GOVERNANCE AND THE EFFICIENCY OF ECONOMIC SYSTEMS
GESY

Discussion Paper No. 328

Commitment in R&D Tournaments via Strategic Delegation to Overoptimistic Managers

Florian Englmaier*

*University of Munich, Ludwigstr. 28 III VG, 80539 Munich, Germany, Phone: +49 89 2180 3916,
E-mail: englmaier@lmu.de

July 2010

Financial support from the Deutsche Forschungsgemeinschaft through SFB/TR 15 is gratefully acknowledged.

Commitment in R&D Tournaments via Strategic Delegation to Overoptimistic Managers*

Florian Englmaier†

March 18, 2010

This paper shows that it is profitable for a firm to hire an overoptimistic manager to commit to a certain investment strategy in an R&D tournament situation. In the unique symmetric equilibrium, all firms delegate to overoptimistic managers, where the optimal degree of overoptimism depends on the riskiness of the tournament. In these situations a manager's type may serve as a substitute for delegation via contracts. By delegating to overoptimistic managers, firms can escape the rat race nature of R&D tournaments.

JEL classification: J 32, J 33, M 12
Keywords: Strategic Delegation, Overoptimism, Tournaments

*I am indebted to Tobias Böhm, Ray Rees, Anno Stolper, and Hans Zenger for their detailed comments and suggestions.

†University of Munich, Ludwigstr. 28 III VG, 80539 Munich, Germany, Phone: +49 89 2180 3916, englmaier@lmu.de

1 Introduction

"Life's battles don't always go to the stronger or faster man. But sooner or later the man who wins, is the man who thinks he can."

Vince Lombardi (American Football Coach, 1913-1970)

Steve Jobs, the CEO of *Apple Inc.* is perhaps the most prominent recent example of how important a top executive is to the success of a company. When over the course of 2009 concerns about Mr. Jobs's health grew among investors, the company's stock price took a rollercoaster ride as health speculation intensified. While *Apple Inc.* has a deep bench of senior managers, Mr. Jobs apparently was considered indispensable to the company's lasting prosperity.[1]

In the academic literature on the subject, the importance of the top executive's person(ality) was already stressed by Drucker (1967) and recently various empirical studies have established that there seems to be a strong connection between individual managers' attitudes and corporate policies. The studies by Bertrand and Schoar (2003), Bennedsen et al. (2007), Kaplan et al. (2008), and Graham et al. (2008) show that the person(ality) of a top-executive has in itself substantial influence on her or his firm's policy and performance.

One particular characteristic of personality, managerial overoptimism, has received particular attention. Malmendier and Tate (2005) establish that for overoptimistic managers there is a strong relation between investment behavior and the availability of internal funds and Malmendier and Tate (2008) show that, in mergers, overoptimistic CEOs overestimate their ability to generate returns and overpay for target companies and undertake value-destroying mergers. Ben-David et al. (2008) show that companies with overconfident CFOs have a significantly different debt structure as compared to other firms.

Given the empirically strong effects of overoptimism, I set up a model to highlight its potential importance for management strategy and to rationalize why it makes sense for a firm to hire overoptimistic managers. I demonstrate that personnel policy, i.e. selecting the right managers (not only with respect to ability), may have an important impact on the strategic position of firms in competition. By hiring an overoptimistic manager (i.e. an "irrational" type) for strategic reasons, the firm can commit to act differently and gain an advantage in competition. This follows the intuition from Schelling (1960): By delegating certain tasks to agents with preferences different from one's own, one can make threats credible that were not credible if oneself would act.

[1] The Wallstreet Journal, June 20, 2009, http://online.wsj.com/article/SB124546193182433491.html

Overoptimism and overconfidence have been a subject of study in (social) psychology for decades. Already early on, the possible importance of these traits for businesses were understood and studied. Bettman and Weitz (1983) find evidence for self-serving bias, a behavior where successes are accounted mainly to own ability whilst they are in fact mainly due to luck, amongst executives in their analysis of annual reports. Overoptimism, where people believe favorable events to be more likely than they actually are, is documented extensively. Kidd and Morgan (1969) find that electric utility managers consistently underestimate the downtime of generating equipment. Larwood and Whittaker (1977) study a sample of corporate presidents and find them to be unrealistic in their predictions of success. Cooper et al. (1988) study entrepreneurs who overestimate their chances of success with their business. In their sample of 2994 entrepreneurs 81% believe their chances to survive are better than 70% and 33% believe they will survive for sure. In reality, 75% of new ventures did not survive the first 5 years.

I analyze a duopoly model of price competition where the firms have the opportunity to carry out cost-reducing R&D, i.e. pursue process innovations, to improve their competitive situation before they enter into product market competition. The R&D stage is modeled as a tournament, following Lazear and Rosen (1981), where the winner of the tournament, i.e. the firm with lower costs, wins the market. A tournament is a simple way to capture important aspects of oligopolistic competition, for example situations where firms have to spend resources to attract customers, where firms compete for highly profitable procurement contracts from a public institution, or where firms compete in new markets with network externalities where a standard has to be incorporated so that in the end there is only one dominant firm (the winner). An overoptimistic manager believes the tournament is biased in his favor and relaxes his efforts. By delegating to overoptimistic managers the firms can escape the rat race nature of these R&D tournaments. The result resembles collusive behavior but is derived in a completely non-cooperative setting.

There exists a large related literature on strategic delegation. The classic literature on strategic delegation analyzes how contract design can create commitment for managers. In models of Cournot competition, Vickers (1985) shows that optimal contracts have elements of relative performance evaluation, inducing the agent to act more aggressively and Fershtman (1985) provides an example that firm profits increase if managerial incentive contracts condition not only on profits but also on sales. Fershtman and Judd (1987) extend this analysis to differentiated Bertrand competition and show that owners there also have an incentive to distort managerial incentives.

Recently this literature has been extended to the analysis of contests, tournaments and all-pay auctions. Kräkel (2002) models the competition between firms as a contest. He shows that under this setting owners may induce their managers to maximize sales and that there is a first-mover advantage for owners when choosing their incentive schemes. Whether all owners delegate their decisions to managers or not will endogenously depend on the type of contest. In Kräkel (2005), owners choose a linear combination of profits and sales incentive schemes for their managers before they compete in an oligopolistic tournament against each other. Although initially the game is completely symmetric, other than in the classic cases of Cournot or Bertrand oligopoly, there exist asymmetric equilibria where one owner puts a positive weight on sales and the other a negative one. Similarly, Konrad et al. (2004) show for a first-price all-pay auction that buyers have an incentive to delegate the bidding to agents and to distort the agents' incentives away from their own incentives. Again, the delegation contracts are asymmetric, even if the buyers and the auction are initially perfectly symmetric.

Delegation in oligopoly models with ex-ante investments has been studied by various authors. Zhang and Zhang (1997) and Kopel and Riegler (2006), correcting a mistake in Zhang and Zhang's analysis, study Cournot competition with ex-ante cost-reducing R&D with spillovers. They derive the structure of contracts conditioning on profits and sales and show that it is optimal for the firms to delegate the production and R&D decisions to managers. Kräkel (2004) considers oligopolistic contests with R&D spillovers and strategic delegation. He derives the structure of (profits and sales) contracts and shows that, dependent on the strength of R&D spillovers, a managerial firm may have a strong strategic advantage when competing with an owner operated firm. Overvest and Veldman (2008) study how an observable and verifiable contract that provides direct monetary incentives for cost reductions can overcome the problem that cost-reducing investments may not be publicly observable and thus cannot be used as strategic commitments. Englmaier (2010), studying Cournot competition with ex-ante cost-reducing R&D and the option to delegate to overoptimistic managers, is probably closest to this study. In his setting, both firms hire overoptimistic managers.

My model is complementary to the above studies as I combine the analysis of Bertrand competition with ex-ante cost-reducing R&D with a different channel of delegation, the degree of overoptimism. Extending the focus of delegation from purely distorting incentive contracts to also considering richer personality attributes is of particular value in situations where for some reasons, e.g. contractibility problems or regulatory restrictions, it is not possible to use distorted contracts but selecting an overoptimistic manager may still be a viable alternative. A novel feature in my model is that the optimal extent of strategic delegation, i.e. the optimal degree of overoptimism, varies non-monotonically with the riskiness of the underlying R&D technology. This has important implications for matching the right manager types to jobs and generates in principle testable predictions.

2 The Model

Consider two firms competing in prices for a unit mass of consumers with unit demand and valuation v. Products are not differentiated, thus, consumers base their decisions solely on prices. The marginal production cost of firm i, with $i = 1, 2$, equals $C_i = c_i - \theta_i - \epsilon_i$, where $\theta_i \in [0, c_i]$ is firm i's cost reducing R&D investment and ϵ_i is a noise term, which is i.i.d. across players and distributed according to $G(\cdot)$ on $[-\bar{\epsilon}, \bar{\epsilon}]$. To ease analysis, assume $v > \max\{c_1 + \bar{\epsilon}, c_2 + \bar{\epsilon}\}$ and, to avoid $C_i < 0$, c_i is large enough relative to $\bar{\epsilon}$. This R&D technology resembles a tournament as in Lazear and Rosen (1981) where the winner is determined depending on effort and luck. The cost reducing R&D comes at a cost $\gamma(\theta_i)$ with $\gamma'(\cdot) > 0$ and $\gamma''(\cdot) > 0$.

Before price competition takes place and before the cost reducing R&D investments are sunk, firms hire (possibly overoptimistic) managers who are responsible for the investment decision. Overoptimism is modeled as follows: When the manager has to decide upon the cost reducing investment, he believes that his firm has an (additional) initial cost advantage of k_i (with $k_i \in R_+$), e.g. due to a superior production technology. In tournament terminology, both managers believe the tournament is biased in their favor. In fact the true $k_i = 0$. A formally equivalent interpretation of k_i would be that the manager believes that his firm's product is vertically differentiated against his opponent's product. Thus he can charge a mark-up of k_i in excess of the competitor's price and consumers are still willing to buy his product. I will use this latter interpretation in what follows. Hence k_i is the direct measure of overoptimism.

The manager gains private benefits B, e.g. promotion prospects or benefits of control, from winning the tournament. One could also think of it as a simple bonus contract which would be the optimal contract if staying in or exiting the market is the only verifiable performance measure.[2] Incentives are aligned as far as, ceteris paribus, winning the tournament is preferred by firm owners, as the firm stays in the market, and the manager.

The timing of the model is as follows:

$t = 0$	Firms simultaneously hire (possibly overoptimistic) managers.
$t = 1$	Managers simultaneously determine their cost-reducing investments θ.
$t = 2$	Actual production costs C_i are realized and observed by all actors.
$t = 3$	Firms compete in prices.

[2]Note that such a bonus contract is, given the assumption on unit demand, equivalent to a pure incentive contract on sales.

Note that in $t = 2$ the overoptimism is resolved. I assume that when the managers observe their own and the competitor's true final production costs they correctly process the new information and take subsequently optimal pricing decisions.

To identify a subgame-perfect Nash equilibrium, I solve the game by backward induction.

t=3 - Price Competition: Given optimal price setting, in the price-competition stage the profits are given by

$$\pi_i = \begin{cases} C_j - C_i - \gamma(\theta_i^*) & \text{if } C_i < C_j \\ -\gamma(\theta_i^*) & \text{otherwise} \end{cases}.$$

Note that these profits are independent of the absolute cost level but only depend on the difference. Thus, firms would like to spend as little on R&D as possible.

t=2 - R&D Investment: In the R&D investment stage, the possibly overoptimistic manager believes that consumers will buy his firm's product as long as $p_i \leq p_j + k_i$. Given the assumption on the incentives for the manager, the firm 1 manager (henceforth manager 1) maximizes

$$\max_{\theta_1} \quad Pr(C_1 > C_2 + k_1)B - \gamma(\theta_1)$$

$$\Longleftrightarrow$$

$$\max_{\theta_1} \quad Pr(\epsilon_2 - \epsilon_1 < c_2 - \theta_2 - c_1 + \theta_1 + k_1)B - \gamma(\theta_1).$$

Let $z \equiv \epsilon_2 - \epsilon_1$ be the convoluted distribution. z is distributed according to $H(z)$ with $z \in [-2\bar{\epsilon}, 2\bar{\epsilon}]$. As standard in the tournament literature I make the following simplifying assumptions:

(1) $\quad E(z) = 0$

(2) $\quad \forall \hat{z} : H(\hat{z}) = 1 - H(-\hat{z})$

Assumptions (1) and (2) imply that z is symmetrically distributed around 0. They are satisfied e.g. if the ϵ_i are normally or uniformly distributed. I will present the problem only from manager 1's perspective. The reasoning for manager 2 is completely analogous. Manager 1's problem can be written as

$$\max_{\theta_1} \quad H(c_2 - \tilde{\theta_2} - c_1 + \theta_1 + k_1)B - \gamma(\theta_1).$$

Manager 1's optimal choice depends on which action, $\tilde{\theta_2}$, he thinks manager 2 will choose. In the spirit of overoptimism, I assume that manager 1 thinks he is advantaged and believes that agent 2 agrees with his perception.[3] Thus, manager 1 **expects** that manager 2

[3] This clearly violates Aumann's impossibility result on agreeing to disagree. However, similar assumptions are commonly invoked in the theoretical literature on overoptimism. In fact, the assumption captures an essential aspect of overoptimism. See for example Van den Steen (2005).

maximizes

$$\max_{\tilde{\theta_2}} \quad Pr(c_2 - \tilde{\theta_2} - \epsilon_2 < c_1 - \theta_1 - \epsilon_1 - k_1)B - \gamma(\theta_2)$$

$$\Longleftrightarrow$$

$$\max_{\tilde{\theta_2}} \quad \{1 - H(c_2 - \tilde{\theta_2} - c_1 + \theta_1 + k_1)\}B - \gamma(\theta_2)$$

The first-order conditions of this game can be written as

$$\begin{aligned} h(c_2 - \tilde{\theta_2} - c_1 + \theta_1 + k_1)B - \gamma'(\theta_1) &= 0 \\ h(c_2 - \tilde{\theta_2} - c_1 + \theta_1 + k_1)B - \gamma'(\tilde{\theta_2}) &= 0. \end{aligned}$$

Rearranging and dividing yields $\frac{\gamma'(\theta_1)}{\gamma'(\tilde{\theta_2})} = 1$.

The above calculations give the standard result that equilibrium effort levels coincide, $\theta_1^* = \tilde{\theta_2^*}$, where $\tilde{\theta_2^*}$ is the effort level manager 1 believes manager 2 chooses. Performing the same reasoning for manager 2, I end up with the symmetric result $\theta_2^* = \tilde{\theta_1^*}$.

From now on I will focus on the case where firms are initially identical, i.e. $c_1 = c_2$. Furthermore, to ease exposition, I will assume that the cost of R&D investment is given by $\gamma(\theta_i) = \frac{1}{2}\theta_i^2$. Using $\theta_i^* = \tilde{\theta_j^*}$ in the two above first-order conditions, equilibrium effort is given by

$$\gamma'(\theta_i^*) = h(k_i)B.$$

From the symmetry assumptions on $H(\cdot)$ and $h(\cdot)$ it follows that effort decreases the further k_i is away from 0, i.e. the more the perceived bias in the tournament is.

t=1 - Hiring: I can use these results when analyzing the firm's decision at the hiring stage. In doing so, I will focus on symmetric equilibria. Given the agents' effort level, firm i now maximizes over the type k_i. I assume that there is a large supply of managers and the degree of overoptimism is observable to firms. Firm 1's profit is the probability of winning, $Pr(\epsilon_2 - \epsilon_1 < c_2 - \theta_2 - c_1 + \theta_1 + k_1) = H(c_2 - \theta_2 - c_1 + \theta_1 + k_1)$, times the expected profit in that case, $\theta_1 - \theta_2$, net of the investment costs, $\gamma(\theta_1)$. Given the above assumptions and results this profit function can be rewritten and the hiring problem of firm 1 is given by [4]

$$\max_{k_1} \quad H[h(k_1)B - h(k_2)B][h(k_1)B - h(k_2)B] - \frac{1}{2}(h(k_1)B)^2$$

and the resulting first-order condition is given by

$$\begin{aligned} 0 &= h[h(k_1)B - h(k_2)B][h(k_1)B - h(k_2)B]h'(k_1)B \\ &+ H[h(k_1)B - h(k_2)B]h'(k_1)B - h(k_1)Bh'(k_1)B. \end{aligned}$$

[4] The respective conditions for firm 2 are given in Appendix A.

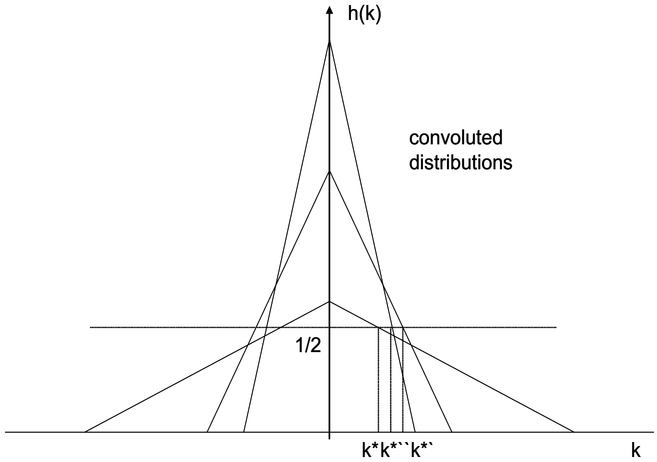

Figure 1: Convoluted Distributions

Canceling out $h'(k_i)B$ and focussing on symmetric equilibria imposes $k_1 = k_2$ which yields

$$h(0) \cdot 0 + H(0) \quad = \quad h(k_1)B.$$

Note that due to the above assumptions on symmetry $H(0) = \frac{1}{2}$ holds and hence I get $h(k_1) = h(k_2) = \frac{1}{2B}$.

The θ_i^* a firm wants to implement is unaffected by B as $\theta_i = B \cdot \frac{1}{2B} = \frac{1}{2}$. Hence a symmetric equilibrium exists in which the optimal degree of delegation is given by the above equations.[5] These equations do not uniquely characterize the exact equilibrium values since $h(\cdot)$ is symmetric around 0 and therefore there exist two values of k_i satisfying the conditions above. However, inspecting the second-order conditions of the problem we see that always an overoptimistic manager, i.e. $k_i > 0$, will be hired.[6]

Proposition 1 *In the unique symmetric equilibrium of the tournament model of oligopolistic price-competition with cost-reducing R&D investments, firms always hire overoptimistic managers.*

The intuition for this result is that the overoptimistic managers allow the firms to curtail R&D spending. It is noteworthy that I get this result though the managers are only interested in winning the tournament.

To illustrate an interesting point, further assume that the error terms ϵ_i are uniformly distributed on $[-\bar{\epsilon}, \bar{\epsilon}]$. This gives a triangular density function $h(\cdot)$ as shown in Figure 1. If the tournament becomes more deterministic the triangular densities are contracted and

[5] To ensure existence I have to assume $h(0) \geq \frac{1}{2B}$. $h(0)$ can be thought of measuring the importance of luck for the outcome of the tournament. The higher $h(0)$ is, the more deterministic is the tournament. Thus I require the tournament to depend not too much on luck.

[6] See Appendix B for details.

become steeper. Carefully inspecting Figure 1 shows that the optimal degree of delegation is non-monotonic in the noisiness of the tournament. First, as the R&D tournament gets less noisy the optimal degree of delegation increases, then, from some level onwards it decreases again.

It is a standard result in tournament theory that effort increases if luck is less important for the outcome of the tournament. Starting from this and interpreting the result as follows makes the intuition apparent: Starting from a noisy situation and decreasing the noise increases the managers' effort levels. The firms are interested in keeping R&D spending down and therefore hire more overoptimistic managers who are less prone to spend much effort. But the less noise is in the tournament, the more tempting it is to invest just a little bit more to win the market almost certainly. In this situation it is too risky to stick with a manager who thinks he has a competitive edge and be expropriated by the opponent firm.

Note that the basic effect that delegation is most pronounced for an intermediate level of noisiness carries over to more general than linear convoluted distributions. Proposition 2 summarizes these findings.

Proposition 2 *The optimal degree of managerial overoptimism is non–monotonic in the riskiness of the tournament. When the R&D technology becomes less noisy the optimal degree of overoptimism first increases and then decreases again. Thus we should find the most overoptimistic types in industries with moderately risky R&D technologies.*

3 Conclusion

My analysis has shown that in symmetric tournaments with ex-ante investments, delegation to overoptimistic managers is the unique symmetric equilibrium. The overoptimistic manager expects the product market to be more profitable (differentiated) than it actually is and hence overoptimism helps to commit to a specific R&D strategy. The model in this paper delivers empirical predictions as I find that the optimal degree of overoptimism depends non-monotonically on the riskiness of the underlying R&D technology. In particular, overoptimistic managers are most valuable in industries with moderately risky R&D technologies.

The results of the analysis are potentially important for management strategy as they highlight the important effect personnel selection, not only with respect to ability but also other personality traits, may have on the strategic position of firms in competition. The result, linking optimal delegation to underlying technology, shows the intricacy of matching a specific task to the right manager type. Furthermore, I demonstrate an additional advantage of extending the focus of delegation from purely distorting contracts to considering richer personality attributes: In situations where for some reasons, e.g. contractibility problems or regulatory restrictions, it is not possible to use distorted contracts, selecting an overoptimistic manager may be a valuable alternative strategy.

To further shed light on organizational issues, it would be interesting to extend the model. As the degree of overoptimism is a relevant characteristic of the manager, it makes sense to further investigate how to adopt various other aspects of a firm's organization to this trait. For example, different internal organizational structures may to a differing degree give rise to managerial overoptimism, respectively enable overoptimistic managers to succeed. If these internal structures are chosen optimally, differing internal organizational forms, dependent on whether overoptimistic managers are beneficial for the organization, are optimal. Results along these lines would be in principle testable.

A Conditions for Firm 2

The hiring problem for firm 2 is given by

$$\max_{k_2} \quad \{1 - H(h(k_1)B - h(k_2)B)\}[h(k_1)B - h(k_2)B] - \frac{1}{2}(h(k_2)B)^2.$$

Firm 2's first-order condition in the hiring stage

$$\begin{aligned} 0 &= h[h(k_1)B - h(k_2)B][h(k_2)B - h(k_1)B]h'(k_2)B \\ &+ \{1 - H(h(k_1)B - h(k_2)B)\}h'(k_2)B - h(k_2)Bh'(k_2)B. \end{aligned}$$

Equilibrium condition for firm 2's hiring decision:

$$h(0) \cdot 0 + 1 - H(0) = h(k_2)B.$$

B Second Order Conditions

Since B does not affect the optimal choice of θ_i, I normalize it to one to ease notation. A symmetric equilibrium exists in which the optimal degree of delegation is given by the above derived equations

$$\begin{aligned} h(0) \cdot 0 + H(0) &= h(k_1) \\ h(0) \cdot 0 + 1 - H(0) &= h(k_2). \end{aligned}$$

As $H(0) = \frac{1}{2}$ I get $h(k_1) = h(k_2) = \frac{1}{2B}$.

Note that these equations do not uniquely characterize the exact equilibrium values since $h(\cdot)$ is symmetric around 0 and therefore there may exist two values of k_i satisfying the conditions above. Inspecting the second-order conditions, however confirms that only delegation to an overoptimistic type will occur in equilibrium.

The second-order condition for firm 1 is given by

$$\frac{\partial^2}{\partial k_1 \partial k_1} = h'[h(k_1) - h(k_2)][h(k_1) - h(k_2)]h'(k_1) + h'(k_1)h[h(k_1) - h(k_2)] \\ + h[h(k_1) - h(k_2)]h'(k_1) - h'(k_1),$$

which can be rearranged to

$$h'(k_1)\left\{h'[h(k_1) - h(k_2)][h(k_1) - h(k_2)] + 2h[h(k_1) - h(k_2)] - 1\right\}.$$

Now focus on the second-order condition at the symmetric solution to the first-order condition. I obtain $h'(k_1^*)\{2h(0) - 1\}$. Since $h(0) > \frac{1}{2}$ has to hold to ensure existence, $h'(k_1^*) < 0$ must hold for the second-order condition to be satisfied. Note that $h'(\cdot) < 0$ only if $k_i > 0$, hence the result that $k_1^* > 0$. The analogous argument applies to the second-order condition of firm 2.

REFERENCES

Ben-David, I., J. Graham, and C. Harvey (2008) 'Managerial Overconfidence and Corporate Policies,' Working paper

Bennedsen, M., F. Perez-Gonzalez, and D. Wolfenzon (2007) 'Do CEOs Matter?,' mimeo

Bertrand, M. and A. Schoar (2003) 'Managing With Style: The Effect Of Managers On Firm Policies,' *Quarterly Journal of Economics*, Vol. 118(4), pp. 1169-1208

Bettman, J. and B.A. Weitz (1983) 'Attributions in the Board Room: Causal Reasoning in Corporate Annual Reports,' *Administrative Science Quarterly*, Vol. 28, pp. 165-183

Cooper, A. C., C.Y. Woo and W.C. Dunkelberg (1988) 'Entrepreneurs' Perceived Chances for Success,' *Journal of Business Venturing*, Vol. 3, pp. 97-108

Drucker, P. (1967) *'The Effective Executive'*, Harper Collins: New York

Englmaier, F. (2010) 'Managerial Optimism and Investment Choice,' *Managerial and Decision Economics*, forthcoming

Fershtman, C. (1985) 'Managerial incentives as a strategic variable in duopolistic environment,' *International Journal of Industrial Organization*, Vol. 3, pp. 245 - 253

Fershtman, C.and K.L. Judd (1987) 'Equilibrium incentives in oligopoly,' *American Economic Review*, Vol. 77, pp. 927 - 940

Graham, J., C. Harvey, and M. Puri (2008) 'Managerial Attitudes and Corporate Actions,' mimeo

Kaplan, S.N., M. Klebanov, and M. Sorensen(2008) 'Which CEO Characteristics and Abilities Matter?,' mimeo

Kidd, J.B. and J.R. Morgan (1969) 'A Predictive Information System for Management,' *Operational Research Quaterly*, pp. 149-170

Konrad, K.A., W. Peters, and K. Wärneryd (2004) 'Delegation in first-price all-pay auctions,' *Managerial and Decision Economics*, Vol. 25(5), pp. 283 - 290

Kopel, M. and C. Riegler (2006) "R&D in a Strategic Delegation Game Revisited: A Note," *Managerial and Decision Economics*, Vol. 27(7), pp. 605 - 612

Kräkel, M. (2002) 'Delegation and strategic incentives for managers in contests,' *Managerial and Decision Economics*, Vol. 23(8), pp. 461-470

Kräkel, M. (2004) "R&D spillovers and strategic delegation in oligopolistic contests," *Managerial and Decision Economics*, Vol. 25, pp. 147-156

Kräkel, M. (2005) 'Strategic delegation in oligopolistic tournaments,' *Review of Economic Design*, Vol. 9(4), pp. 377-396

Larwood, L. and W. Whittaker (1977) 'Managerial myopia: self-serving biases in organizational planning,' *Journal of Applied Psychology*, Vol. 62, pp. 194-198

Lazear, E.P. and S. Rosen (1981) 'Rank-Order Tournaments as Optimum Labor Contracts,' *Journal of Political Economy*, Vol. 89(5), pp. 841-864

Malmendier, U. and G. A. Tate (2005) 'CEO Overconfidence and Corporate Investment,' *Journal of Finance* Vol. 60(6), pp. 2661-2700

Malmendier, U. and G. Tate (2008) 'Who Makes Acquisitions? CEO Overconfidence and the Market's Reaction,' *Journal of Financial Economics*, Vol. 89(1), pp. 20-43

Overvest, B.M. and J. Veldman (2008) "Managerial incentives for process innovation," *Managerial and Decision Economics*, Vol. 29(7), pp. 539 - 545

Schelling, T. (1960) 'The Strategy of Conflict,' Harvard University Press/Cambridge, MA

Van den Steen, E. (2005) 'Organizations beliefs and managerial vision,' *Journal of Law, Economics, and Organization*, Vol. 21(1), pp. 256 - 283

Vickers, J. (1985) 'Delegation and the theory of the firm,' *Economic Journal*, Vol. 95, pp. 138 - 147

Zhang, J. and Zhang, Z. (1997) "R&D in a strategic delegation game," *Managerial and Decision Economics*, Vol. 18, pp. 391 - 398