Fast Trading and Prop Trading

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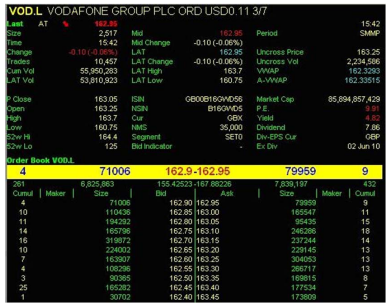
Market Microstructure Confronting many viewpoints #3

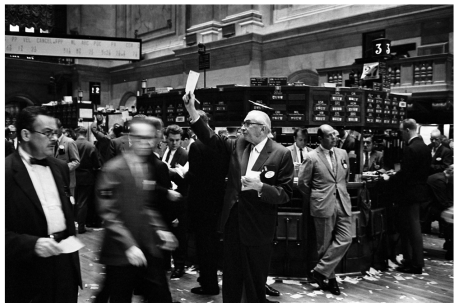
New market organization, new financial intermediaries

In the past

Today



In the past



Brokers, broker-dealers,
mutual funds

Today

Prop traders, hedge funds,
high frequency traders

Speed & information

Fast traders: a short term informational advantage

Impact on market liquidity?

- Better monitoring $\rightarrow$ avoid being picked off, should lower cost for fast liquidity suppliers
- But possibly more adverse selection of fast takers imposed on other traders

Speed & information

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Consistent with the literature, e.g., Brogaard, Hendershott, and Riordan, 2014a (Nasdaq) & 2014b (on short sale ban); Baron, Brogaard, and Kirilenko, 2014 (E-mini S&P 500 futures) (...)

- Some HFT supply liquidity, their limit orders are exposed to adverse selection, they trade against price pressure, they improve liquidity and price discovery
- Some HFT take liquidity and have a negative impact on markets, a limited number of HFT realize huge profits, HFT's short selling decreases liquidity and price efficiency

Speed & information

Fast traders: a short term informational advantage

In the short run, Impact on market liquidity?

- Better monitoring → avoid being picked off, should lower cost for fast liquidity suppliers
- But possibly more adverse selection of fast takers imposed on other traders

In the long run, can the "slow" survive?

- increased adverse selection (if fast pick off their limit orders) + winner's curse (if fast liquidity suppliers cancel limit orders when news)
  → loose on limit orders?
- if can't be first to pick off stale quotes
  → loose on market orders?

Prop trading & information

Yet another important characteristic of traders is whether they act on their own account (prop trading) or on behalf of customers (brokers).

Prop traders act as principals

- incitations to acquire and analyze information
- fundamental, long term analysis
- but also: arbitrage, market making...

Prop traders as well are supposedly informed, ...

Focus of this paper

Which orders and traders are informed ... generating adverse selection costs for others?

Which are profitable?

Are fast traders more informed? More profitable?

Are slow traders loosing on their limit orders? on their market orders?

Are prop traders more informed? More profitable?

Are limit or market orders more informed? More profitable?

What's the relative magnitude of the different effects?

Data to answer these questions

Data from Euronext and AMF : all stocks traded in Euronext Paris, in Eurolist 100 + Next 150, from Jan to Sept, 2010

Trades and orders

To obtain the best quotes time-stamped at the micro-second:

- Need to replay the entire limit order book

Tick-by-tick data including anonymised member ID

- Know if agency trading vs prop trading

Agency trading vs prop trading

Pure play prop-trader/market maker

- 20 prop traders

Pure broker only placing client orders

- 37 brokers

Placing both prop & client orders

- 82 “dual” traders

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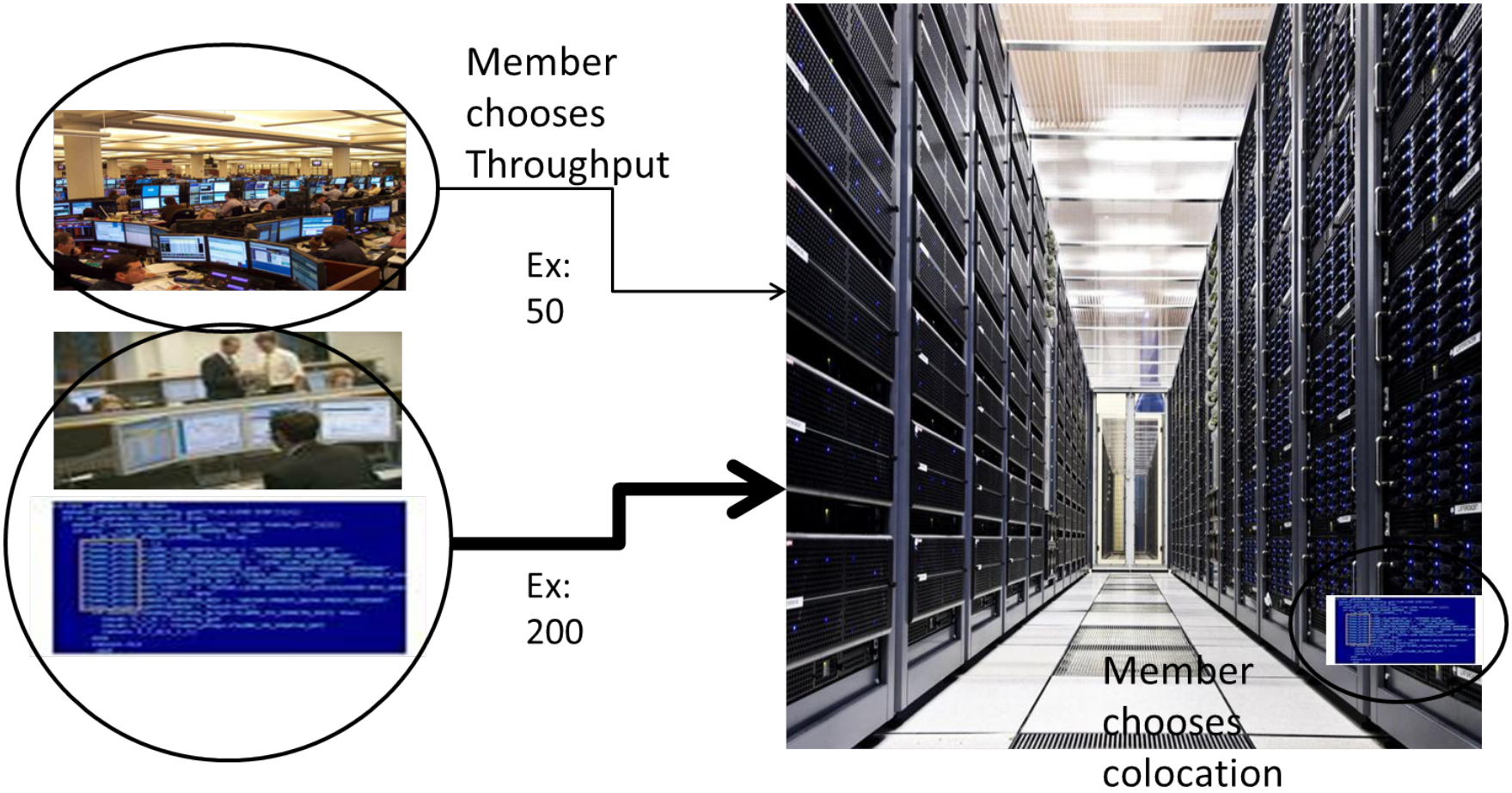
Tick-by-tick data including anonymised member ID

- Know if agency trading vs prop trading
- **Know if order came from member with high speed connection**

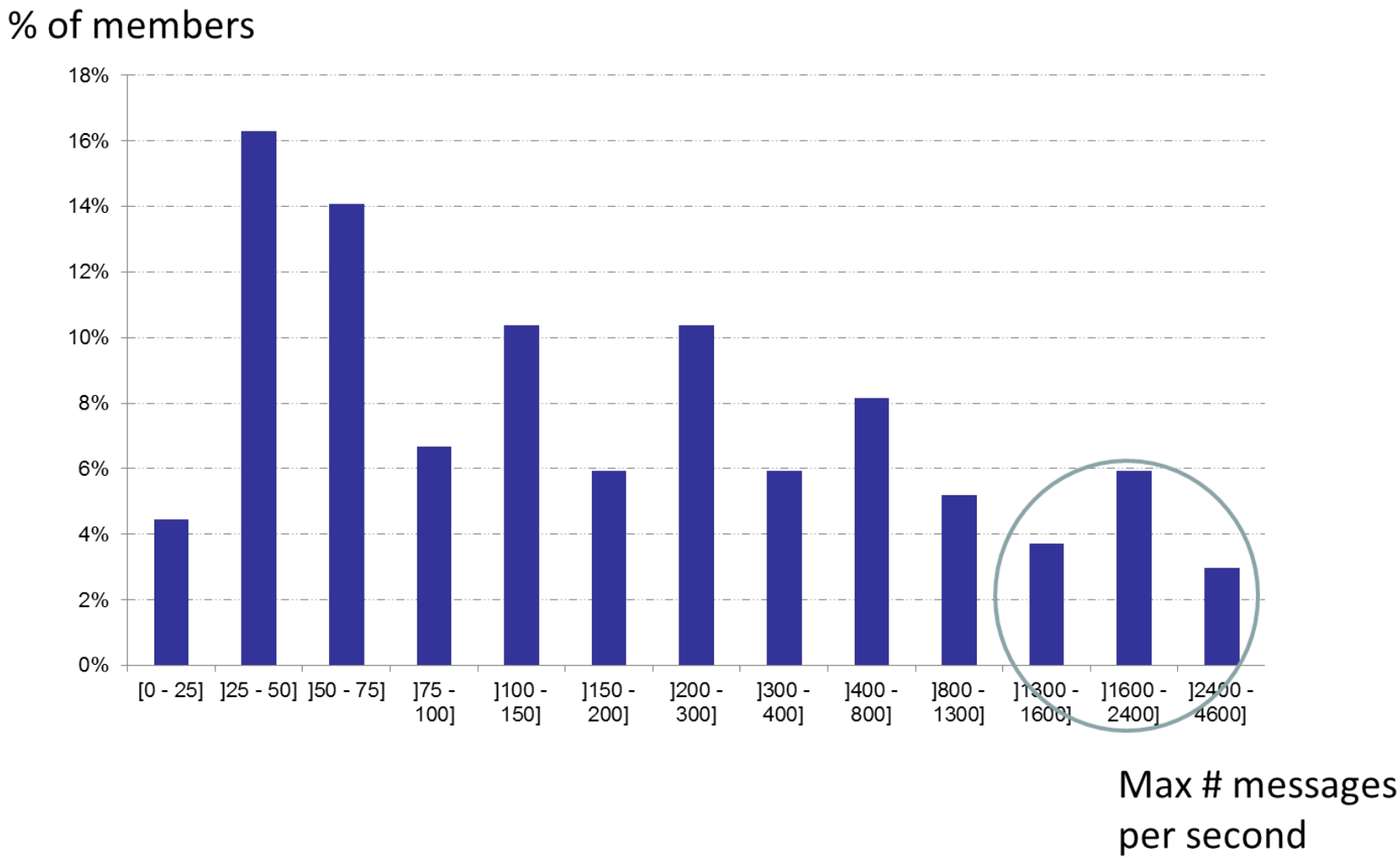
High speed connection: direct measure



Throughput = max number of messages / sec

Speed Capacity = $\sum$ Throughputs

Speed



Define as "fast" the 16 members with capacity $>$ 1300 mssg/sec

5 types of players

	Fast (>1300 mssg/sec)	Slow (< 1300 mssg/sec)
Principal (100% trades as principal)	5	15
Dual trader	11	71
Broker (0% trades as principal)	0	37

Sample of stocks

Sub-sample: 23 stocks (already more than 7To = 1,000 CDs)

- large cap & financial: 1 stock (/10 stocks)
- large cap & non-financial: 9 stocks (/56 stocks)
- mid cap & financial: 1 stock (/6 stocks)
- mid cap & non-financial: 8 stocks (/28 stocks)
- small cap & non-financial: 4 stocks (/16 stocks)

Descriptive stats on orders, messages, and trades

Standard findings with speed: 16 "fast" (/ 139 members) =

- 53% trades
- 78% of messages (+ more updates and cancellations)
- lower trades to messages ratio
- lower time to update non marketable limit orders

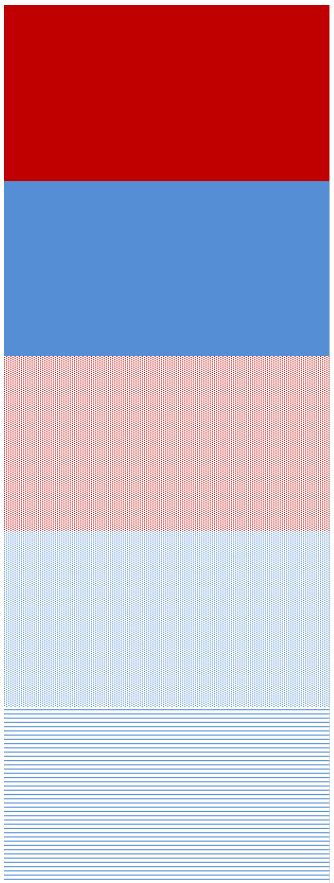
Characteristics of prop traders: 20 "prop" (/139 members)

- lower trade size
- less hidden orders
- lower time to cancel non marketable limit orders

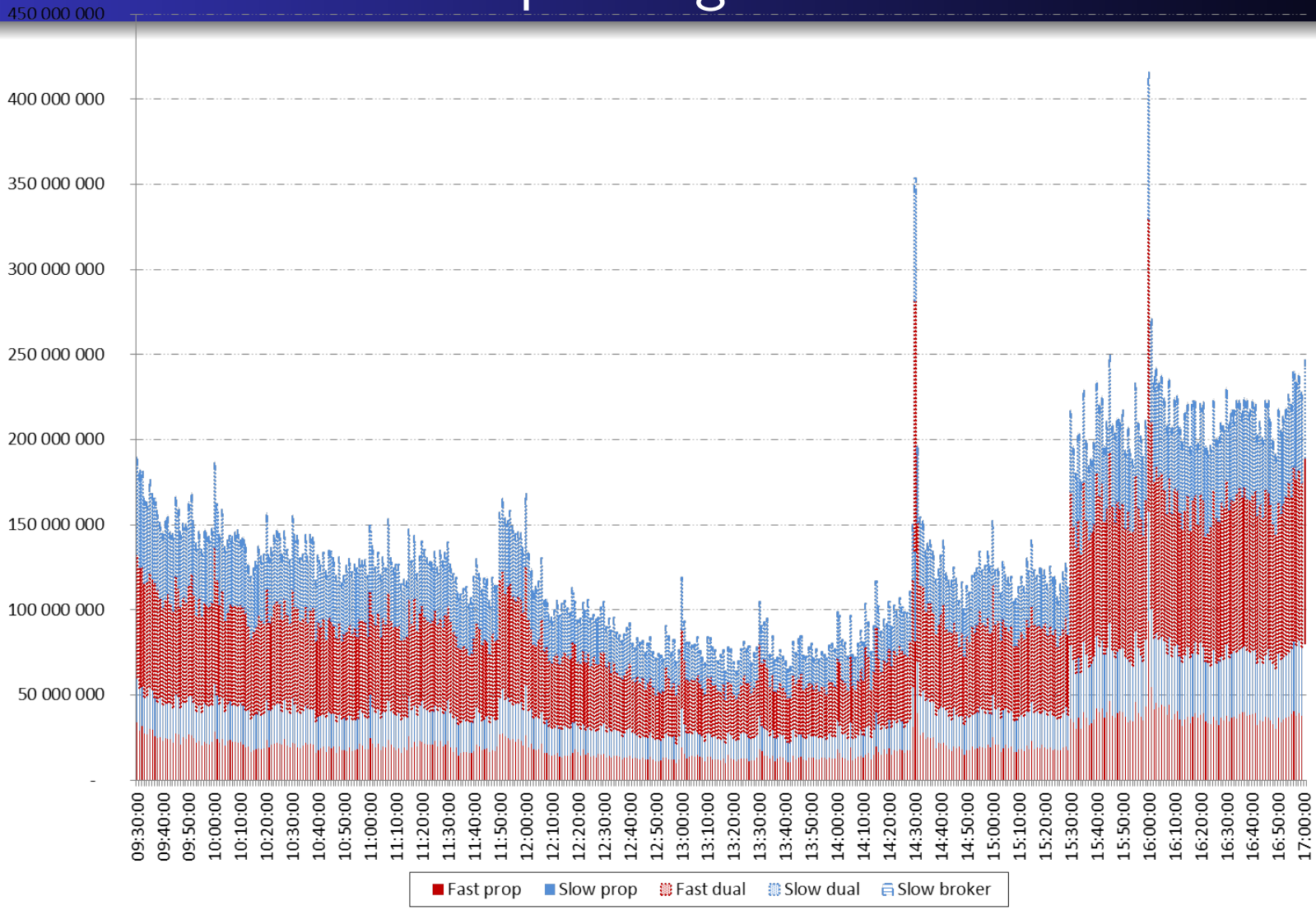
Outline

What days, time of the day, stocks do different categories trade?

Legend



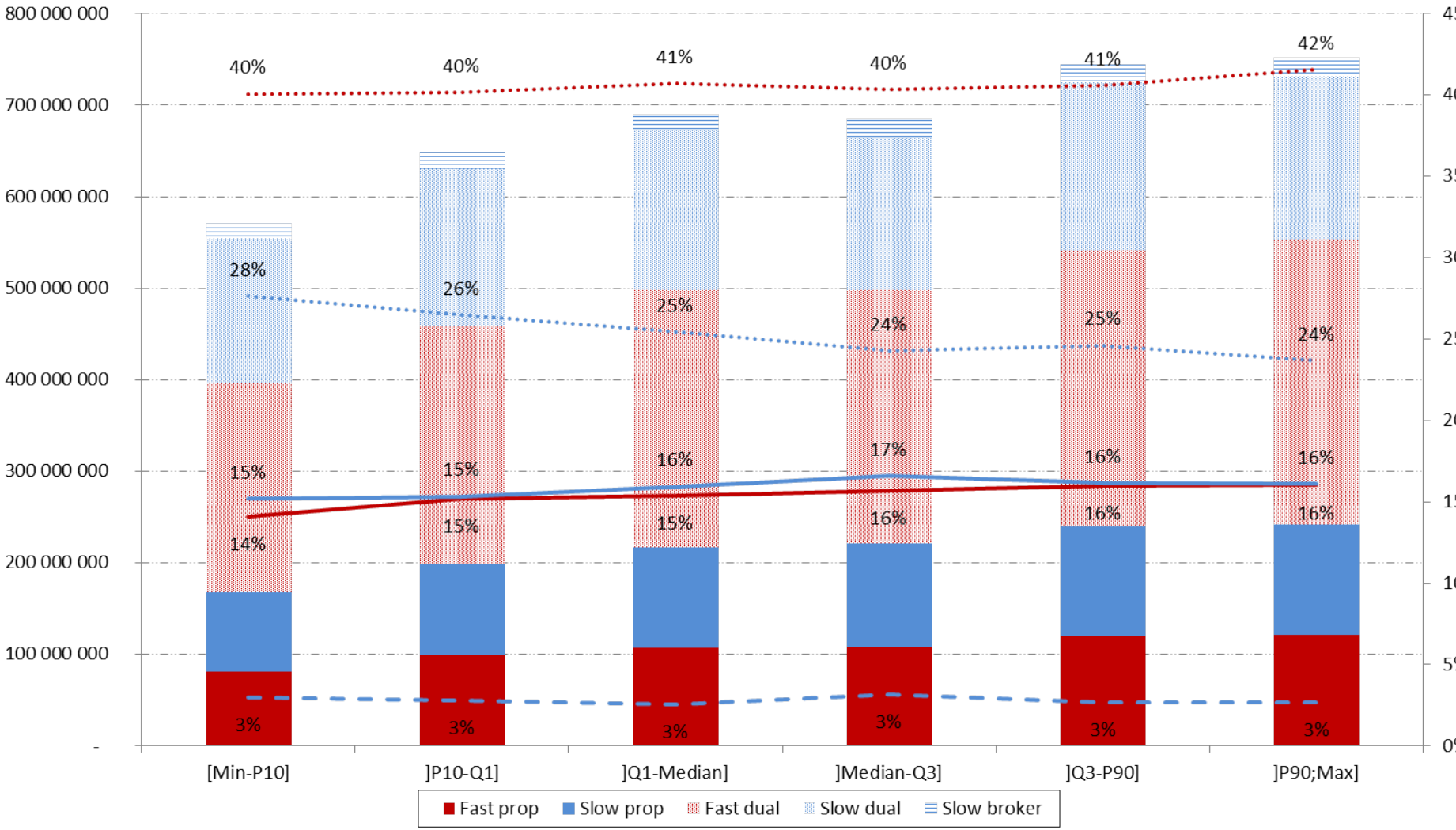
Volume in euros depending on the time of the day



Peaks at 11:50, 14:30*, 15:30, 16:00*

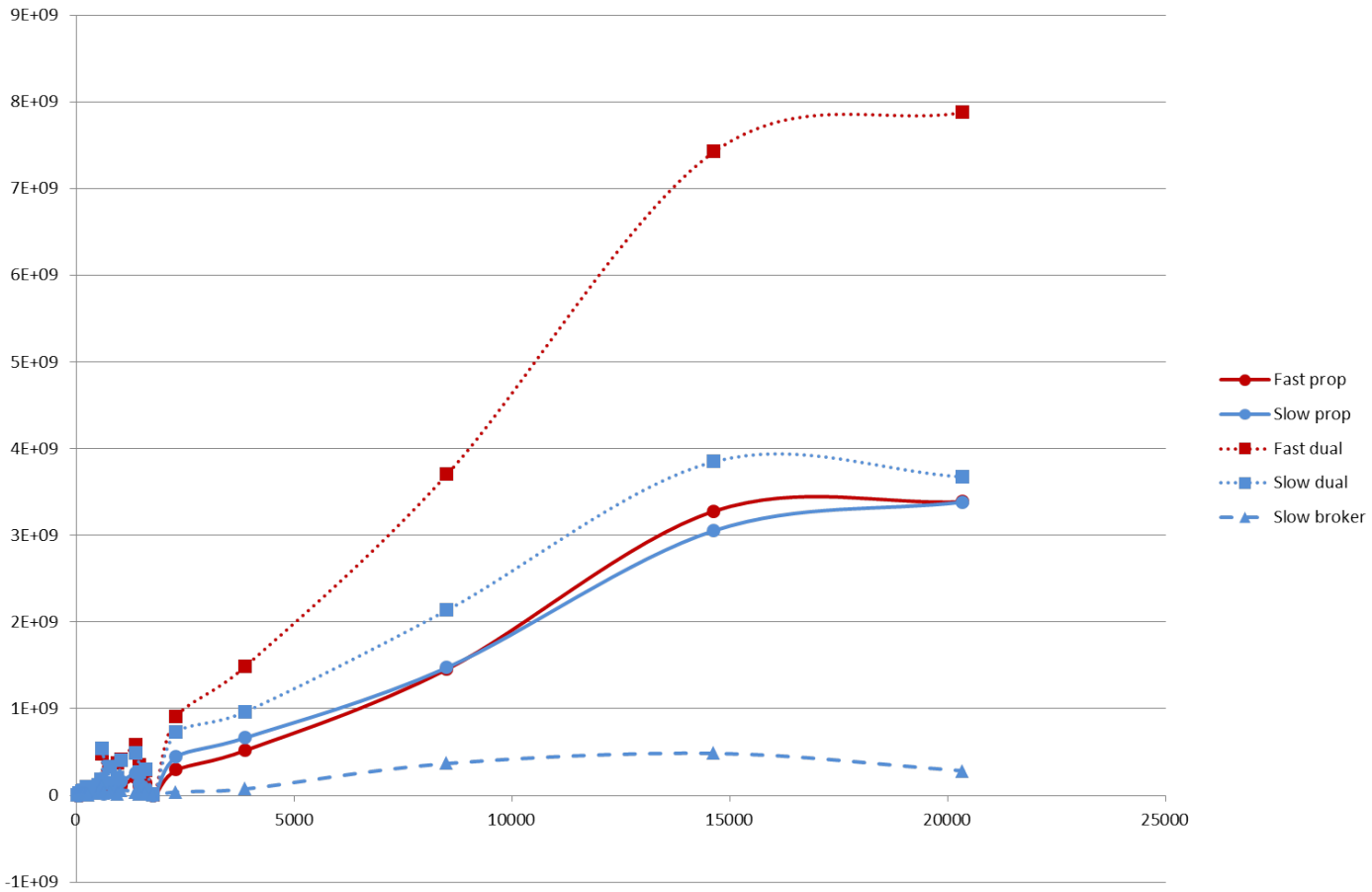
Impact slightly more fast traders but market share mainly stable

Daily Volume in euros and market share depending on the volatility of the previous day



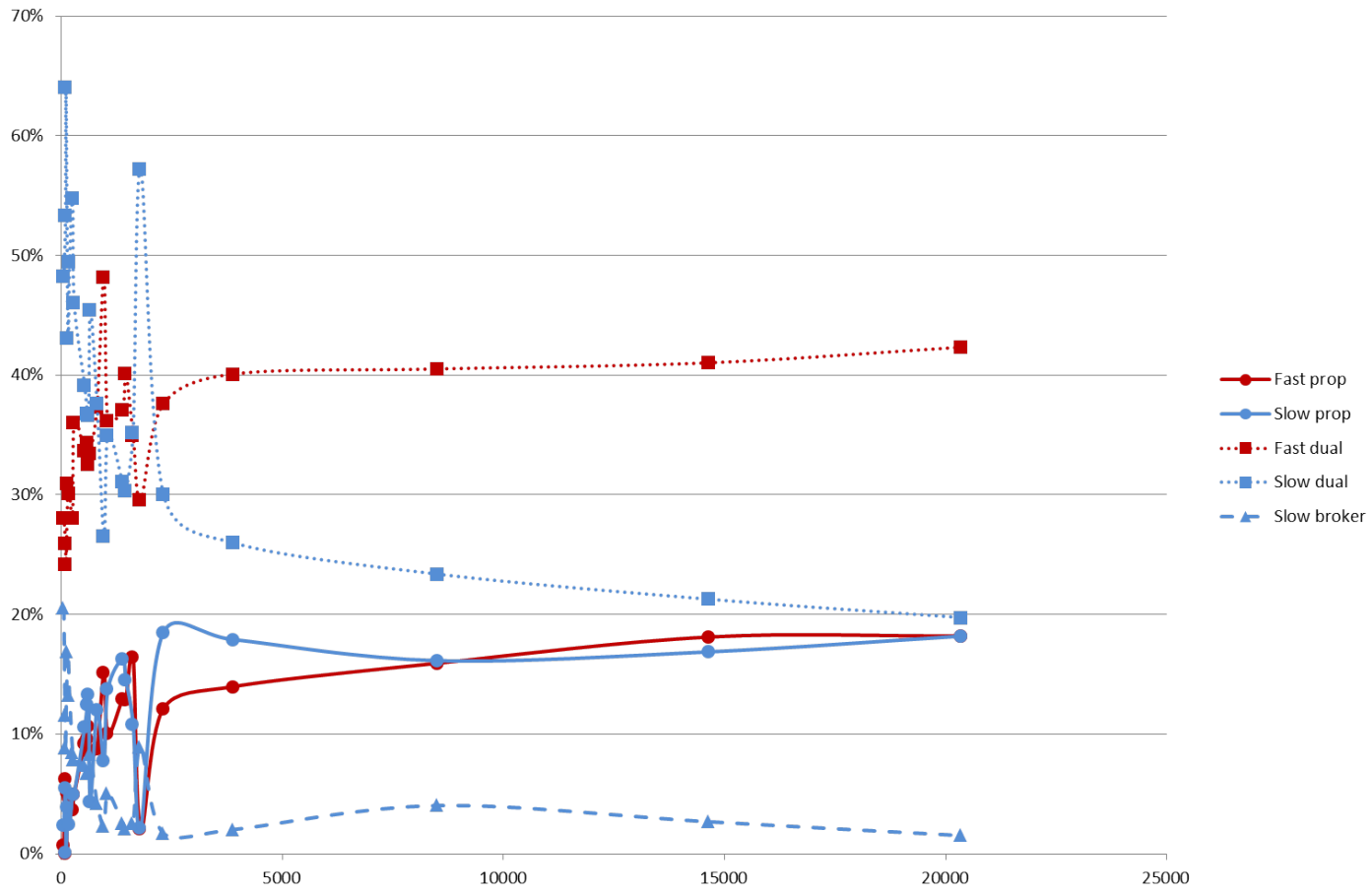
Fast or prop : slightly increasing in volatility

Volume in euros depending on the market cap (1 bullet point = 1 stock)



Volume increases in market cap (not surprising...)

Market share depending on the market cap (1 bullet point = 1 stock)



Increases more for fast or prop traders

Outline

Inf. content and profits of the two counterparts of a trade at $\Delta = 2$ mns

Which orders are informed? Profitable?

Informational content $=$

$$\frac{(M_{t+\Delta}-M_{t-})}{M_{t-}} \times \text{ sign of order } (>0 \text{ if buy})$$

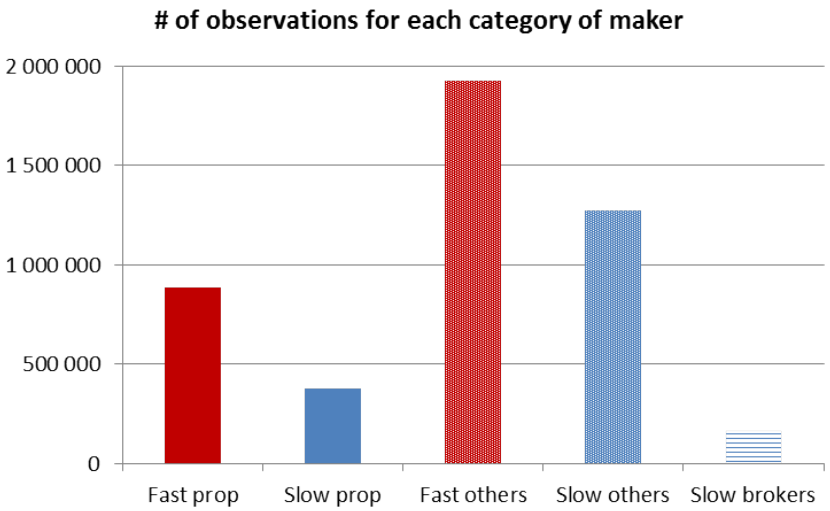
Profit $=$

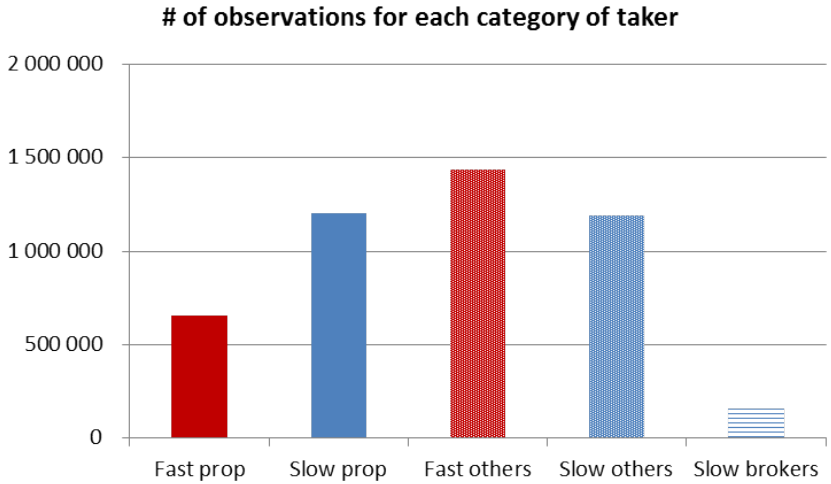
$$\frac{(M_{t+\Delta}-P_t)}{M_{t-}} \times \text{ sign of order}$$

In both cases: empirical average by category of traders.

- Robustness checks: other Δ
- Regression with fixed effects on stock, day, time of the day: same key features

Number of immediately marketable & not immediately marketable orders





Fast: less marketable orders than limit orders placed in book then hit

Slow prop: more marketable orders than limit orders placed in book then hit

Who is trading with whom?

		Taker					
		Fast prop (5)	Slow prop (15)	Fast others (11)	Slow others (71)	Slow brokers (37)	*total by maker*
Maker	Fast prop (5)	2,7%	4,2%	6,4%	5,1%	0,7%	*19%*
	Slow prop (15)	1,2%	2,2%	2,6%	1,9%	0,2%	*8%*
	Fast others (11)	5,9%	11,3%	12,7%	10,4%	1,3%	*42%*
	Slow others (71)	3,8%	7,4%	8,1%	7,2%	1,0%	*28%*
	Slow brokers (37)	0,5%	0,9%	1,0%	1,0%	0,2%	*4%*
	total by taker	*14%*	*26%*	*31%*	*26%*	*3%*	

Reading key: the sum of all columns + rows = 100%

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Fast traders involved on either side in 78% of the trades.

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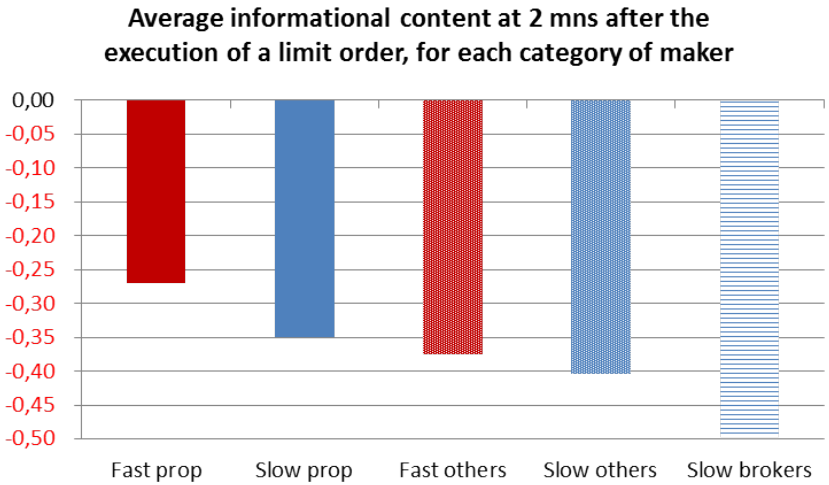
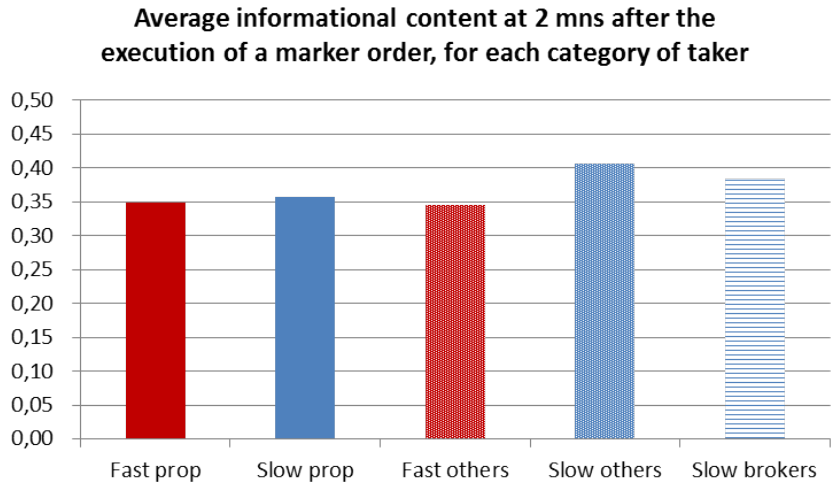
Fast traders involved on either side in 78% of the trades.

Prop traders involved on either side in 51% of the trades.

Informational content



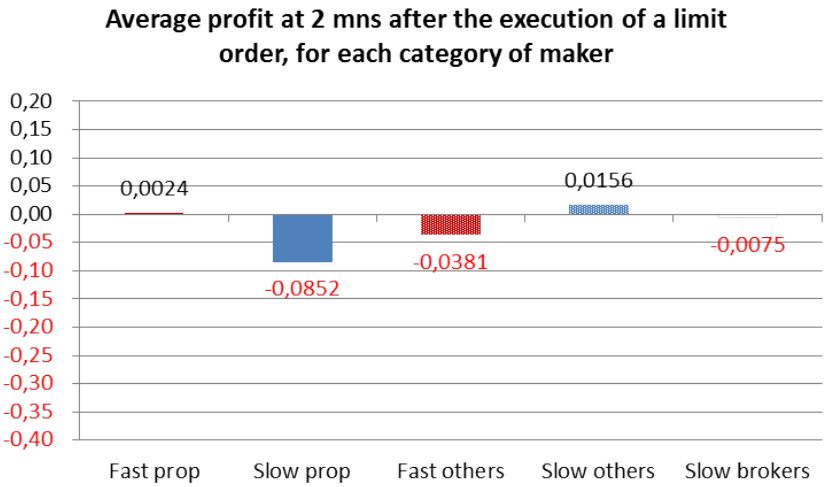


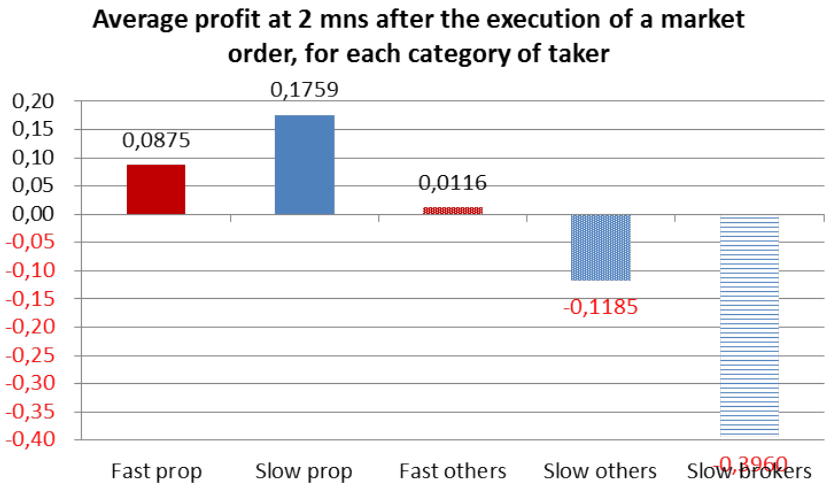
All limit order traders adversely selected, all market orders have informational content

Fast marketable limit orders don't have more informational content than slow ones

Fast prop traders' limit orders incur minimal adverse selection cost

Profits



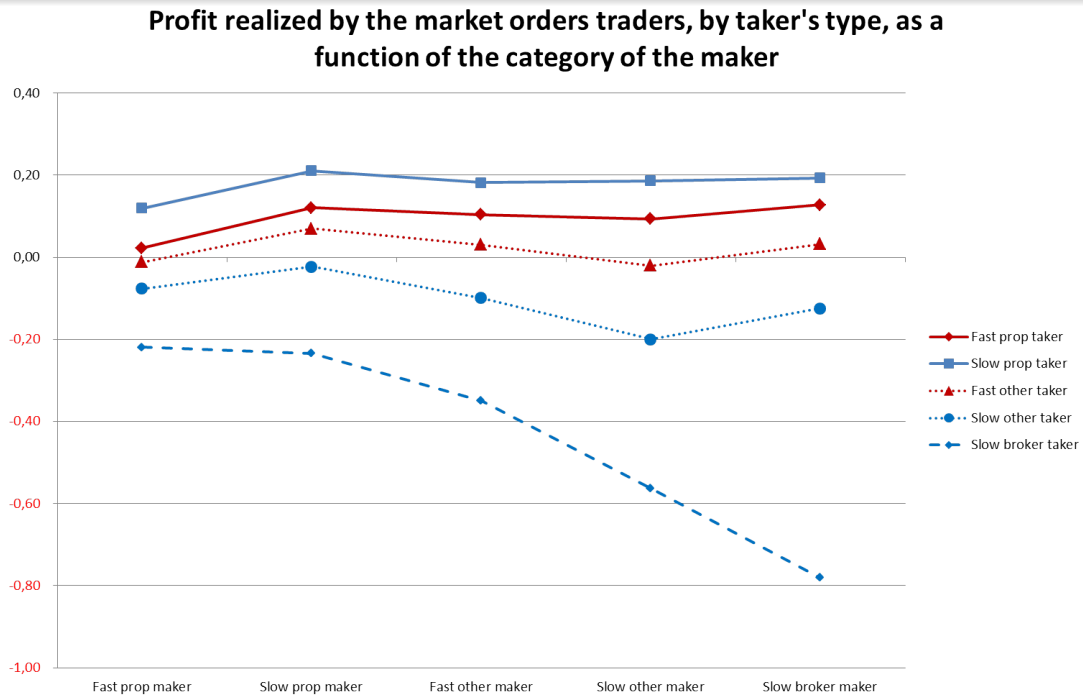


Limit orders: Fast prop manage to offset adverse selection cost by earning the spread. Others don't

Prop marketable orders earn profits, especially slow prop

Slow others + brokers' marketable orders not profitable: spread > info content

Marketable orders' profits by maker's and taker's type



Slow prop marketable orders earn profits agains all types (a bit lower against fast prop)

Fast prop marketable orders earn profits agains all types, except fast prop

Slow brokers' marketable orders make losses (a bit less against prop trader. Why???)

Outline

Dynamics of inf. content and profits

Informational content & profits of trades: summary

Informational content of aggressive trades

- Prop trade on reversals: supply liquidity, slow non-prop ride short-term momentum

Profit of trades of aggressive trades

- Prop market orders remain profitable: 2 bp after 5 minutes, Momentum riding market orders of slow brokers not profitable (spread $>$ info advantage)

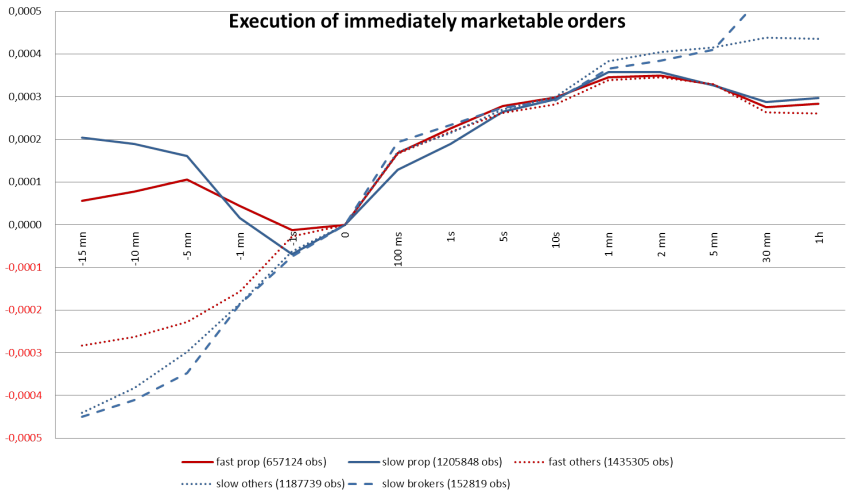
Informational content of non-aggressive trades

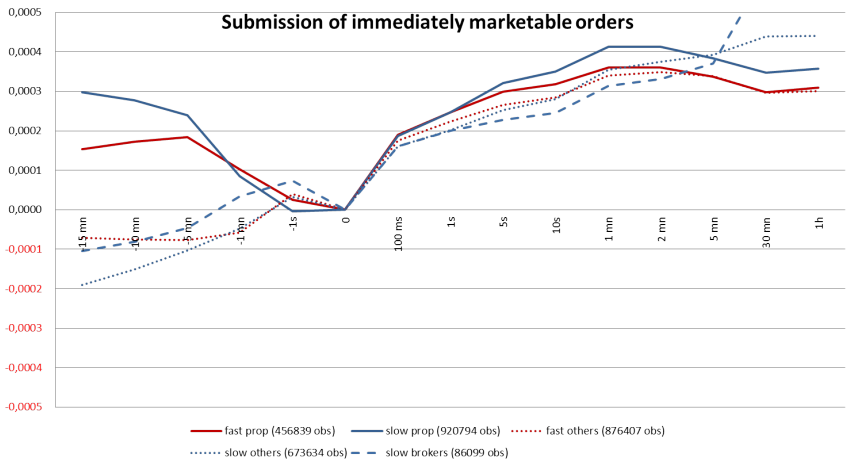
- Slow broker ask hit after decline in price, continued after trade

Profit of non-aggressive trades

- Fast limit order executions profitable if unwound sufficiently fast

Informational content: comparing aggressive trades and immediately marketable orders



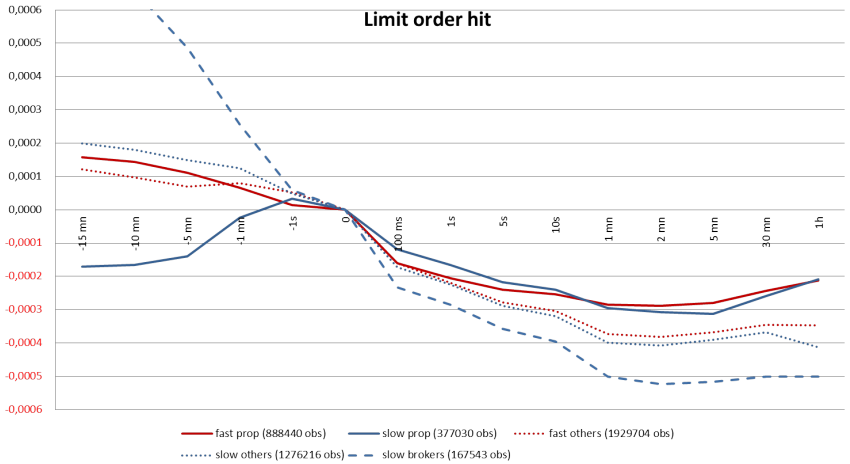


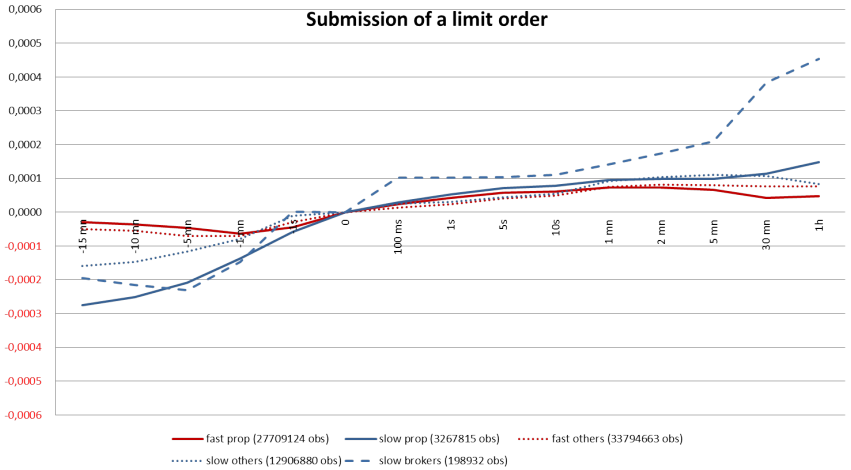
Conditioning on the message instead of on a trades:

Same patterns (reversal of prop, momemtum of slow)

Informational content of brokers decreases while inf. content of slow prop increases. Resiliency related to order size?

Informational content: comparing limit order hits with new submissions

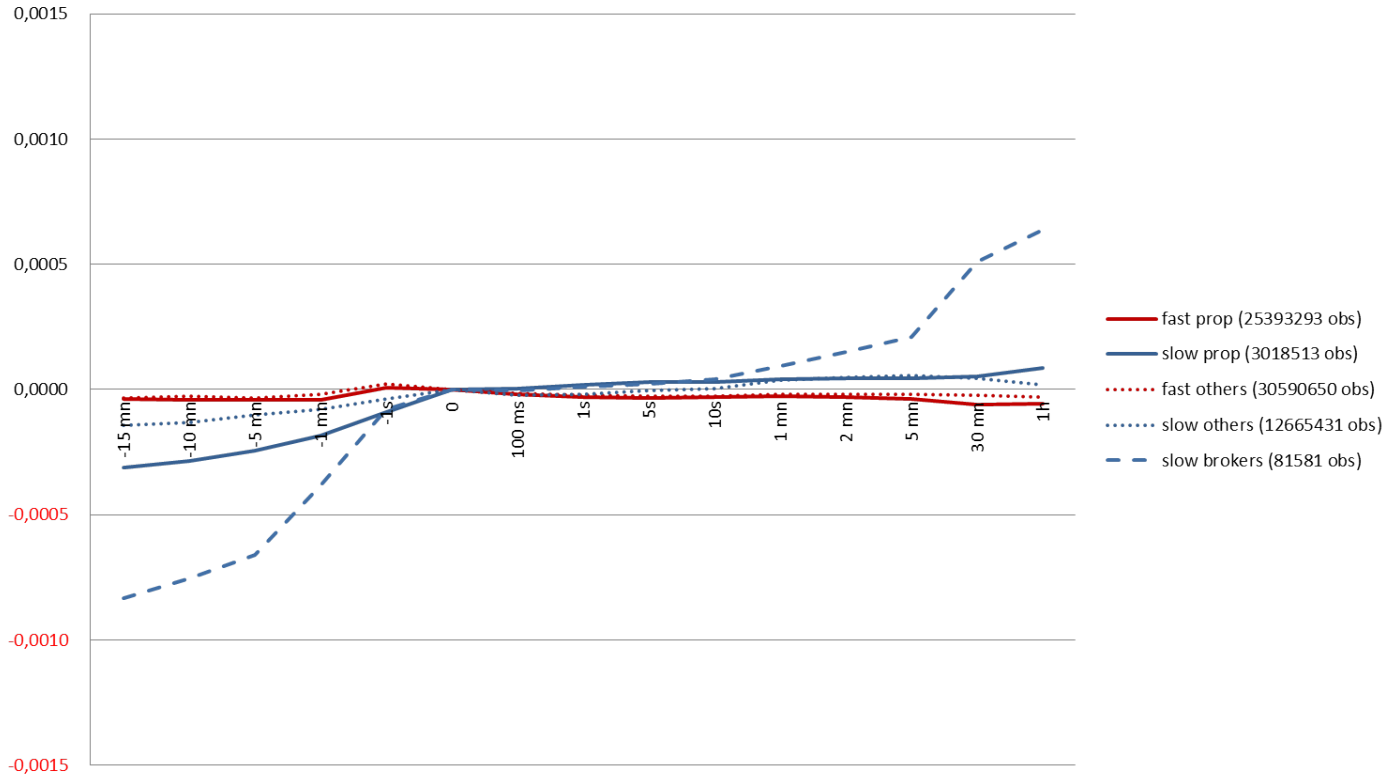




Conditioning on the message instead of on a trades:

Slow brokers: momentum riding. Very small informational content in limit order submissions.

Informational content of **orders**: cancellation or update less aggressive of non immediately marketable orders



Slow brokers step back in the book when prices move in their direction: cancel and re-submit to chase trends? (almost no update for them)

For all others : no inf. content

Conclusion

All limit orders hit are adversely selected, all market orders have informational content

For prop traders, speed matters more for limit orders than for market orders

- Fast prop traders manage to offset adverse selection cost incurred on their limit orders; others don't
- Fast traders, less exposed to adverse selection, execute larger % of trades via passive (limit) orders than slow traders

Slow others + brokers' marketable orders are not profitable, but loose less against prop traders

Prop marketable orders earn profit, especially slow prop

- Slow prop, more exposed to adverse selection, mainly trade with market orders (marketable limit)