

Unique Symptoms of Japanese Stagnation

An Equity Market Perspective

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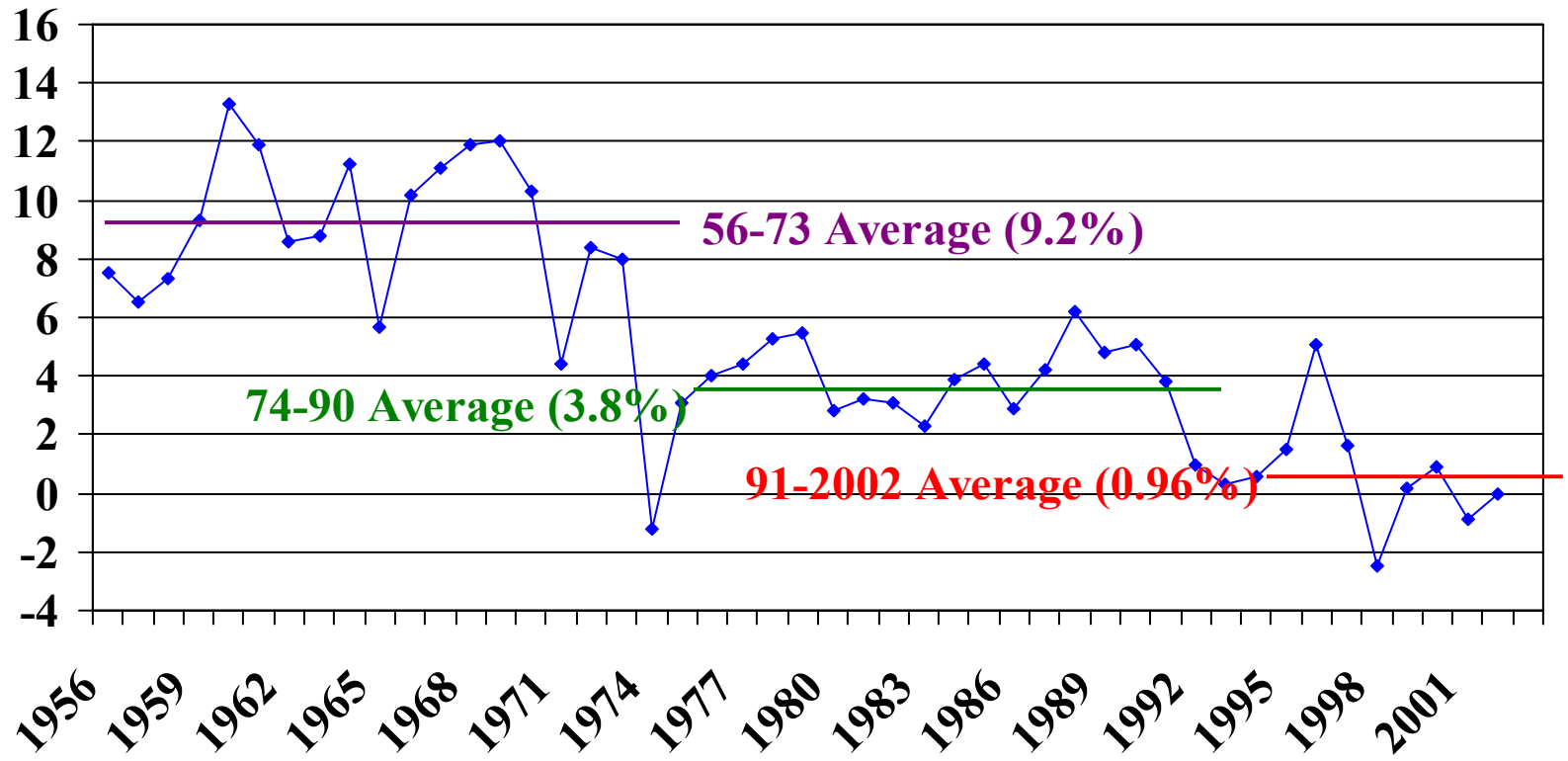
Jianping Mei

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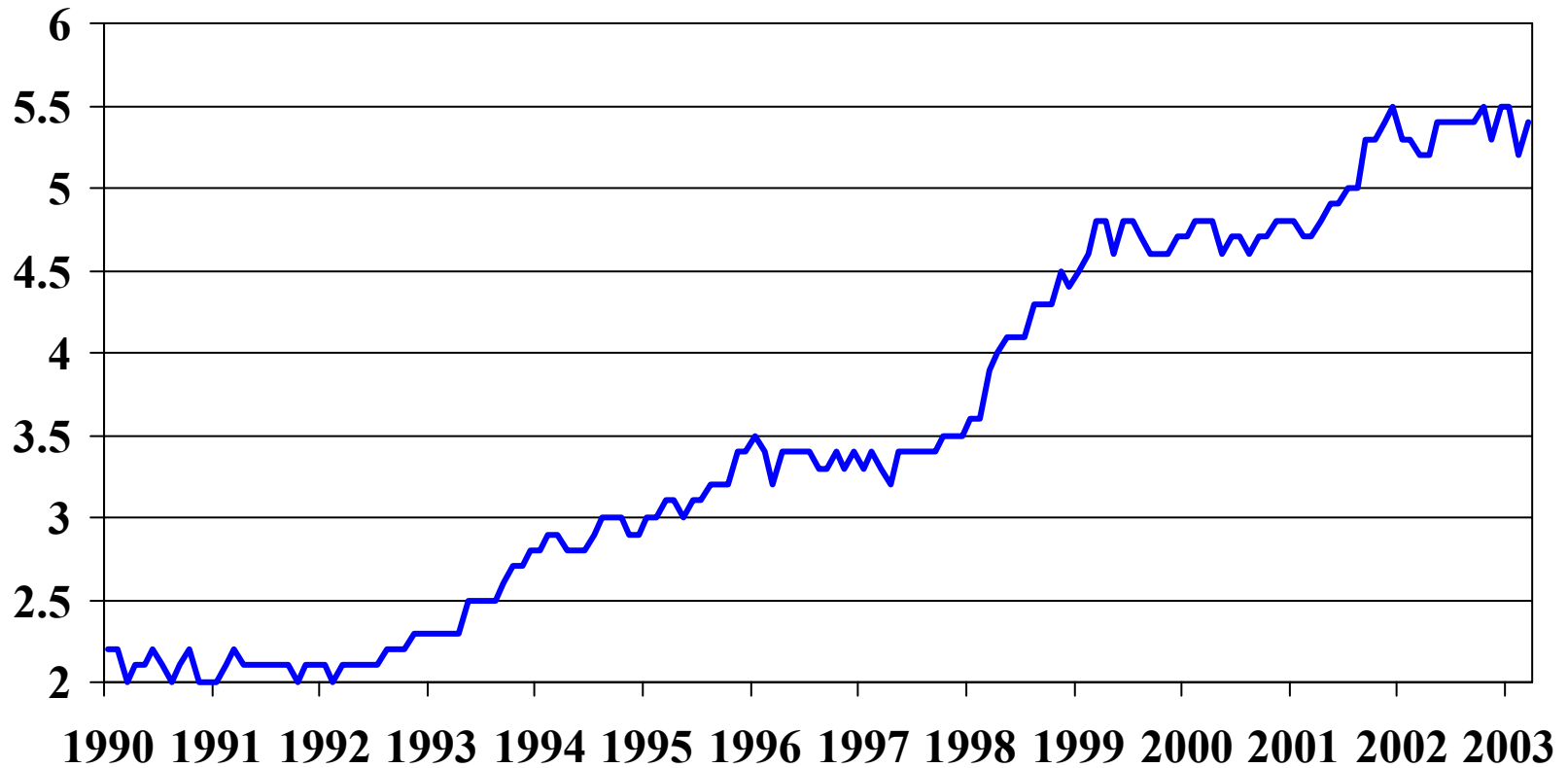
Motivation

- Japan: Stagnation after collapse of bubble
 - GDP growth, unemployment, and inflation
 - Stock market return
- Bad loan problem in the banking sector
 - As much as ¥100 trillion, 18% of GDP
 - Major bank failures in 1997 and 1998: end of “convoy system.”
- Government :
 - Slow response to economic problems
 - Mounting government debt
 - Zero interest rate policy

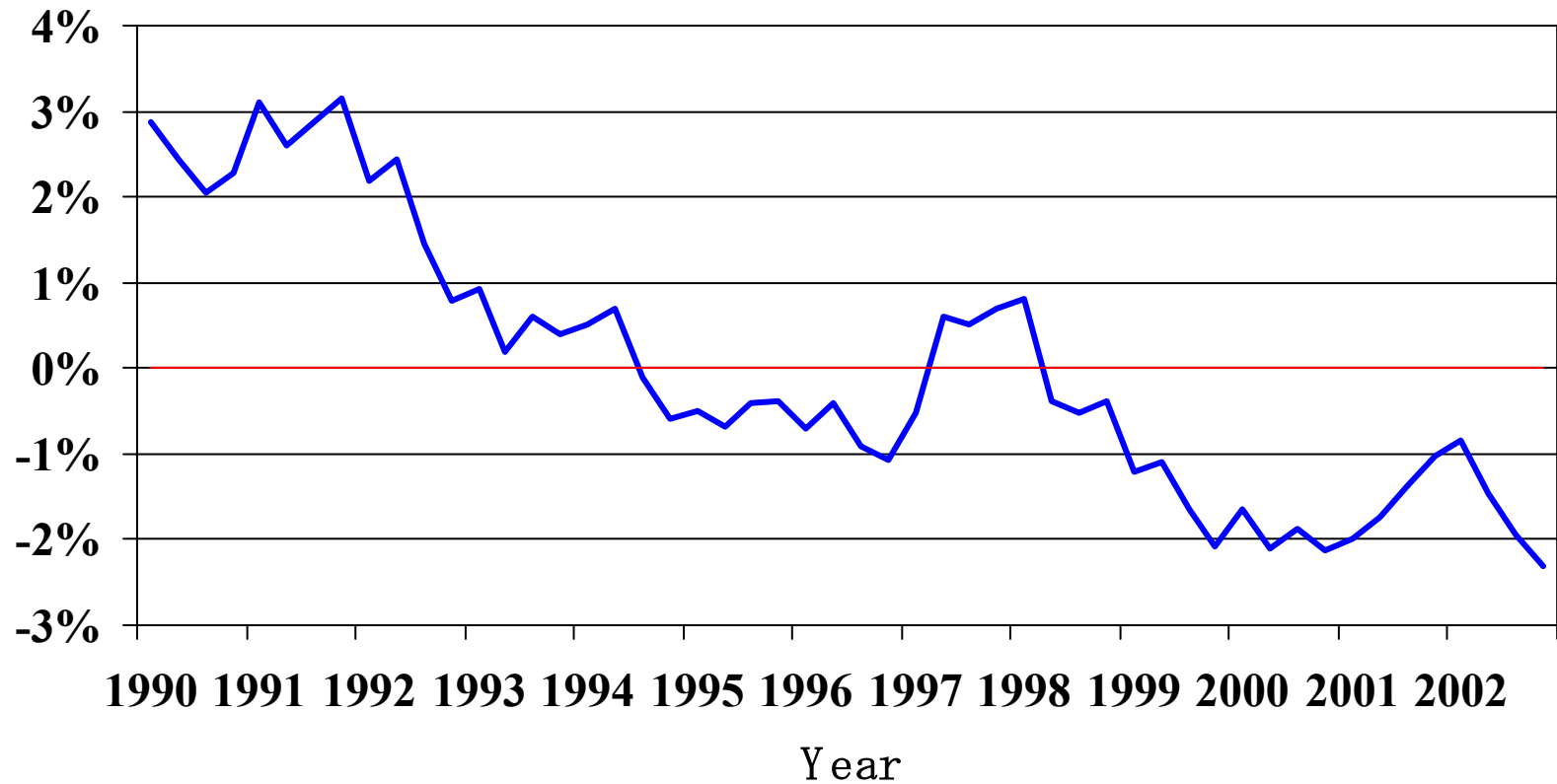
GDP Growth Rate, 1956-2002



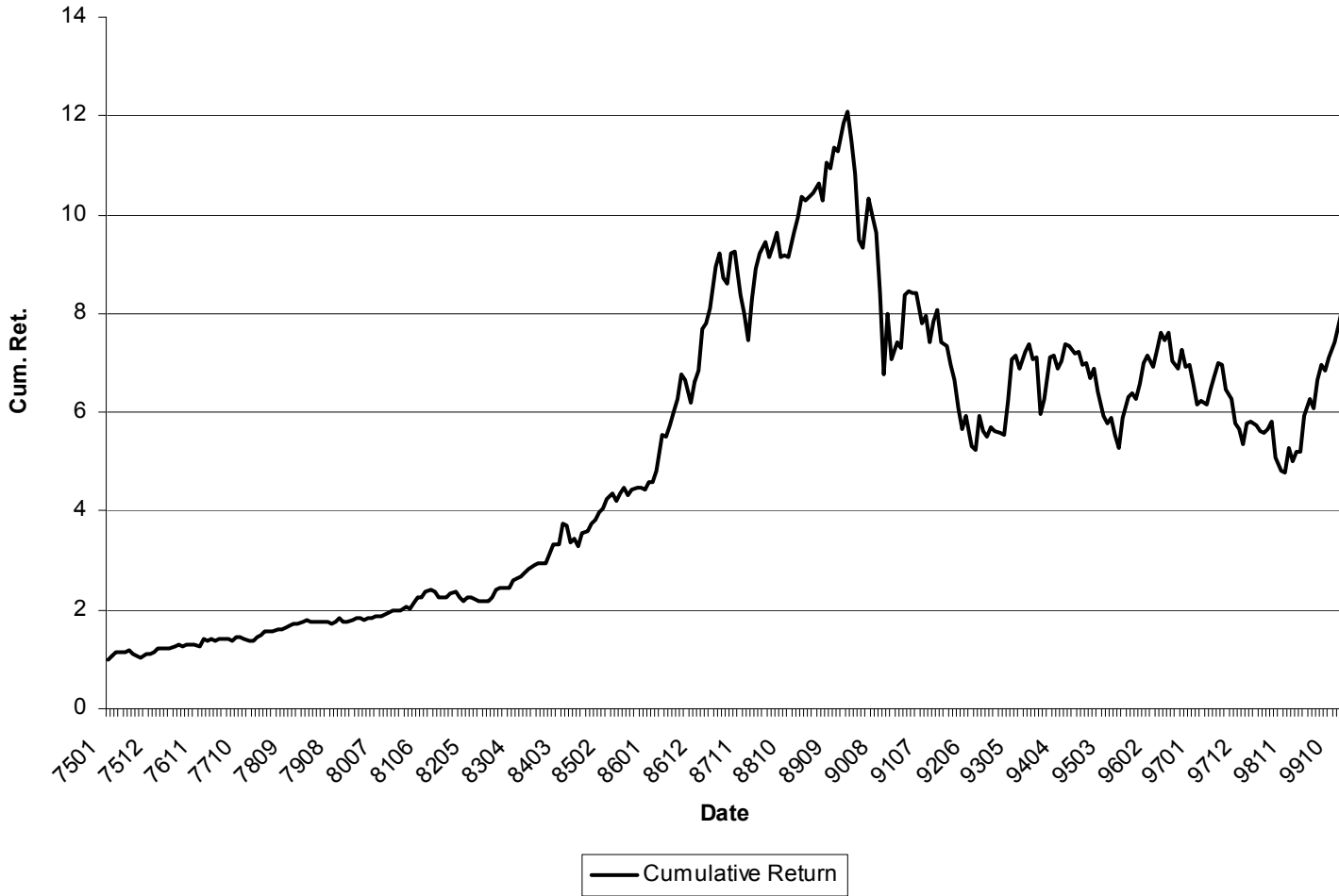
Unemployment Rate (% , SA)



Inflation Rate (GDP Deflator)



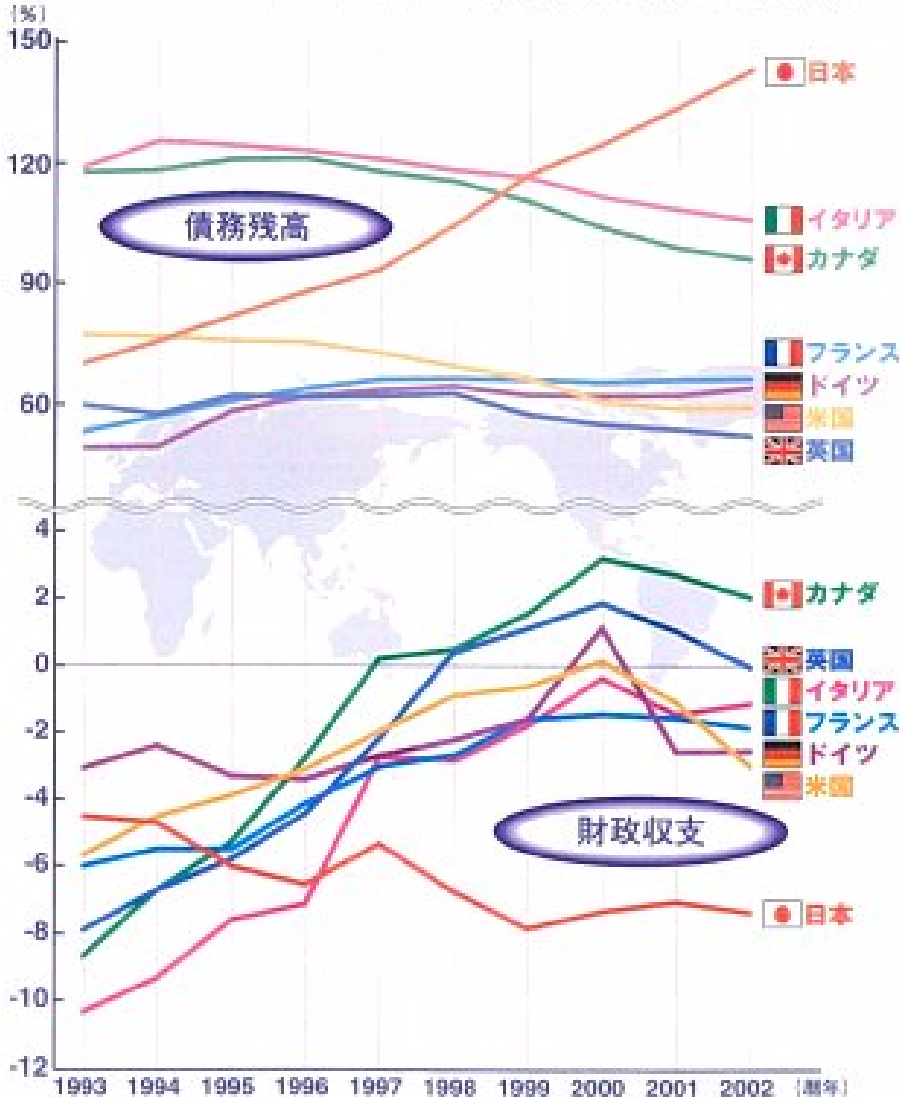
**Figure 1. Cumulative Returns and Trading Volume
(TSE Value-Weighted Index)**



Mounting Government Debt

- New Government Debt
 - FY1999 ¥37.5 trillion (7.1% of GDP)
 - FY2000 ¥34.6 trillion (6.5% of GDP)
 - FY2001 ¥28.3 trillion (5.3% of GDP)
 - FY2002 ¥30.0 trillion (6.0% of GDP)
- Outstanding Debt (September 2002)
 - JGB ¥463 trillion (89% of GDP)
 - All liabilities ¥627 trillion (130% of GDP)
 - This is the highest in G7 countries
- Limits its fiscal expansion ability

(SNAベース、OECD/エコノミック・アウトルック (70号 (2001年12月))



Balance of National Debt To GDP Ratio

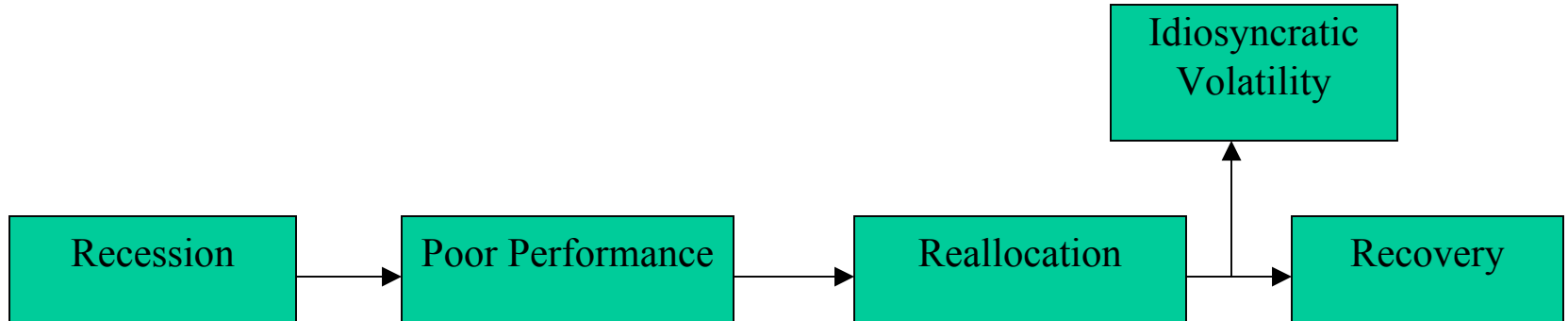
Fiscal Surplus (Deficit) To GDP Ratio

Bad Loans Problem as an Impediment to Reform

- Rather than writing off non-performing loans, Japanese banks tend to “ever-green” many of them
- Peek and Rosengren (2003) report some statistical evidence for “ever-greening”
- Ever-greening creates “zombie firms”
- Problems of “ever-greening”
 - Keeps the resources in zombie firms
 - Reduces the amount of resources available for potential new entrants
 - Zombie firms distort the competition

An Equity Market View

- “Creative destruction”
 - “Cleansing recessions” (Caballero and Hammour, 1994)



- What can volatility reveal?
 - Market volatility
 - Idiosyncratic volatility (Wurgler, 2000)

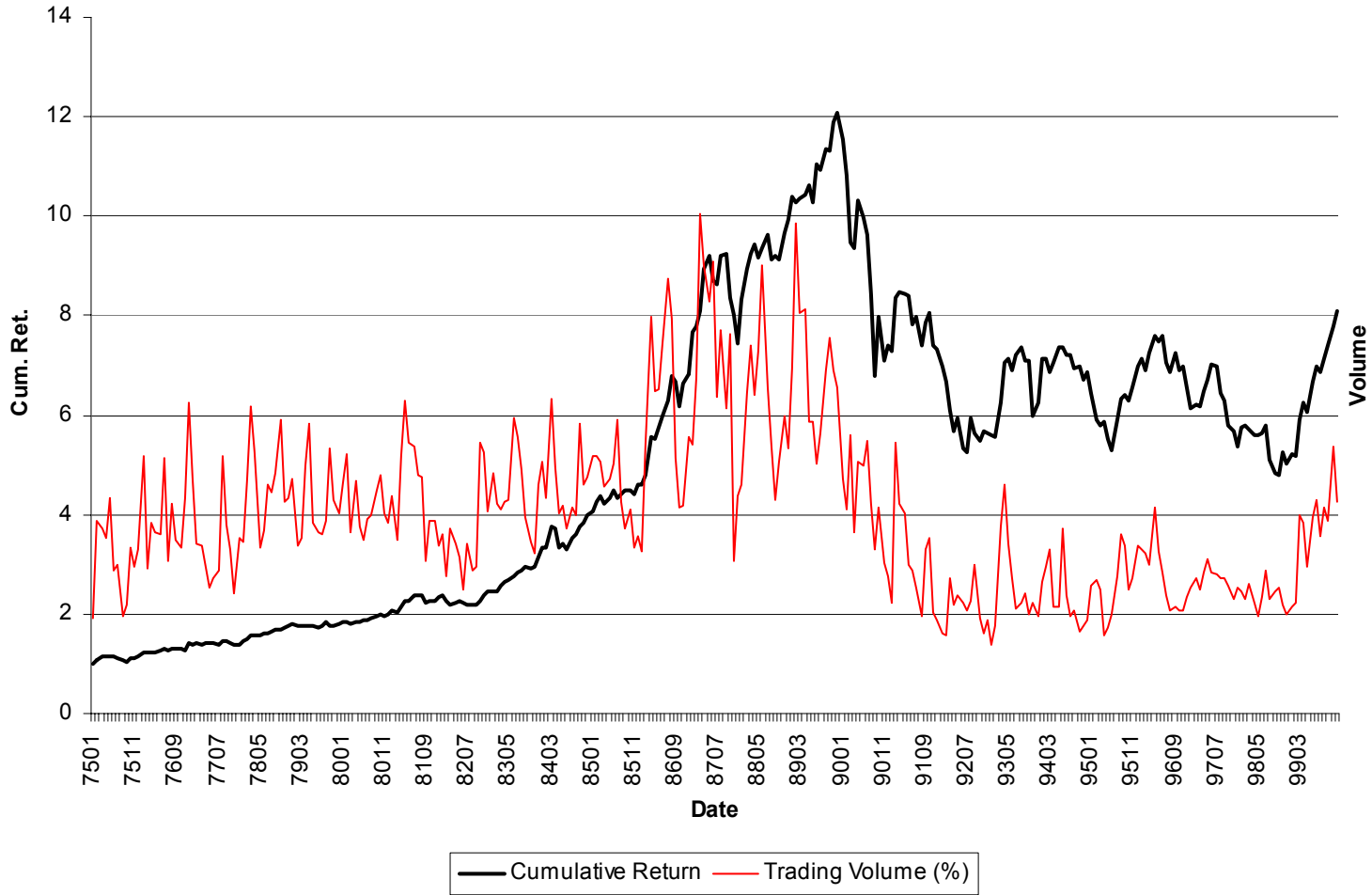
Main Findings

- A sharp *reduction* in firm-level volatility relative to market volatility after the Japanese market crash.
- Market-wide volatility has increased, but there is a significant drop in the variation of systematic risk across firms.
 - This is in sharp contrast with the U.S. (1962-99) results of Campbell, Lettau, Malkiel and Xu (2001).

Data

- First and Second Sections of the Tokyo Stock Exchange (TSE). Monthly individual stock returns and volume. Annual financial statements data for book value of equity.
- From 1975 to 1999. Subdivided to five 5-year periods. The numbers of stocks: 1174, 1275, 1368, 1521, and 1607.

**Figure 1. Cumulative Returns and Trading Volume
(TSE Value-Weighted Index)**



Measuring idiosyncratic volatility

- Direct decomposition using asset pricing models:

- $R_{i,t} - R_{f,t} = \alpha_i + \beta_{m,i}(R_{M,t} - R_{f,t}) + \varepsilon_{i,t}$

- $R_{i,t} - R_{f,t} = \alpha_i + \beta_{m,i}(R_{M,t} - R_{f,t}) + \beta_{SMB,i}R_{SMB,t} + \beta_{HML,i}R_{HML,t} + \varepsilon_{i,t}$

- Model-free, indirect decomposition (Xu and Malkiel, 2001)

- Compute total aggregate volatility σ_{TV}^2 first

- The aggregate idiosyncratic volatility:

- $\sigma_{TV}^2 - \sigma_{Mkt}^2$

Time-varying market volatility and idiosyncratic volatility

- Summary statistics (cross-section).
 - In 1990-94 for the market Model,
 - SD of β went down
 - Mean of R^2 went up
 - Mean and SD of idiosyncratic volatility went down

	R_M	\overline{R}_i	$\beta_{i,CAPM}$	R^2_{CAPM}	$\sigma_{i,IV}$	$\sigma_{i,TV}$	$\overline{\eta}_i$
				1975-79			
Median		0.015	0.997	0.117	0.085	0.093	0.037
Mean	0.016	0.016	0.999	0.132	0.09	0.096	0.05
S.D.	0.033	0.01	0.58	0.095	0.036	0.037	0.049
				1980-84			
Median		0.012	0.951	0.086	0.081	0.085	0.027
Mean	0.013	0.014	0.996	0.103	0.087	0.091	0.04
S.D.	0.026	0.011	0.653	0.083	0.04	0.041	0.04
				1985-89			
Median		0.028	1.027	0.157	0.097	0.107	0.049
Mean	0.027	0.028	1.024	0.172	0.106	0.115	0.056
S.D.	0.041	0.012	0.447	0.113	0.039	0.038	0.039
				1990-94			
Median		-0.004	1.016	0.538	0.076	0.116	0.022
Mean	-0.004	-0.004	1.011	0.513	0.08	0.117	0.027
S.D.	0.083	0.007	0.321	0.168	0.024	0.029	0.022
				1995-99			
Median		-0.007	0.983	0.407	0.085	0.115	0.021
Mean	-0.004	-0.005	1.006	0.387	0.093	0.122	0.027
S.D.	0.075	0.012	0.519	0.188	0.039	0.049	0.024

Figure 2. Annualized Market Volatility, Idiosyncratic Volatility, and Trading Volume



- Trend in volatility: Table 3.
 - Aggregate stock market volatility has trended *upwards* over the entire sample years.
- But,
- Firm-level volatility *decreased* during the 1990s.

$$\text{Model: } \ln(\sigma_t^2) = \mu + \rho \ln(\sigma_{t-1}^2) + \gamma t + \alpha_1 \frac{\Delta \ln(\sigma_{t-1}^2)}{t-1} + \dots + \alpha_6 \frac{\Delta \ln(\sigma_{t-6}^2)}{t-6} + \varepsilon_t$$

	Entire Sample Period: 1975-1999				Sub Sample Period: 1985-1999			
	μ	γ	ρ	R^2	μ	γ	ρ	R^2
Market Volatility								
Estimates	-.1728	.00016	.8948	0.901				
T	-3.63	2.44	31.67					
ADF T(ρ -1)			-37.38					
Idiosyncratic Volatility (σ_{IV})								
Estimates	-.0486	.00001	.9560	.937	-.0975	-.00018	.8958	.950
T	-2.68	0.54	58.3		-2.98	-2.12	25.2	
ADF T(ρ -1)			-18.75				-35.92	
Idiosyncratic Volatility ($\sigma_{CUMULIV}$)								
Estimates	-.0438	.00001	.9596	.949	-.1078	-.00023	.8803	.948
T	-2.75	0.46	65.9		-3.32	-2.42	24.1	
ADF T(ρ -1)			-19.96				-46.84	
Idiosyncratic Volatility (σ_{TRIV})								
Estimates	-.0351	.00001	.9699	.963	-.1194	-.00023	.8782	.966
(Std.E)	-2.44	0.58	76.0		-3.58	-2.76	25.4	
ADF T(ρ -1)			-16.01				-74.82	

- R^2 and correlation coefficient
 - Figure 3a: R^2 from market model (24-month rolling regression).
 - Figure 3b: Average pair-wise correlations using past 24 months data.
- Stocks in the Japanese market lost their individuality and started to move together after 1990.

Figure 3a. Average R2 Statistics of Returns and Turnover

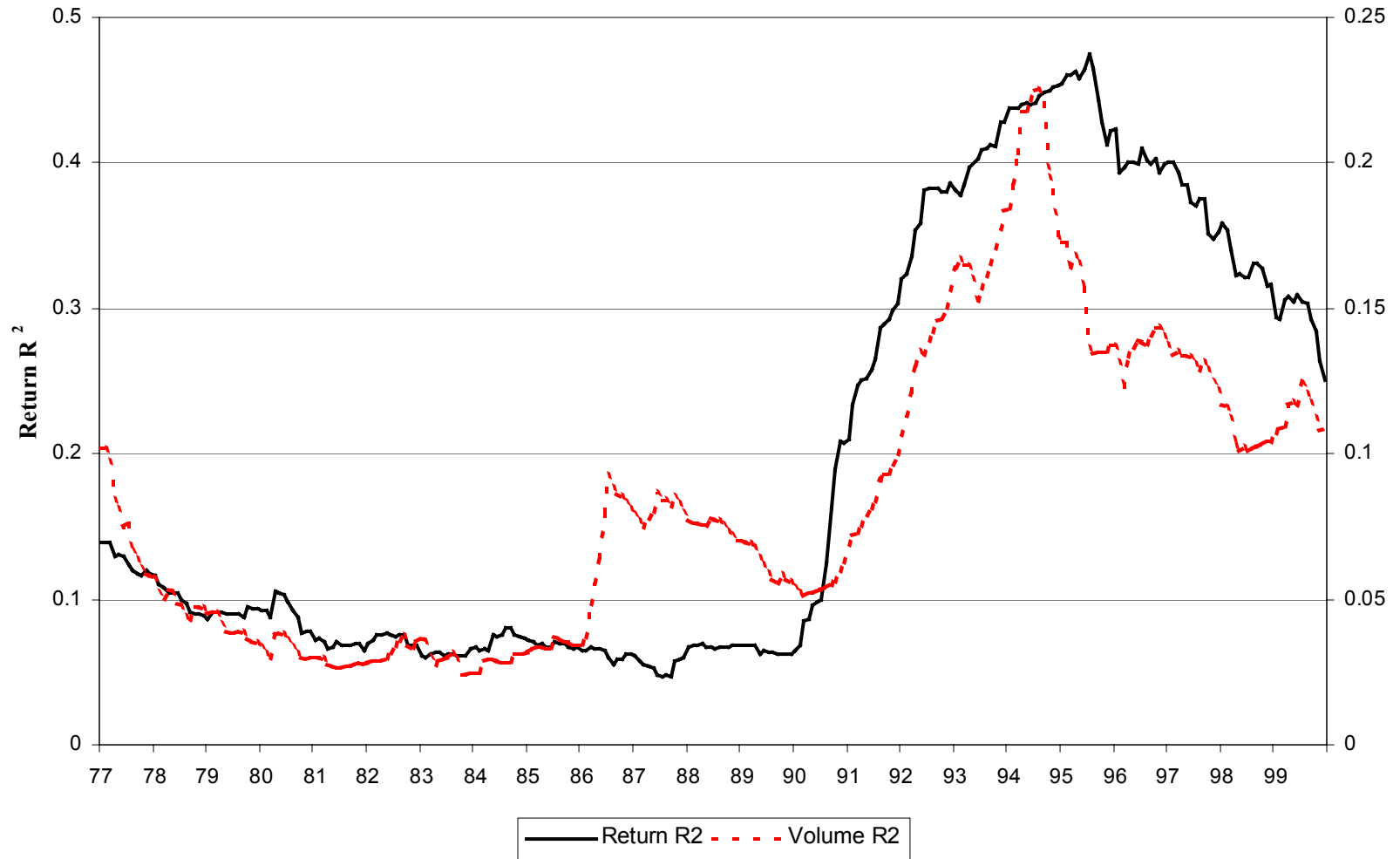
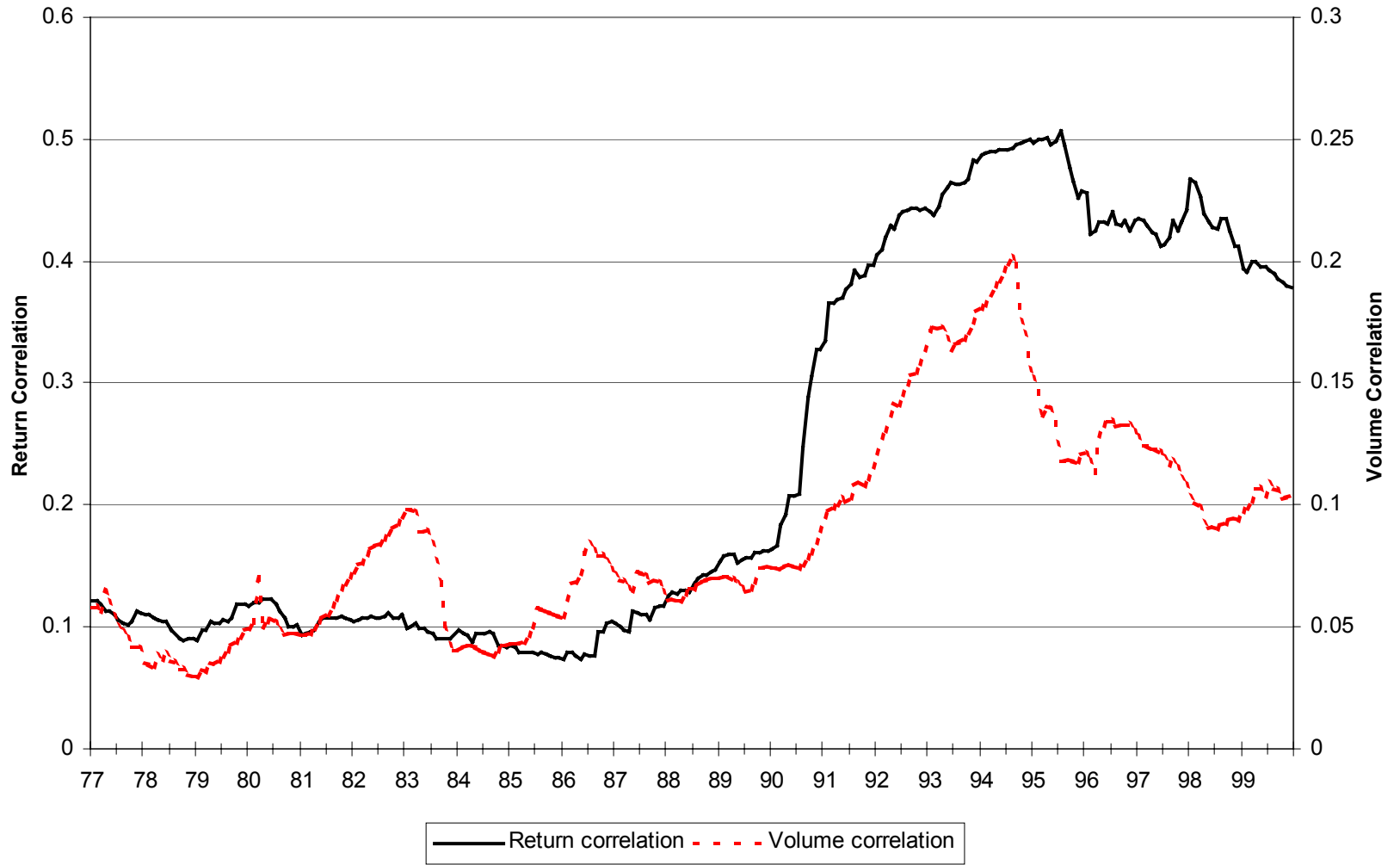


Figure 3b. Return and Volume Correlations among Individual Stocks



Comparison with the U.S. Market

- The U.S. in 1928-1946.
 - Increased market *and* idiosyncratic volatilities in 1929-1933 and 1937-1938.
 - Increased R^2 and correlations.
 - U.S.: Probably due to massive “deconstruction”
- The Japanese case
 - Japan: Increased market volatility but falling idiosyncratic volatility due to lack of “deconstruction.”

Figure 6a. Market and Idiosyncratic Volatility in the U.S. Market: 1928-1947

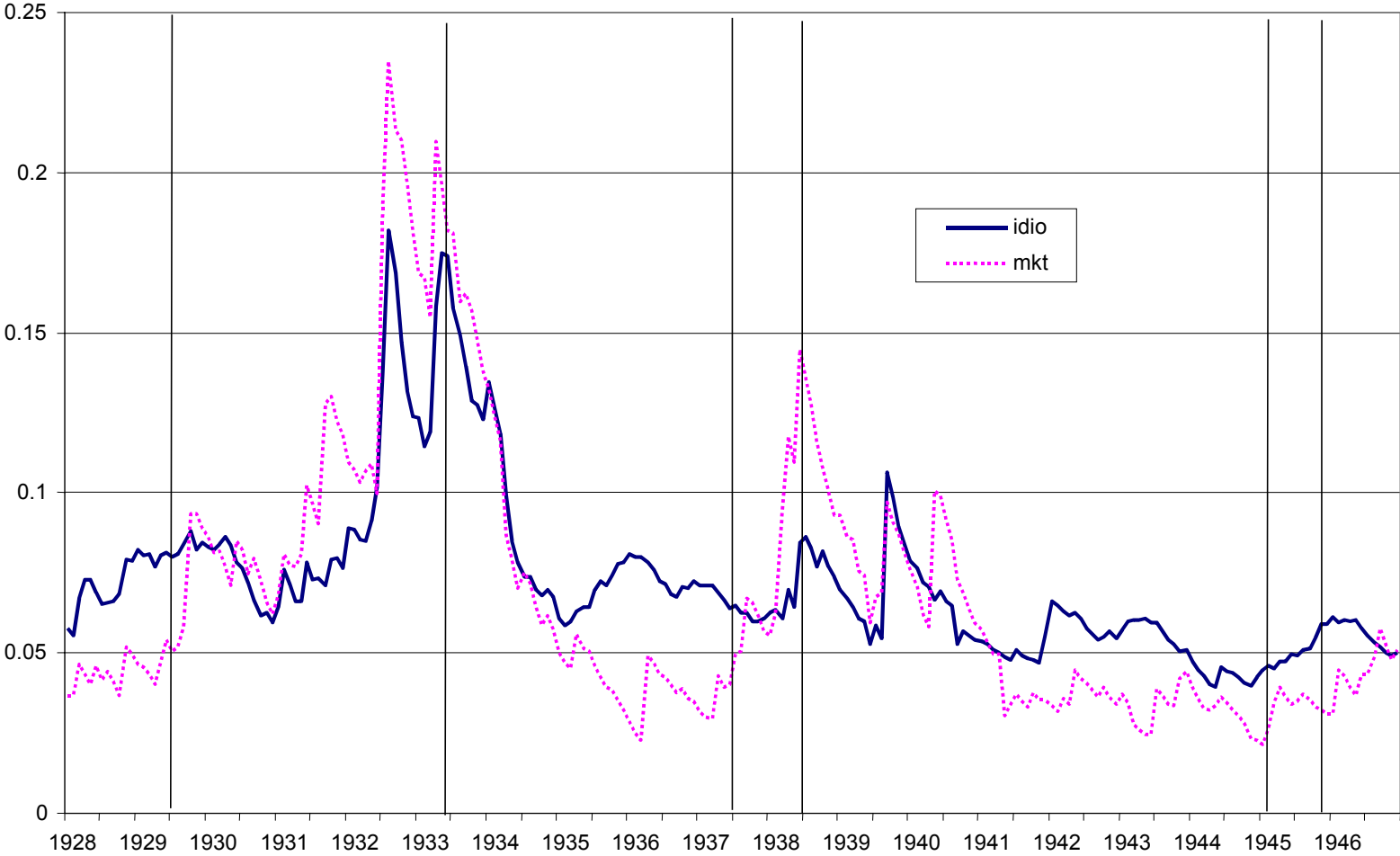
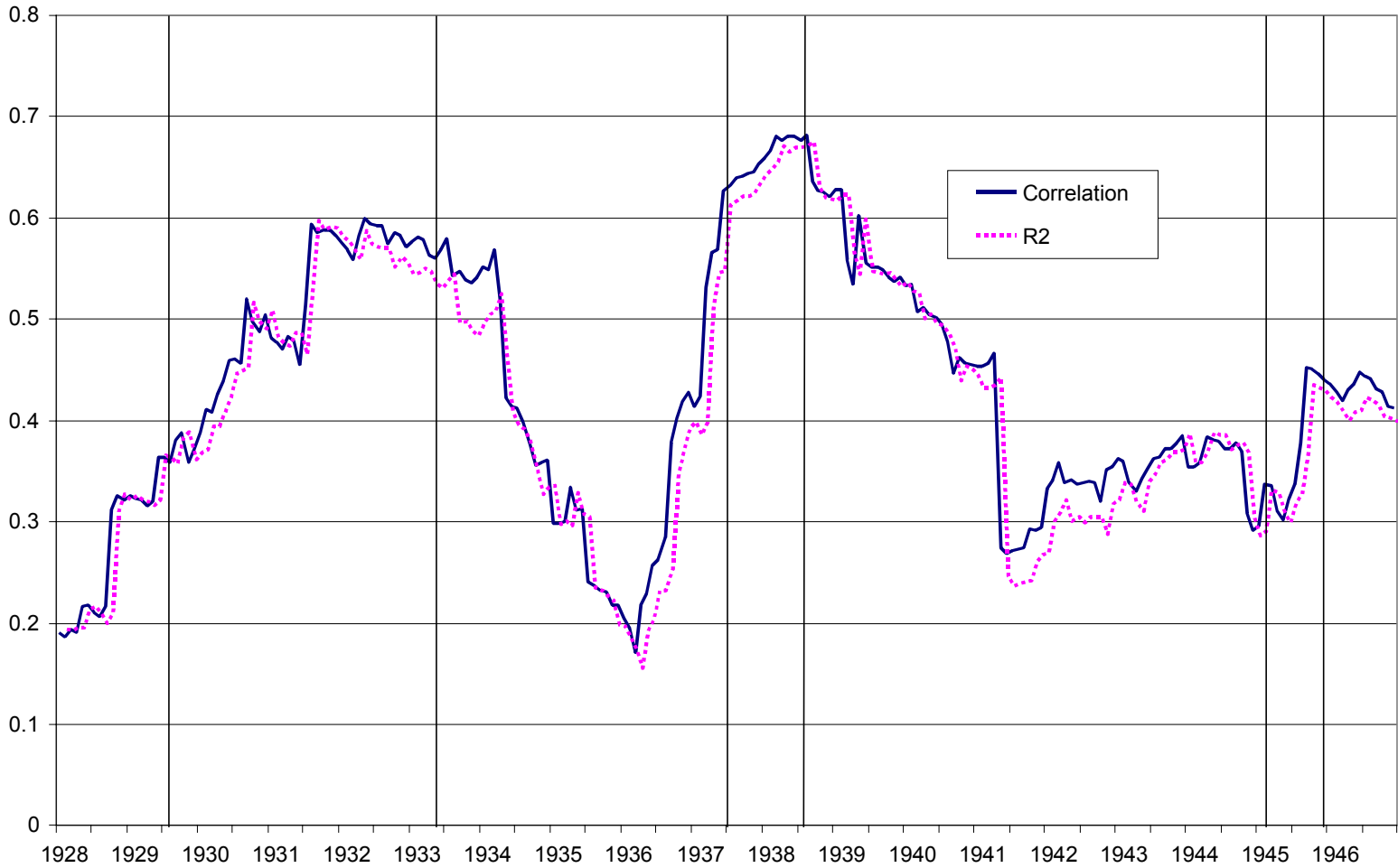


Figure 6b. Correlation and R2 in the U.S. Market: 1928-1946



Why Did Idiosyncratic Volatility Fall After 1990?

- Lack of restructuring
 - Positive relation between changes in idiosyncratic volatility and corporate bankruptcies
 - Sharp fall in firm-level volatility during the 1990-1996 period could be due to a lack of corporate restructuring.
- The role of keiretsu and main bank
 - A *decrease* in economic growth tends to *increase* the difference of idiosyncratic volatility between non-keiretsu and keiretsu firms in 1990-96
 - Similar results hold when comparing the firm-level volatility between firms w and w/o main banks tie

Figure 4a. Bankruptcies in Japan

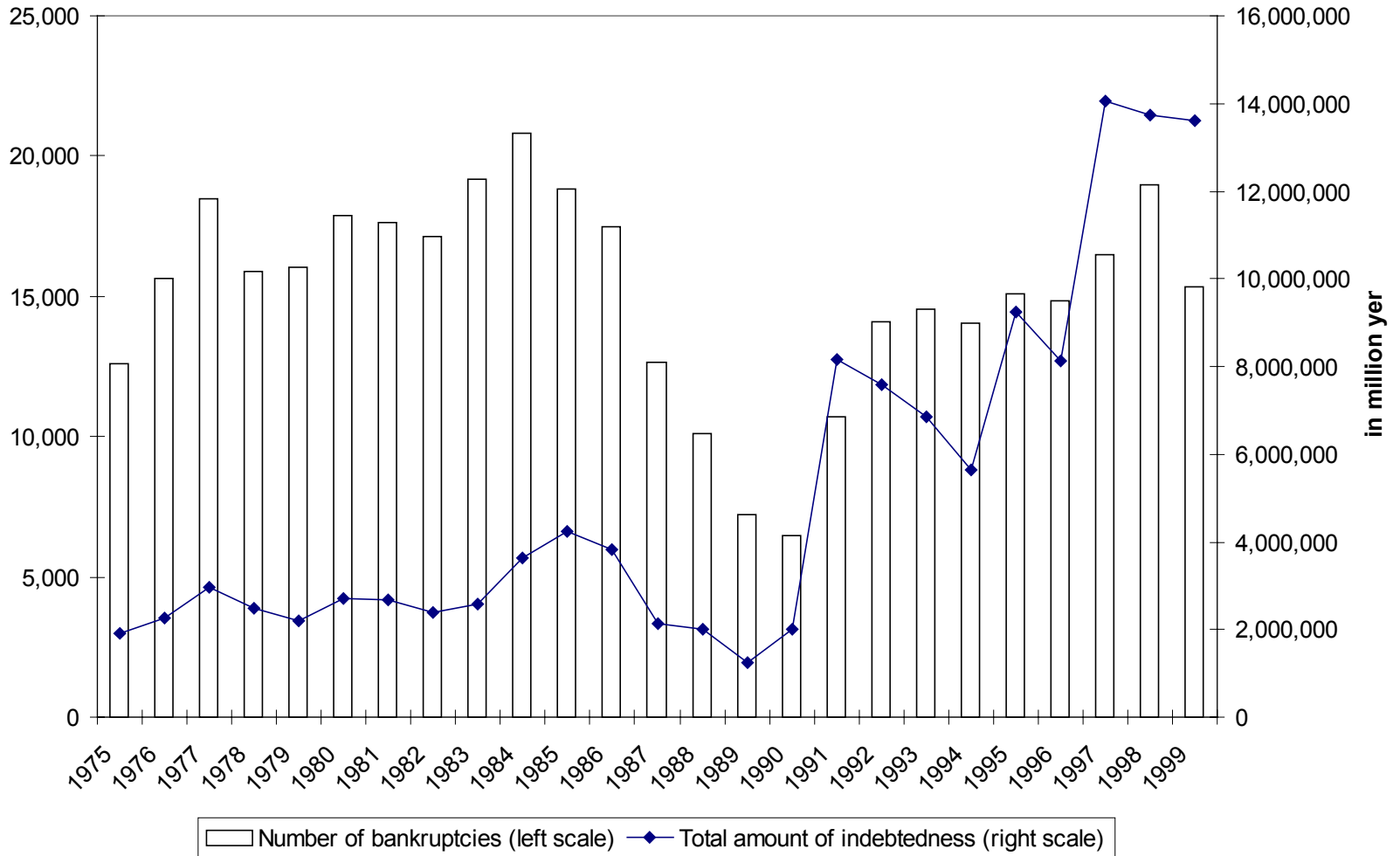
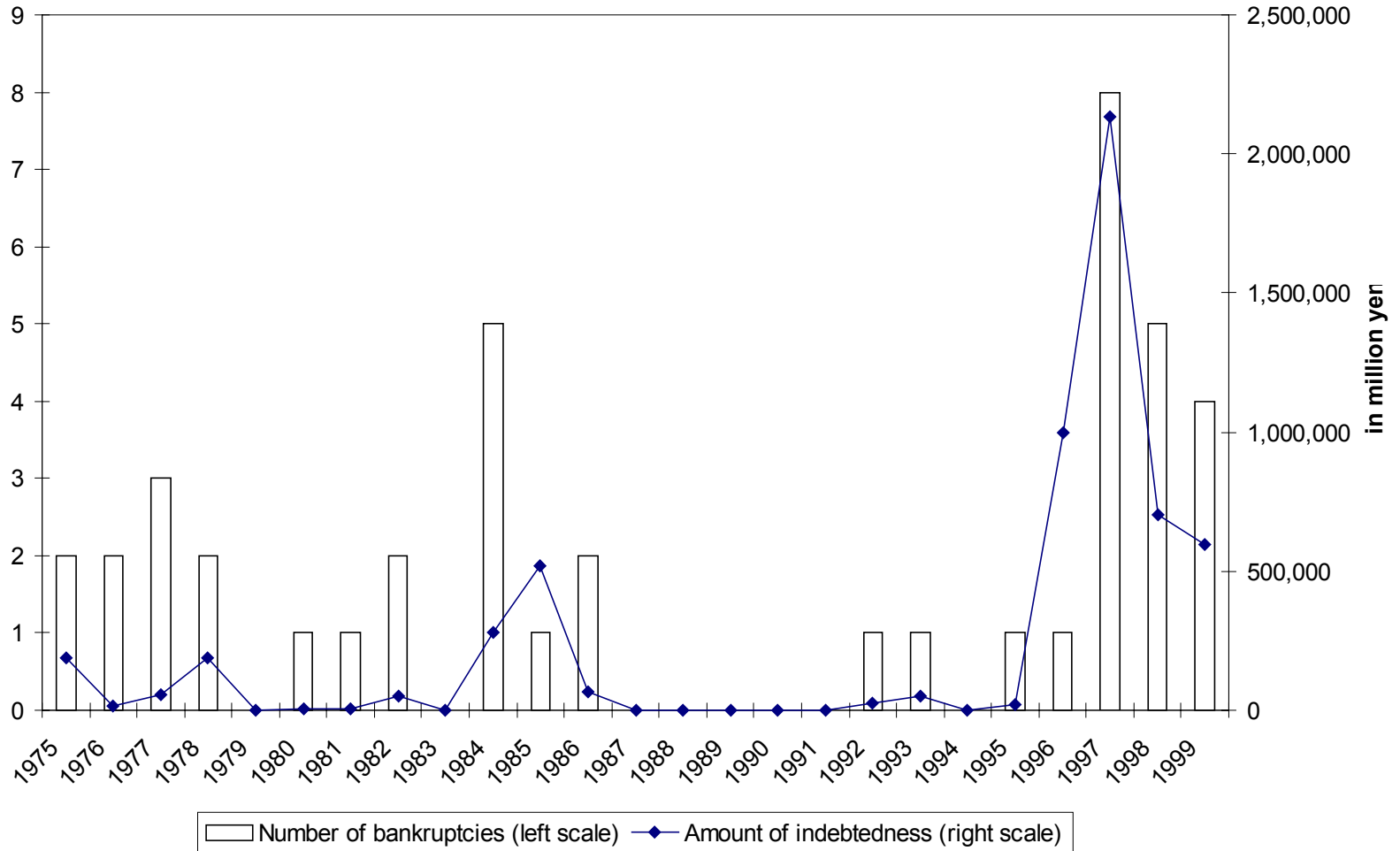


Figure 4b. Bankruptcies of TSE Listed Firms



- Homogeneous Fundamentals
 - ROA's became highly correlated in the 1990's
 - Smaller variation of ROA's for keiretsu firms than non-keiretsu firms

Figure 5a. Ten Year ROA Correlations

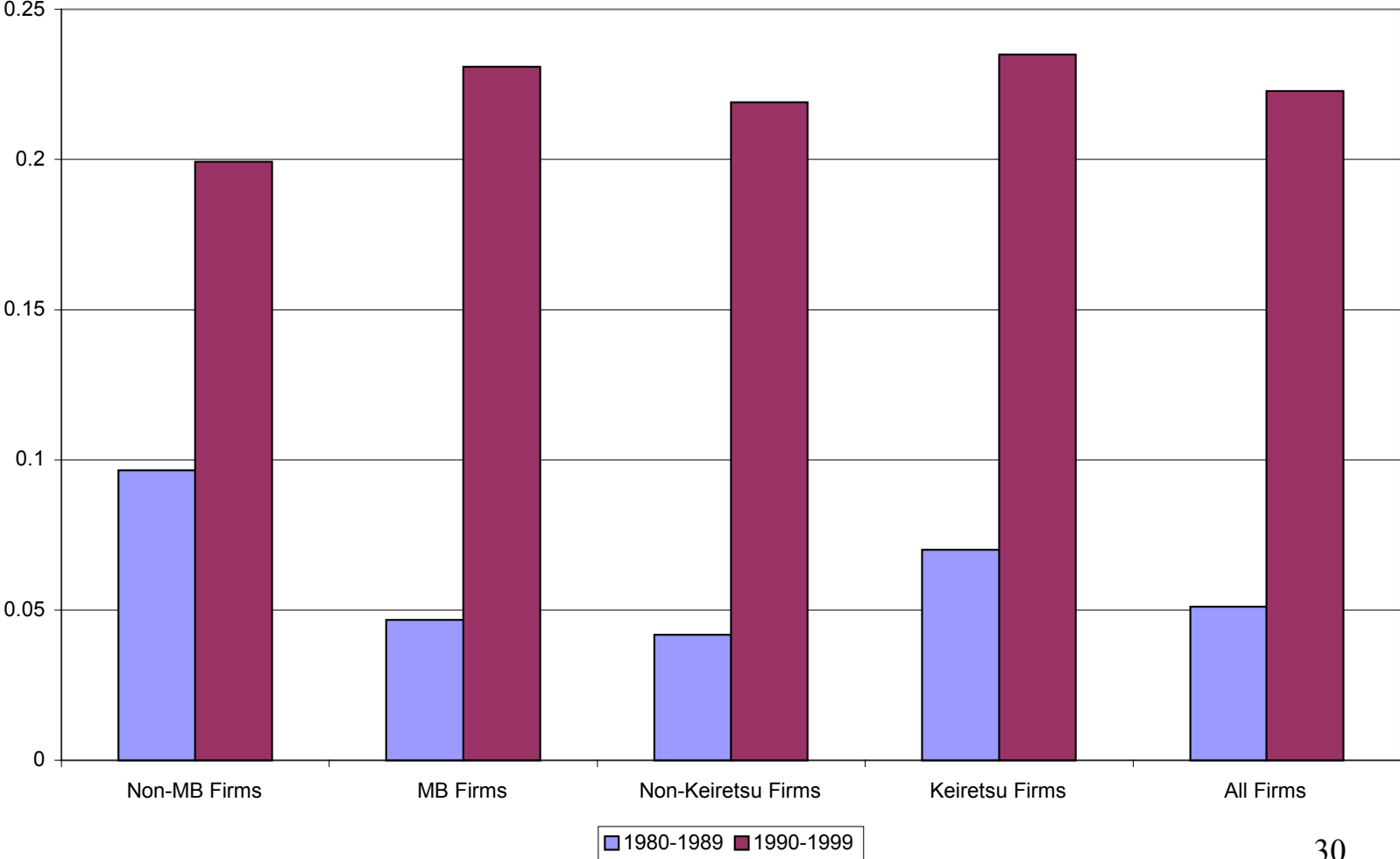
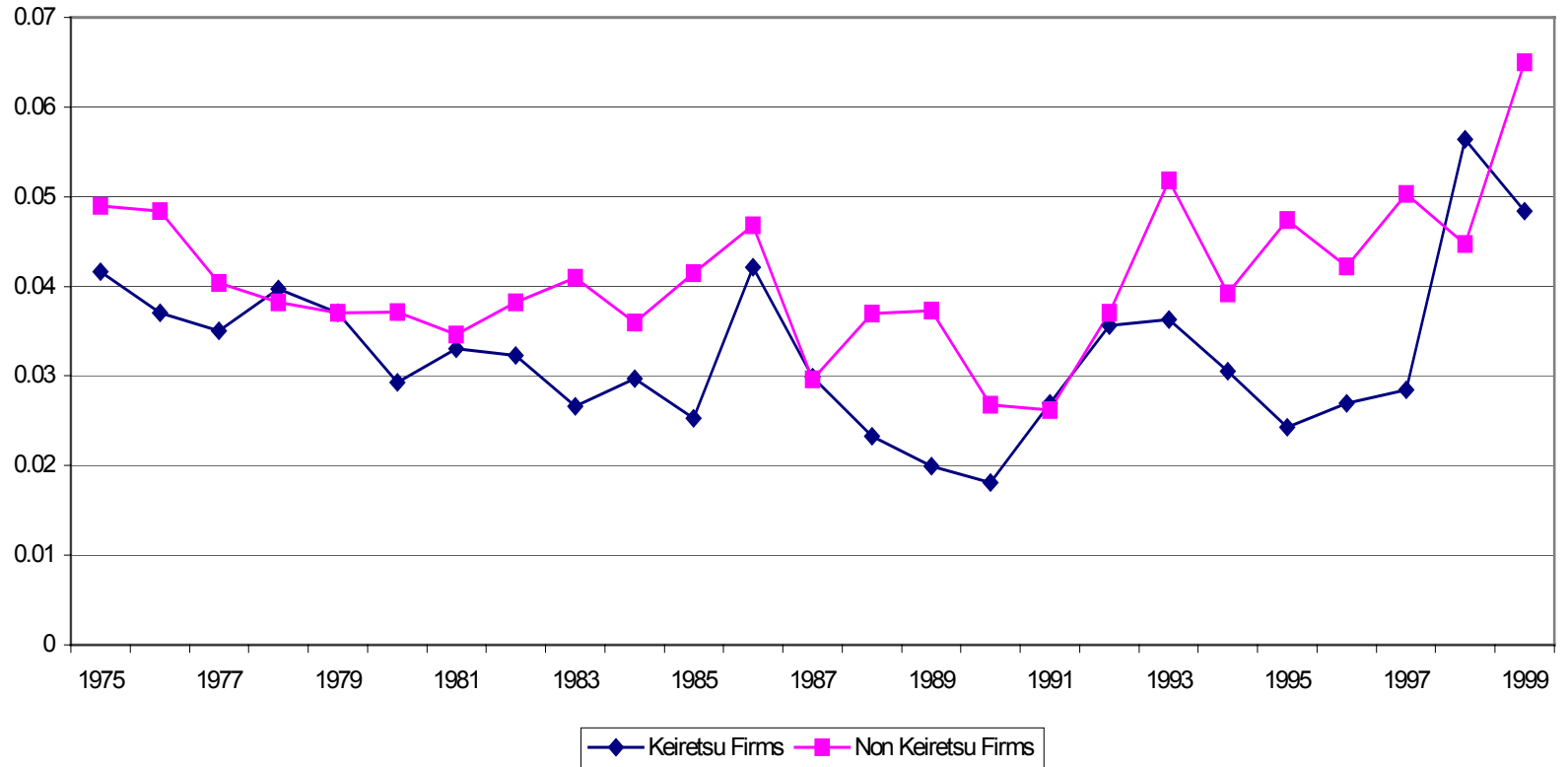


Figure 5b. Standard Deviation of ROA's



Vicious Cycle?

- Lack of restructuring (bankruptcies) may have contributed to increased co-movement of Japanese stocks
- This makes it difficult to distinguish the good firms from bad ones, causing good ones to suffer, too
- Capital formation process may suffer from this

Conclusions

- Dramatically increased co-movement in Japanese equities
- This may be caused by bailouts and the lack of restructuring
- Further research:
 - Did reduction of efficiency affect capital budgeting?
 - Effect of decreased idiosyncratic risk on asset pricing