Chasing Private Information

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New Developments in Long-Term Asset Management Conference

A Quick Summary

- A huge theoretical literature on the effect of informed trading on asset prices, liquidity, turnover
  - Grossman and Stiglitz; Glosten and Milgrom; Kyle; ...
- Empirical tests of these theories, however, are hamstrung by the lack of clear identification of private information
- The main innovation of the paper is to identify a setting where we can confidently claim these trades are motivated by private information
  - the idea is to look at illegal insider trading – as identified by the SEC
  - clearly based on material (huge returns) and non-public information
  - collected data on all such cases in the past 20 years

A Quick Summary

- Examines an array of public signals on days of illegal insider trading
- Examines signals from both stock and options markets
  - 2/3 of the illegal trading in stocks, and 1/3 in options
- Three types of public price/volume signals
  - price-based: quoted spreads, price impact (i.e., price movements in the 5 min after the trade), daily price range, realized variance, R^2 from the market model, option implied volatility
  - volume-based: absolute order imbalance, abnormal volume, volume ratio (option-to-stock)
  - price and volume based: Kyle's λ, Amihud illiquidity, cross-market illiquidity ratio (similar to Amihud)

Regrouping of the Signals

- Regroup these signals into three categories
  - related to turnover/trading volume: abnormal volume, volume ratio
  - related to variance: price range, realized variance, $1 - R^2$ (idiosyncratic vol), option implied volatility
  - related to liquidity/price impact: quoted spreads, abs order imbalance, price impact, Kyle's λ, Amihud, illiquidity ratio
- Standard information economics models predict that more informed trading would
  - trading volume – uninformed trading unlikely to go up
  - increase return variance – more information is revealed
  - lower liquidity – market makers less willing to provide liquidity

Main Findings

- On days with illegal insider trading (either in stocks or in options)
  - higher trading volume, particularly in options
  - higher volatility, especially idiosyncratic vol
  - higher liquidity, across nearly all measures
- The results on turnover and liquidity seem to contradict classic information models
- In particular, on days when insiders trade
  - more trading even by the uninformed
  - lower quoted spread and lower price impact

An Alternative Interpretation

- A key assumption in these classic models
  - constant noise trading volatility
  - so the informed do not time their trades based on liquidity
- Findings in this paper can be understood through the lens of Collin-Dufresne and Fos (2015, 2016)
  - activists trade on days with higher liquidity
  - introduce stochastic noise trading volatility to Kyle (1985)
  - informed trade more aggressively when uninformed volume is higher and price impact is lower
  - insider choose to trade on days with more uninformed trading $\Rightarrow$ thus, higher turnover and lower price impact (potentially excess volatility)

An Alternative Interpretation

- The paper tries to distinguish the "causal impact" of informed trading on public liquidity signals from a "timing" story
- Idea is to look at information that is short lived
  - if the private information is publicly released soon after the tip
  - not much scope for timing, but find similar results
- There may be multiple tips, not sure which day is recorded
- More important, the public release day is endogenous
  - information release only after insider trading
  - would help if focus only on scheduled events or trading by individuals that are unlikely to affect the release date (e.g., second cousin)

An Alternative Interpretation

- This paper offers a clean test of Collin-Dufresne and Fos (2016)
  - larger return effect (40% vs. 4%)
  - in the case of activists, also coordination issues
  - stronger incentives for insiders to time uninformed trading
- In Collin-Dufresne and Fos (2015), informed investors (activists) time "liquidity" to minimize trading costs
- In the case of illegal insider trading, insiders have another incentive to time – to minimize litigation risk
  - trade on days with high volume and volatility
  - if caught, can potentially argue that many others are trading in the same way on the same day

A Few Suggestions

- Reposition the paper; from an exposition perspective
  - a more balanced discussion of the timing story
  - tone down a casual relation from insider trading to liquidity
- Can perhaps shed more light on how insiders time liquidity
  - what are the signals that insiders potentially use?
  - intraday price/vol signals – assuming some persistence?
- An imperfect test is to look at the time of the day of the trade
  - a morning order, more likely to be "causing" the day's liquidity
  - an afternoon order, likely to be "responding" to that day's liquidity

A Few Suggestions

- A potentially interesting extension to Collin-Dufresne and Fos (2016) is to consider stochastic arrival of informed traders
- To illustrate: scheduled vs. unscheduled events
  - expectation of meeting an informed is high before scheduled
  - consistent with low turnover before earnings announcements
- One way of modeling this: volatility of uninformed (noise) trading not entirely exogenous, but rather
  - depends on the *expectation* of the arrival of the informed
  - this could then affect the incentives of the informed to time
  - may exist multiple equilibria?

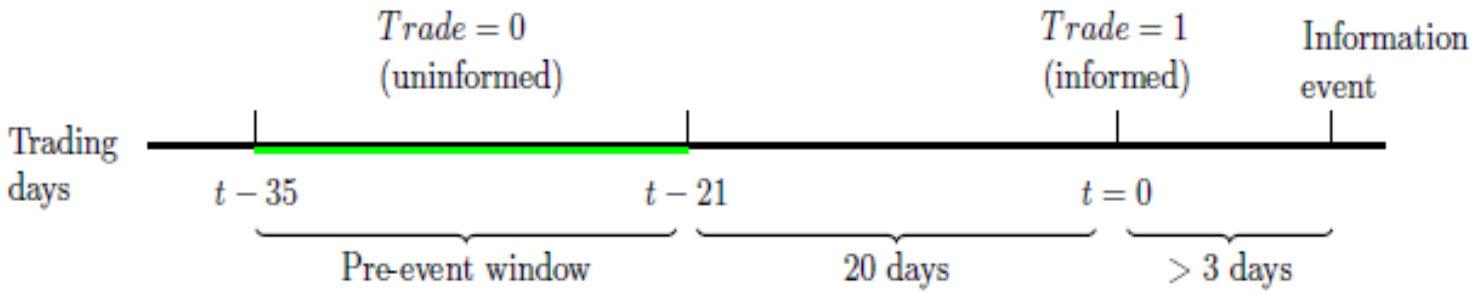
A Few Suggestions

- Along this line, expectations of having an informed investor may change after each lawsuit
  - for the same firm – is there a firm-fixed effect?
  - also for other firms with similar characteristics (same industry, similar size, age, growth opportunities)
  - the change in expectation can be positive or negative
- Two potentially interesting aspects
  - how does the average spread change? widens? narrows?
  - how does the spread change on insider trading days?

A Few Suggestions

- SEC enforcement varies across regions
  - some cities have a local SEC office, turns out firms nearby are more likely to be the target of an SEC investigation
  - firms that are further away are less likely be to targeted
  - firms near the boundary of two administrative regions the least
- One interpretation is differences in enforcement costs
  - if true, then insiders further away from any SEC office are more likely to engage in insider trading than the rest
  - equivalent to introducing an exogenous cost to informed trading
  - changes the expectations of the uninformed
  - consequently, feed back to the actions of the informed

Event Study Time Line



- Unclear why we skip the period (-20, -1)
  - liquidity, turnover can be generally different during this period than in other periods (this is precisely why this is the right control group)
  - e.g., liquidity is generally lower before earnings announcements
  - insiders pick the day with max liquidity during that window
- Show a plot for each liquidity/volatility measure around the trading day, from the tip day to public release day

Variation in Insider Behavior

- How do they trade to minimize price impact and litigation risk?
  - across different types of insiders
  - across different time periods/market conditions
- One puzzling result is that not much difference in liquidity pattern around trading by sophisticated vs. unsophisticated insiders
  - sophisticated: hedge fund managers, top executives
  - unsophisticated: e.g., second cousin of the CTO
  - somewhat inconsistent with a timing story
  - also inconsistent with a price impact story
  - are the unsophisticated trading together with the sophisticated?
  - are they trading different types of firms?

High vs. Low Expertise Investors

Based on	Prices					Volume		Both	
	Quoted Spread	Price Impact	Price Range	Realized Volatility	Price Inform.	Order Imb.	Abn. Volume	Lambda	Illiq.
Panel A: Stock-based Signals: Low Expertise									
InfoTrade	-0.035*	0.112	0.854***	0.026	24.720	-0.008	279.748**	-0.019*	-0.287**
	(0.020)	(0.532)	(0.184)	(0.023)	(28.924)	(0.005)	(117.297)	(0.010)	(0.133)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
#Obs	4,948	4,931	5,041	4,676	4,324	4,931	5,022	4,920	5,001
Panel B: Stock-based Signals: High Expertise									
InfoTrade	-0.009	-0.413	0.711***	0.011	33.606	-0.002	139.508	-0.015	-0.201**
	(0.018)	(0.548)	(0.206)	(0.036)	(31.277)	(0.005)	(231.065)	(0.010)	(0.078)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
#Obs	5,125	5,110	5,148	4,815	4,215	5,110	5,142	5,107	5,132

Not much difference between low vs. high expertise insiders

Other Comments/Thoughts

- A big puzzle in asset pricing is excessive trading
  - usually attribute it to noise trading
  - we don't know much about noise trading, empirically
  - what's the average magnitude, time variation, etc.
  - can we learn anything about noise trading through the actions of the informed investors?
  - take the Collin-Dufresne and Fos (2016) model, can we calibrate the model, quantify time variation in noise trading volatility?
- Separately analyze insider trading in options vs. in stocks
  - to the extent these two markets are segmented, trading in one of the markets could have different predictions for the two markets
  - true for both the price impact and liquidity timing story

Other Detailed Comments

- Average insider trading: 10% of stock ADV and 30% of option ADV
  - subtract insider trading from all volume measures
- Many of the firms are small, paper uses S&P500 as the market index
  - also try a small-cap index (R2000), or have SMB in the regression
- Any systematic differences between scheduled, unscheduled events
  - e.g., number of days between receiving the tip and trading
  - number of days between trading and public announcements
- Sort trades based on trade size (as a fraction of ADV)
  - if it's price impact, should see larger effects for larger trades
  - trade size is endogenous (so does not solve the problem entirely)

Conclusions

- An interesting paper that examines important questions
- Cool datasets, a lot can be done with the data
- Interesting and intriguing empirical results
- A more balanced discussion of the two mechanisms
  - causal impact of informed trading on liquidity
  - informed investors time their trades based on uninformed trading
- Think about ways to extend the Collin-Dufresne and Fos framework
- Would be very interesting to quantify amount of uninformed trading