Activism, Strategic Trading, and Market Liquidity

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Motivation

- Activists play central role in modern corporate governance and are often successful in increasing the value of targeted companies (Icahn, Buffett, Ackman, Peltz, Loeb).
- Recent issue of The Economist called them: "Capitalism's unlikely heroes."
- Event-driven funds attracted $29.6bn in new money in 2013, more than any other hedge fund category (according to data provider Hedge Fund Research). Assets under management more than doubled since 2008 to close to $120 billion of capital in 2014, where it attracted a fifth of all flows into hedge funds.
- According to the Economist: "Last year Activists launched 344 campaigns against public companies, large and small. In the past five years one company in two in the S&P 500 index of Americas most valuable listed firms has had a big activist fund on its share register, and one in seven has been on the receiving end of an activist attack."

Motivation

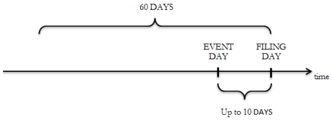
- Activists typically accumulate shares by trading **anonymously** in secondary markets.
- When their stake reaches the (regulatory) limit of 5%, they must disclose within 10 days their holdings and intentions, such as:
  Corporate governance action, Management shake-up, M&A transaction, Capital structure change, Cost reduction measures, Dividend payouts, Share buybacks, ...
- Recently senators Baldwin of Wisconsin and Merkley of Oregon propose new legislature (the "Brokaw Act") to shorten the disclosure window to 2 days to *"remove the opportunity for risk-less gains that activists achieve."*
- Famous law firms such as Wachtell, Lipton, Rosen and Katz lobby the SEC to review the 13D disclosure rules to make it more difficult for activists to acquire shares *"in the interest of transparency and fairness for small shareholders."*
- Raises questions about economic efficiency (and market liquidity).

Today's presentation

- Empirical Results on Activists' Trading:
  - Activists make high abnormal profits.
  - Significant (permanent) increase in target stocks.
  - Activists target more liquid firms and "time" market liquidity.
- Theoretical model linking activism and market liquidity:
  - Extension of Kyle model to endogenize terminal value ('effort')
  - Optimal strategy displays 'amplification' effect: the informed buys more the larger his accumulated position.
  - If driven by shock in noise trading volatility, then stock liquidity typically good for economic efficiency, except if effort cost function has binary 'all or nothing' outcome and initial stake is high ('lock-in effect').
  - If driven by shock to prior uncertainty or productivity of insider, then stock liquidity typically bad for economic efficiency, except if effort cost function has binary ('all or nothing') outcome and initial stake is high ('lock-in effect').
  - Realized amount of activism depends on realized amount of liquidity trading.

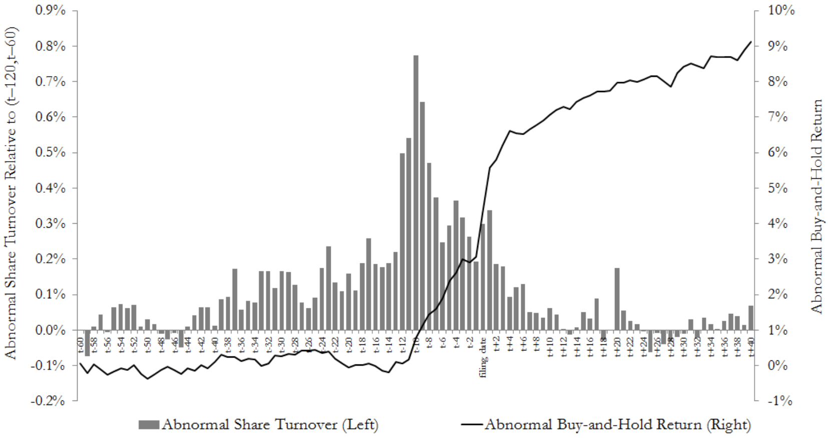
13D disclosure requirements

In recent JF paper *'Do prices reveal the presence of informed trading?,'* CD and Fos collect data on informed trades from Schedule 13D filings – Rule 13d-1(a) of the 1934 Securities Exchange Act that requires the filer to *"... describe any transactions in the class of securities reported on that were effected during past 60 days..."*



- Trades executed by Schedule 13D filers are informed:
  - On filing date 13D filers own 7.2% stake on average
  - Significant announcement returns (+6% excess returns in 30days pre-filing)
  - Large profits of Schedule 13D filers
- Measures of adverse selection are **lower** even though prices **increase** on days when schedule 13D filers trade:
  - Activists trade on days when volume is abnormally high ('liquidity timing')
  - Activists 'provide liquidity' using limit orders.

Buy-and-Hold Abnormal Return



1-month excess return pre-filing around 6%

Do informed trades move stock prices?

	days with informed trading (1)	days with no informed trading (2)	difference (3)	t-stat (4)
excess return	0.0064	-0.0004	0.0068***	9.94
turnover	0.0191	0.0077	0.0115***	21.67

- Informed trade about 1/3 of the days.
- When they trade they trade around 10-25% of the daily volume.
- Prices move up on days when they trade.
- Volume is abnormally high on days when they trade.
- Measures of adverse selection are significantly lower when the informed trade.

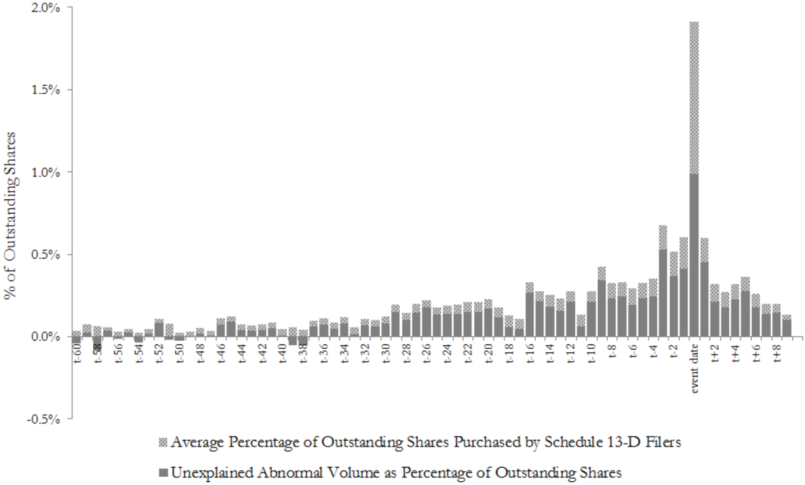
Is adverse selection higher when informed trade?

	(t-60,t-1)	(t-420,t-361)	diff
Adverse Selection Measures			
$\lambda * 10^6$	19.0011	22.3285	-3.3274*** [-3.36]
pimpact	0.00659	0.00664	-0.00005 [-0.21]
cumir	0.0015	0.0017	-0.0002** [-2.16]
$trade - related$	0.0691	0.0686	0.0005 [0.24]
illiquidity	0.4611	0.5025	-0.0413*** [-4.12]
pin	0.4385	0.4943	-0.0559*** [-13.1]
Other Liquidity Measures			
rspread	0.0095	0.0109	-0.0014*** [-4.69]
espread	0.0162	0.0175	-0.0012*** [-2.99]
baspread	0.0219	0.0239	-0.0020*** [-4.85]

Is adverse selection higher when informed trade?

	days with informed trading (1)	days with no informed trading (2)	difference (3)
Adverse Selection Measures			
$\lambda * 10^6$	14.3311	20.1644	-5.8334***
			[-8.38]
pimpact	0.0060	0.0064	-0.0004**
			[-2.18]
cumir	0.0013	0.0015	-0.0002**
			[-2.06]
$trade - related$	0.0654	0.0673	-0.0019
			[-0.99]
Other Liquidity Measures			
rspread	0.0081	0.0089	-0.0008***
			[-3.43]
espread	0.0145	0.0155	-0.001***
			[-3.25]

Abnormal Share Turnover - Revisited



Empirical Stylized facts on Activism and Liquidity

- Schedule 13D filers have valuable information when they trade.
- Value 'created' by activist is persistent (no long term reversal).

$\Rightarrow$ Information asymmetry is high when Schedule 13D filers purchase shares.

- Excess returns are higher when insiders trade, which suggests they have price impact.
- However, measures of adverse selection indicate that stocks are more liquid when activists trade because they
  - (A) trade when volume is high ('liquidity timing')
  - (B) use limit orders
- Stocks targeted by activists are *more* liquid than similar stocks matched on several characteristics ($\sim$ Brav, Partnoy, Jiang, Thomas (2008)).

Background

- Link between market liquidity (price efficiency), corporate governance (activism), and firm value (economic efficiency):
  - Suppose activist can create (or destroy) value at some (e.g., governance) cost.
  - Profitability depends on ability to buy (or sell) shares before market reflects full value.
  - Conversely, if market reflects value of activism, market liquidity may allow activist to sell out of her stake and hurt share-holders (Bhide (1993)).

- Kyle (1985) proposes seminal model of strategic trading by informed investor:
  - Risk-neutral insider knows **exogenous** terminal value of the firm v will be revealed at T and trades to maximize expected profits.
  - Market marker sets price equal to expected value given she observes only total order flow (equal to the insider's trading plus noise).

  $\Rightarrow$ (a) Optimal trading strategy, (b) Equilibrium price dynamics, (c) Market liquidity (price impact).

- We endogenize the liquidation value by explicitly modeling the effort choice of the activist as a function of the accumulated stake.

Related Literature

- The microstructure literature
  Kyle, 1985; Glosten and Milgrom, 1985; Easley and O'Hare, 1987; Back, 1992
- Take-over literature
  Grossman and Hart (1980), Shleifer and Vishny (1986) , Kyle and Vila (1991)
- Corporate governance literature
  Bhide (1993), Admati, Pfleiderer, and Zechner (1994), Maug (1998)
- Dynamic model of governance
  DeMarzo and Urosevic (2006), Back, Li, Ljungqvist (2014), CD and Fos (2014)
- Market efficiency and disclosure rules:
  Grossman and Stiglitz (1980), Fishman and Haggerty (1995)
- Insider trading:
  Glosten (1989), Fishman and Haggerty (1992)

Model Setup

- Given a price function $P(t, Y_t)$, the activist seeks to maximize

$$\max_{v,\theta} \mathrm{E}\left[v X_T - C(v) - \int_0^T P(t, Y_t)\theta_t \, \mathrm{d}t \mid X_0 \right]. \tag{1}$$

  where
  - $C(v)$ is arbitrary (convex) effort cost paid by activist to achieve v.
  - $X_t = X_0 + \int_0^t \theta_s ds$ is aggregate stock position of activist.

- Market Maker has prior $X_0 \sim N(\mu_X, \sigma_X^2)$ and observes total order flow Y_t:

$$dY_t = \theta_t dt + \sigma dZ_t$$

  where Z_t is standard Brownian motion.

- An equilibrium is a pair (P, θ) s.t. trading strategy θ maximizes (1) given P and

$$P(t, Y_t) = \mathrm{E}\left[V(X_T) \mid \mathcal{F}_t^Y \right] \tag{2}$$

  for each t, given θ and where $V(x) = \mathrm{argmax}_v \{vx - C(v)\}$

Some Examples of Cost function

- Binary (all or nothing): It costs $c > 0$ to increase stock value from v_0 to $v_0 + \Delta$.

$$V(x) = v_0 + \Delta \mathbf{1}_{[c/\Delta, \infty)}(x)\,.$$

- Symmetric quadratic (continuous) cost: $C(v) = (v - v_0)^2/(2\psi)$:

$$V(x) = v_0 + \psi x$$

- Asymmetric Quadratic cost: $C(v) = \begin{cases} (v - v_0)^2/(2\psi) & \text{if } v \geq v_0\,, \\ \infty & \text{otherwise}\,. \end{cases}$

$$V(x) = v_0 + \psi x^+$$

- Exponential case $C(v) = \frac{1}{\psi} v \ln(\frac{v}{v_0}) - \frac{1}{\psi} v$

$$V(x) = v_0 e^{\psi x}$$

Equilibrium

Theorem

The pricing rule defined by $P(t, Y_t) = \mathrm{E}\left[h(Y_T)\,|\mathcal{F}_t^Y\right]$ *with* $h(y) = V\left(\mu_x + \Lambda\, y\right)$ *and the trading strategy:*

$$\theta_t = \frac{b(X_t - \mu_x) - (2b+1)Y_t}{T - t}\,, \tag{3}$$

where $b = \frac{1}{\sqrt{\hat{\lambda}^2+1}-1}$ *and* $\Lambda = 1 + \sqrt{1+\hat{\lambda}^2}$ *only depend on the signal to noise ratio* $\boxed{\hat{\lambda} = \frac{\sigma_x}{\sigma\sqrt{T}}}$ *constitute an equilibrium.*

In this equilibrium:

- $dP(t, Y_t) = \lambda(t, Y_t)dY_t$ *with* $\lambda(t, y) = \frac{\partial P(t,y)}{\partial y}$.
- *Price impact* $\lambda(t, Y_t)$ *is a martingale.*
- $P(T, Y_T) = V(X_T)$ *almost surely.*

- A crucial step in the proof is to show that $dY_t = \theta_t dt + \sigma dZ_t$ is a Brownian Motion with standard deviation σ on its own filtration (i.e., given the market maker's information) and converges a.s. to a linear function of X_T at T.

- Remarkably, the optimal trading strategy is independent of the effort cost $(C(v), V(x))$ when expressed as a function of Y_t, X_t.

- Instead, the cost function $C(v)$ determines $V(x)$ and thus affects the price function $P(t, Y)$.

- Different from Kyle, the optimal trading strategy depends positively on the number of accumulated shares (X)

→ Amplification effect: The informed more than offsets the cumulative noise trading demand because the value of activism increases with his ownership.

- This general framework allows to study the relation between market liquidity and economic efficiency for different cost functions.

A few examples

Example

In the binary effort model,

$$V(x) = v_0 + \Delta \mathbf{1}_{[c/\Delta,\infty)}(x)\,,$$

so

$$\begin{aligned} h(y) &= v_0 + \Delta \mathbf{1}_{[c/\Delta,\infty)}\left(\mu_x + \Lambda y\right) \\ &= \begin{cases} v_0 & \text{if } y < \frac{(c/\Delta - \mu_x)}{\Lambda}\,, \\ v_0 + \Delta & \text{otherwise}\,. \end{cases} \end{aligned}$$

It follows that the price function at any time $t \leq T$ is given by:

$$P(y,t) = v_0 + \Delta \mathrm{N}\left[\frac{\mu_x + \Lambda y - c/\Delta}{\Lambda\sigma\sqrt{T-t}}\right] \tag{4}$$

The price impact is given by: $\lambda(y,t) = \frac{\partial P(y,t)}{\partial y} = \Delta \frac{\mathrm{n}\left[\frac{\mu_x + \Lambda y - c/\Delta}{\Lambda\sigma\sqrt{T-t}}\right]}{\sigma\sqrt{T-t}}$

Example

In the symmetric quadratic model, $V(x) = v_0 + \psi x$, so

$$h(y) = v_0 + \psi\mu_x + \psi\Lambda\, y\,.$$

The price function at any time $t \leq T$ is given by:

$$P(y,t) = v_0 + \psi\mu_x + \psi\Lambda y \tag{5}$$

The price impact function is given by:

$$\lambda(y,t) = \psi\Lambda \tag{6}$$

This case resembles the original Kyle model:

- Price impact is constant
- However, $\lim_{\sigma\to 0}\lambda = \psi > 0$ ('endogenous uncertainty'!).

Example

In the asymmetric quadratic model, $V(x) = v_0 + \psi x^+$, so

$$h(y) = v_0 + \psi\left(\mu_x + \Lambda y\right)^+ = \begin{cases} v_0 & \text{if } y < -\frac{\mu_x}{\Lambda} \\ v_0 + \psi\mu_x + \psi\Lambda\, y & \text{otherwise} \end{cases}.$$

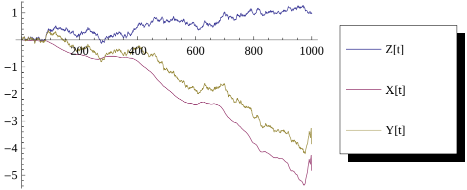
The price function at any time $t \le T$ is given by:

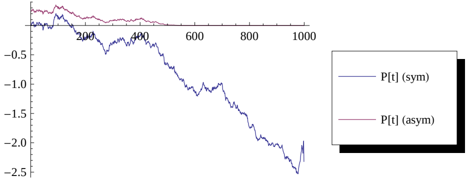
$$P(y,t) = v_0 + \psi(\mu_x + \Lambda y)\mathrm{N}\left[\frac{\mu_x + \Lambda y}{\Lambda\sigma\sqrt{T-t}}\right] + \psi\Lambda\sigma\sqrt{T-t}\,\mathrm{n}\left[\frac{\mu_x + \Lambda y}{\Lambda\sigma\sqrt{T-t}}\right] \tag{7}$$

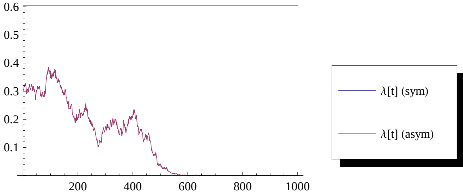
The price impact function is given by:

$$\lambda(y,t) = \psi\Lambda\mathrm{N}\left[\frac{\mu_x + \Lambda y}{\Lambda\sigma\sqrt{T-t}}\right] \tag{8}$$

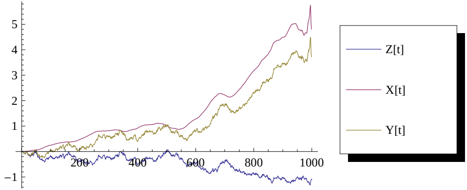
Symmetric vs. asymmetric quadratic cost function

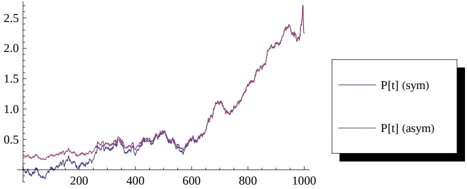


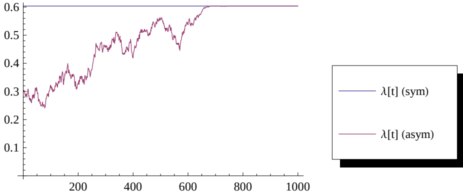




Symmetric vs. asymmetric quadratic cost function







Example

In the exponential model, $V(x) = v_0 e^{\psi x}$, so

$$h(y) = v_0 e^{\psi(\mu_x + \Lambda y)}$$

The price function at any time $t \leq T$ is given by:

$$P(y,t) = v_0 e^{\psi\left(\mu_x + \Lambda y + \frac{1}{2}\Lambda^2 \sigma^2 (T-t)\right)} \tag{9}$$

The price impact function is given by:

$$\lambda(y,t) = \Lambda\, P(y,t) \tag{10}$$

A Black-Scholes price process with a price-volume relationship.

Economic efficiency and market liquidity

- We measure economic efficiency by price, which is the expected effort of the activist.
- We measure market liquidity by price impact.
- Importantly, market liquidity (λ_t) can be affected by different channels:
  - Noise trading volatility (σ) $\sim$ Trading volume or length of disclosure window.
  - Prior uncertainty about insider's position (σ_X) $\sim$ Disclosure rules.
  - Productivity of the activist (Δ, ψ) $\sim$ Legal environment.
- These channels also have different implications for economic efficiency.

$\Rightarrow$ We consider separately the ex-ante impact at date 0 when $Y_0 = 0$ of a change in σ, σ_x, ψ on price (economic efficiency) and price impact (market liquidity).

Noise trading volatility (length of disclosure window)

Example

In the binary effort model,

$$\frac{\partial P}{\partial \sigma} \begin{cases} \geq 0 & \text{if } \mu_x \leq c/\Delta, \\ < 0 & \text{if } \mu_x > c/\Delta, . \end{cases} \quad \text{and} \quad \frac{\partial \lambda}{\partial \sigma} < 0 \;\; \text{when } |\mu_x - c/\Delta| \text{ not too large}$$

Example

In the symmetric quadratic model,

$$\frac{\partial P}{\partial \sigma} = 0 \quad \text{and} \quad \frac{\partial \lambda}{\partial \sigma} < 0$$

Example

In the asymmetric quadratic model,

$$\frac{\partial P}{\partial \sigma} > 0 \quad \text{and} \quad \frac{\partial \lambda}{\partial \sigma} < 0$$

Prior Uncertainty (disclosure rules)

Example

In the binary effort model,

$$\frac{\partial P}{\partial \sigma_x} \begin{cases} \geq 0 & \text{if } \mu_x \leq c/\Delta\,, \\ < 0 & \text{if } \mu_x > c/\Delta,. \end{cases} \quad \text{and} \quad \frac{\partial \lambda}{\partial \sigma_x} > 0$$

Example

In the symmetric quadratic model,

$$\frac{\partial P}{\partial \sigma_x} = 0 \quad \text{and} \quad \frac{\partial \lambda}{\partial \sigma_x} > 0$$

Example

In the asymmetric quadratic model,

$$\frac{\partial P}{\partial \sigma_x} > 0 \quad \text{and} \quad \frac{\partial \lambda}{\partial \sigma_x} > 0$$

Conclusion

- Propose extension of Kyle (1985) to endogenize terminal value and study relation between economic efficiency and market liquidity. Results depend on (a) nature of the shock that moves liquidity and (b) characteristics of the cost function.
- If driven by shock in noise trading volatility, then stock liquidity typically good for economic efficiency, except if effort cost function has binary 'all or nothing' outcome and initial stake is high ('lock-in effect').

$\Rightarrow$ Market liquidity and economic efficiency are complements (for activists with low initial stakes).

$\Rightarrow$ Argues for longer 13D disclosure window.

- If driven by shock to prior uncertainty or productivity of insider, then stock liquidity typically bad for economic efficiency (both are substitutes), except if effort cost function has binary ('all or nothing') outcome and initial stake is high ('lock-in effect').
- Realized amount of activism always depends on realized amount of liquidity trading.

Extensions

- Allow for fixed privately known component of firm value (to differentiate stock-picking from activism):
  - Equilibrium is not fully revealing: market cannot separate one from the other based on price and volume information.
- Allow for stochastic noise trading volatility process (CDF (2016)). This gives the informed trader a liquidity timing option:
  - Trades more when uninformed volume is high.
  - Price volatilitiy is stochastic and positively correlated with uninformed volume.
  - Price impact is stochastic, increasing on average, and negatively correlated with volume
- Derivatives Trading by Activists (also part of 13D disclosure requirement):
  - Activists use derivatives in only 2.62% of all cases
  - When exchange-traded options are availble (20%) then use derivatives in 10% of cases.
  - Use derivative to increase their long-exposure (not to hedge) by 2.2% to achieve 8.5% total.
  - Options Implied Volatilities accurately forecast the move in realized volatility which drops on average at announcement.
- Many open questions