining office, which implies the “golden handshake.” For positive  $b_i$  they are increasing in  $g$ , which proves the last part of the proposition. ■

Hence, as in the symmetric case, severance payments have to be “golden” if the shareholders wish to avoid investments in the conflict. The severance payments  $F_i(f_j)$ ,  $i, j = \{1, 2\}$  and  $i \neq j$ , which avoid the occurrence of influence activities do not compensate for past income claims. In order to provide incentives not to waste firm resources in the takeover contest, the “golden handshake” has to internalize the potential income gain associated with heading the merged firm. However, contrary to the symmetric case this does not imply that both, the successful and the defeated manager are

equally well off. It is possible that the severance payment to the laid-off manager exceeds the wage of the successful manager and vice versa.

Next we will analyze the relationship between  $f_i$  and  $f_j$  on the one hand and the lay-off decision by the shareholders on the other hand. In particular, we are interested whether it is optimal to offer a severance payment to only one manager or to both managers. It seems intuitive that if the shareholders coordinate on a lay-off and severance-pay decision at stage 0 they will agree to offer the manager with the higher wage rate a severance pay and to retain the “cheaper” manager. As we will see in the following this need not be true.

Hence, assume that the shareholders wish to minimize the influence activities of their managers. They can agree to retain manager  $j$  by offering a severance pay  $F_i(f_j) = a_i + b_i[2g - f_j]$  to manager  $i$ . It follows from (30) that  $\partial F_i(f_j)/\partial f_j = -b_i < 0$ . Clearly,  $f_j$  only constitutes a ‘virtual’ severance pay offer, if manager  $i$  has already been selected to be dismissed. Nevertheless, the severance payment sufficient to completely crowd out manager  $i$ ’s influence activities decreases with the severance pay level offered to manager  $j$ . This has an important implication.

**Proposition 4:** Assume that the shareholders wish to minimize the influence activities of their managers. The shareholders minimize the total management compensation costs by maximizing the ‘virtual’ severance payment to the retained manager.

**Proof.** Denote the virtual severance offers to managers  $i$  and  $j$  in case that the shareholders agree to retain this manager by  $f_i^v, f_j^v$ . Given this notation, the total wage bill paid by the shareholders if manager  $j$  (manager  $i$ ) is laid off is equal to  $WB(j) = w_i + f_j$  ( $WB(i) = w_j + f_i$ ). By insertion it follows

$$WB(j) = a_i + (1 - b_i)a_j + (b_i + b_j - b_i b_j)2g - (1 - b_i)b_j f_i^v, \quad (31)$$

$$WB(i) = a_j + (1 - b_j)a_i + (b_i + b_j - b_i b_j)2g - (1 - b_j)b_i f_j^v. \quad (32)$$

The wage bills are decreasing in the virtual severance payments. Shareholders are interested in actually maximizing the virtual severance pay. ■

Recall that the severance pay must at least compensate for the loss of the job. Hence, cost minimization plausibly implies that the virtual severance payment does not exceed the actual severance payment. We will add this condition as an additional constraint in the following. Imposing the restrictions  $f_i^v \leq f_j$  and  $f_j^v \leq f_i$  yields severance payments

$$f_j = f_i^v = \frac{a_j + b_j 2g}{1 + b_j}, \quad f_i = f_j^v = \frac{a_i + b_i 2g}{1 + b_i}. \quad (33)$$

The difference in wage bills then equals

$$\begin{aligned} \Delta WB_{i,j} &:= WB(i) - WB(j) \\ &= \frac{b_i + b_j}{(1 + b_i)(1 + b_j)} ((1 + b_i)a_j - (1 + b_j)a_i + 2g(b_j - b_i)). \end{aligned} \quad (34)$$

Given Proposition 4, the following can then be established.

**Proposition 5:** Suppose that the ‘virtual’ severance pay offered to the manager who will be retained does not exceed the actual dismissal costs. Further assume that the shareholders wish to minimize the influence activities of their managers.

1. If  $g \geq 1/2$  and  $a_i = a_j$ , it is better to retain manager  $i$  if and only if  $b_i < b_j$ .
2. If  $b_i = b_j$ , it is better to retain manager  $i$  if and only if  $a_i < a_j$ .
3. It is possible that manager  $i$  should be laid off even though  $a_i + b_i < a_j + b_j$ .

**Proof.** 1. If  $a_i = a_j = a$ , (34) simplifies to  $\Delta WB_{i,j} > 0 \Leftrightarrow (b_i - b_j)(a - 2g) > 0$ . The second term of the product is negative irrespective of  $a$  if  $g \geq 1/2$ . Hence,  $\Delta WB_{i,j} > 0 \Leftrightarrow b_i < b_j$ .

2. If  $b_i = b_j = b$ , (34) simplifies to  $\Delta WB_{i,j} > 0 \Leftrightarrow (a_j - a_i)(1 + b) > 0$ . The second term is positive, hence,  $\Delta WB_{i,j} > 0 \Leftrightarrow a_i < a_j$ .

3. We show the third part of the proposition by means of an example. Assume that  $g = 2$ ,  $a_i = 0.1$ ,  $b_i = 0.1$ , and  $a_j = 0.2$ . This yields  $\Delta WB_{i,j} = -0.28 + 3.9b_j$ . As a consequence, the wage bill if manager  $i$  is laid off is smaller than the wage bill if manager  $j$  is laid off as long as  $b_j < 0.0717949$  irrespective of the fact that the incentive scheme of manager  $j$  is more costly.

■

Parts 1 and 2 of the proposition capture the intuitive part: as long as the fixed (variable) parameter of the salary scheme is the same for both managers, the shareholders should always retain the manager with the smaller variable (fixed) parameter. This conclusion is, however, not true in general. According to part 3, the effect is not driven by a higher incentive intensity,  $b$ , because this parameter influences the total wage paid.

Propositions 3–5 have exclusively focused on potential contest equilibria in which the managers’ influence activity levels are essentially equal to zero. For interior solutions, the impact of the severance payment on the influence behavior of the managers can further be characterized as follows:

**Proposition 6:** Consider a takeover battle in which both managers invest in influence activities. The following relationships hold:

1. If  $a_1 = a_2 = 0$  and  $f_1 = f_2 = 0$ , it follows that  $R_1 = R_2$  irrespective of  $b_1$  and  $b_2$ .
2. If  $b_1 = b_2$  and  $f_1 = f_2$ , it follows that  $R_1 < R_2 \Leftrightarrow a_1 > a_2$ .

3. If  $a_1 = a_2$  and  $f_1 = f_2 = 0$ , it follows that  $R_1 < R_2 \Leftrightarrow b_1 > b_2$ .
4. The influence of severance payments on the equilibrium influence activities are in general ambiguous.

**Proof.** Using (10) and (11), it follows that

$$\begin{aligned} \frac{R_1^*}{R_2^*} &= \frac{\frac{b_2(-f_2 + a_2 + b_2(-f_1 + 2g))(-f_1 + a_1 + b_1(-f_2 + 2g))^2}{g(b_1(f_2 - a_2) + b_2((1 + b_1)f_1 - a_1 + b_1(f_2 - 4g)))^2}}{\frac{b_1(-f_2 + a_2 + b_2(-f_1 + 2g))^2(-f_1 + a_1 + b_1(-f_2 + 2g))}{g(b_1(f_2 - a_2) + b_2((1 + b_1)f_1 - a_1 + b_1(f_2 - 4g)))^2}} \\ &= \frac{b_2 f_1 - (a_1 + b_1(2g - f_2))}{b_1 f_2 - (a_2 + b_2(2g - f_1))}. \end{aligned} \quad (35)$$

Parts 1-3 of Proposition 6 follow directly. Without loss of generality it can be shown for manager 1 that<sup>15</sup>

$$\begin{aligned} \frac{\partial R_1^*}{\partial f_1} &= \frac{-b_2[-f_1 + F_1(f_2)][b_2[F_1(f_2) - f_1] + 2[F_2(f_1) - f_2]]}{g[b_1[-f_2 + F_2(f_1)] + b_2[-f_1 + F_1(f_2)]]^2} \\ &\quad + \frac{2b_2(1 + b_1)b_2[-f_2 + F_2(f_1)][-f_1 + F_1(f_2)]^2}{g[b_1[-f_2 + F_2(f_1)] + b_2[-f_1 + F_1(f_2)]]^3}, \end{aligned} \quad (36)$$

$$\begin{aligned} \frac{\partial R_1^*}{\partial f_2} &= \frac{-b_2[-f_1 + F_1(f_2)][[F_1(f_2) - f_1] + 2b_1[F_2(f_1) - f_2]]}{g[b_1[-f_2 + F_2(f_1)] + b_2[-f_1 + F_1(f_2)]]^2} \\ &\quad + \frac{2b_1(1 + b_2)b_2[-f_2 + F_2(f_1)][-f_1 + F_1(f_2)]^2}{g[b_1[-f_2 + F_2(f_1)] + b_2[-f_1 + F_1(f_2)]]^3}, \end{aligned} \quad (37)$$

where  $F_i(f_j)$  have been defined in (30) above. Note that the first terms in the two expressions are positive, while the second terms are negative. Hence, the signs of the expressions cannot be determined in general. ■

Part 1 together with part 3 of the proposition shows that it is the fixed salary part of the wage scheme that induces differences in the contest behavior of the managers: without severance payments and fixed salaries both managers will always invest the same amount of resources in the contest irrespective of  $b_i$ . However, as soon as fixed salaries exist (and still in the absence of severance payments), a stronger incentive intensity induces a less aggressive behavior of the manager. By the same argument, a larger fixed salary payment induces less aggressive behavior as long as both, the variable and the severance part are the same for both managers.

On first sight it may seem intuitive that larger severance payments discipline managers in takeover battles. However, this intuition cannot be confirmed when investigating the expressions (36) and (37). Only the first

<sup>15</sup>The respective calculations are delegated to Appendix 2.

terms in both reflect a direct disciplinary effect of the severance payments on the influence activities. Increasing the severance payment for manager 1, she has less to gain when succeeding in the contest. Similarly, increasing manager 2's severance pay offer also decreases the potential gain from winning the contest for manager 1. If manager 2 is actually dismissed, her severance payment must be financed by drawing on firm funds as well.

These two effects therefore induce an incentive to reduce the influence activity level for manager 1. However, due to the symmetry of the model, manager 2 may at the same time reduce her influence activity level as a response to an increase in the severance payment offered to either to herself or to manager 1. Hence, manager 1's marginal impact of increasing her influence activity level on the probability to win the contest increases. Consequently, the probability to succeed in a contest for a smaller benefit can be improved at lower costs. Thus, simultaneously, there always exist counteracting indirect incentives to engage in more influence activities when the severance pay offers are increased.

#### 4 Summary and conclusions

Models of takeover battles typically focus on the bidding process for shares, or, if considering management behavior, assume that one party can already be identified as the "target." In contrast, the current analysis has investigated a symmetric contest structure between two top managements. The managements' influence activities reduce the potential value of the merged firm. At the same time, shareholders can only agree to the merger plan proposed by the succeeding manager. Given this agreement, only one manager's incentive scheme is transferred to the new firm while the contest loser has to leave the firm.

However, the shareholders may decide to offer a severance payment. This payment generally constitutes a device to control the relative aggressiveness of the opposing managements. Due to counteracting direct and indirect effects, the severance-pay effect on the levels of influence activities generally remains ambiguous. As a general rule, however, the severance payment completely abolishing all incentives to initiate a takeover contest always constitutes a "golden handshake." The manager leaving office still benefits from the possible synergies associated with merging the two firms.

The analysis proceeds by investigating the benchmark case with identical management compensation schemes. The rational shareholder policy then chooses between the two particular solutions of the takeover contest. Relatively strong incentive intensities and low synergy gains imply that offering no severance pay dominates. If the reverse holds, the optimal severance pay always completely restrains the managers' influence activities. Since the compensation schemes misalign manager and shareholder interests with

respect to the potential benefits of mergers, inefficient mergers can occur.

The current study assumes that the compensation scheme as well as the decision to lay off one of the two managers if the firms are merged are exogenous. In contrast, Choi (2001) analyzes the turnover decision as an incentive device. However, the study exclusively investigates the principal-agent problem associated with aligning management and shareholder interests for the purpose of generating profitable mergers. Thus, the two contributions highlight opposite benchmark cases. While in Choi (2001) the distinction of hostile vs. friendly mergers is exogenous and the management incentive scheme endogenous, the current study addresses the aggressiveness of management behavior in contest equilibrium given exogenous management compensation schemes.

Further, Pugh et al. (2000) and North (2001) empirically investigate the impact of employee-stock ownership on the incidence of takeovers. While the latter finds a significant negative relationship between management ownership and the takeover likelihood, the former can only confirm that directly takeover related Equity-Stock Ownership Programs (ESOP) provide an effective protection against takeover threats. Moreover, Walker (2000) concludes that shareholder and management interests in the pursuit of a profitable takeover strategy are not well aligned when the merged firms' original business operations overlap. Hence, the focus of the former two studies appears to refer to an incentive-intensity effect, while the third contribution highlights a synergy effect – both also discussed within the current framework.

However, the symmetric contest analyzed above cannot address the issue of unsuccessful takeover activities or the choice of target firms. In order to pursue this line, the model would have to be enriched to explicitly consider the bargaining process between shareholders and management. The two parties then possess different strategic options to affect the incidence and organizational design of a proposed merger. Hence, the influence behavior of an aggressor will qualitatively differ from the defensive activities of a target firm's management. The corresponding contest structure will therefore be asymmetric with the roles of "aggressor" and "target" being determined endogenously as well. Thus, this line of argument calls for a completely different model structure and is therefore left for further research.



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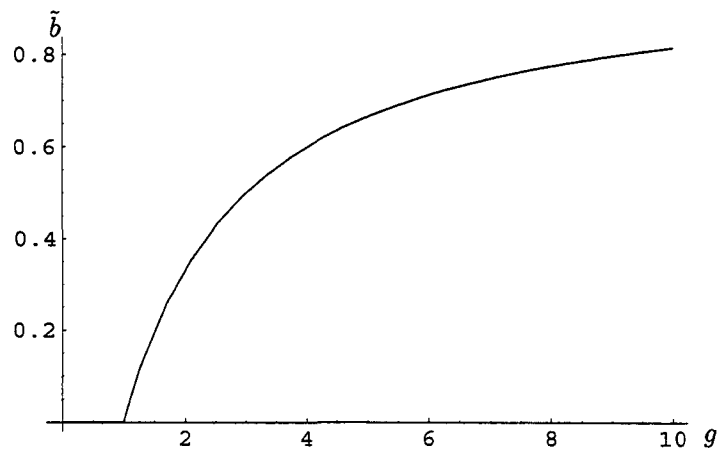


Figure 1: The critical incentive intensity  $\tilde{b}$  as a function of the synergy parameter  $g$ .

## Appendix 1: A brief case-study of the Mannesmann-Vodafone merger

British-based Vodafone emerged as a subdivision of Racal Electronics as recent as 1980<sup>16</sup>. In 1985, then-called Racal Telecom succeeded in winning the tender to operate Britain's second cellular telephone network and, subsequently, launched Vodafone. The company was first listed at the New York and London Stock Exchanges in October 1988 with 20% of its shares for float. It became completely independent when - in the largest company spin-off in UK industrial history - the remaining shares were issued in September 1991. In the year preceding the Mannesmann takeover, Vodafone took over the US mobile telephone company Airtouch and entered a joint venture with Bell Atlantic. In this year, Vodafone chairman Chris Gent may have earned up to £ 4 million by selling Vodafone shares.

In contrast, Mannesmann constituted one of Germany's oldest industrial firms<sup>17</sup>. Founded in 1885 as a steel company, it employed 119,000 workers with sales of EURO 19 billion in 1999. However, at this time the company derived one third of its revenues from telecommunications already. Reacting to the restructuring of the European steel sector, Mannesmann had developed to become Europe's largest private telecommunications firm by the end of the 1990s. This included initiating and operating Germany's second mobile telephone network and the takeover of Olivetti - only shortly after Olivetti had taken over Telecom Italia. Given this development, Mannesmann was able to successfully defend itself against a hostile takeover bid by the German steel and automotive company Thyssen in 1997<sup>18</sup>.

On February 4, 2000, the \$180.95 billion bid by Vodafone-Airtouch for Mannesmann finally settled the largest takeover ever. It also put an end to a takeover battle which began in November 1999. This involved at least EURO 15 million expenses on public and investor relations activities by each of the two rivals<sup>19</sup>. Vodafone alone spent as much as \$ 150 million on the investment bank advisors. During the takeover battle Mannesmann then unsuccessfully filed a law suit claiming a conflict of interest of the investment bank Goldman-Sachs. Vodafone's overall cost of the bid - including the Mannesmann advisory expenses, the restructuring of the joint-venture with Bell Atlantic, £ 100 million financing cost for the EURO 30 billion loan, and payments to the German banks for dealing the share tender - is estimated to reach £ 600 million<sup>20</sup>. Moreover, both the British Prime Minister and the German Chancellor issued supportive, respectively defensive political

<sup>16</sup>BBC News, *The rapid rise of Vodafone*, Business: The Company File, November 19, 1999.

<sup>17</sup>BBC News, *Mannesmann fights back*, Business: The Company File, November 19, 1999.

<sup>18</sup>Südwest Fernsehen, *Mann o Mann - Die Übernahmeschlacht Mannesmann-Vodafone ist geschlagen*, SALDO Wirtschaftsmagazin, February 7, 2000.

<sup>19</sup>Südwest Fernsehen, *Anzeigenkrieg: Mannesmann und Vodafone liefern sich beispiellose Werbeschlacht*, SALDO Wirtschaftsmagazin, January 24, 2000.

<sup>20</sup>Financial Express, *Mega harvest for advisors of Vodafone-Mannesmann Deal*, February 6, 2000.

statements during this process.

When faced with Vodafone's take-over bid, the Mannesmann board presented a restructuring plan which entailed selling off the automotive and tube divisions. Announced at the shareholder meeting on November 23, 1999, this obviously perfectly coincided with Vodafone's publicized plan upon successful takeover<sup>21</sup>. Both firms also heavily engaged in forming very similar strategic alliances during their takeover battle<sup>22</sup>. Mannesmann negotiated with the internet provider AOL, the French IT-consultancy Cap Gemini, and, in order to enhance its electronic banking potential, with Deutsche Bank. At the November 1999 shareholder meeting, Mannesmann also announced the takeover of the British-based mobile telephone network Orange. At the same time, Vodafone arranged internet-mobile telephone cooperations with IBM and Sun Microsystems and agreed with Swiss UBS on developing its electronic banking business. Both Mannesmann and Vodafone negotiated with the French Vivendi corporation in order to form an alliance. Vivendi finally cooperated with Vodafone on both Internet and telephone operations. Newly created Mannesmann-Vodafone immediately advanced attempts to sell off Orange again. It was sold to France Telecom in May 2000 then<sup>23</sup>.

The agreement between Vodafone and Vivendi has likely decided the takeover battle. Following its publication, Mannesmann Chairman Klaus Esser, then verbally attacked Vivendi Chairman Jean-Marie Messier. Messier, in turn, filed a law suit charging Esser with "libelling"<sup>24</sup>. This dispute in part certainly reflects the media attention directed at the very charismatic chairmen involved. However, Messier also claimed that Esser had received almost EURO 31 million in direct exchange for his agreement to the merger. Given this information, two German lawyers representing shareholder interests filed a law suit. On March 12, 2001, the General State Attourney at the Mannesmann headquarter in Düsseldorf then agreed to charge Esser with "unfaithfulness." Interestingly, the Director of the Supervisory Board of Mannesmann, Klaus Funk, is also charged. Moreover, 14 other Mannesmann top managers are thought to have received such "golden handshakes." Funded by large shareholders, Esser was able to distribute EURO 16.36 million among his former colleagues in the Mannesmann board of directors<sup>25</sup>.

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<sup>21</sup>Südwest Fernsehen, *Mann o Mann - Die Übernahmeschlacht Mannesmann-Vodafone ist geschlagen*, SALDO Wirtschaftsmagazin, February 7, 2000.

<sup>22</sup>Berliner Morgenpost, *Schlagabtausch im Internet*, Wirtschaft, February 1, 2000.

<sup>23</sup>Le Telegramme, *France Telecom décroche Orange*, Economie, May 30, 2000.

<sup>24</sup>BerlinOnline, *Vivendi-Chef Messier will Esser wegen Verleumdung verklagen*, April 4, 2001.

<sup>25</sup>BerlinOnline, *Mannesmann-Chef Esser zahlte nach Übernahme Prämien an Mitarbeiter*, March 25, 2001.

## Appendix 2: The reaction of the influence activity level to changes in the severance payments

Focussing on (10), it can be obtained that

$$\begin{aligned}
& \frac{\partial}{\partial f_1} (b_2(-f_2 + a_2 + b_2(-f_1 + 2g))(-f_1 + a_1 + b_1(-f_2 + 2g))^2) \\
&= -b_2(-f_1 + a_1 - b_1f_2 + 2b_1g) \times \\
&\quad \times (b_2a_1 - 3b_2f_1 - b_2b_1f_2 + 2a_2 + 4b_2g + 2b_2b_1g - 2f_2) \\
&= -b_2[-f_1 + F_1(f_2)] [b_2[F_1(f_2) - f_1] + 2[F_2(f_1) - f_2]] \quad (\text{A.1})
\end{aligned}$$

with  $F_i(f_j) = a_i + b_i[2g - f_j]$ .

Also,

$$\begin{aligned}
& \frac{\partial}{\partial f_2} (b_2(-f_2 + a_2 + b_2(-f_1 + 2g))(-f_1 + a_1 + b_1(-f_2 + 2g))^2) \\
&= -b_2(-f_1 + a_1 - b_1f_2 + 2b_1g) \times \\
&\quad \times (a_1 + 4b_2b_1g - f_1 - 3b_1f_2 - 2b_2f_1b_1 + 2b_1a_2 + 2b_1g) \\
&= -b_2[-f_1 + F_1(f_2)] [[F_1(f_2) - f_1] + 2b_1[F_2(f_1) - f_2]] \quad (\text{A.2})
\end{aligned}$$

Moreover,

$$\begin{aligned}
& \frac{\partial}{\partial f_1} \left( \frac{1}{g \left( (-b_1f_2 + b_1a_2 - b_2f_1 - b_2f_1b_1 + b_2a_1 - b_2b_1f_2 + 4b_2b_1g)^2 \right)} \right) \\
&= 2b_2 \frac{1 + b_1}{g \left( (-b_1f_2 + b_1a_2 - b_2f_1 - b_2f_1b_1 + b_2a_1 - b_2b_1f_2 + 4b_2b_1g)^3 \right)} \\
&= \frac{2b_2(1 + b_1)}{g [b_1[-f_2 + F_2(f_1)] + b_2[-f_1 + F_1(f_2)]]^3} \quad (\text{A.3})
\end{aligned}$$

and

$$\begin{aligned}
& \frac{\partial}{\partial f_2} \left( \frac{1}{g \left( (-b_1f_2 + b_1a_2 - b_2f_1 - b_2f_1b_1 + b_2a_1 - b_2b_1f_2 + 4b_2b_1g)^2 \right)} \right) \\
&= 2b_1 \frac{1 + b_2}{g \left( (-b_1f_2 + b_1a_2 - b_2f_1 - b_2f_1b_1 + b_2a_1 - b_2b_1f_2 + 4b_2b_1g)^3 \right)} \\
&= \frac{2b_1(1 + b_2)}{g [b_1[-f_2 + F_2(f_1)] + b_2[-f_1 + F_1(f_2)]]^3} \quad (\text{A.4})
\end{aligned}$$

Collecting terms yields (36) and (37) in the text.