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Takeover defenses, golden parachutes, and bargaining over stochastic synergy gains: a note on optimal contracting

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We incorporate managerial risk aversion and stochasticity of takeover synergy gains into Harris' (Harris, E.G. 1990. Antitakeover measures, golden parachutes, and target firm shareholder welfare. *Rand Journal of Economics* 21, no. 4 : 614–25.) bargaining model for the coexistence of antitakeover defenses and golden parachutes in corporate charters. We show that: (i) it is not always optimal that the target-firm shareholders adopt antitakeover defenses, (ii) the size of the golden parachute is proportional to the riskiness of the synergistic gains, and (iii) the target-firm shareholders are unequivocally better-off with golden parachutes than takeover-contingent stock options.

Keywords: golden parachutes; antitakeover defenses; tender offers; mergers and acquisitions

1. Introduction

Managers have gained substantially from takeovers of their firms in recent years. While large equity exposure can explain part of this wealth gain, golden parachutes have also contributed significantly.[1] Lambert and Larcker (1985) argue that these payments facilitate takeovers by compensating the managers of the target firm for the loss of 'benefits of control' from a successful takeover. Surprisingly, the majority of firms that pay out golden parachutes also adopt a variety of antitakeover defenses, which can thwart a corporate takeover.

Harris (1990) provides an elegant economic rationale for why shareholders might allow managers both golden parachutes and effective (legal) antitakeover measures. Antitakeover defenses effectively force the bidder to negotiate with the management of the target firm. Incumbent managers will always negotiate for a larger share of the synergy gains relative to non-managerial target shareholders because they stand to experience a significant job-related loss of utility as they most likely have no place in the post-acquisition firm.[2] If the post-takeover loss of utility is too large, however, target managers may demand a tender price that is unacceptable to the aquiring firm and thus effectively oppose a value-maximizing raid. Target shareholders can eliminate such an impasse by awarding target managers golden parachutes to offset the incumbent management's welfare loss in a takeover, thus providing an incentive mechanism to align managerial interests with maximizing shareholders' wealth.[3] Falaschetti (2002) also provides a rationale for how golden parachutes could enhance efficiency, especially during hostile bids, by

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increasing the credibility with which owners can commit against opportunism. He reports that the incidence of golden parachutes is more likely in firms with concentrated ownership in a sample of S&P 500 firms.

We generalize Harris' bargaining model by allowing for managerial risk aversion and stochasticity of synergy gains. More specifically, our generalization recognizes that target managers, with their physical as well as human capital disproportionately invested in their firm, are inherently poorly diversified and therefore quite likely to be risk averse.[4] In addition, the decisions regarding the adoption of antitakeover amendments and golden parachutes are made before the synergy gains from a corporate raid are realized. The timing of those decisions and the inherent uncertainty as to the economic performance of the post-acquisition firm clearly suggest that synergistic gains from takeovers are stochastic in nature.

Contrary to Harris' prediction, we show that it is not always optimal that target firms adopt antitakeover defenses in the presence of managerial risk aversion. It is possible for risk-averse target managers bargaining over stochastic gains to settle for a smaller fraction of synergy gains than what the risk-neutral target shareholders could have themselves bargained for. Our model also predicts that the size of the golden parachute is positively related to the riskiness of takeover premiums. Finally, consistent with Harris' model, we demonstrate that granting takeover-contingent equity would be more expensive to shareholders than golden parachutes.

In Section 2, we present our generalized version of Harris' model that explicitly incorporates managerial risk-averse behavior and the stochastic nature of synergistic gains. Concluding remarks are contained in Section 3.

2. Bargaining without antitakeover defenses

A firm, called the bidding firm or 'raider', seeks to redeploy the resources of another firm, called the target firm, toward higher-valued uses. Such redeployment necessitates complete control over the target firm's resources by the raider entailing, among other things, the dismissal of the current management of the target firm. The raider seeks to acquire the resources of the target firm by a tender offer. Recently, Lambert and Myers (2007) provide a real-options approach to explain when incumbent managers might allow value-increasing takeovers. Unlike Harris' model, their work provides an understanding of how the stochastic nature of the demand for a firm's products may play an important role in a takeover consideration. In our model, we abstract away from demand-side considerations but model the use of golden parachutes and antitakeover defenses when the gains from takeovers are stochastic (on an *ex-ante* basis). The basic agency cost underlying a takeover is key to both approaches. Incumbent managers with specialized human capital and rent-seeking abilities may not want to restart their careers after a takeover and antitakeover defenses and golden parachutes are used to overcome the manager's reluctance to act differently.

The exact gains from redeployment are not known at the time of a tender offer so that the raider makes the acquisition decision based on the probability distribution of such gains. Let S reflect the net synergy gains from a takeover, where S is a random variable with a probability density function given by $F(S)$ and having bounded support $[S_L, S_H]$, with $S_L, S_H > 0$ and $S_L < S_H$. All parties are assumed to be perfectly informed. Once a tender offer is made, the underlying distribution becomes common. The synergy gains are realized if an acquisition agreement is reached.

Let δ denote the proportion of synergy gains received by the target-firm shareholders, β_m represent the proportion of the target firm's shares held by the incumbent management, and E be the mathematical expected value. If the target firm has not adopted antitakeover defenses, the equilibrium of the (symmetric information) Nash bargaining game between shareholders of the

raiding and target firms solves

$$\max_{\delta}[(1-\delta)E(S)][(1-\beta_m)\delta E(S)]. \tag{1}$$

The outcome of this bargaining problem yields $\delta^* = 0.5$.

2.1 *Bargaining with antitakeover defenses*

Alternatively, the non-managerial shareholders of the target firm may choose to delegate negotiating power to the firms' management by adopting credible antitakeover defenses. The target manager's inability to diversify and his post-takeover costs create a significant difference between his incentives to complete a takeover and those of the firm's non-managerial shareholders. It is this asymmetry in payoff that can be successfully exploited by the target shareholders to negotiate a larger portion of the synergy gains.

Let Z represent the known dollar value of losses incurred by the target manager if his employment were terminated in the case of a successful takeover. The net gains from a takeover to the target manager can be written as $E[U(\beta_m\delta S) - Z]$, where $U(\cdot)$ is the manager's utility for income with $U'(\cdot) > 0$ and $U''(\cdot) < 0$. The Nash bargaining solution implies the value of δ, denoted by $\hat{\delta}$, that maximizes

$$\hat{\delta} = \arg\max_{\delta}[(1-\delta)E(S)][E(U(\beta_m\delta S)) - Z]. \tag{2}$$

The first-order condition for this bargaining problem yields

$$\hat{\delta} = 1 - \Phi, \text{ where } \Phi = \frac{EU(\beta_m\hat{\delta}S) - Z}{\beta_m E[U'(\beta_m\hat{\delta}S)S]}. \tag{3}$$

Under managerial risk aversion, the optimal solution given by Equation (3) leads to three cases. First, if $\hat{\delta} < 0.5$ (when $\Phi > 0.5$), the non-managerial shareholders are better off not providing the managers with any antitakeover defenses. Unlike Harris' finding, in this model $\hat{\delta}$ is not always greater than $\delta^* = 0.5$ and thus it is not always true that the incumbent management will drive a harder bargain than the non-managerial shareholders. In particular, if the target manager is very risk averse he may actually have a weaker bargaining position than the risk-neutral target shareholders (this is particularly the case if the target manager also has a relatively small private benefit of control). A numerical example using a constant-relative-risk-aversion (CRRA) utility function with realistic parameter values that produces this outcome ($\hat{\delta} < 0.5$) is provided in Appendix A.

PROPOSITION 1 *In the presence of antitakeover measures, it is not always optimal that the incumbent management will negotiate for a larger portion of the synergy gains than the non-managerial shareholders.*

Second, if $\delta \in (0.5, 1)$, it would be welfare-enhancing for the target non-managerial shareholders to delegate the negotiating authority to the managers since bargaining for themselves would result in a reduction of their wealth as $\hat{\delta} > 0.5$. Furthermore, the greater the takeover-related loss to the manager, the larger is the share of the synergy gains, $\hat{\delta}$, obtained by the target firm (as $\mathrm{d}\hat{\delta}/\mathrm{d}Z > 0$ in Equation (3)).

Finally, if Z is large enough so that $EU(\beta_m\hat{\delta}S) - Z < 0$, then $\hat{\delta} > 1$ implying that that the takeover would not occur since both the manager and the raider would receive negative returns.

Under such circumstances, the target shareholders would be better off if they did not provide antitakeover defenses to the incumbent management and obtain $\delta^* = 0.5$ in the bargaining problem in Equation (1).

In the above circumstance, the non-managerial shareholders can still allow managers to have credible antitakeover defenses but at the same time compensate them for some of the takeover-related disutility by offering a golden parachute.

2.2 *Bargaining with golden parachutes*

Let P denote the dollar value of the golden parachute that the shareholders of the target firm decide to provide their manager. The corresponding shareholders' problem can be written as

$$\underset{P}{\text{Max}}(1-\beta_m)\tilde{\delta}(P)E(S-P) \tag{4}$$

subject to

$$\text{(i)} \quad P \geq 0. \tag{4.1}$$

$$\text{(ii)} \quad \tilde{\delta}(P) \leq 1. \tag{4.2}$$

$$\text{(iii)} \quad \tilde{\delta}(P)[E(S)-P] \geq 0.5E(S); \;\; P=0 \;\text{ and }\; \delta = 0.5_{\text{otherwise.}} \tag{4.3}$$

$$\text{(iv)} \quad \tilde{\delta}(P) = \underset{\delta}{\arg\max}\,[(1-\delta)E(S-P)]\,[EU(\beta_m\delta[S-P]+P)-Z]. \tag{4.4}$$

The first three constraints lay out the basic rules governing the payment of golden parachutes. Golden parachutes must be nonnegative (constraint 4.1), must be set such that there can be a successful raid (constraint (4.2)), and must enable the shareholders to be at least as well off as they would be if they were bargaining for themselves (constraint (4.3)). The last constraint (4.4) is that $\tilde{\delta}(P)$ is determined by the Nash bargaining game between the raider and the target manager (incentive compatibility constraint). From Equation (4.4), $\tilde{\delta}(P)$ is given by

$$\tilde{\delta}(P) = 1 - \frac{EU(\beta_m\tilde{\delta}[S-P]+P)-Z}{\beta_m E[U'(\beta_m\tilde{\delta}[S-P]+P)[S-P]]}. \tag{5}$$

PROPOSITION 2 *The optimal solution of the shareholder's problem in Equation* 4 *is to choose* P *such that the manager's expected utility,* $EU(\beta_m\delta(S-P)+P)-Z$*, is infinitesimally greater than zero so that* $\tilde{\delta}$ *is infinitesimally less than unity.*

Proof From Equation (5) it follows that the shareholder will not choose a P such that $EU[(\beta_m\delta(S-P)+P)-Z] < 0$, since this would imply no successful raids ($\tilde{\delta} > 1$). Also since $d\tilde{\delta}/dP < 0$ for all P such that $EU[(\beta_m\delta(S-P)+P)-Z] \geq 0$, shareholders can do no better than setting $P = P^*$ such that $\tilde{\delta}$ is infinitesimally less than unity as long as $P^* < 0.5E(S)$. If $P^* > 0.5E(S)$ non-managerial shareholders would be better off bargaining with the raider directly. □

Proposition 2 suggests that target shareholders will grant golden parachutes in such a way so as to induce the incumbent management to negotiate a successful takeover with the target shareholders receiving almost all synergy gains.

In addition, the analytical framework enables us to derive a relationship between the optimal level of golden parachutes and the riskiness of synergistic gains.

PROPOSITION 3 *If the optimal level of golden parachute is positive, then the greater the riskiness (in the sense of Rothschild and Stiglitz* (1970)) *of the synergy gains, the larger the level of golden parachute chosen by the non-managerial shareholders.*

Proof Let P^* denote the optimal level of golden parachutes. If $P^* > 0$, it solves $EU(\beta_m \delta(S - P^*) + P^*) - Z = 0$. Define $EV(X; Z; r) = EU(\beta_m \delta(S - P^*) + P^*) - Z = 0$, where $X = \beta_m \delta(S - P^*) + P^*$, and r is an index of risk. Rothschild and Stiglitz (1970) show that if X_{r1} is less risky than X_{r2}, then $EV(X; Z; r_1) > EV(X; Z; r_2)$ for any strictly concave utility function. Let P^* and P' be the levels of golden parachutes that solve $EV(X; Z; r_1) = 0$ and $EV(X; Z; r_2) = 0$, respectively. If $P^* = P'$, then $EV(X; Z; r_1) = 0$ implying $EV(X; Z; r_2) < 0$. Since $EV(X; Z; r_2)$ is increasing in P, it must be the case that $P^* < P'$. □

Due to their risk aversion, the incumbent managers will require more compensation the greater is the risk associated with the synergy gains. The managers are exposed to such risk as they are partial shareholders of the target firm.[5]

2.3 *Bargaining with stock options*

The role of golden parachutes in the above analysis is to ensure that the post-raid utility of the manager is non-negative. Several studies on the adoption of golden parachutes note that these contracts signal managerial entrenchment (see, for example, Subramaniam and Daley (2000) and Subramaniam (2001)). Evans, Noe, and Thornton (1997) report evidence in support of managerial opportunism in golden parachute adoption in the banking industry. Hall and Anderson (1997) however find a significant positive relationship between the size of the golden parachute relative to the firm's market value and the market's reaction to its adoption, thus bolstering the incentive alignment hypothesis. Given the mixed empirical findings, it is important to look at an alternative to golden parachutes. Takeover-contingent stock options could potentially serve the same purpose and be less controversial.

Let γ denote the proportion of shares awarded to the incumbent manager when the post-raid losses to the manager are such that raids are not feasible, that is, when $\hat{\delta} > 1$. Incorporating both golden parachutes and stock options into the analysis, the non-managerial shareholders' problem can be written as

$$\underset{\gamma,\ P}{\text{Max}}\ (1 - \beta_m - \gamma)\delta(P, \gamma)[E(S) - P] \tag{6}$$

subject to

$$\text{(i)} \quad \gamma,\ P \geq 0. \tag{6.1}$$

$$\text{(ii)} \quad \hat{\delta}(P, \gamma) \leq 1. \tag{6.2}$$

$$\text{(iii)} \quad \hat{\delta}(P, \gamma) = \arg\max_{\delta}\ [(1 - \delta)E\{S - P\}]\ [EU((\beta_m + \gamma)\delta[S - P] + P) - Z]. \tag{6.3}$$

$\hat{\delta}(P, \gamma)$ denotes the solution to the Nash bargaining game between the incumbent manager and the raider in the case where both golden parachutes and stock options are issued.[6]

PROPOSITION 4 *The non-managerial shareholders would never find it profitable to issue takeover-contingent stock options as long as they can issue golden parachutes.*

Proof We know that if $\hat{\delta} < 1$ it is optimal for the shareholders to provide neither takeover-contingent stock options nor golden parachutes, *i.e.*, $P = 0$ and $\gamma = 0$. We also know that if $\hat{\delta} > 1$, $P = 0$, and $\gamma = 0$, no takeovers will take place. Hence the non-managerial shareholders' maximization problem in Equation (6) is relevant only if $\delta \leq 1$ is a binding constraint. Since it is a binding constraint, it will hold with an equality. If we impose this condition on the manager's bargaining decision, we can replace constraint (6.2) with $EU((\beta_m + \gamma)(S - P) + P) - Z = 0$. Intuitively, the non-managerial shareholders set P and γ so that the manager is indifferent concerning the takeover. The shareholders' problem can now be rewritten as

$$\underset{\gamma,\ P}{\text{Max}}\ \pi = (1 - \beta_m - \gamma)\delta(P, \gamma)[E(S) - P] \tag{7}$$

subject to

$$\text{(i)} \quad EU((\beta_m + \gamma)(S - P) + P) - z = 0. \tag{7.1}$$

$$\text{(ii)} \quad \gamma,\ P \geq 0. \tag{7.2}$$

Next we want to show that the solution to Equation (7) is characterized by $\gamma = 0$. To do this, it is sufficient to show that $\mathrm{d}\pi/\mathrm{d}P > 0$. This implies that, given a positive level of stock options, non-managerial shareholders can always increase their wealth by increasing the level of golden parachutes. This suggests that the level of stock options should be zero in equilibrium. Since

$$\frac{\mathrm{d}\pi}{\mathrm{d}P} = \frac{\mathrm{d}\pi}{\mathrm{d}P} + \frac{\mathrm{d}\pi}{\mathrm{d}\gamma}\frac{\mathrm{d}\gamma}{\mathrm{d}P}, \tag{7.3}$$

deriving each part in Equation (7.3), imposing the condition that $\hat{\delta}(P,\ \gamma) = 1$ in equilibrium, and simplifying yields the relationship

$$\frac{\mathrm{d}\pi}{\mathrm{d}P} = -(1 - \beta_m - \gamma)\left(1 - \frac{E[U'(\cdot)]E(S - P)}{E[U'(\cdot)(S - P)]}\right). \tag{7.4}$$

Since $E[U'(\cdot)(S - P)] = E[U'(\cdot)]E(S - P) + \mathrm{Cov}[U'(\cdot), (S - P)]$ and $\mathrm{Cov}[U'(\cdot), (S - P)] < 0$ from the strict concavity of the utility function, we obtain $E[U'(\cdot)]E(S - P)/E[U'(\cdot)(S - P)] > 1$. This ensures that $\mathrm{d}\pi/\mathrm{d}P > 0$ in Equation (7.4). □

3. Conclusions

In the presence of managerial risk aversion and stochastic synergy gains from takeovers, we show that delegating negotiating power to the incumbent management via the adoption of antitakeover defenses is not always optimal for non-managerial target shareholders. The analytics also demonstrates that the size of golden parachutes varies positively with the riskiness of synergy gains. Providing incumbent managers with takeover-contingent stock options is always more expensive than providing them with golden parachute payments.

Our generalization of Harris' model also offers new testable hypotheses. Measures of risk aversion of the target-firm managers (for example, length of tenure and size of stock holding) may be an important determinant for the adoption of both golden parachutes and antitakeover amendments. Also, one would expect larger golden parachutes to target managers in mergers where the synergy gains are more uncertain. Finally, the composition of golden parachutes of more risk-averse target managers is predicted to be more cash based (as opposed to equity based).

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Notes

1. Hartzell, Ofek, and Yermack (2004) report that, in their sample of firms acquired between 1995 and 1997, golden parachutes were on average as large as 30% of the gains in stock and option holdings.
2. Hartzell, Ofek, and Yermack (2004), among others, report high turnover rates of target managers following corporate control activity.
3. Comment and Schwert (1995) provide evidence supportive of the bargaining model in adopting antitakeover defenses. They note that these measures have been 'reliably associated with higher takeover premiums for selling shareholders, both conditionally and unconditionally on a successful takeover.'
4. For example, Bryant (1997) cites statistics suggesting that top executives hold more than one-third of their net worth in their own firm's stock.
5. Narayanan and Sundaram (1998) report that firms adopting golden parachutes have a substantially higher level of systematic risk than the typical firm.
6. We assume the exercise price of the stock options to be zero.

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Appendix A

We need to show that a risk-averse manager can maximize his utility with a lower share of the synergy gains than a risk-neutral shareholder. Since we know that the shareholders always chooses $\delta = 0.5$ we need to show that the managers can choose $\delta < 0.5$.

Assume that the manager has a CRRA utility function, that is,

$$U(.) = \frac{1}{1-R}(\delta\beta_m S)^{1-R}, \tag{A1}$$

where R is the coefficient of relative risk aversion. Then Equation (3) in the text becomes

$$1 - \delta = \frac{1/1 - R(\delta\beta_m S)^{1-R} - Z}{\delta^{-R}\beta_m^{1-R} E S^{1-R}}. \tag{A2}$$

Denote the value of δ which solves Equation (A2) by $\hat{\delta}$ and define

$$k = \frac{Z}{1/1 - RE(\hat{\delta}\beta_m S)^{1-R}}. \tag{A3}$$

Substituting Equation (A3) into (A2) and solving for $\hat{\delta}$ yields

$$\hat{\delta} = \frac{1-R}{2-R-k}. \tag{A4}$$

Thus, if $R = 0.8$ and $k = 0.5$, then $\hat{\delta} = 0.286$. For this to be a valid example, it is necessary that $Z > 0$. Since $EU(.) > 0$, then $Z = k\,EU(.) > 0$.