

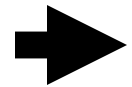
Information and Asset Prices

Johan Walden

IPAM

November 2007

Outline



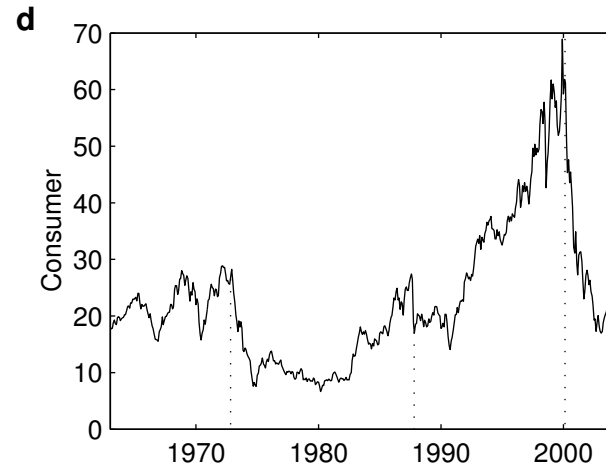
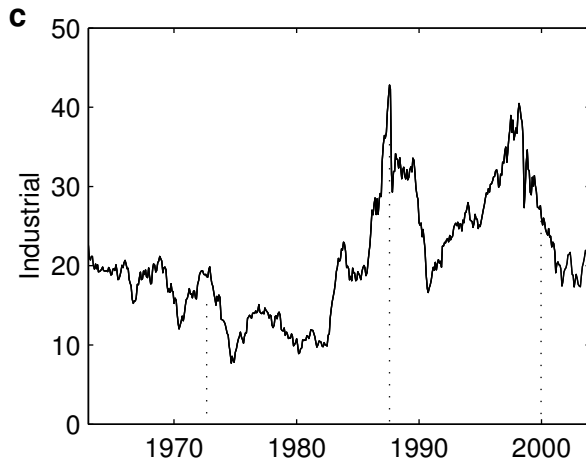
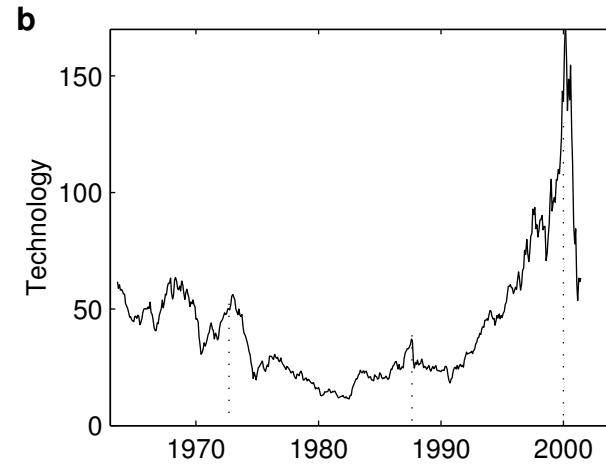
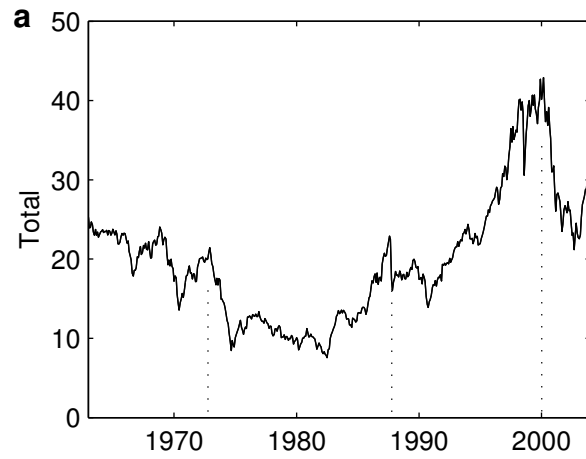
•The US stock market – facts & explanations

•Information diffusion in US markets

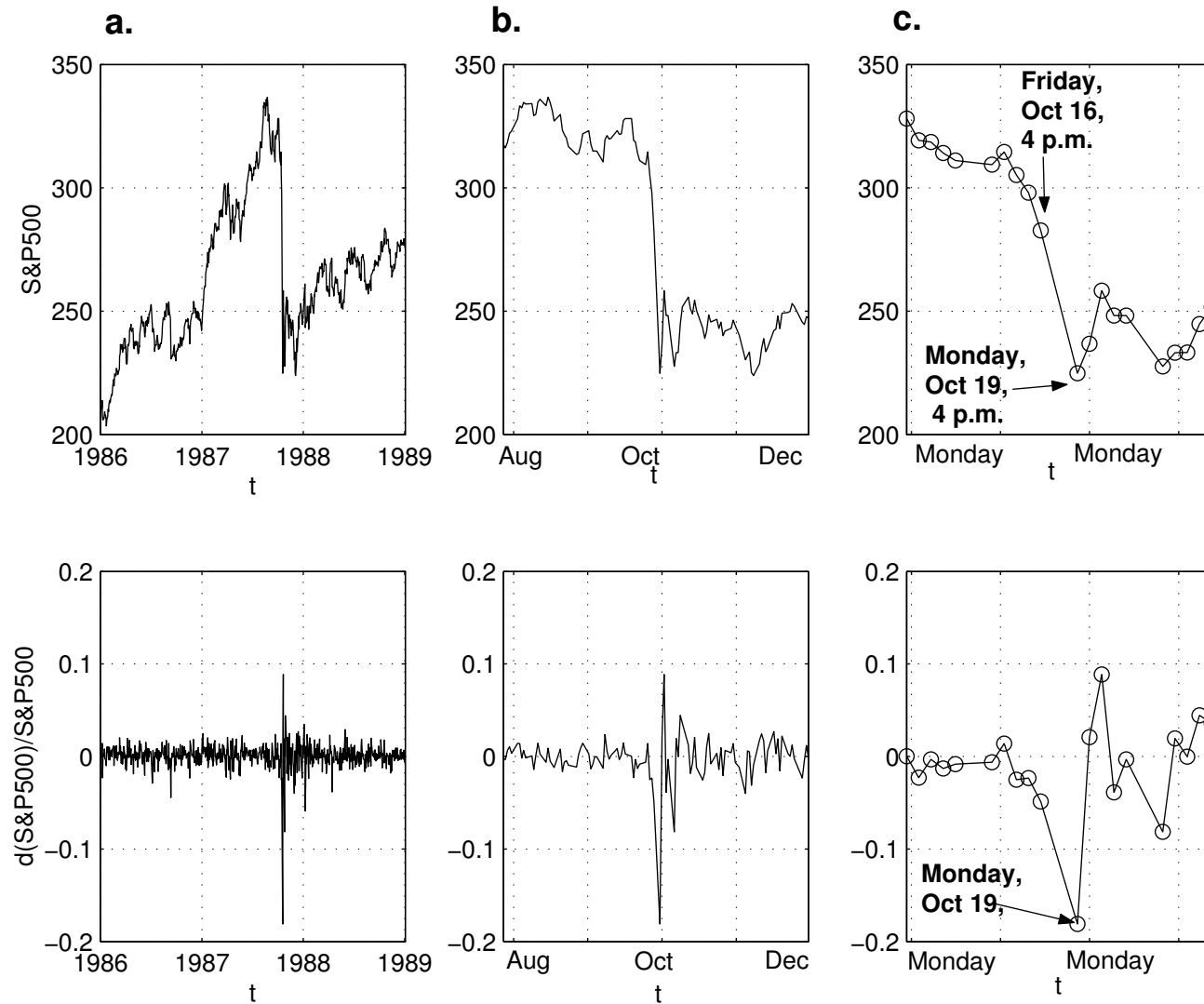
Some stylized facts about stock returns

- **Heavy-tailed** (Mandelbrot 1963, Fama 1965)
- **Excess volatility** (Shiller 1981, LeRoy and Porter 1981)
- **Time-varying volatility** (Hamilton 1989, 1990)
- **Weak relation to “information”** (Cutler, Poterba and Summers 1989, Fair 2002)

The US stock-market 1970-2005



An example: The crash on October 19, 1987



Other capital markets

Catastrophe insurance: (Ibragimov & Walden 2007, Jaffee, Imbragimov & Walden 2007)

- Tail distributions: Earthquake energy $0.8 < a < 1.2$, Florida hurricanes: $1.5 < a < 2.5$

Currency markets: (Tucker and Pond 1988, Osler & Savaser 2005)

- **Dollar-yen ratio dropped 11% on October 7, 1998.**

EUR-USD*	Kurtosis
15 min	24
30 min	19
1 h	14
6 h	7
12 h	5
24 h	5
Normal	3

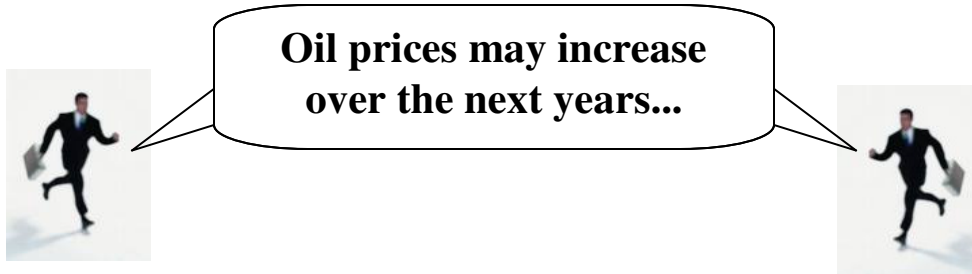
* Table from Osler and Savaser (2005)

Some explanations

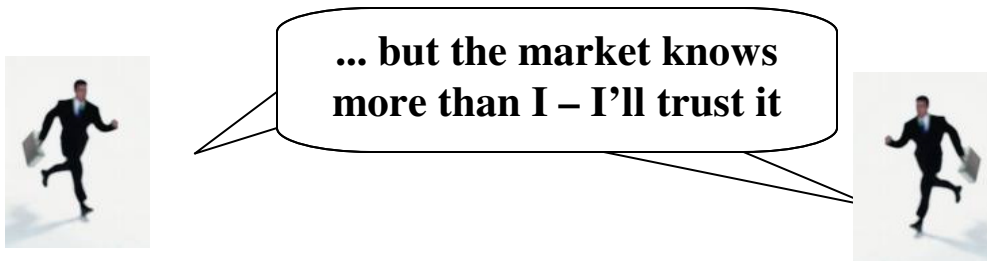
- **Heavy-tailed:** Heavy tailed exogenous information/innovation shocks
- **Excess volatility:** Bubbles, Non-stationary time series of fundamentals
- **Varying Volatility:** Exogenous regime shifts
- **Weak relation to “information”:** Equilibrium switch, Imperfect information aggregation

“Internal news” - Romer (1993)*

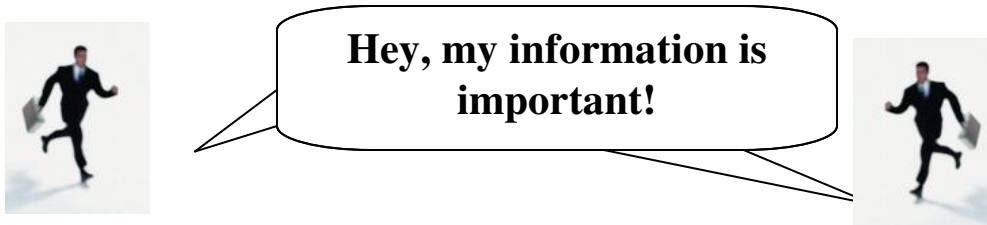
- Investors sit on pieces of private information...



- ... but each investor (rationally) trusts market prices...



- ... until a small exogenous shock reveals the truth



* David Romer 1990, “Rational Asset-Price Movements Without News, American Economic Review 83:5 1112-1130.

Romer (1993) - continued

- Investors' information structure:

Type	50% chance		50% chance
1	<u>50% of pop</u>	$P + \varepsilon_1$	
2	<u>50% of pop</u>	$P + \varepsilon_1 + \delta_1$	<u>50% of pop</u>
3		$P + \varepsilon_1 + \delta_2$	<u>50% of pop</u>

Romer (1993) – continued: The price impact of revelation

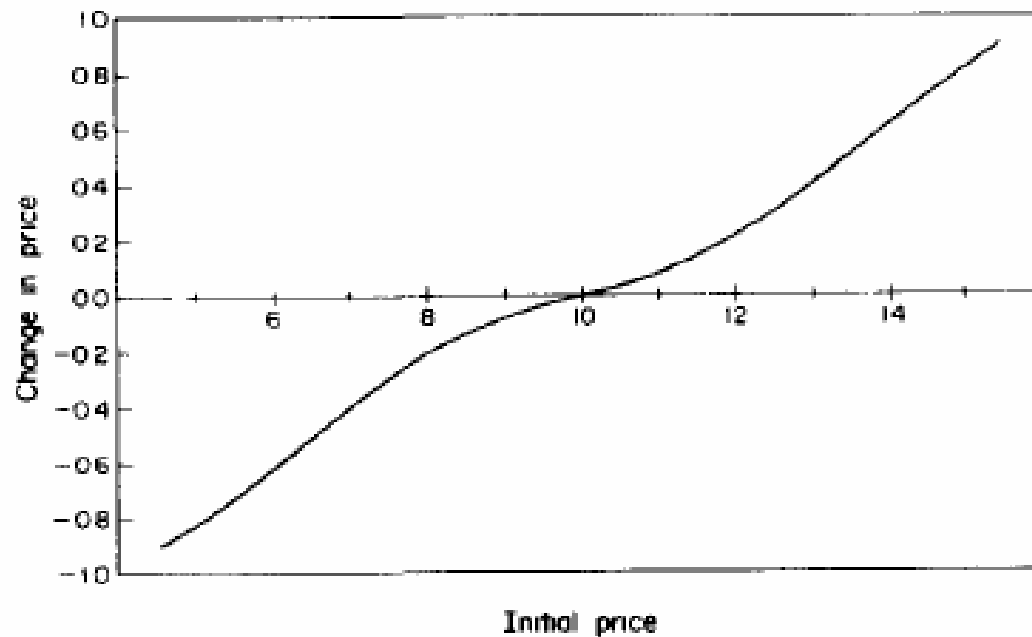
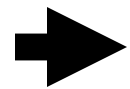


FIGURE 3. THE IMPACT ON PRICE OF A REVELATION THAT OTHER INVESTORS ARE TYPE 1'S

Outline

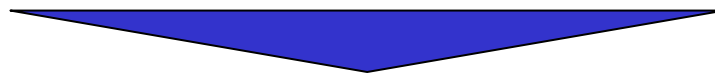
- **The US stock market – facts & explanations**



- **Information diffusion in US markets**

Key takeaways from September talk

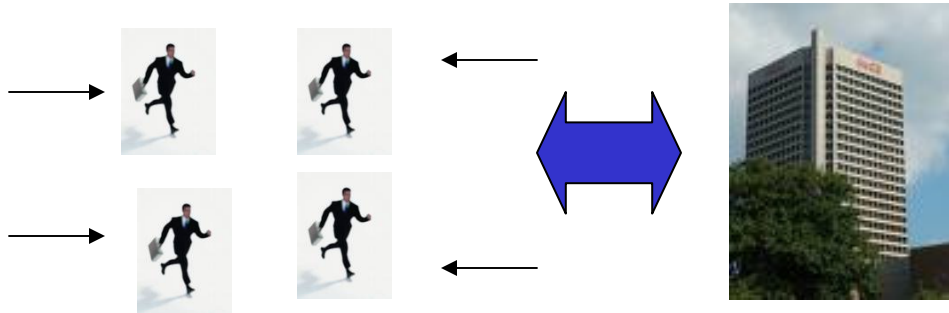
- **Non-repeatable data makes statistical significance crucial**
- **High uncertainty in market makes it difficult to get high statistical significance**



Theoretical structure always crucial in understanding markets

The crucial role of information

•The classical view of information

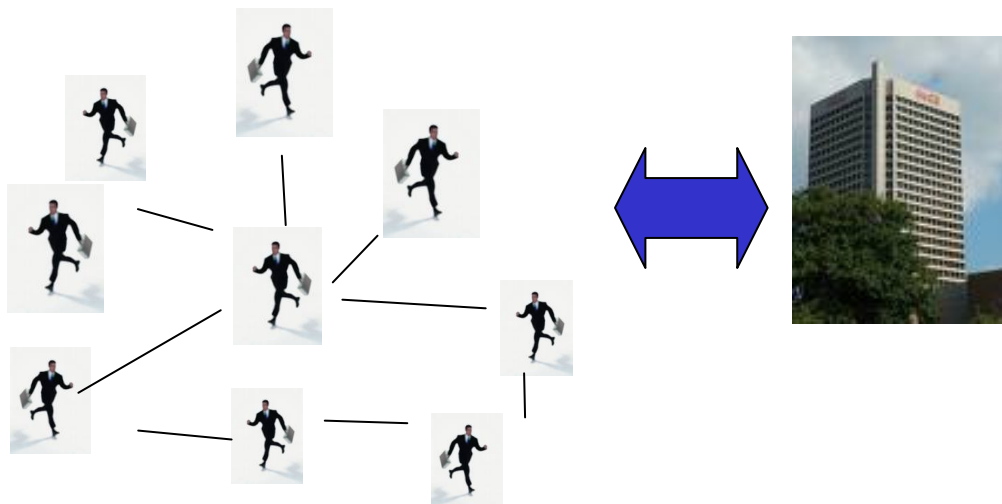


Investors

Stock

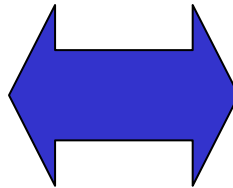
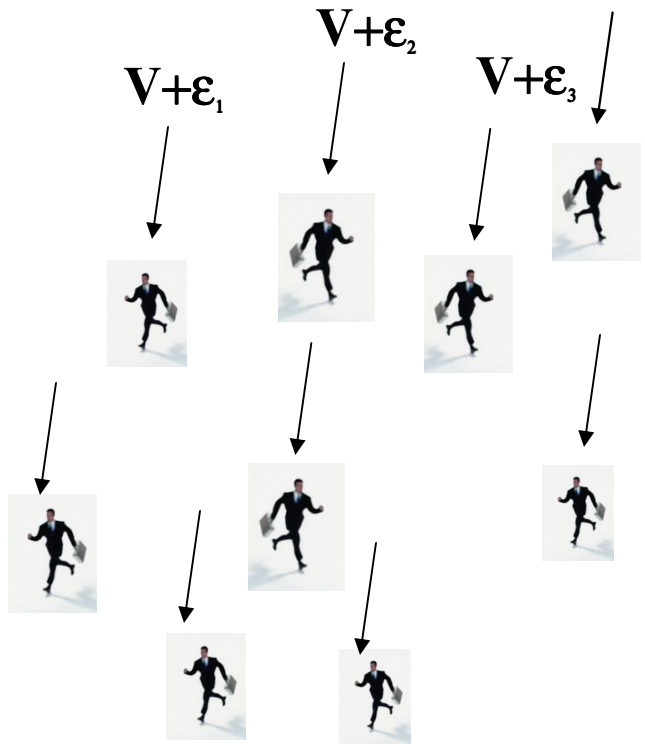
•Grossman & Stiglitz 1980,
Hellwig 1980, Admati 1985, Kyle
1985, Jackson 1991, Wang 1993,
Vives 1995

•A network information view



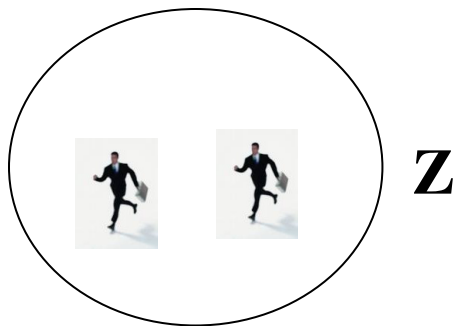
•Ozsoylev 2005, Jackson 2004,
2005, 2007, Kelly & O'Grada
2000, Hong, Kubik & Stein 2004,
Das & Sisk 2005, Tetlock, Saar-
Tsechansky & Macskassy 2007,
Cohen, Frazzini, & Malloy 2007.

The model of Hellwig (1980)



$$P = \pi_0 + qV + \pi_1 \epsilon - \gamma Z$$

$$P^* = \pi_0 + qV - \gamma Z$$



Empirical studies – Cohen, Frazzini & Malloy (2007)



Fund manager

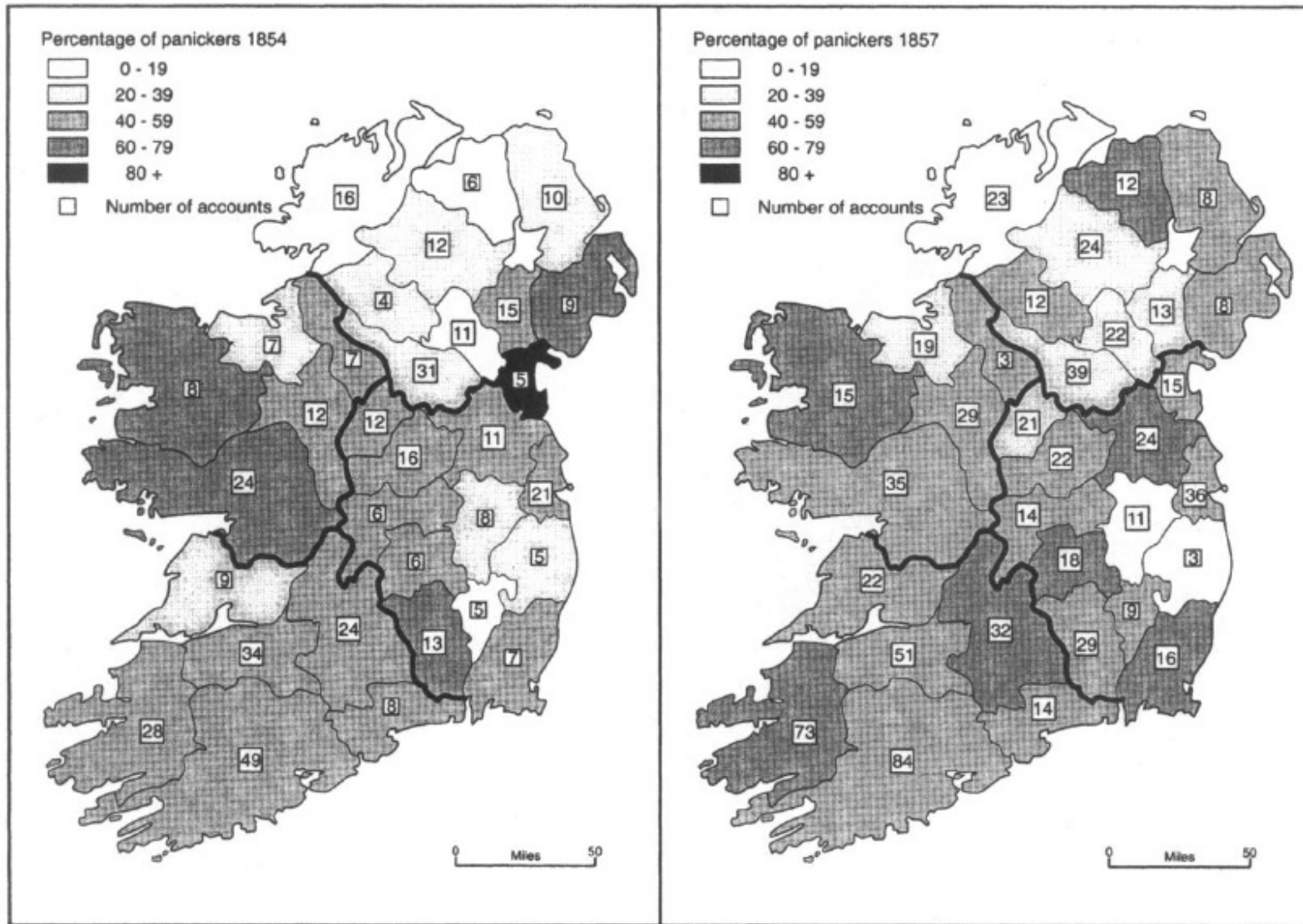


CEO



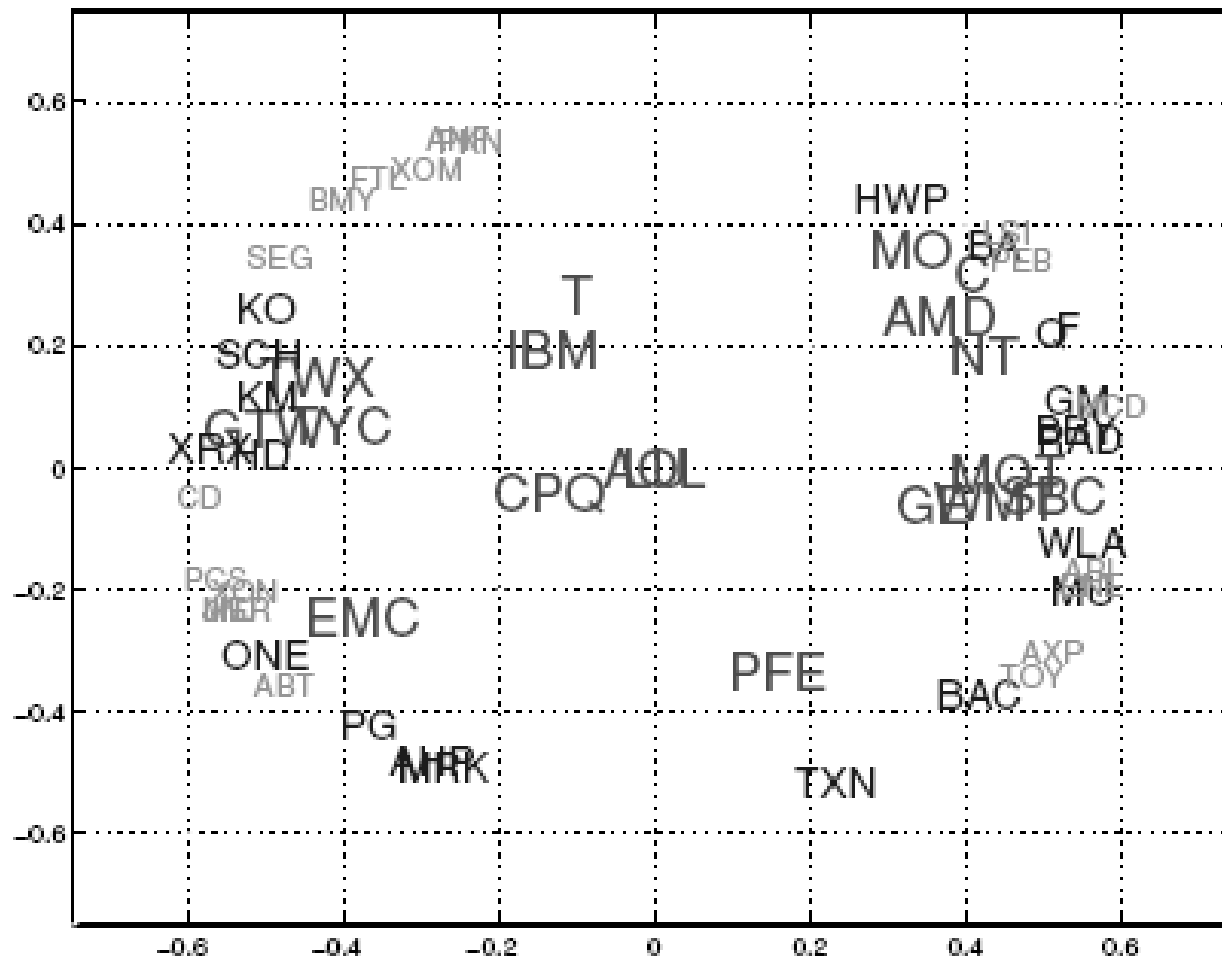
**Portfolio of stocks that are “connected”
outperform by up to 8.4% per year**

Financial Contagion in Banks - Kelly & O'Grada 2000

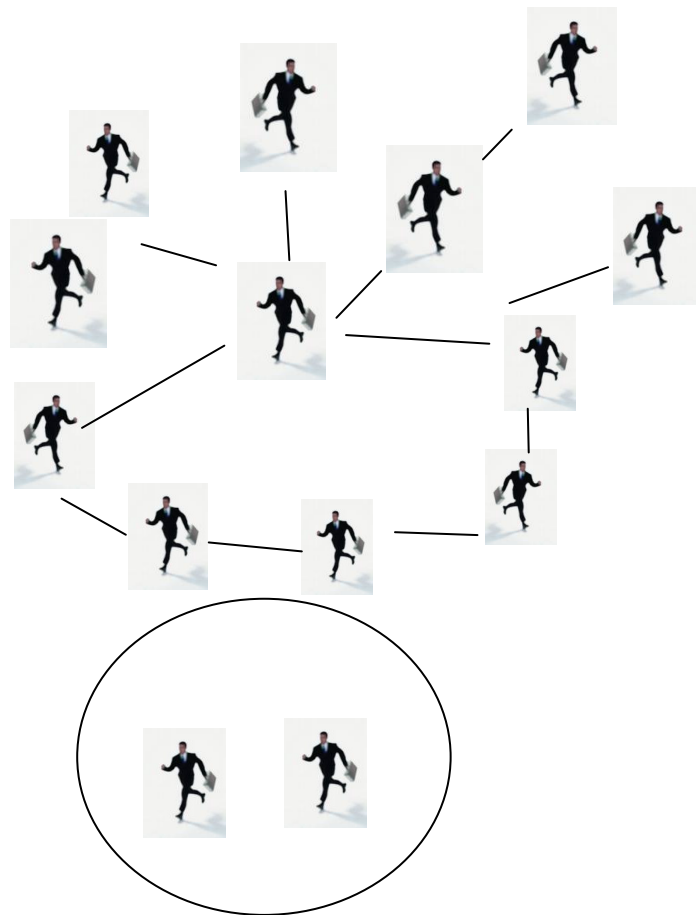


Internet communities and stock returns

-Das & Sisk (2005)



Adding a network structure – Ozsoylev 2005



- **Excess volatility**
- **Network ordering w.r.t. informational efficiency**



- **Model not dynamic**
- **Structure of network not known**
- **Difficult to analyze with discrete agents**

An empirical approach

- All ISE trades 2005-2006

- Turkish stock exchange:

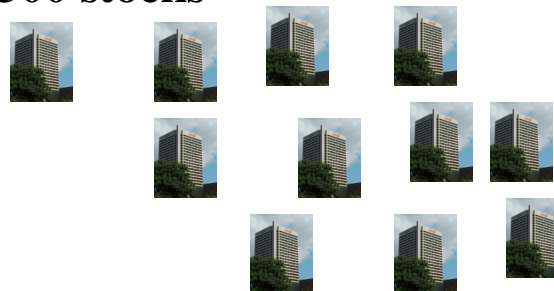
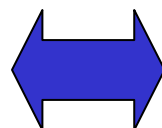
multiple price-continuous auction

- ~15 GB

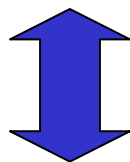
- ~700M trades

- ~2 M accounts

- ~300 stocks



- Newswires



Related studies:

- Barber Odean (1998, 2005, 2007)