

Financial Market Crises in the 21st Century

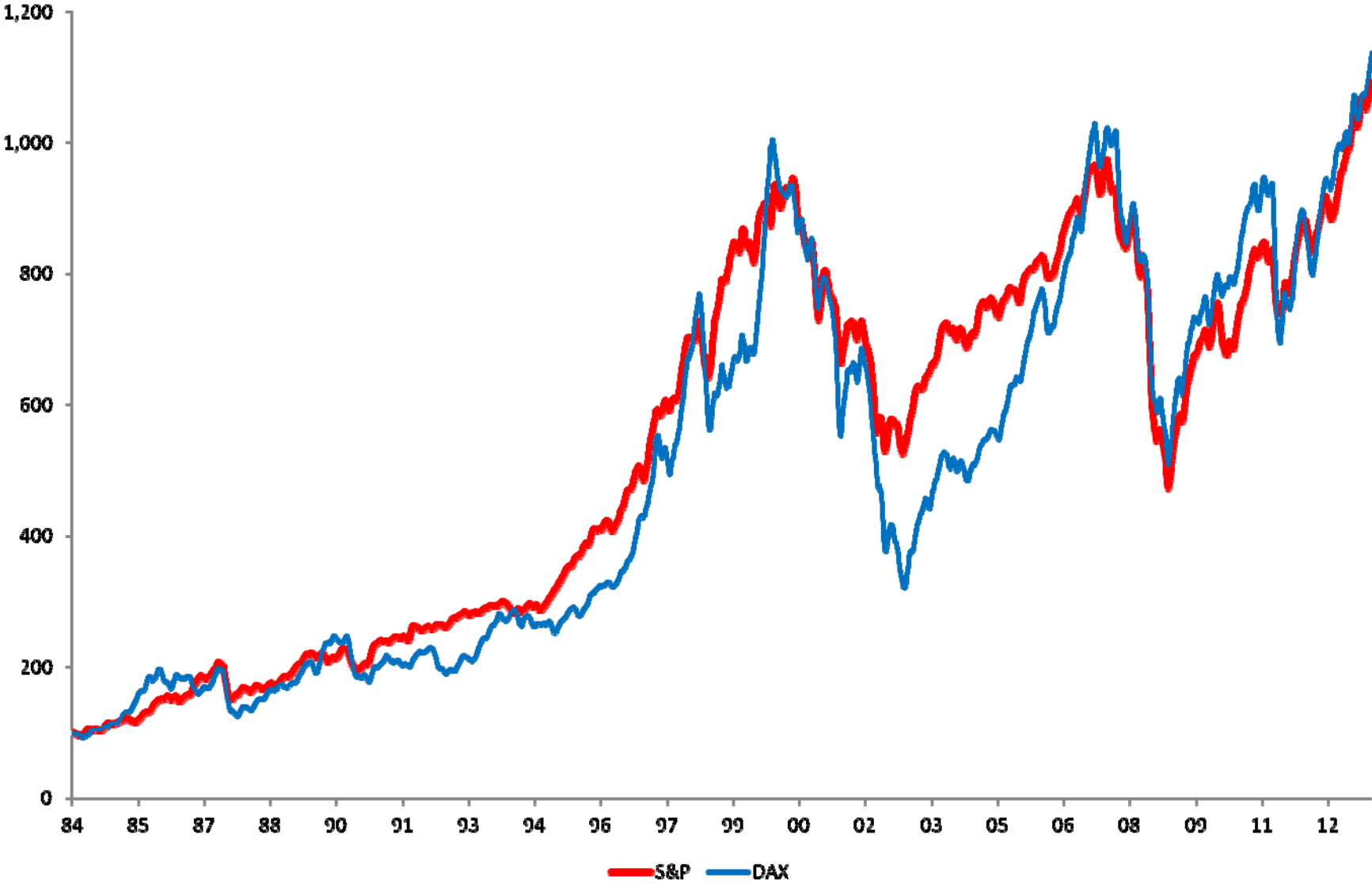
A comparison of 22 OECD-countries

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S&P 500 and DAX: 1984-2013 (1984=100%)



Structural features of the crises (stock market)

- Enron and subprime – Country of origin: USA
- Long *take-off*: 1984 - 2000: DAX and S&P 500 increased from 100% to $\approx 1000\%$.
- *High frequency* of the cycles - short time span between boom and bust – acceleration of stock price movements.
- *High amplitude* of the cycles (difference between boom and bust). DAX: March 2000-03: **-70%**; Jan. 2008-Apr.09: **-55%**.
- *Co-movement* between the national stock market indices. Correlation coefficient between DAX and S&P: $r = 0.96$ (1984-2013) - *globalization* of the crises.
- This *combination* of structural features is unique to the financial market crises of the early 21st century.

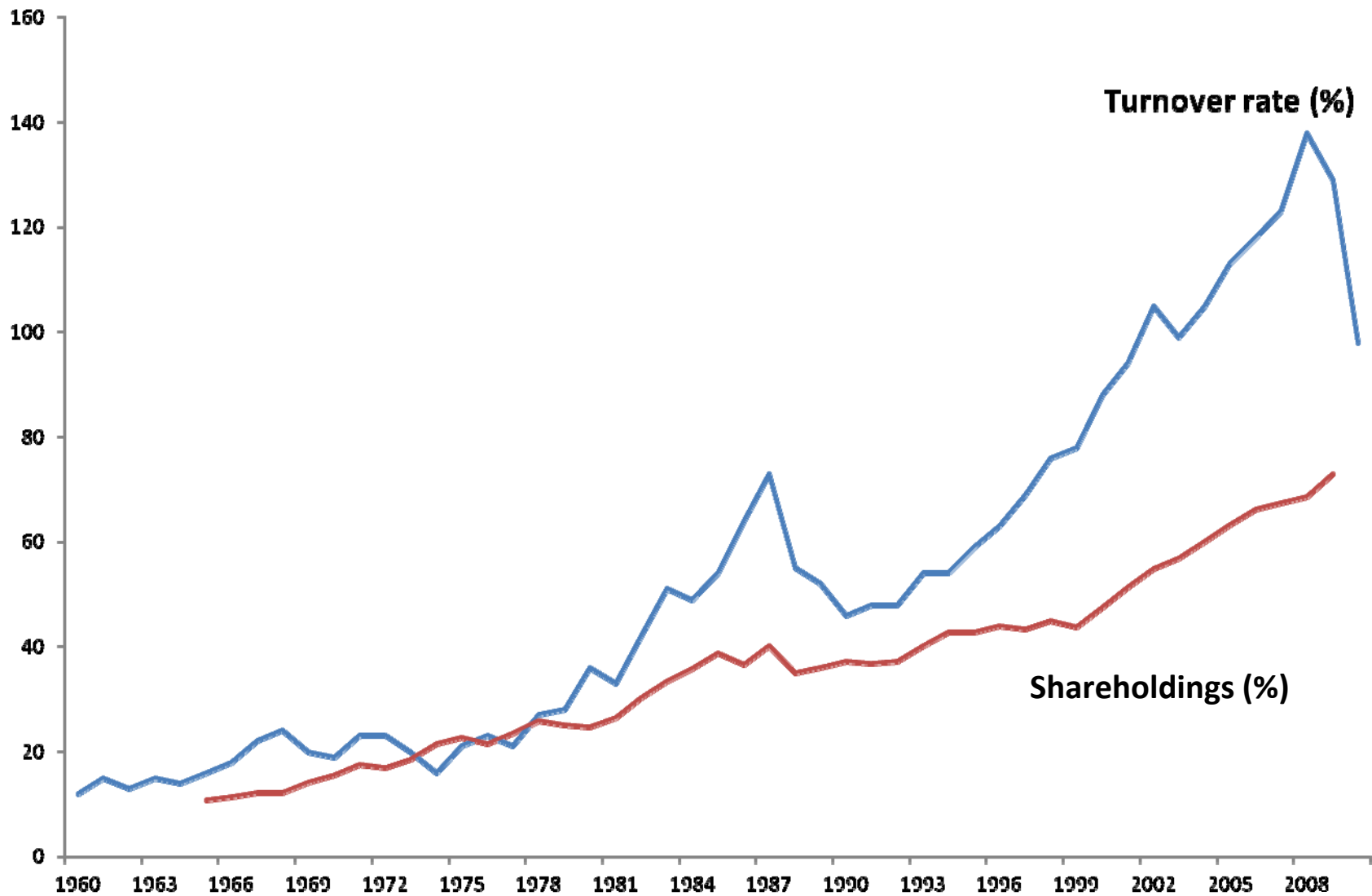
How can we explain stock price movements?

- *Rational expectations*: Capitalization of the present value of expected future returns determines the stock price. Investors take into account all information (over-rationalized conception of man).
- *Behavioral finance*: Volatility of stock prices is much higher than the volatility of the dividend payments (excess volatility, R. Shiller). Stock prices are driven by fads and fashions, greed and fear (non-rational conception of man).
- *New institutionalism*: Financial market actors are embedded in institutions that shape their strategies and behavior. Stock market cycles are produced by dominant financial market actors whose strategies are determined by competition and the ideology of shareholder value.

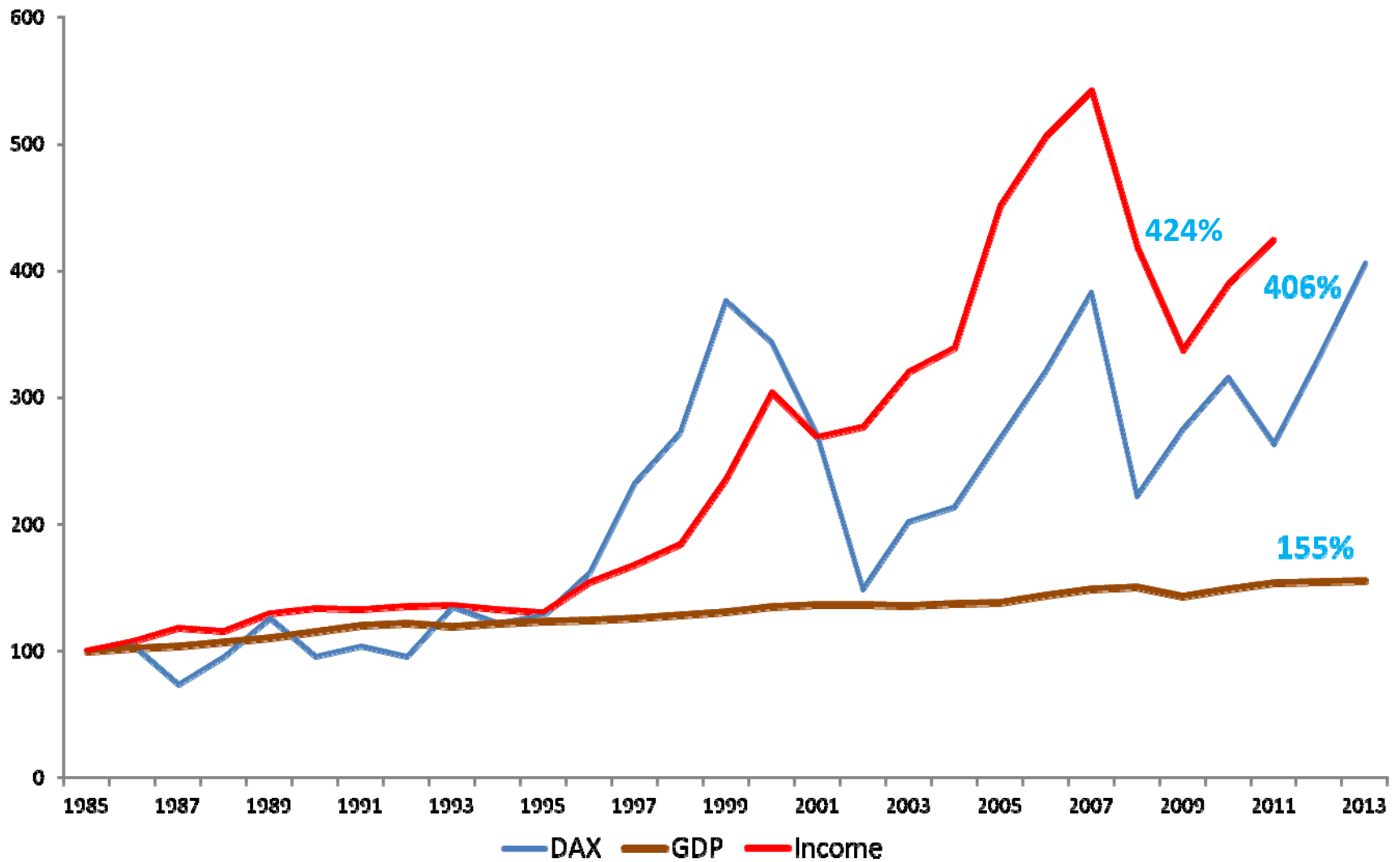
Dominant actors: Institutional Investors

- InInv: investment-, pension-, hedge funds; private equity.
- *Majority owner*: InInv hold $\approx 75\%$ of share capital (option: voice). - “Do this, we own you” (N. Pelz).
- *High turn over rate*: $\approx 100\%$ (short-termism; option: exit)
- *Competition*: The market for InInv is fragmented. InInv promise high rates of return. – They transmit the competition to which they are exposed in the financial market to the large corporations (profit maximization).
- InInv drive corporations to a higher *level of risk* (higher volatility of stock prices).
- Stock options create a *community of interest* between InInv and corporate managers (interest alignment). They are both interested in high stock prices.
- Global network of shareholdings \rightarrow co-movement of stock prices

Shareholdings (%) of institutional investors (US) Turnover rate NYSE (1960-2010)



Growth rates of GDP, DAX, and income of top-managers Germany 1985-2012 (deflated) 1985=100%



Global network of institutional investors (N=10)

Investor	Ctry	Firm	Ø %	Origin
Black Rock	18	1122	2.4	US
Fidelity Investments	18	690	2.4	US
Vanguard Group	13	834	1.2	US
Government Pension Fund	13	332	1.6	Nor
Capital Group International	10	204	3.2	US
Capital Research&Mgm.	9	370	3.8	US
JP Morgan Asset Mgm.	9	356	2.2	US
Norges Bank Investment	8	122	1.9	Nor
Columbia Mmg. Advisers	7	286	1.9	US
Franklin Resources	7	238	2.2	US

Sample: 22 OECD-countries; 1380 firms

True uncertainty

- Entrepreneurs undertake investments under conditions of **true uncertainty**: “Our basis of knowledge for estimating the yield ten years hence of a railway, a copper mine, a textile factory amounts to little and sometimes to nothing” (Keynes). Why would investors buy securities whose rate of return cannot be forecasted?
- Investors/speculators do not decide on the basis of rational calculations, but in conformance with “opinions.” Beauty contest: The prize is awarded to the investor whose choice most nearly corresponds to the average preferences of the investors as a whole. Investors anticipate “**what average opinion expects the average opinion to be.**”
- Speculators have to take into account the strategies of their counterparts and vice versa. Speculation is a **zero-sum game** among players who mutually anticipate the strategies of alter ego.

Riding the bubble

- “When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, **you’ve got to get up and dance**. We’re still dancing” (Charles Prince, Citibank, July 2007).
- As long as the music is playing (= as long as average opinion expects average opinion to believe in rising stock prices) it is **rational** to continue to dance (riding the bubble).
- Competitive pressure: You **must** dance. If you don’t, your competitor makes a billion \$ while you are watching her from the sidelines.
- Stock prices are not driven by rational expectations, but by **expected expectations**, i.e., by expectations about “what average opinion expects the average opinion to be.”

Independent variables

Context variables (level: country):

- correlation of the national indices with S&P 500
- stock market capitalization
- liquidity (turnover rate of the national stock market)

Controlling variables (level: firm):

- Economic sector: manufacturing, pharma, banks, insurance, services
- Firm size: total assets
- Financial indicators: total debt, return on equity, turnover of common stock (percent/year)

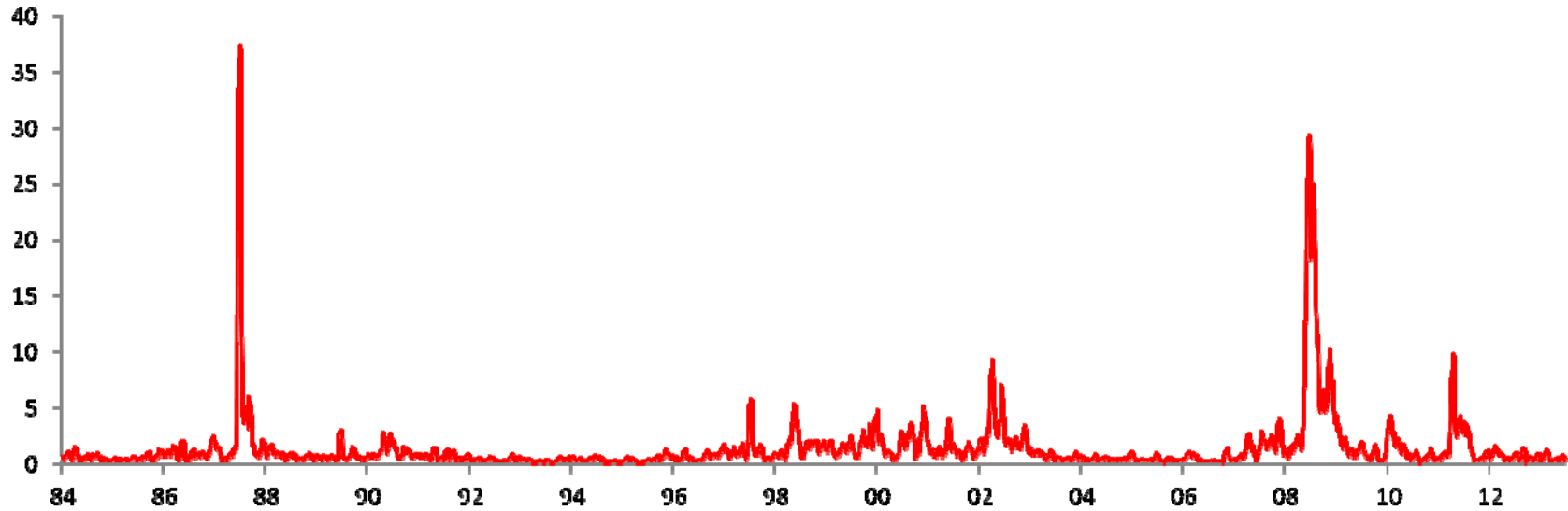
Ownership (level: firm)

- 40 largest institutional investors (% shareholdings)
- Concentration ratio (CR 1)
- Shareholdings of foreign institutional investors

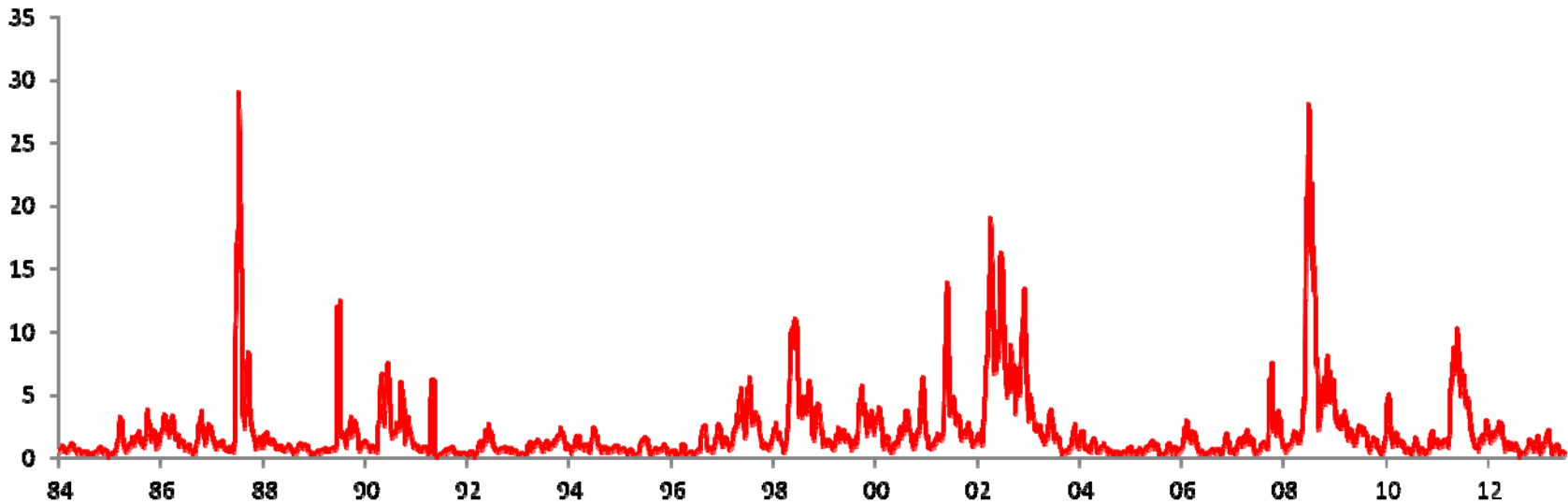
Dependent variables (risk/volatility)

- Variance (volatility)
- Variance of the variance: $\text{Var}(\text{Var})$
- Beta: aggressive stock: $\text{beta} > 1$; defensive stock: $\text{beta} < 1$
- Amplitude: ratio of highest to lowest stock price during a cycle

S&P: Moving variances 1984-2013 (N=20)



DAX: Moving variances 1984-2013 (N=20)



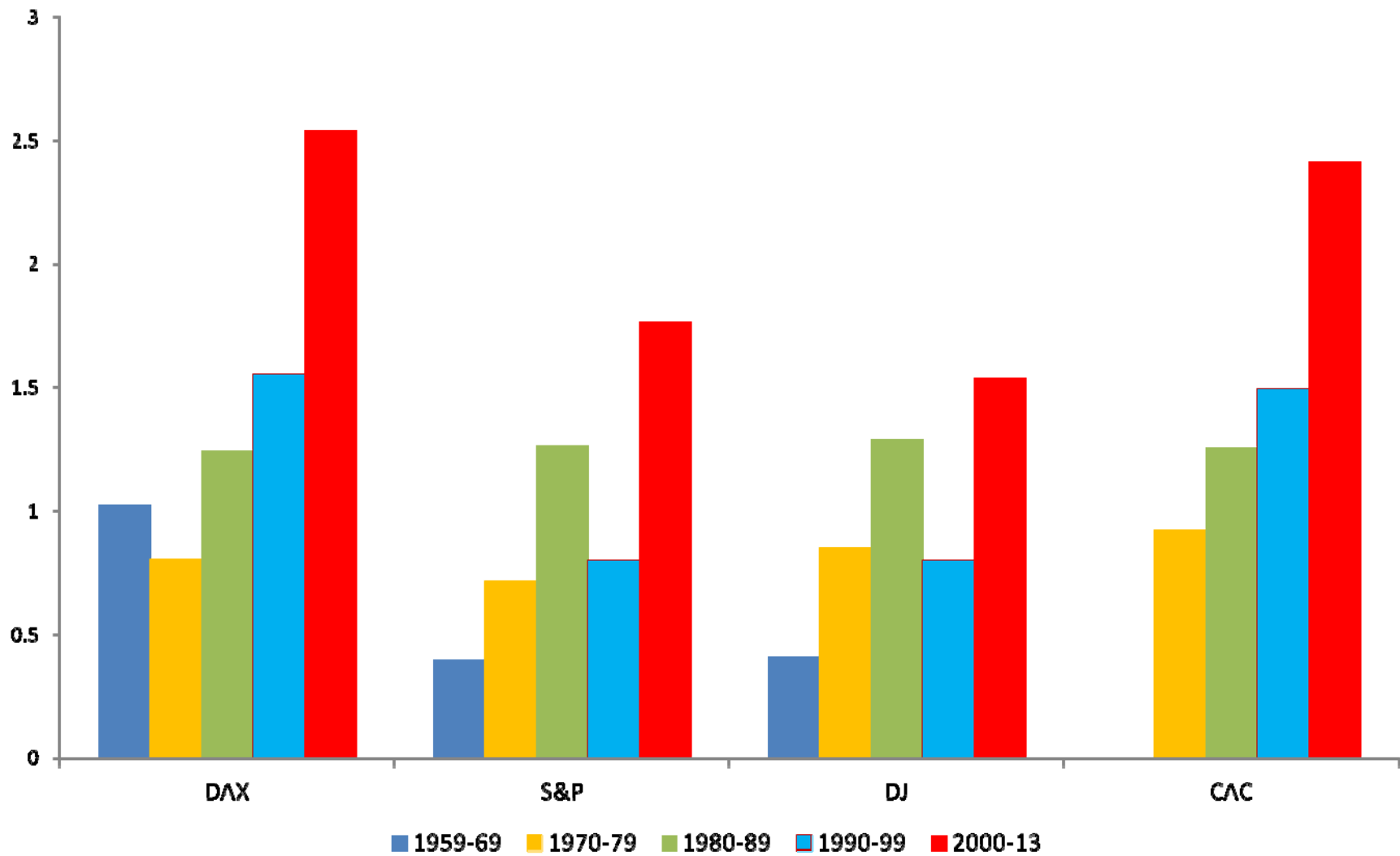
Hypotheses

- **Hypothesis 1:** The level of volatility (stock market indices) has been rising since the 1980s.
- **Hypothesis 2:** The stock prices of corporations that are owned by institutional investors tend to have higher levels of risk compared to other firms.
- **Measures of risk:** variance (volatility), Var(Var), beta, amplitude
- **Sample:** 1380 firms in 22 OECD countries.
- **Data sources:** Capital IQ (Standard and Poor's), Data Stream, Annual Reports of Corporations, Internet.

Results (multi-level regression)

- Stock market volatility (indices) has been rising since the 1970s.
- Firms with a high percentage of institutional ownership tend to have higher levels of risk: variance (volatility) and $\text{Var}(\text{Var})$.
- No significant relationship between institutional ownership and the amplitude of the cycles.
- Inst. Inv. tend to buy aggressive stocks ($\text{beta} > 1$).
- Firms that have high rates of return on equity tend to have lower levels of risk.
- No relationship between the percentage of institutional ownership and the return on equity.
- It seems that risk taking on the part of institutional owners is not rewarded.
- Firms with high concentration of ownership (CR1) also tend to exhibit higher levels of risk

Variance (volatility): DAX, S&P, DJ, CAC (1959-2013)

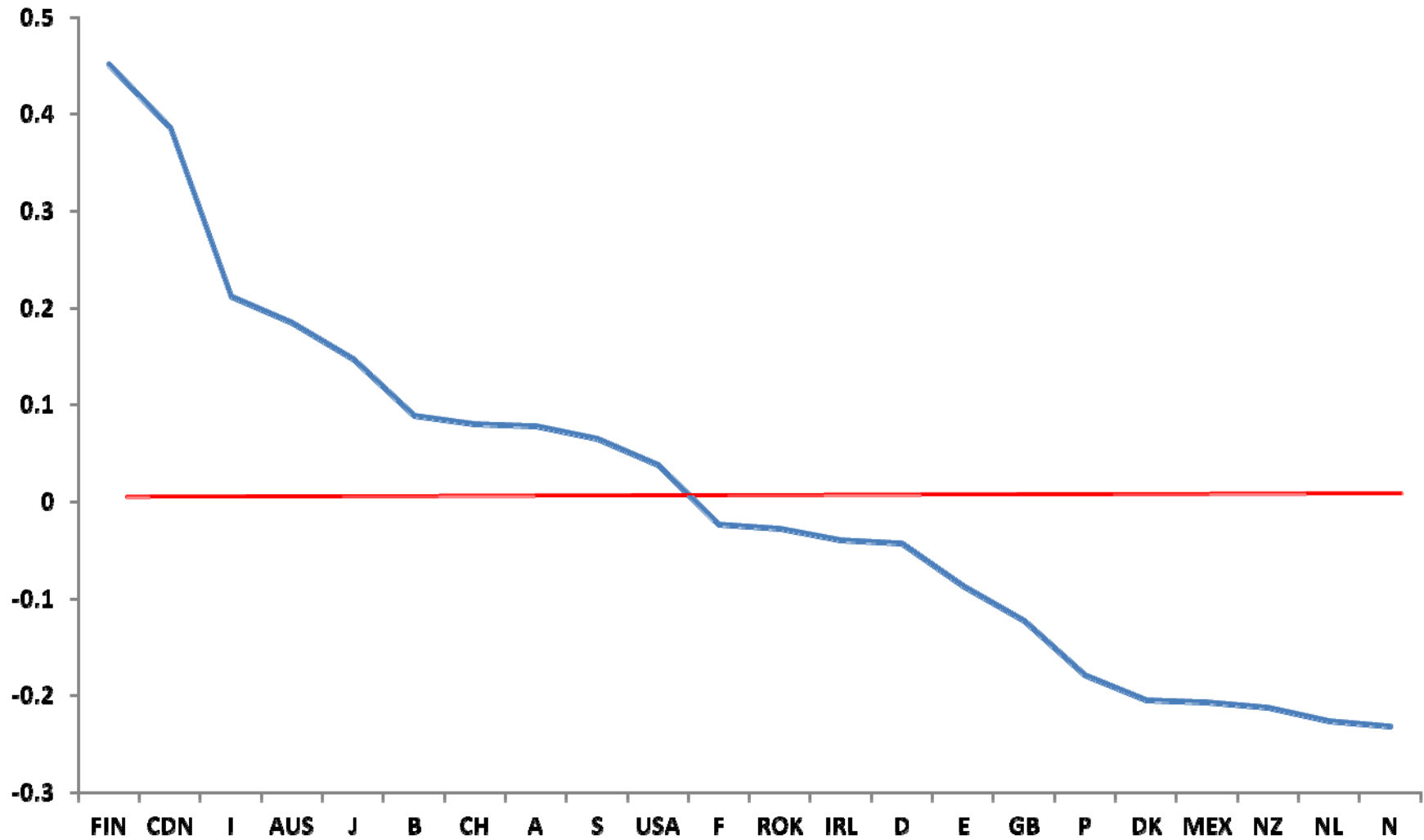


Multilevel-regression: 22 OECD countries (fixed effects)

Indepen.Var	Level	Variance	Var(Var)	Beta	Amplit.
r(S&P)	C	-0.77	-77.25	0.035	-1.32
Capitalization	C	-0.67	52.56	0.058	1.03
Liquidity	C	-0.02	-0.60	0.000	-0.02
Manufacturing	F	0.41	-22.62	0.031	0.93
Pharma	F	-0.43	-10.25	-0.102	2.28
Banks	F	2.75	119.39	0.149	0.90
Insurance	F	1.90	214.75	0.065	2.66
Services	F	0.51	6.40	-0.012	0.09
Assets	F	0.03	16.24	0.027	0.31
Debt	F	0.04	1.68	0.000	0.09
RoE	F	-0.10	-4.32	-0.002	-0.12
Turnover	F	0.55	23.35	0.030	0.64
Institutional Inv	F	0.05	2.22	0.004	-0.01
CR1	F	0.09	2.65	0.001	0.08
InInv*CR1	F	0.00	-0.05	0.000	0.00
ICC		0.13	0.11	0.08	0.09
(R ²)		(0.16)	(0.17)	(0.18)	(0.24)

red: $\alpha \leq 0,000$; blue: $\alpha \leq 0,05$, unstandardized coefficients; ICC: intraclass correlation

22 OLS-regression coefficients (β) % institutional investors - volatility



Type of ownership and level of risk Two groups of OECD-countries

	r	Amplit.	Variance	InstInv	30%+	Capital(%)
US	-	2.1	1.8	37.3	0.9	119.8
Group I	0.87	2.7	2.4	25.1	10.4	96.1
Group II	0.45	3.3	2.5	14.6	29.8	41.9

Group I: GB, S, D, FIN. **Group II:** A, IRL, RoK, Mex

Conclusions I

- The central hypothesis was confirmed: The higher the percentage of institutional ownership, the higher the level of risk in terms of volatility, $\text{Var}(\text{Var})$, and beta (multi-level regression, 22 OECD-countries).
- However, there is empirical evidence that contradicts these findings: US-firms have the highest level of institutional ownership, but they rank below average in volatility (rank 13) and amplitude (rank 15), behind Germany, Spain, Italy, Japan, France. How can this puzzle be explained?

Conclusions II

- The US has the most developed financial market in terms of capitalization, liquidity, institutionalized market monitoring (analysts, rating agencies). Many innovations that have revolutionized the financial markets have been 'invented' in the US: stock option prices (Black/Scholes); Arch/Garch models (R. Engle), etc.
- The US is the country of origin of the crises, but the infection could only be transmitted to other countries because these countries had opened their markets to financial innovations and institutional ownership. They removed legal barriers which would have prevented financial market actors from applying high-risk financial innovations (deregulation).

Conclusions III

- High-risk innovations (derivatives) are applied by sophisticated (Goldman Sachs/Paulson) as well as by less sophisticated financial market actors (IKB Bank: Abacus).
- The US not only has the most developed financial market, but also the most regulated market. The US has a higher regulation density (number of laws). It spends more money for implementing these regulations and for monitoring market actors. Legal procedures initiated against those who violated the regulations are more numerous compared to other countries.