Unique Symptoms of Japanese Stagnation
An Equity Market Perspective

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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

• Government:
  – Slow response to economic problems
  – Mounting government debt
  – Zero interest rate policy
GDP Growth Rate, 1956-2002

56-73 Average (9.2%)

74-90 Average (3.8%)

91-2002 Average (0.96%)
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
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


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 \( \sigma_{TV}^2 \) 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 $\beta$ went down
    - Mean of $R^2$ went up
    - Mean and SD of idiosyncratic volatility went down
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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.
Model: $\ln(\sigma_t) = \mu + \rho \ln(\sigma_{t-1}) + \gamma t + \alpha_1 \Delta \ln(\sigma_{t-1}) + \ldots + \alpha_6 \Delta \ln(\sigma_{t-6}) + \epsilon_t$

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• $R^2$ 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

- Number of bankruptcies (left scale)
- Total amount of indebtedness (right scale)
Figure 4b. Bankruptcies of TSE Listed Firms

- Number of bankruptcies (left scale)
- Amount of indebtedness (right scale)
• 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

Keiretsu Firms  Non Keiretsu Firms
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