

Renegotiation-proof Contracting, Disclosure, and Incentives for Efficient Investment

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For a presentation at NTU

February 27, 2009

Disclosure

Informational asymmetry tends to cause inefficiency (adverse selection and moral hazard).

Disclosure of information can be useful, but many disclosures do not deal with fundamentals (such as sales or expenses or capital) but deal instead with information (about compensation for example) whose meaning is endogenous and *a priori* unclear.

This paper analyzes the impact of compensation disclosure and the announcement of forward-looking forecasts, two types of information that bear indirectly on the value of the firm. It is hoped that a study of the usefulness of these disclosures will help to inform the choice of regulatory policy.

Modeling Approach

- Myers and Majluf [1984] inefficiency: can eliminate?
- renegotiation-proofness: not too easy or hard for disclosure to work
- optimal contracting
- agency formulation/principal's problem (Ross [1973]) because game theory does badly with rich contracting games.
- no ad hoc restriction, e.g. to linear contracts
- pricing is always rational and credible

Renegotiation-proofness is an interesting condition even if it is not literally true that firms cannot precommit, since it is a useful proxy for the real reasons that it is difficult to write exhaustive contracts.

Related Literature

The economic questions are policy questions in disclosure regulation.

- Healy and Palepu [2001] (empirical survey)
- Kumar and Langberg [2007]
- NYSE and NASDAQ web sites

Tools come from the literature following Myers-Majluf:

- Myers and Majluf [1984]
- Dybvig and Zender [1991]
- Persons [1994] (renegotiation-proofness)

Main Results

- Disclosure of the compensation rule does not help to solve the Myers-Majluf problem.
- Additional disclosure of the entire salary negotiation process does solve the Myers-Majluf problem.
 - Complete disclosure is not reasonable but it shows why disclosing just the outcome of negotiations does not work.
 - Dog that didn't bark: absent complete disclosure investors stay away because they know owners could manipulate their beliefs.
- Disclosure of a forward-looking contract as well as the compensation rule does solve the Myers-Majluf problem. This result relies on selection of the optimal contract which gives the manager an incentive to reveal an accurate forecast.

Existing Shareholders' Problem (summary)

The existing shareholders choose a compensation contract s_0 (for any $d, A, a + bd, P_1$ and P_2 , $s_0(d, A, a + bd, P_1, P_2) \in [0, a + (b + I)d]$), an investment plan d^* , a forward-looking-announcement policy A^* , and rational pricing rules $P_1(d, A)$ and $P_2(d, A, a + bd)$ to maximize the expected terminal stock price:

$E [P_2(d^*(\mu_a, \mu_b), A^*(\mu_a, \mu_b), a + bd^*(\mu_a, \mu_b))]$, subject to

1. Incentive Compatibility of Managers' choices d^* and A^*
2. Manager's Participation Constraint
3. Rational Pricing of Existing Shares in Period 1
4. Rational Pricing of Existing Shares in Period 2
5. Renegotiation-Proofness

Problem 1. Existing Shareholders' Problem (details)

The existing shareholders choose a compensation contract s_0 (for any $d, A, a + bd, P_1$ and P_2 , $s_0(d, A, a + bd, P_1, P_2) \in [0, a + (b + I)d]$), an investment plan d^* , a forward-looking-announcement policy A^* , and rational pricing rules $P_1(d, A)$ and $P_2(d, A, a + bd)$ to maximize the expected terminal stock price:

O1: $E [P_2(d^*(\mu_a, \mu_b), A^*(\mu_a, \mu_b), a + bd^*(\mu_a, \mu_b))]$, subject to

P0a. (Incentive Compatibility) For each μ_a and μ_b , setting $d = d^*(\mu_a, \mu_b)$, $A = A^*(\mu_a, \mu_b)$ solves:

Choose an investment indicator $d \in \{0, 1\}$ and a forward-looking announcement A to maximize the manager's expected compensation:

$$E \left[s_0 \left(d, A, a + bd, P_1(d, A), P_2(d, A, a + bd) \right) \middle| \mu_a, \mu_b \right]$$

subject to $A = 0$ if forward-looking announcement is prohibited ($\kappa = 0$);

P0b. (Participation Constraint) Let $s_0^*(\mu_a, \mu_b)$ be the maximum in (P0a), then

$$E[s_0^*(\mu_a, \mu_b)] \geq u_0;$$

P0c. (Rational Pricing of Existing Shares in Period 1) The rational pricing rule in period 1 is

$$P_1(d, A) = E[a + bd - s_0^*(\mu_a, \mu_b) | d^*(\mu_a, \mu_b) = d, A^*(\mu_a, \mu_b) = A];$$

P0d. (Rational Pricing of Existing Shares in Period 2) The rational pricing rule in period 2 is

$$P_2(d, A, a + bd) = \frac{P_1(d, A)}{P_1(d, A) + Id} \left(a + (b + I)d - s_0(d, A, a + bd, P_1, P_2) \right); \text{ and}$$

P0e. (Renegotiation-Proofness) The contract s_0 , investment plan d^* , forward-looking-announcement policy A^* , and rational pricing rules P_1 and P_2 are not blocked in the sense of Definition 1.

Blocking Contract (summary)

A compensation contract with associated intended forward-looking announcement, investment plan, and rational prices is blocked if there exists the new contract the existing shareholders can offer that will do better for them and the manager if offered secretly (meaning that if the manager switches pricing is rational but if the manager does not switch the investors use the original pricing).

The equilibrium notion assumes there is no blocking contract, because investors are rational and will not invest if they know the existing shareholders and manager can trick them. In Myers and Majluf [1984], efficient investment is not credible because in some states the existing shareholders would prefer not to invest (diluting valuable shares), making the shares they do sell worth on average less. Having renegotiation-proofness can be thought of as an extension of this idea to a world with managerial contracting.

Definition 1. Blocking Contract (details)

A compensation contract s_0 , an investment plan d^* , a forward-looking-announcement strategy A^* , and rational pricing rules P_1 and P_2 that satisfy (P0a) to (P0d) are said to be **blocked** if there exist a new contract s_1 (for any $h, B, a + bh, Q_1$, and Q_2 , $s_1(h, B, a + bh, Q_1, Q_2) \in [0, a + (b + I)d]$), an acceptance strategy t^* , an investment plan h^* , a forward-looking-announcement strategy B^* , and rational pricing rules Q_1 and Q_2 such that

D0a. (Initiator's Higher Expected Payoff) The existing shareholders strictly prefer the deviation:

$$E [Q_2(t^*(\mu_a, \mu_b), h^*(\mu_a, \mu_b), B^*(\mu_a, \mu_b), a + bh^*(\mu_a, \mu_b))] > E [P_2(d^*(\mu_a, \mu_b), A^*(\mu_a, \mu_b), a + bd^*(\mu_a, \mu_b))];$$

D0b. (Incentive Compatibility) For each μ_a and μ_b , setting $t = t^*(\mu_a, \mu_b)$, $h = h^*(\mu_a, \mu_b)$, and $B = B^*(\mu_a, \mu_b)$ solves: Choose an acceptance indicator $t \in \{0, 1\}$, an investment indicator $h \in \{0, 1\}$, and a forward-looking announcement B to maximize the manager's expected compensation:

$$E \left[s_t \left(h, B, a + bh, Q_1(t, h, B), Q_2(t, h, B, a + bh) \right) \middle| \mu_a, \mu_b \right]$$

subject to $B = 0$ if forward-looking announcement is prohibited ($\kappa = 0$);

D0c. (Rational Pricing of Existing Shares in Period 1) The pricing rule in period 1 is

$$Q_1(t, h, B) = \begin{cases} P_1(h, B), & \text{if } t = 0 \text{ and } \lambda = 0, \\ E[a + bh - s_t^*(\mu_a, \mu_b) | t^*(\mu_a, \mu_b) = t, h^*(\mu_a, \mu_b) = h, B^*(\mu_a, \mu_b) = B], & \text{otherwise,} \end{cases}$$

where $s_1^*(\mu_a, \mu_b)$ is the maximum in (D0b) when the manager accepts the new offer and $P_1(h, B)$ is defined in (P0c), and

D0d. (Rational Pricing of Existing Shares in Period 2) The pricing rule in period 2 is $Q_2(t, h, B, a + bh) = \frac{Q_1(t, h, B)}{Q_1(t, h, B) + Ih} \left(a + (b + I)h - s_t(h, B, a + bh, Q_1, Q_2) \right)$.

Forward-looking Announcements

If forward-looking announcements are allowed, the optimal contract solves the Myers-Majluf problem, with this implementation:

$$d_{fb}(\mu_a, \mu_b) \equiv \begin{cases} 1, & \mu_b \geq 0 \\ 0, & \mu_b < 0 \end{cases}$$

$$A_{fb}(\mu_a, \mu_b) \equiv \mu_a + \mu_b d_{fb}(\mu_a, \mu_b)$$

$$s_{fla}(d, A, a + bd, P_1, P_2) \equiv \alpha + \beta \left((a + bd) - \eta \frac{(a + bd - A)^2}{\text{var}(\varepsilon_a + \varepsilon_b d)} \right)$$

Of course, a suboptimal contract does not. Are managers penalized based on the quality of their forecasts? This is an empirical question. Also, what institutions are conducive for optimal contracting?

Other results

Revealing the entire contract can solve the Myers-Majluf problem but revealing only the final contract does not in general. The formal statement for the negative result is subject to a nondegeneracy condition. For example, if the optimal contract never takes the new project, or if the first-best can be implemented using a contract for which the value of shares remaining after paying the manager is a constant when the new project is taken, then revealing only the final contract can be good enough.

Intuition and Further Extensions

- If investors do not have enough information, than planning efficient investment is not credible because the existing shareholders could raise more money by “cherry-picking” good states that are signalled by a change in contract.
- If the investors have enough information, they price shares accurately and a Modigliani-Miller argument implies renegotiation-proofness. Because the investors are no worse off and there is no efficiency gain, existing shareholders and the manager cannot be better off.
- The order of moves does not matter and the result is the same if the manager offers the deviation.
- Having a round of renegotiation in equilibrium does not make efficient investment available except in degenerate cases.

Policy Implications (applied results)

- Disclosure of compensation alone does not resolve the Myers-Majluf inefficiency.
- Further disclosure of all salary negotiations would but is probably impractical.
- Disclosure of forward-looking announcements is a good idea, provided managers have an incentive to reveal their information.

Empirical Implications (“applied” results)

- Allowing forward-looking announcements improves efficiency.
- If forward-looking announcements are permitted, managers will reveal their best information.
- At the time forward-looking announcements are made, prices are efficient with respect to public information and manager’s information.
- If the manager’s information is incorporated into prices, investment efficiency is improved.
- Absent the ability and incentive to disclose expectations, disclosing the manager’s compensation can reduce investment inefficiency.

Summary

We have analyzed a model that helps us to think about disclosure regulation. It is hard to get enough disclosure announcing only compensation, since it is impractical to disclose all negotiations, but with optimal incentives forward-looking announcements can help a lot. This result is derived in a model in which the optimal contract gives the manager an incentive to reveal an accurate forecast, and maybe we should test for this before relying too heavily on the result.