Market Ecology I
Taxonomy of strategies

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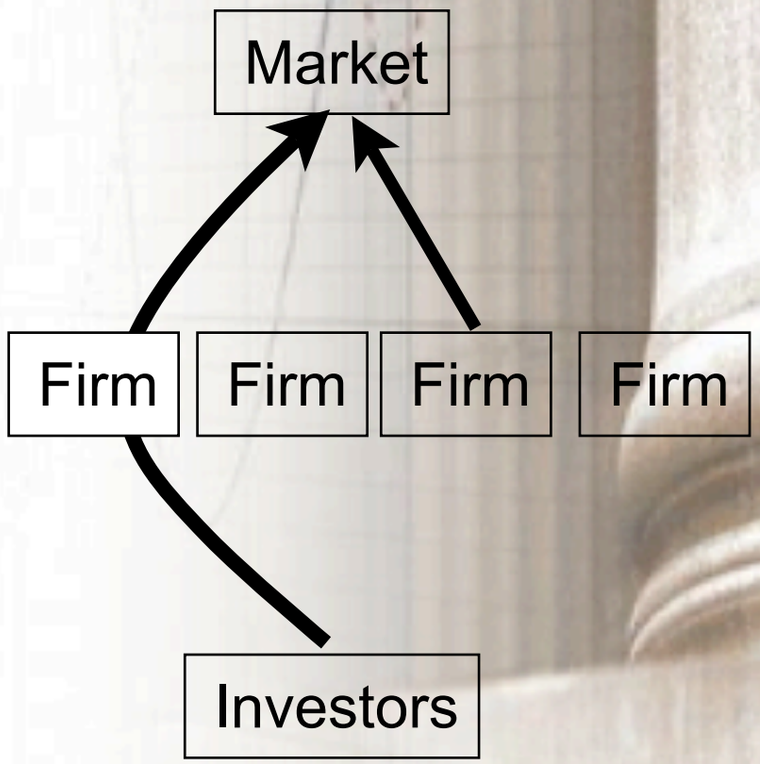
Objective

- **Empirical investigation of agent strategies in a stock market**

  - Financial data with information about agents

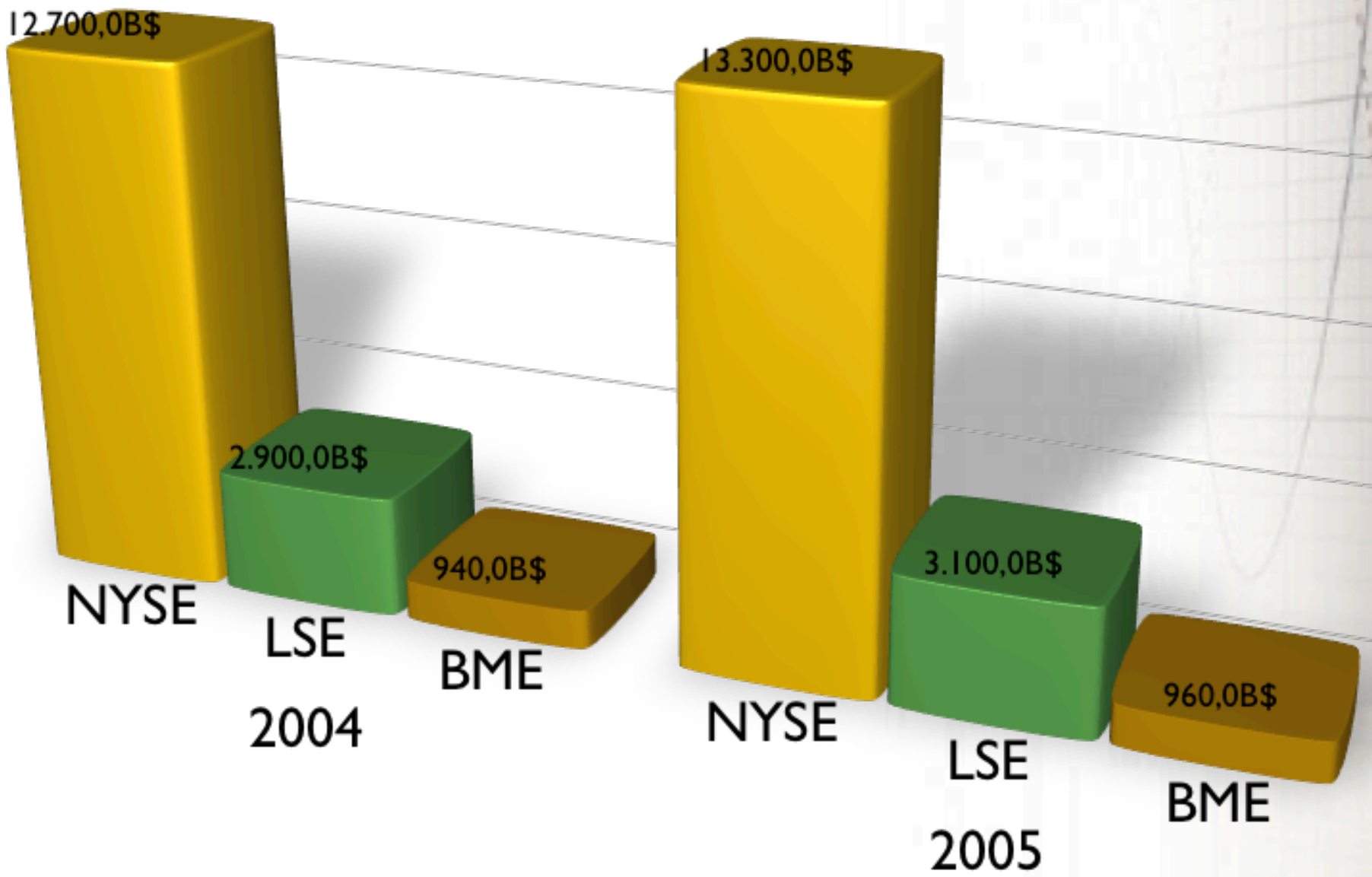
data set	# records	years	actions	institution	account	upstairs
London	1B	1998 - 2005	yes	yes	no	yes
Madrid	XXX	2001-2004	no	yes	yes	no
Australian	XXX	1995 - 2005	yes	yes	yes	no
New York (SOD)	XXX	2004	yes	no	no	no
New York (TAQ)	XXX	1995 - 2005	no	no	no	yes
NASDAQ (TAQ)	XXX	1995 - 2005	no	no	no	no
Paris	XXX	XXX	yes	no	no	no
Reuters Corpus	XXX	1995 - 1996	-	-	-	-



  - Is there any detectable pattern in firms' trading?

Spanish Stock Market BME

- Market Capitalization



Source: IMF International financial statistics Yearbook 2005/2004

Data

- Databases:
  - Book: 1999 -> 2007
  - Transactions: 1999 -> 2007
- Our study (Jan 01->Dec 04)
  - 52 Millions or transactions
  - 88 Millions of bid-ask movements
  - 100 Firms
  - 5 transactions/(minute×firm)
- Level II Plus data
  - YOU CAN BUY IT!! (real time data)
  - In most of the brokers screens (Routers, Bloomberg, Visual Trader, etc)

Firms

- Members of the stock
- The only institutions entitled to trade in the stock market
- ~100 firms per year
  - 75% major financial institutions
  - 25% established securities dealers

Grupo Santander

BBVA

Merrill Lynch

Morgan Stanley

SG

BNP PARIBAS
bnpparibas.com

MERCAVALOR S.V.

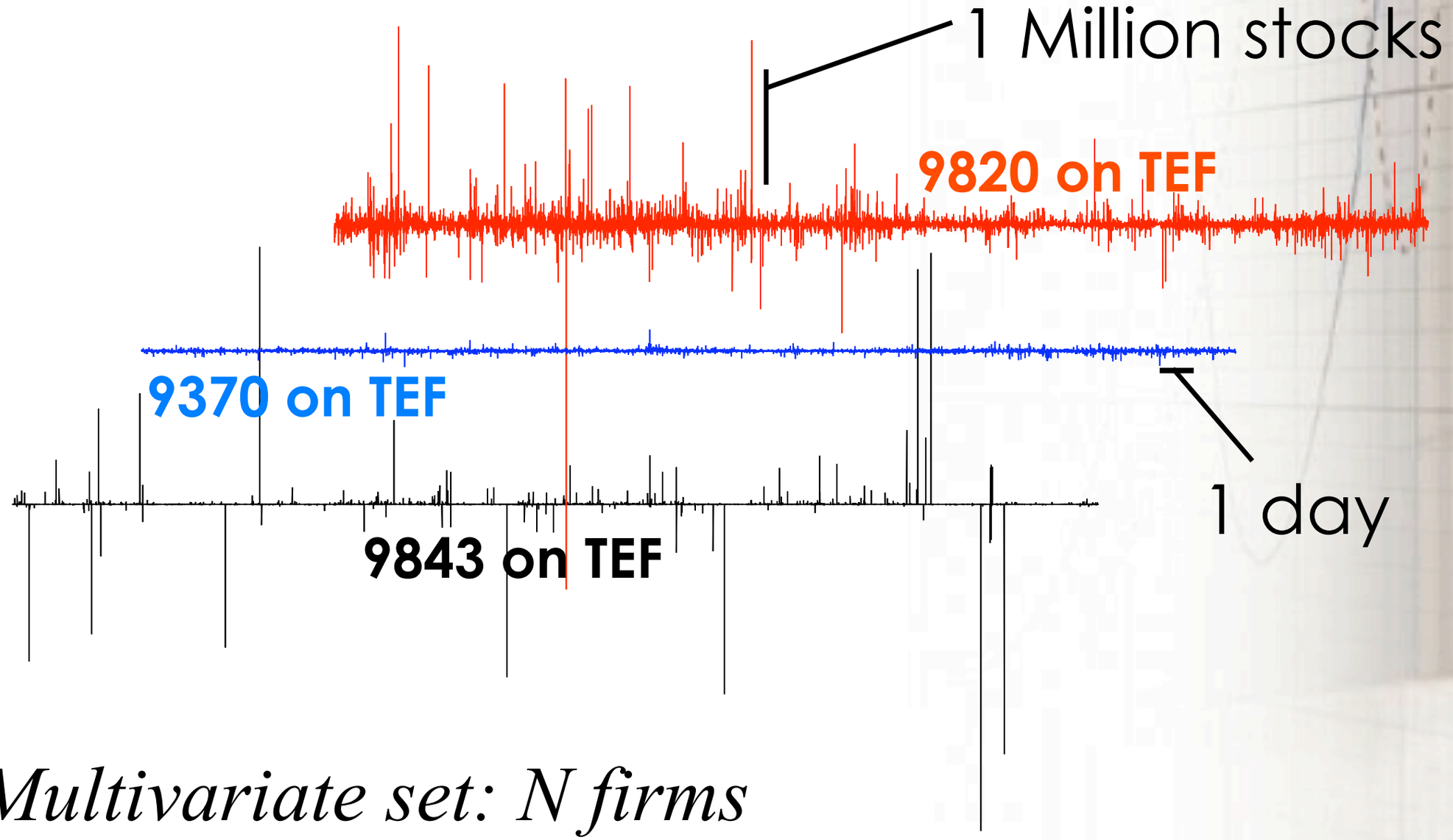
Ahorro Corporación

Renta 4

SeBroker
SEBROKER BOLSA AGENCIA DE VALORES SA

Firms activity

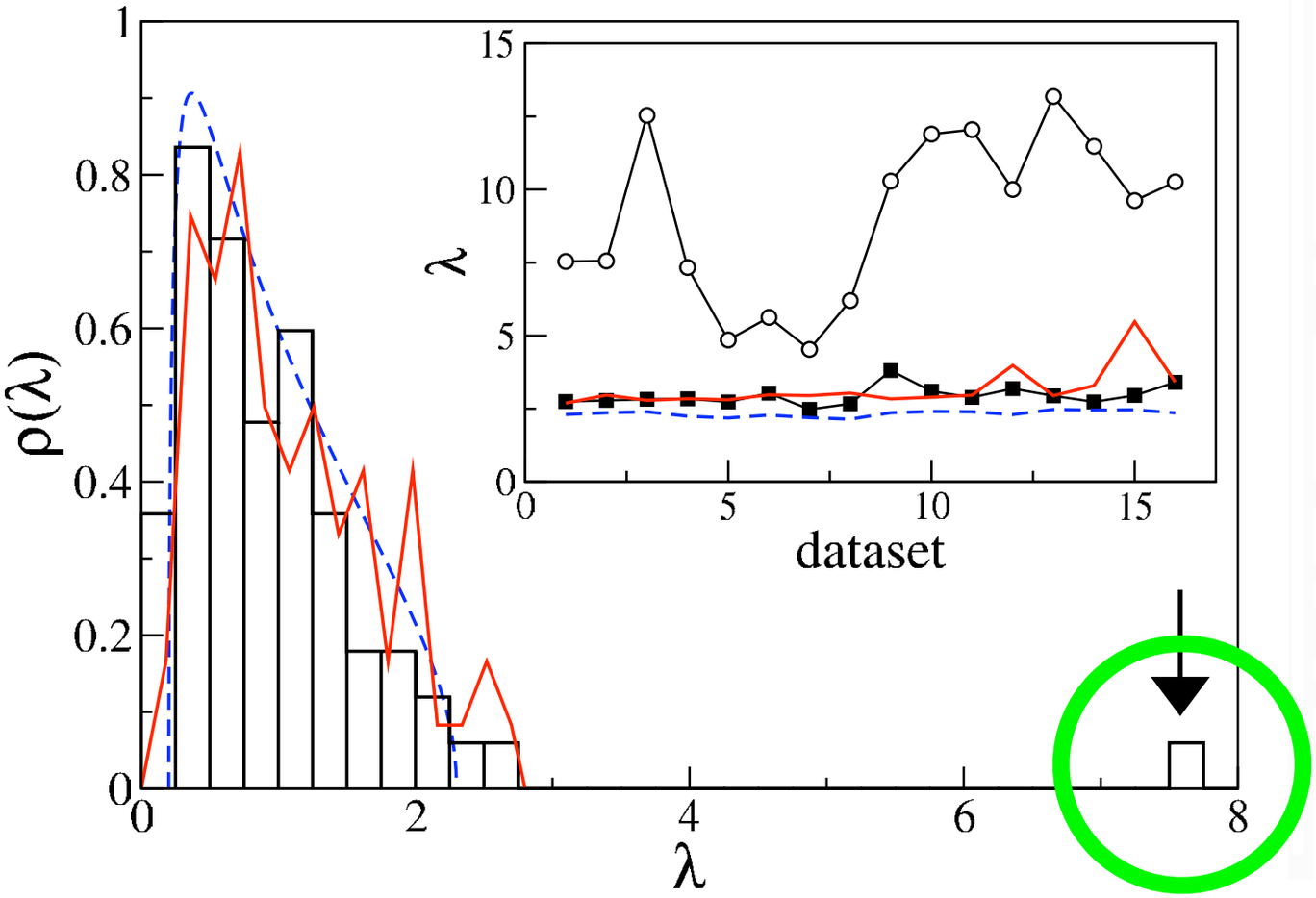
- $v_i(t)$ = change of firm i inventory on stock at time t

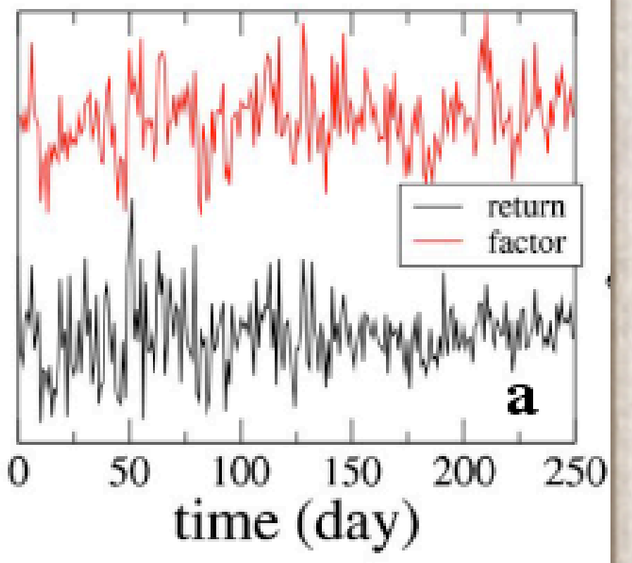


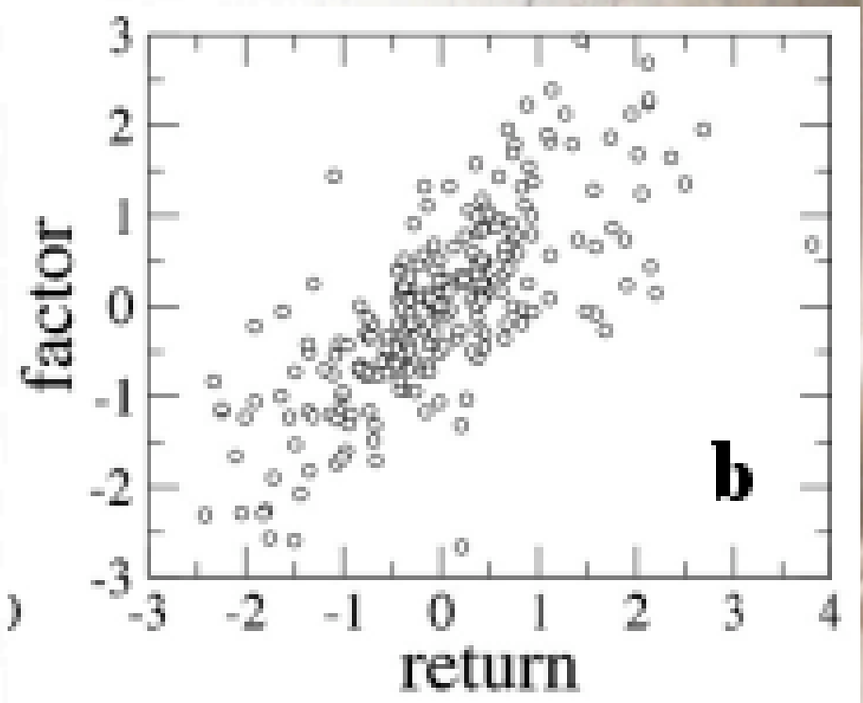
- *Multivariate set: N firms*

Information

- Correlation matrix $\rho_{ij} = \langle v_i(t) v_j(t) \rangle$







- One factor model $v_i(t) = \gamma_i r(t) + \varepsilon_i(t)$

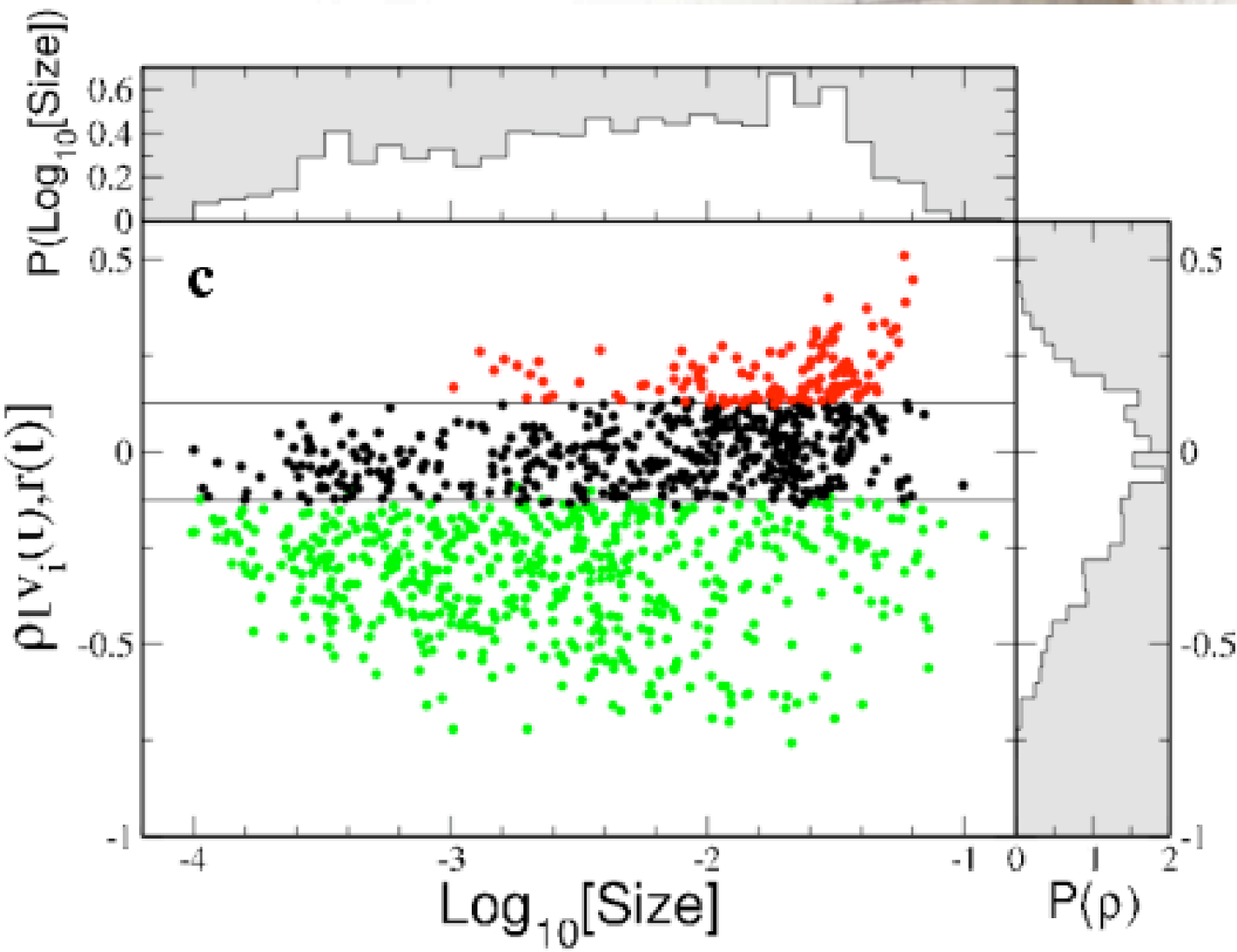
Three groups of strategies

$$v_i(t) = \gamma_i\, r(t) + \varepsilon_i(t)$$

- Trending firms $\gamma_i > 0$
  - JP Morgan, Merry Lynch, Credit Suisse, Deustche Securities, Credit Agricole, BNP Paribas, UBS Warburg, Societé General
- Reversing firms $\gamma_i < 0$
  - Mercavalor, Renta 4, etc
- Undetermined $\gamma_i \approx 0$
  - BBVA, Santander, etc.

Choe, Kho and Stulz, 2001
Chan, Lakonishok, JFE (1995)

	2001	2002	2003	2004
Reversing	43	39	42	37
Uncategorized	28	31	31	29
Trending	11	10	8	6
Total	82	80	81	72



Causality

- Firm's activity is long-range correlated

$$\langle v_i(s+t)v_i(s)\rangle \sim t^{-\alpha}$$

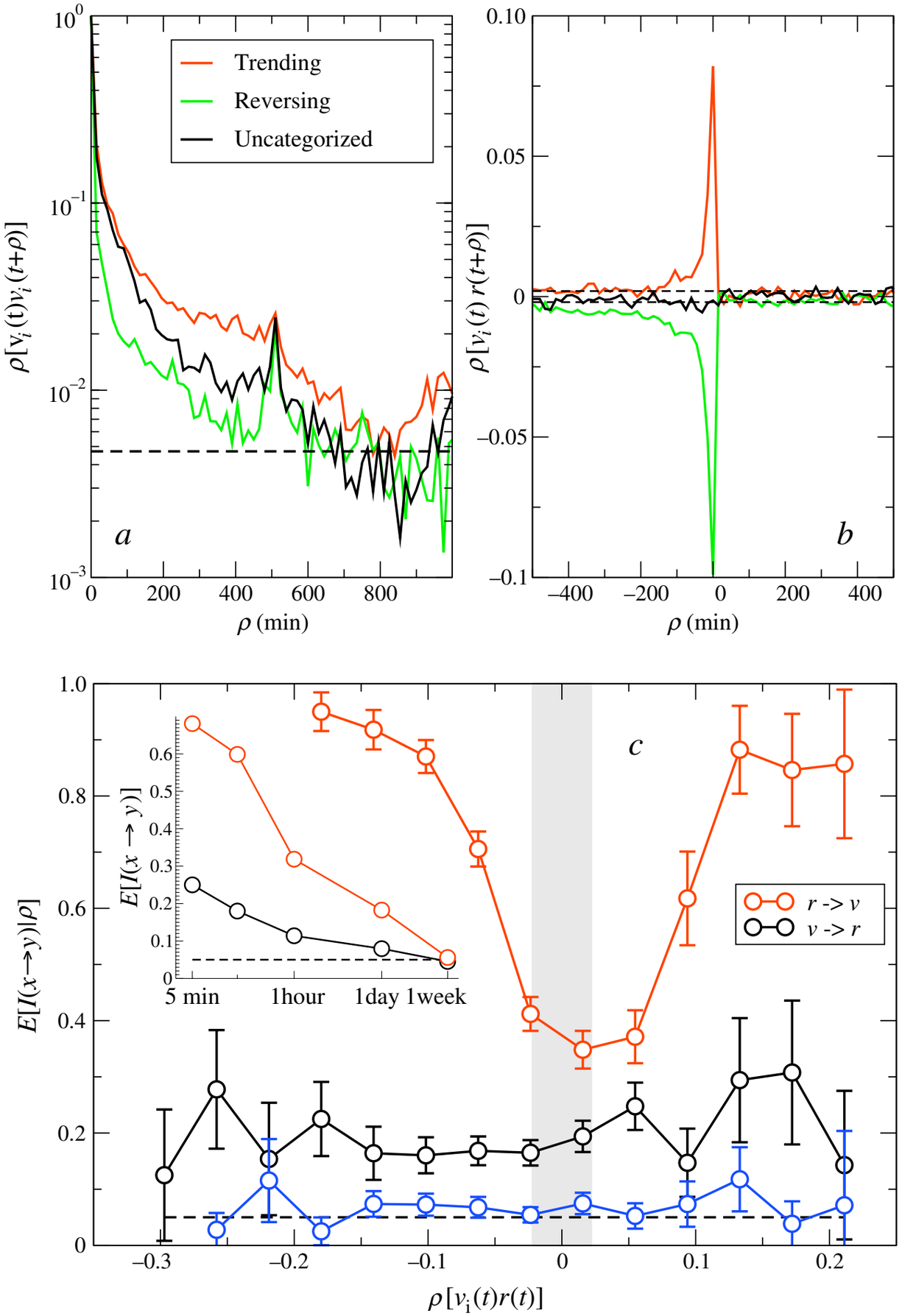
- Volume-price cross correlation asymmetry

$$\langle v_i(s)r(t+s)\rangle = \begin{cases} 0 & t > 0 \\ t^{-\beta} & t < 0 \end{cases}$$

- Granger causality asymmetry

$r \longrightarrow v_i$

$v_i \not\longrightarrow r$

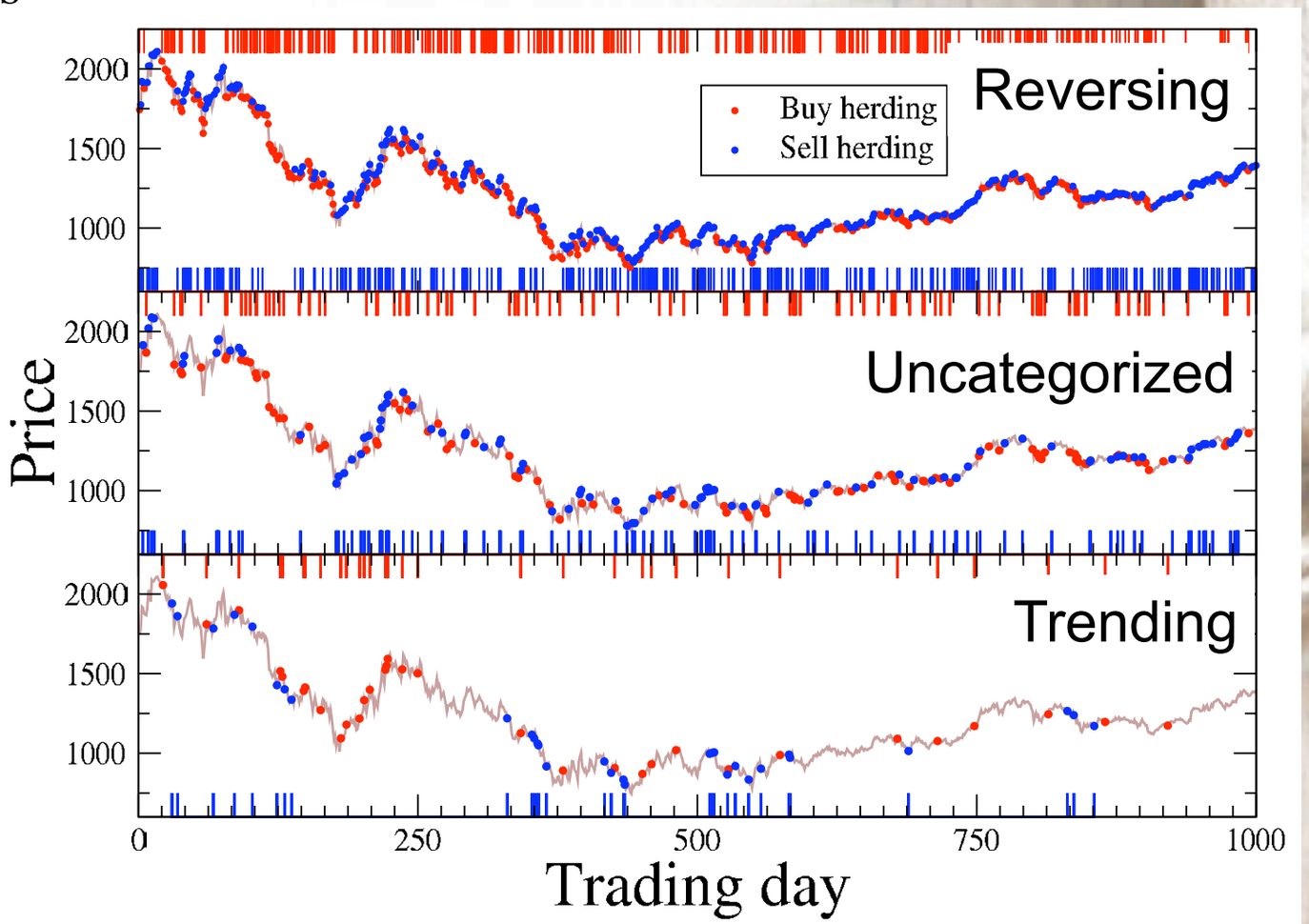


Herding

- Do firms within the same group behave in a similar way at specific time intervals?

$$h = \frac{\#\text{ of buying firms}}{\#\text{ of buying firms} + \#\text{ of selling firms}}$$

	2003			2004		
	ALL	BH	SH	ALL	BH	SH
Reversing (1 day)	64.8	31.2	33.6	59.6	27.2	32.4
Uncategorized (1 day)	21.2	10.8	10.4	19.2	10.4	8.8
Trending (1 day)	6.0	2.0	4.0	2.4	1.2	1.2
Reversing (15 min)	29.2	14.7	14.5	26.6	13.3	13.3
Uncategorized (15 min)	10.2	5.3	4.9	11.5	6.3	5.2
Trending (15 min)	3.9	1.7	2.2	3.3	1.7	1.6



Summary

- A large number of firms trading show detectable trending or reversing strategies
  - Treding: major foreign financial institutions (institutional traders)
  - Reversing: retailers, small institutions
  - Undefined: major banks

- Reversing (trending) present a pattern of herding behavior at daily and intradaily time horizons