

Passive vs. active monitoring

	Active monitoring/ prospective information	Passive monitoring/ speculative information
Incumbent monitor	Venture capitalist, holder of unregistered securities, ¹ long-term core shareholder (noyau dur), board of directors, bank or life insurance company monitoring long-term loans (demands during reorganization).	<p><i>Debt claim:</i> bank (short-term debt, revocable credit line, demandable debt), commercial paper market, interbank market.</p> <p><i>Equity claim:</i> speculators (analysts), derivative suits.</p> <p><i>Equity-like claims:</i> credit enhancer, underwriter (firm commitment contract).</p>
Entrant monitor	Raider (takeover), proxy fight organizer.	<p><i>Other claims:</i> rating agency, underwriter (best-efforts contract).</p>

1. The buyer of unregistered securities or letter stocks must write to the Security and Exchange Commission that the stocks are not bought for resale.

Figure 8.1

The value of speculative information - Intuition

- ▶ Speculators in stock markets might acquire costly information about the prospects of a firm
 - ▶ If information reveals a good signal they will buy the stock (if signal is bad they sell)
 - ▶ Stock price incorporates more precise information about expected firm's return
 - ▶ Reveals some information about managers invested effort
 - ▶ Relating managerial compensation to stock market performance makes it more unlikely that compensation is paid to a shirking manager
- A high stock price (good signal) is a more accurate indication for invested effort than the project's success

The value of speculative information - Intuition

- ▶ Important precondition: When trading on their information speculators must make profit to compensate monitoring costs
- ▶ If stock markets thin attempt to buy shares has significant positive price impact leaving little margin for speculators
- ▶ If there are many liquidity traders (market participant that trade for other reasons than information) price impact of speculators' demand small, speculators can conceal their information and speculators' profit large

- ▶ Speculators make profits at the expense of liquidity traders
- ▶ Liquidity traders must be compensated ex-ante for the losses they make when trading with speculators
- ▶ IPO price must incorporate these costs
- ▶ Long-term investors benefit from this (equity premium)

The value of speculative information - Assumptions

- ▶ Standard agency conflict
- ▶ After effort decision signal $j \in \{H; L\}$ about effort level $i \in \{H; L\}$ released
- ▶ Probability of signal j given effort level i is σ_{ij}
- ▶ Signal is sufficient statistic for success and thus effort
- ▶ ν_j probability of success given signal j

$$p_H = \sigma_{HH}\nu_H + \sigma_{HL}\nu_L$$

$$p_L = \sigma_{LH}\nu_H + \sigma_{LL}\nu_L$$

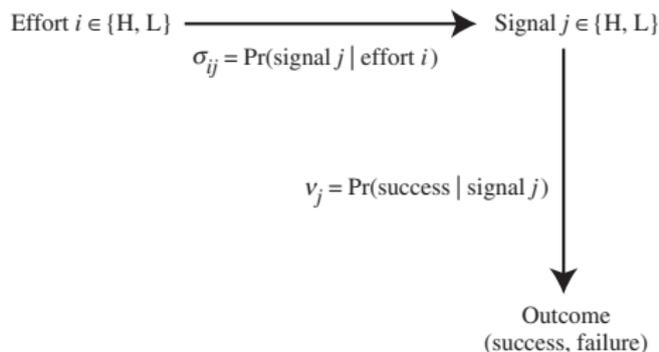


Figure 8.2

The value of speculative information - Assumptions

- ▶ Conditional success probability after observing a signal H is higher than the a priori success probability given high effort: $\nu_H > p_H$
- ⇒ Signal contains information not only on effort level but also on success probability
- ⇒ Signal contains information on a shock to success prob. that materialized after effort invested

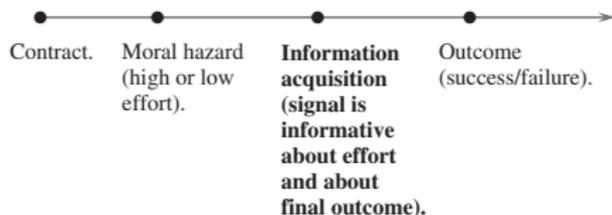


Figure 8.3

The value of speculative information - Assumptions

Example:

- ▶ Project is the development of new product
- ▶ Receiving patent for developed product is a positive signal
- 1. Indicates a higher than the a priori success probability of project
- 2. Probability is for positive signal increases in invested effort of manager
- ▶ But even after realization of good signal success uncertain

Benchmarking on free signal

- ▶ Signal more precise indication of invested effort than success
- ▶ Contract should reward manager based on signal rather than based on success
- ▶ No reward in case of $j = L$ because bad signal more likely after shirking
- ▶ Incentive constraint:

$$\sigma_{HH}R_b \geq \sigma_{LH}R_b + B \quad (\text{IC})$$

- ▶ Agency rent:

$$\sigma_{HH}R_b = \frac{\sigma_{HH}}{\sigma_{HH} - \sigma_{LH}}B$$

Benchmarking on free signal

- ▶ Pledgable return:

$$p_H R - \frac{\sigma_{HH}}{\sigma_{HH} - \sigma_{LH}} B \geq I - A$$

- ▶ Given that $j = H$ is a better indication of invested effort than success:

$$\frac{p_H}{p_H - p_L} = \frac{\sigma_{HH}(\nu_H - \nu_L) + \nu_L}{(\sigma_{HH} - \sigma_{LH})(\nu_H - \nu_L)} > \frac{\sigma_{HH}}{\sigma_{HH} - \sigma_{LH}}$$

- ▶ Pledgable return increased using signal as benchmark:

$$p_H R - \frac{p_H}{p_H - p_L} B < p_H R - \frac{\sigma_{HH}}{\sigma_{HH} - \sigma_{LH}} B$$

⇒ Based on signal compensation more precisely rewarding for exerted effort

Implementing benchmark

- ▶ Signal might be freely observable but not verifiable
- ▶ In this case stock option can implement efficient incentive scheme
- ▶ Manager receives a fraction x of shares only if the stock price increases to $\nu_H R$
- ▶ Optimal stock options x determined by

$$x\nu_H R = R_b^* = \frac{\sigma_{HH}}{\sigma_{HH} - \sigma_{LH}} B$$

Monitoring cost

- ▶ Assume now that monitoring involves a fixed cost (for processing or extracting information)
- ▶ Fixed cost: Only one monitor should monitor
- ▶ Monitoring is not observable:
No contingent contracts available
- ▶ Monitoring generates private, soft information:
No contracts available contingent of information revealed
- Monitoring must be incentive compatible
- In order to use monitoring to incentivize manager information must be revealed

Benchmarking with costly monitoring

- ▶ Providing monitor with option to buy fraction s^* of shares at ex ante par value $p_H R$ allows monitor to break even on monitoring costs when he trades on the acquired information:

$$s^* \sigma_{HH} (\nu_H R - p_H R) = c \quad (\text{ICm})$$

- ▶ Only when investing in monitoring he learns with prob. σ_{HH} whether he can make profit $\nu_H R - p_H R$ by executing his option
 - ▶ When he receives a low signal he does not execute his option because he would incur a loss $\nu_L R - p_H R$
- ⇒ If manager expects monitoring he has incentive to exert effort
- ⇒ Investing effort increases chances of benefiting from stock option

Coordination problem in costly monitoring

- ▶ There also exists a second equilibrium
- ▶ Managers expects no monitoring
- ⇒ Without monitoring monitor never executes his option
- ⇒ Manager expects never to benefit from his stock option
- ⇒ Manager expects never to be compensated for his effort
- ▶ Monitor expects that manager exerted no effort
- ⇒ Monitor expects not to break even on monitoring costs

$$s^* \sigma_{LH} (\nu_H R - p_H R) = c$$

- ▶ Executing option without monitoring also detrimental for monitor, because $p_L R < p_H R$

Coordination problem in costly monitoring

- ▶ Multiplicity of equilibria arises because of strategic complementarities: Monitoring is (more) rewarding if manager exerts effort; Exerting effort is (more) rewarding if monitor monitors
- ▶ Multiplicity of equilibria can be avoided by granting monitor put options s_P^* with

$$s_P^* \sigma_{HL} (p_H R - \nu_L R) = c$$

- ▶ Selling after receiving a bad signal even if manager behaves balances monitoring costs
- ▶ But reward to monitor even larger if manager shirks:

$$s_P^* \sigma_{LL} (p_H R - \nu_L R) > c \Leftrightarrow \sigma_{LL} > \sigma_{HL}$$

Market monitoring

- ▶ Usually hard to assign certain investors role of a designated monitor
- ▶ Problem: Liquidity needs of investor; unknown abilities to monitor etc
- ▶ Firm rely on anonymous market to acquire retrospective information
- ▶ E.g. only after manager invested effort one investor learns about his abilities to monitor
- ▶ All investors hold shares that entitle them to a fraction of the return R
- ▶ Given managers effort ex ante value of each share is $p_H R$

No-trade theorem

- ▶ Assume that all investors can hold on to their shares until $t = 2$, i.e. no liquidity needs
 - ▶ If speculator learns through costly monitoring that shares are undervalued by $\nu_H R - p_H R$ he wants to purchase shares
 - ▶ Being willing to buy a share at a price $P \geq p_H R$ though reveals that speculator received positive signal about firm
 - ▶ Other shareholder know that they will lose money if they sell any shares at $P < \nu_H R$; they will only sell at $P = \nu_H R$
 - ▶ Speculator cannot acquire any undervalued shares
 - ▶ He cannot make any profit that compensates him for his monitoring costs
- ⇒ Even though stock market is well functioning it is informationally inefficient

The role of liquidity traders

- ▶ To provide incentives for costly monitoring price must not respond too sensitive to speculators' orders
- ▶ If some investors have liquidity needs they are forced to sell their stocks
- ▶ Speculator might acquire shares from those liquidity traders without revealing his information to other long-term investors
- ▶ Assumption: Anonymous market in which only the net order flow is observable

The role of liquidity traders - Assumptions

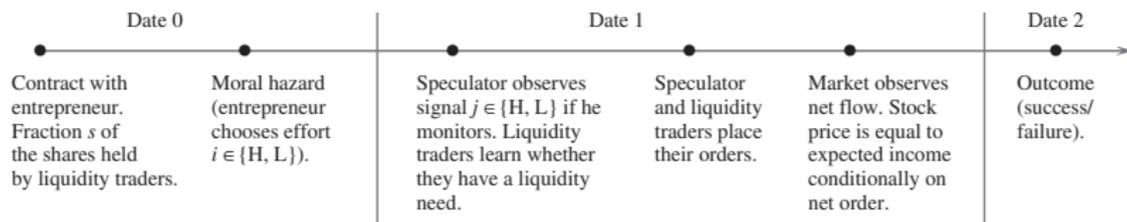


Figure 8.4

- ▶ Market share of liquidity traders: s
- ▶ Liquidity traders face correlated liquidity risk:

$$U_L = c_0 + c_1 + \theta c_2 \quad \text{with} \quad \theta \in \{0; 1\} \quad \text{and} \quad \text{prob}(\theta = 0) = \lambda$$

- ▶ Other investor: $U_I = c_0 + c_1 + c_2$
- ▶ Other investors cannot observe liquidity shock

The role of liquidity traders - Equilibrium

- ▶ If liquidity traders face liquidity need ($\theta = 0$) they will sell at any price their shares s
- ▶ Thus they place orders: $-s$
- ▶ Assume speculator demands s given a high signal and 0 otherwise

Table 8.1

	High signal (probability σ_{HH})	Low signal (probability σ_{HL})
Liquidity sales (probability λ)	Stock price: P Net order: 0	Stock price: $v_L R$ Net order: $-s$
No liquidity sales (probability $1 - \lambda$)	Stock price: $v_H R$ Net order: s	Stock price: P Net order: 0

The role of liquidity traders - Equilibrium

- ▶ Other investors infer a high signal from a net order flow s and demand shares at

$$P = v_H R$$

- ▶ Other investors infer a low signal from a net order flow $-s$ and sell shares up to

$$P = v_L R$$

- ▶ When observing no order flow they cannot directly infer the state

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The role of liquidity traders - Equilibrium

- ▶ But from Bayes' rule they know that...

... signal is high and liquidity traders active with prob.

$$\frac{\lambda\sigma_{HH}}{\lambda\sigma_{HH} + (1 - \lambda)\sigma_{HL}}$$

... signal is low and liquidity traders inactive with prob.

$$\frac{(1 - \lambda)\sigma_{HL}}{\lambda\sigma_{HH} + (1 - \lambda)\sigma_{HL}}$$

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The role of liquidity traders - Equilibrium

- ▶ Consequently observing no order flow other share holders willing to trade at

$$P = \frac{\lambda\sigma_{HH}}{\lambda\sigma_{HH} + (1-\lambda)\sigma_{HL}}\nu_H R + \frac{(1-\lambda)\sigma_{HL}}{\lambda\sigma_{HH} + (1-\lambda)\sigma_{HL}}\nu_L R$$

- ▶ If liquidity traders are active speculator can benefit from receiving a high signal and buy undervalued shares
- ▶ Speculator's expected profit:

$$\pi(s) = \lambda\sigma_{HH}(\nu_H R - P) = \lambda\sigma_{HH} \frac{(1-\lambda)\sigma_{HL}}{\lambda\sigma_{HH} + (1-\lambda)\sigma_{HL}}(\nu_H - \nu_L) R s$$

The role of liquidity traders - Equilibrium

- ▶ Speculator will find it ex ante preferable to invest in monitoring if

$$\pi(s) \geq c$$

- ▶ Given that $\partial\pi/\partial s > 0$ there is a lower bound s^{**} to financial market liquidity below which market is not informational efficient

$$\pi(s^{**}) = c$$

- ▶ Since a high signal does not always lead to the high share price $\nu_H R$ (only if liquidity traders are in active) incentive effect of stock options lower
 - ▶ Managers must receive more stock options
- ⇒ Pledgable return lower under market monitoring than under designated monitor

The role of liquidity traders - Conclusions

- ▶ Obviously market monitoring cannot be taken as granted
- ▶ It does not necessarily implement an efficient incentive scheme
- ▶ Pure market monitoring can only ensure efficient use of retrospective information

- ▶ The profits $\pi(s)$ made by a speculator is the loss born by liquidity traders
- ▶ To ensure that liquidity traders hold stocks issuing price P_E must compensate liquidity traders for those losses, i.e.
$$P_E < p_H R$$
- ▶ Long-term return to shares must be higher than the rate of return (\rightarrow equity premium)
- ▶ But actually long-term investors should compete away the equity premium