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Early Warning Indicators for Asia

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(Please do not quote without approval from the authors)

金融庁
Financial Services Agency

Characteristics :Asian Countries

1, Bank-oriented financial system

2, Relatively stable banking system

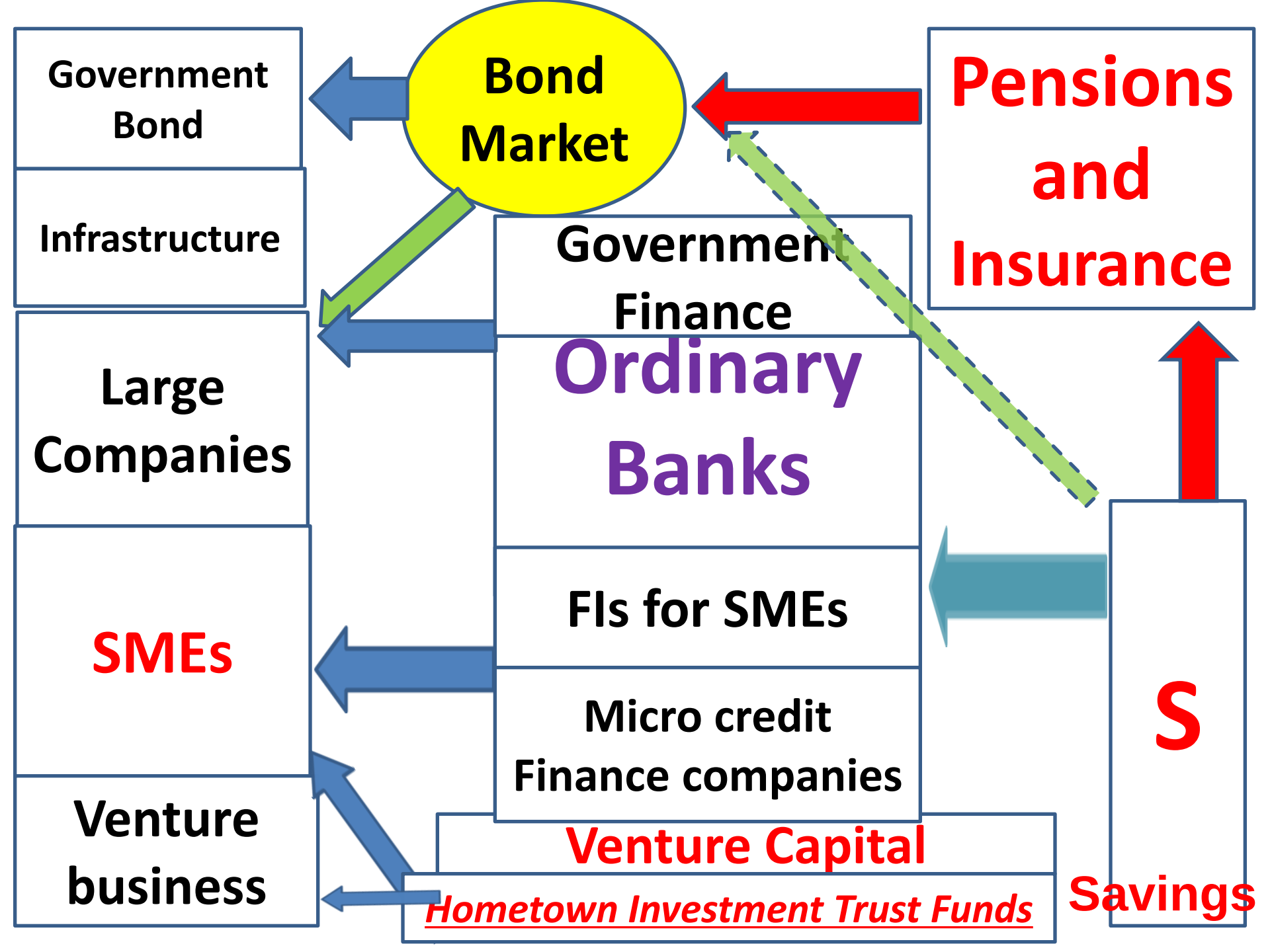
3, small share of bond markets

Needs for long term financing

4, Lack of long term investors such as pension funds and insurance companies

4, High percentage of Small & Medium Sized Enterprises (SME)

5, Large share or Micro Credit (Finance companies), Lack of venture capital


Government Bond
Infrastructure
Large Companies
SMEs
Venture business
Bond Market
Government Finance
Ordinary Banks
FIs for SMEs
Micro credit Finance companies
Venture Capital
Hometown Investment Trust Funds
Pensions and Insurance
S
Savings

Structure of the paper

1, Easy monetary policy and Too much liquidity

2, Inconsistency between micro behavior of banks and aggregated macro behavior of banks

3, Early warning indicators for the bubble

4, Estimation of Banking Behavior

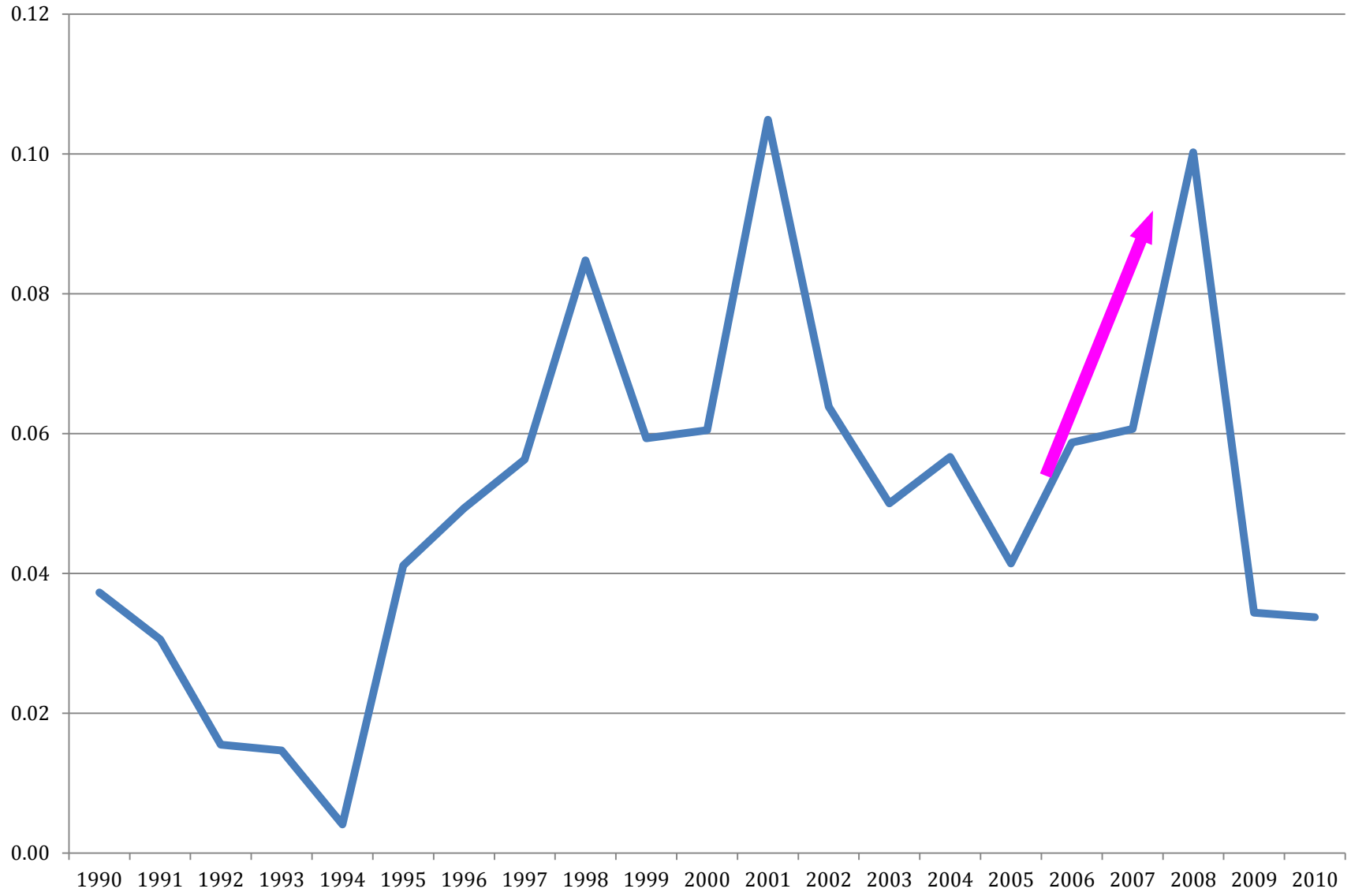
Japan and USA

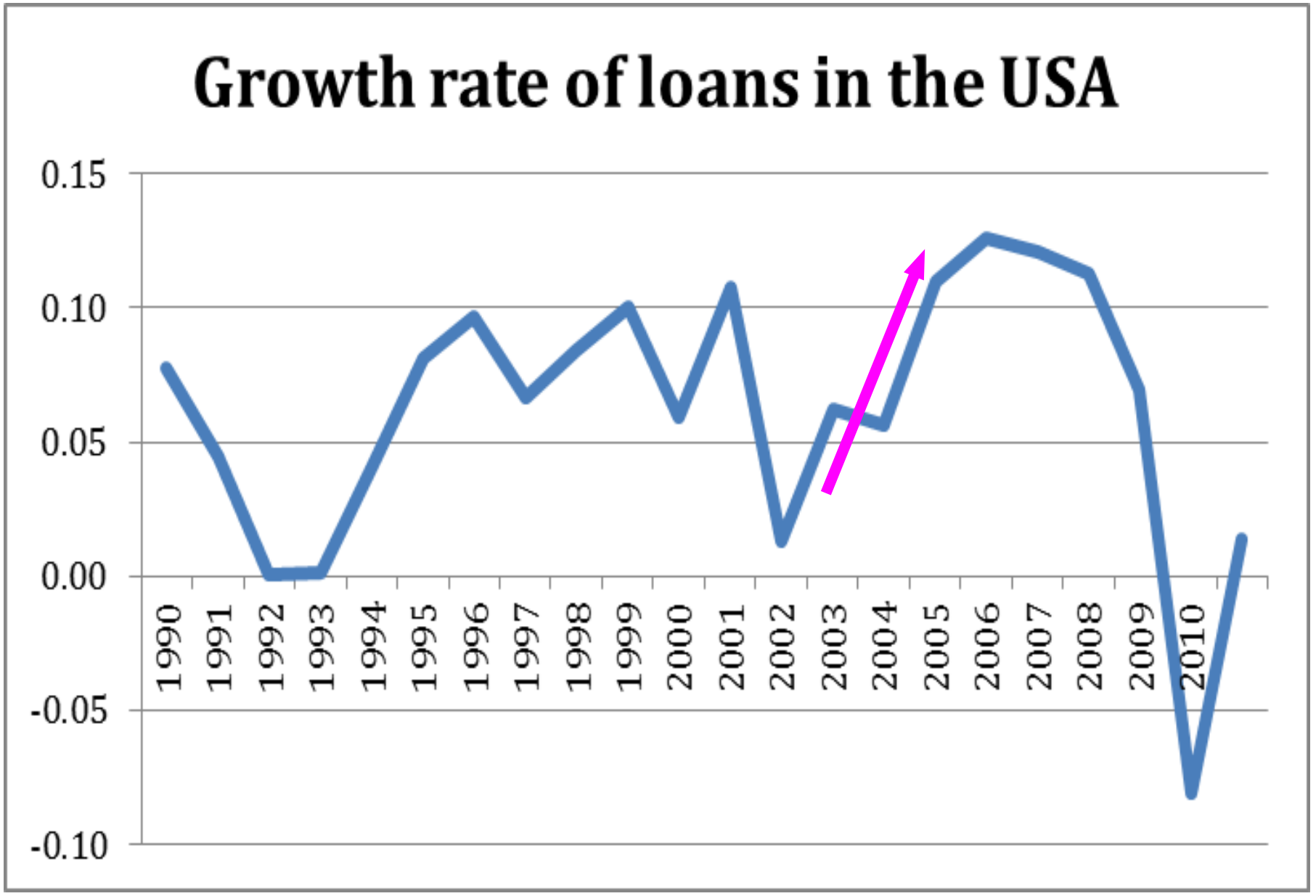
5, Supply of Risk capital

Hometown Investment Trust Funds

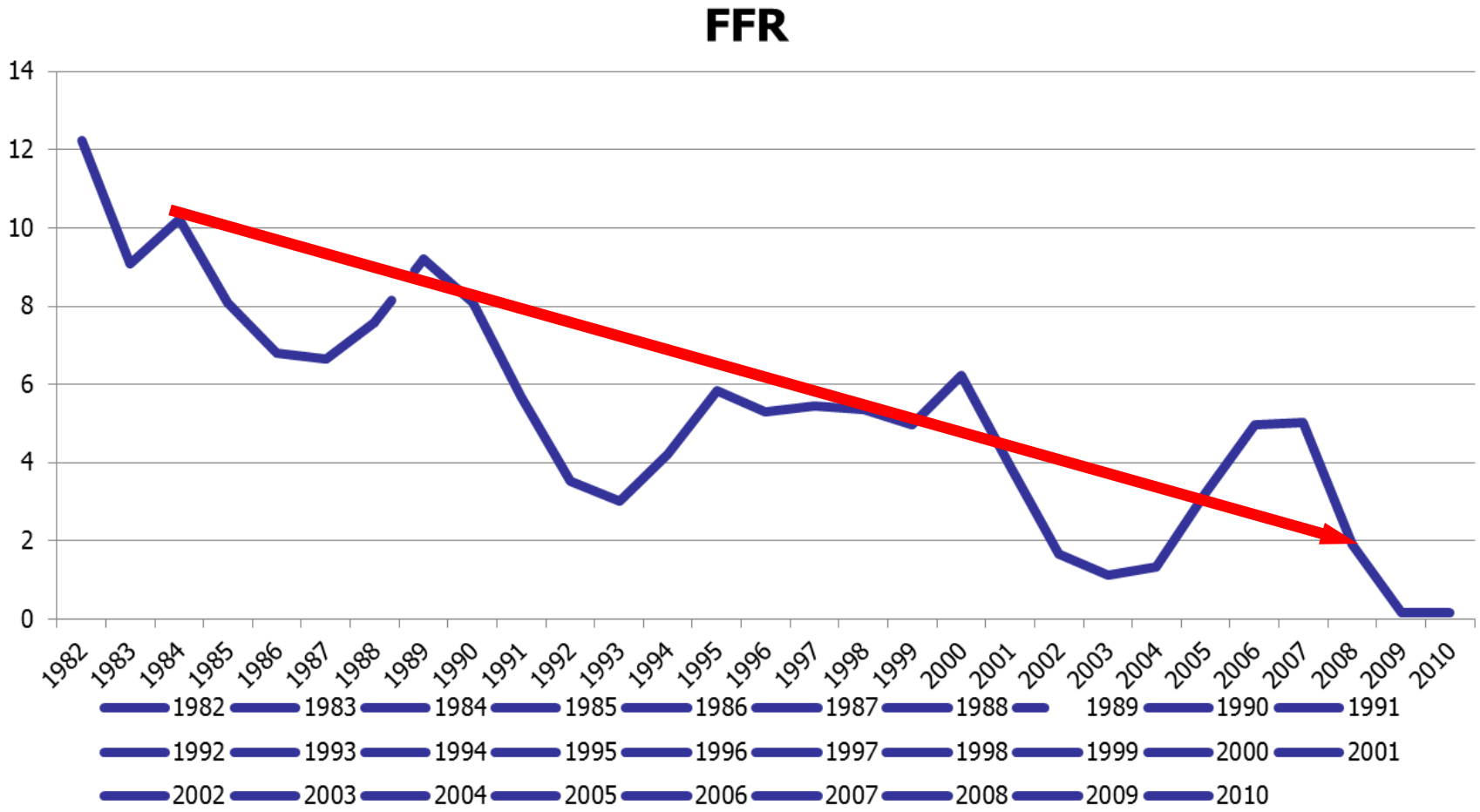
6, Deposit Insurance

Growth rate of M2 (USA)



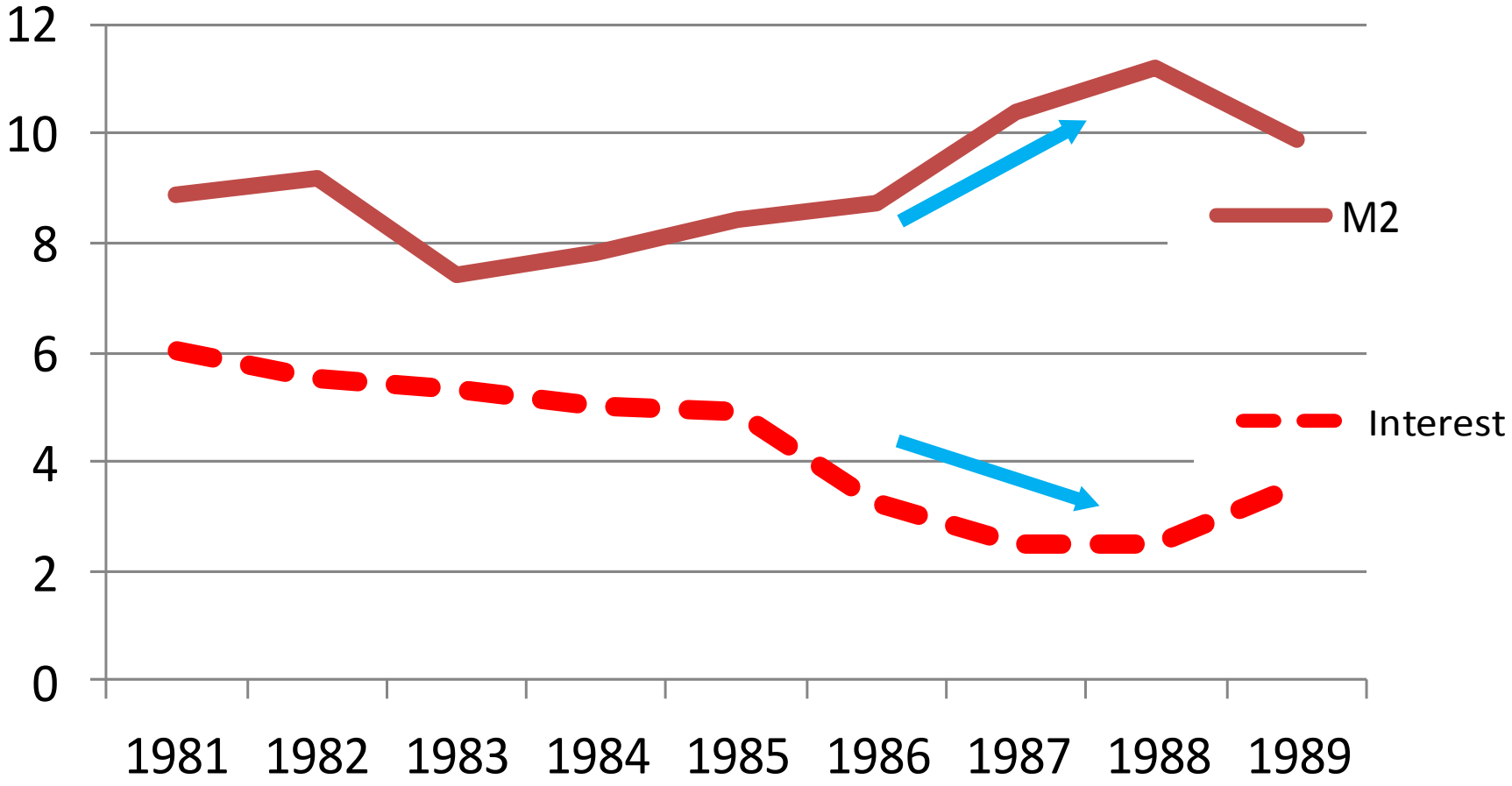

Growth rate of loans in the USA
0.15
0.10
0.05
0.00
-0.05
-0.10
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

Interest Rate (FFR) (USA)

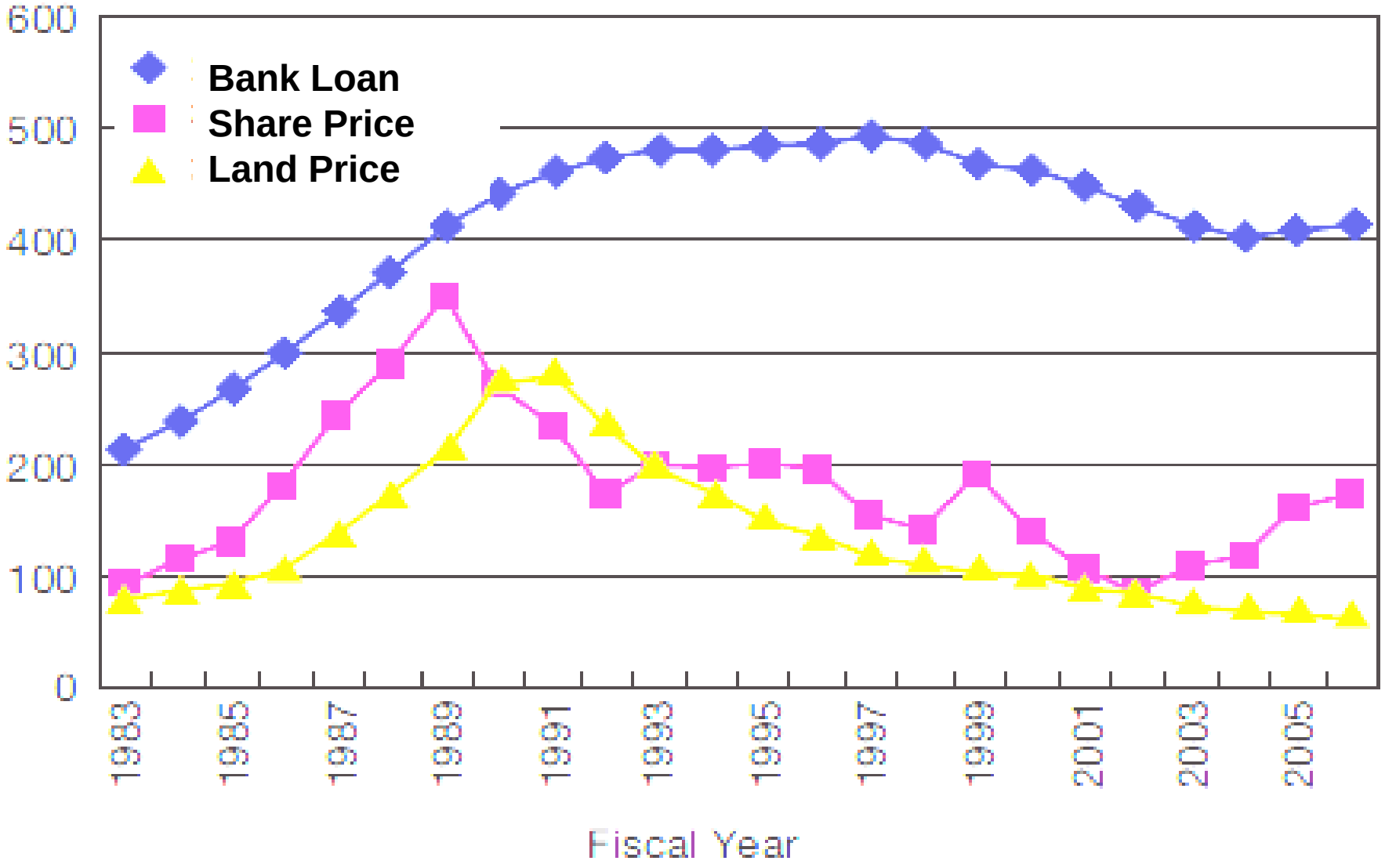


1. Ease Monetary Policy before the Bubble

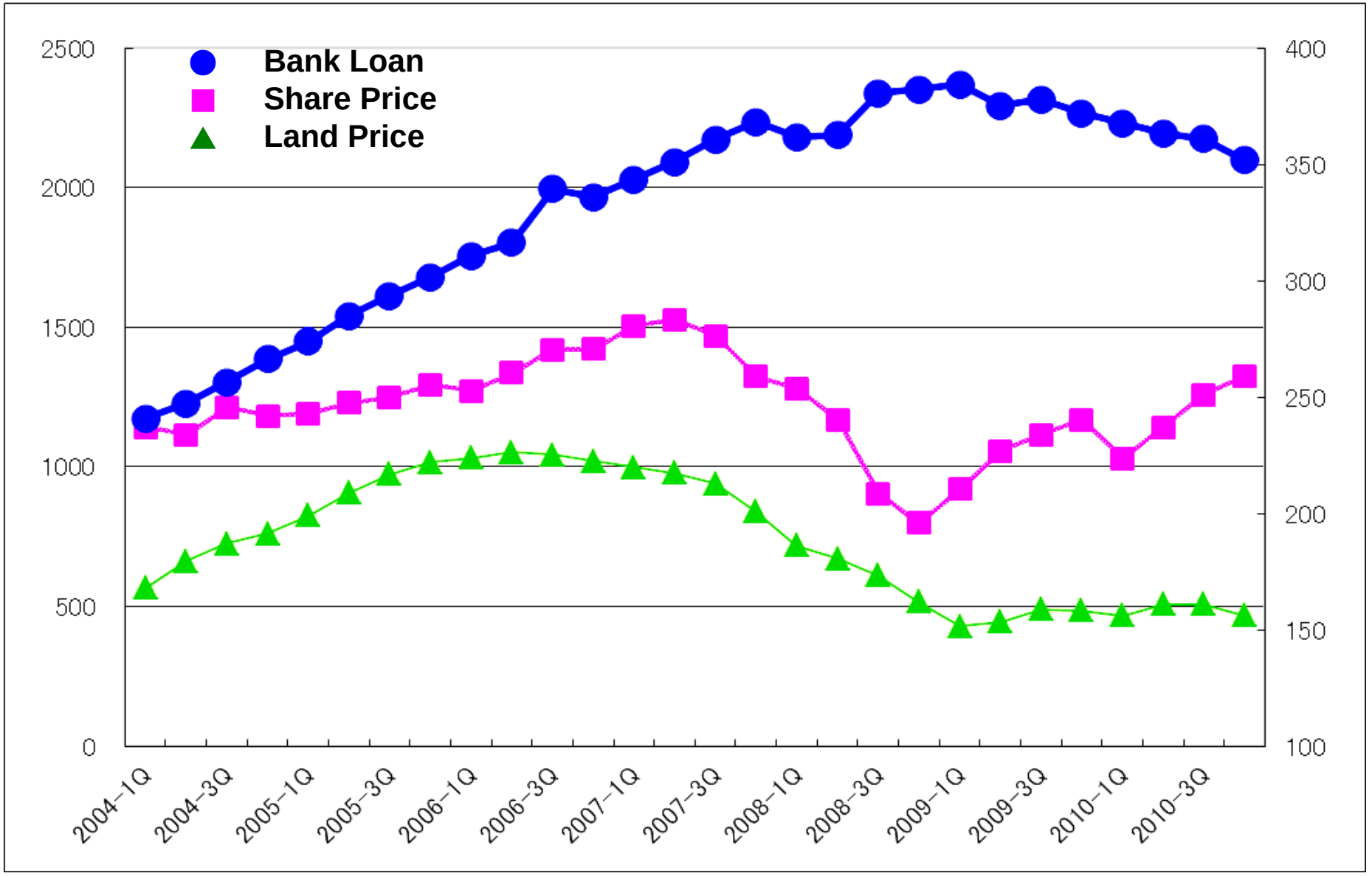
Interest Rate and Money Supply of Japan



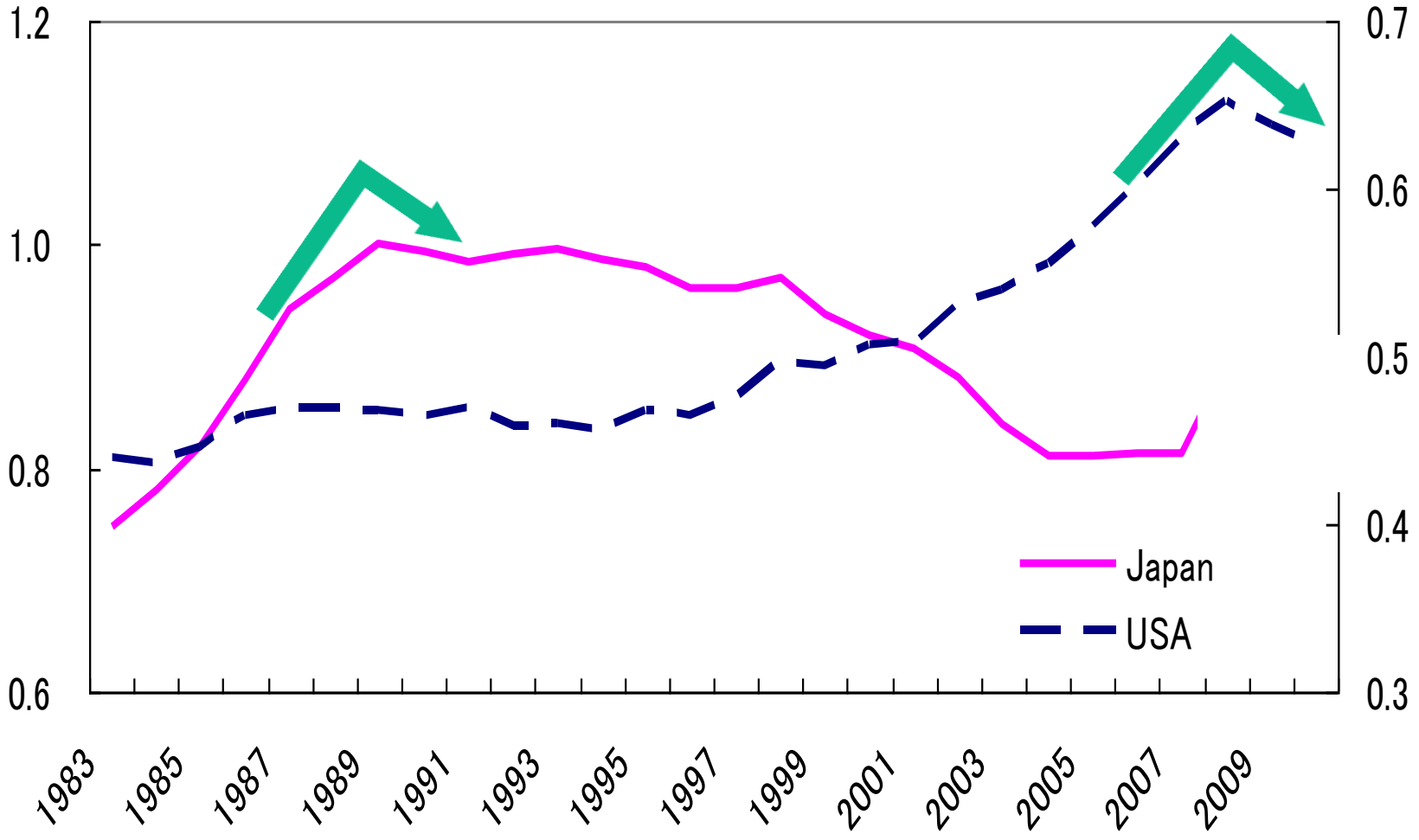
Japan: Share Price, Land Price, Bank Loans



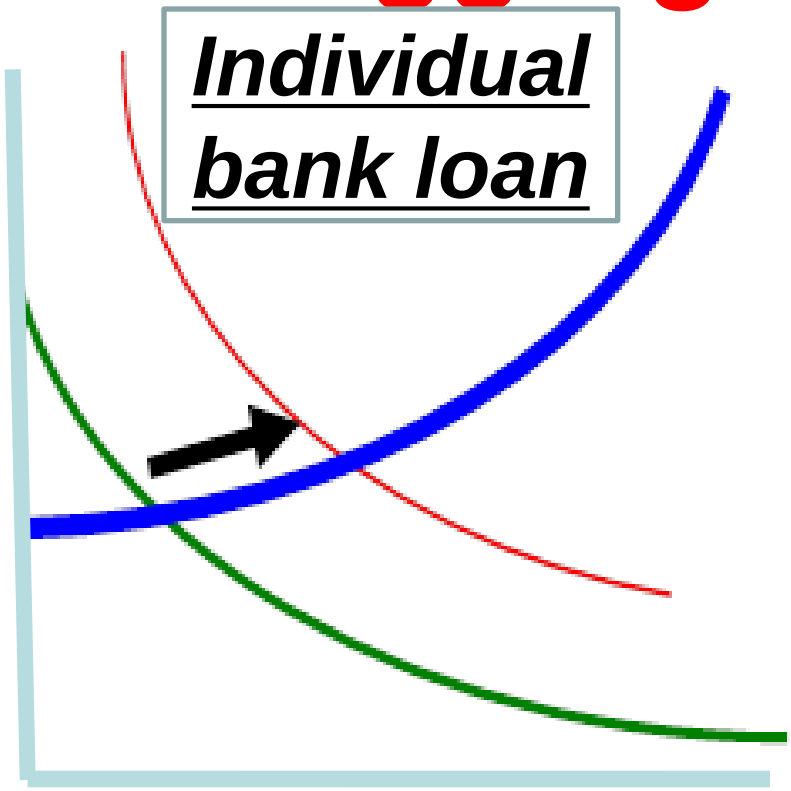
US bank Loans, stock price and land price

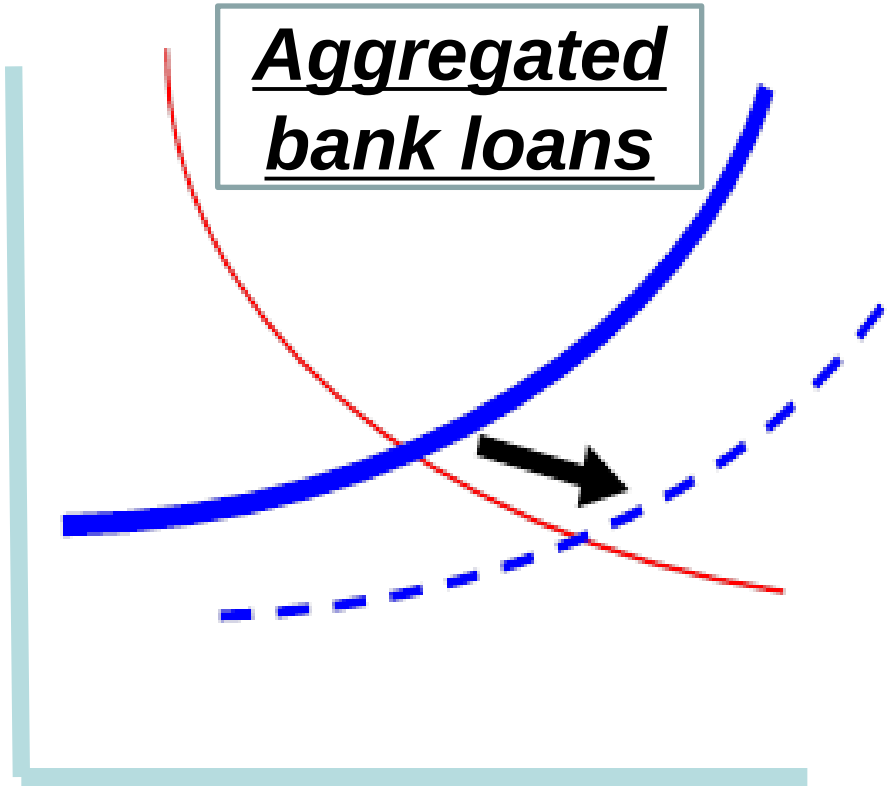


「Bank Credit / GDP」Ratio



Micro behavior of bank and aggregated macro effect





Japan's Bubble (1986 – 1990)

U.S. Bubble (2002 – 2006)

Japan's post bubble (1991 – 2001)

U.S. post bubble (2007 – 2010)

(1) Individual bank loan supply

(i) based on its own demand for loans

(ii) A bank expects future housing price based on lagged housing price

$P_H^e(t)=f(P_H(t-1), P_H(t-2),\ldots\ldots)$

$S_H(t)=S_H(P_H(t-1), P_H(t-2), P_H^e(t))$

(2) Housing price keeps on going up

$\Delta P_H=\lambda\{D_H(Y,r,P_H(t),P_H^e(t))-S_H(P_H(t-1),P_H(t-2),P_H^e\}$

(3) All the banks increase their loan supply

(4) Aggregate loans supply goes up $\{=\Sigma S_H(t)\}$

(5) Housing price starts to fall

Bubble Indicators

Bank based financial Market of Asia

(i)the ratio of banks' real estate-related loans to the loans of banks overall, In Japan, this ratio rose from 16% to 32.6%,

$$L_H > L_{total}$$

(ii) Comparison of the pace of growth in banks' real estate lending with the real economic growth rate,

$$\frac{\Delta L_H}{L_H} > \frac{\Delta Y}{Y}$$

(iii) The rise in the housing prices compared with the average income of workers

$$P_H > \alpha Y$$

Ratio of Real Estate Loans to Total Loans

- GDP Y

$$Y = F(K, N, K_H) = K^{\alpha} N^{\beta} K_L^{\gamma}$$

  - K : bank loan supply (excluding real estate)
  - N : labor supply
  - K_L : real estate loan supply

$$\frac{\Delta Y}{Y} = \alpha\left(\frac{\Delta K}{K}\right) + \beta\left(\frac{\Delta N}{N}\right) + \gamma\left(\frac{\Delta K_L}{K_L}\right)$$

GDP growth rate = bank loan supply + labor supply
+ real estate loan supply

Simple two period model

$$\max_{c_1,c_2,H} U(c_1, c_2, H) = \sum_{t=1}^{2} \beta^{t-1} u_t(c_t, H)$$

s.t.

$$u(c_t, H) = \ln c_t + \ln H$$

$$Y_2 = (1+g)Y_1$$

$$P_H^e(2) = (1+\theta)P_H(1)$$

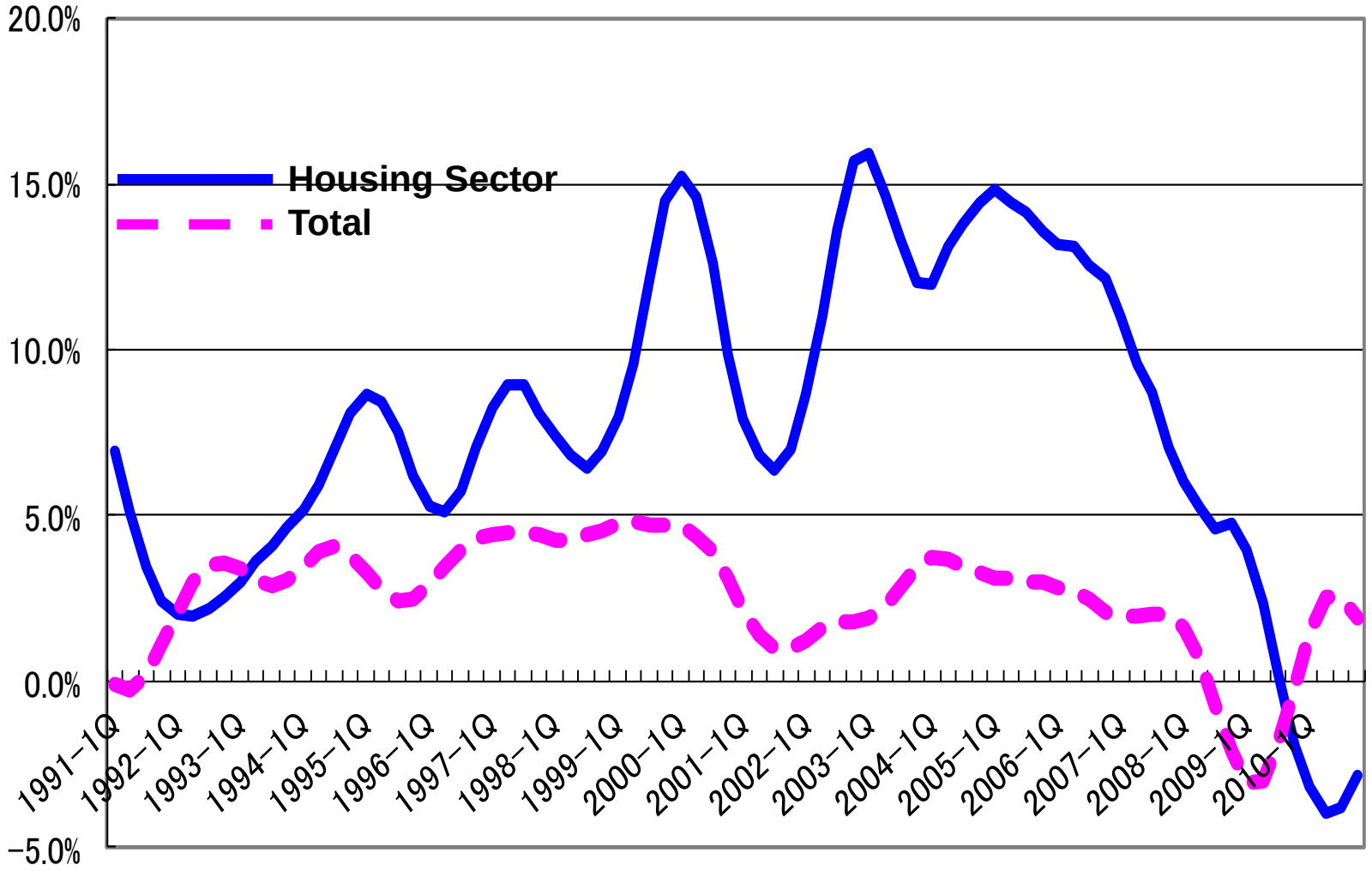
$$c_1 = P_H(1) \times H = Y_1 + L$$

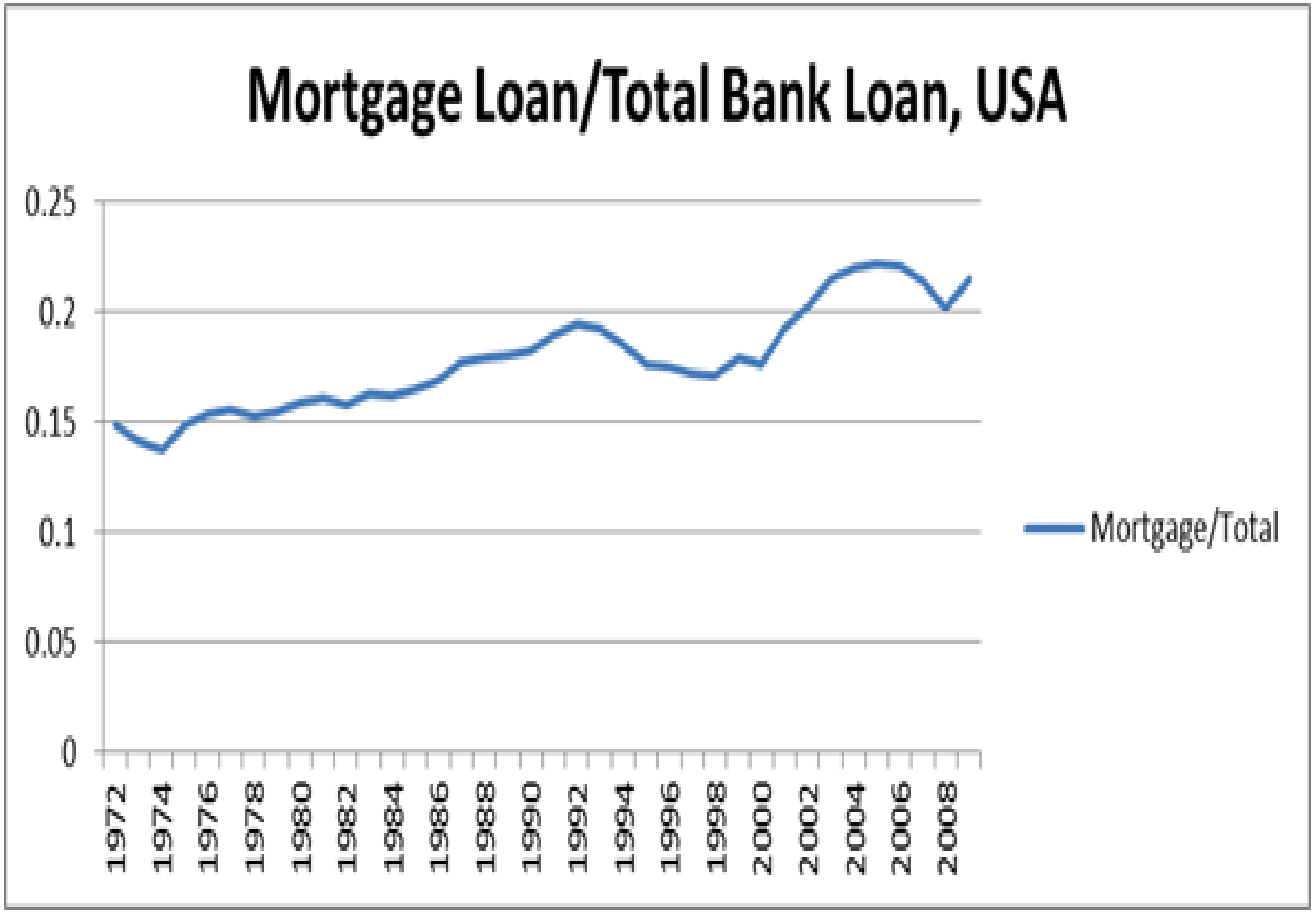
$$c_2 + (1+r)L = Y_2 + P_H^e(2) \times H$$

- Housing price/Income ratio

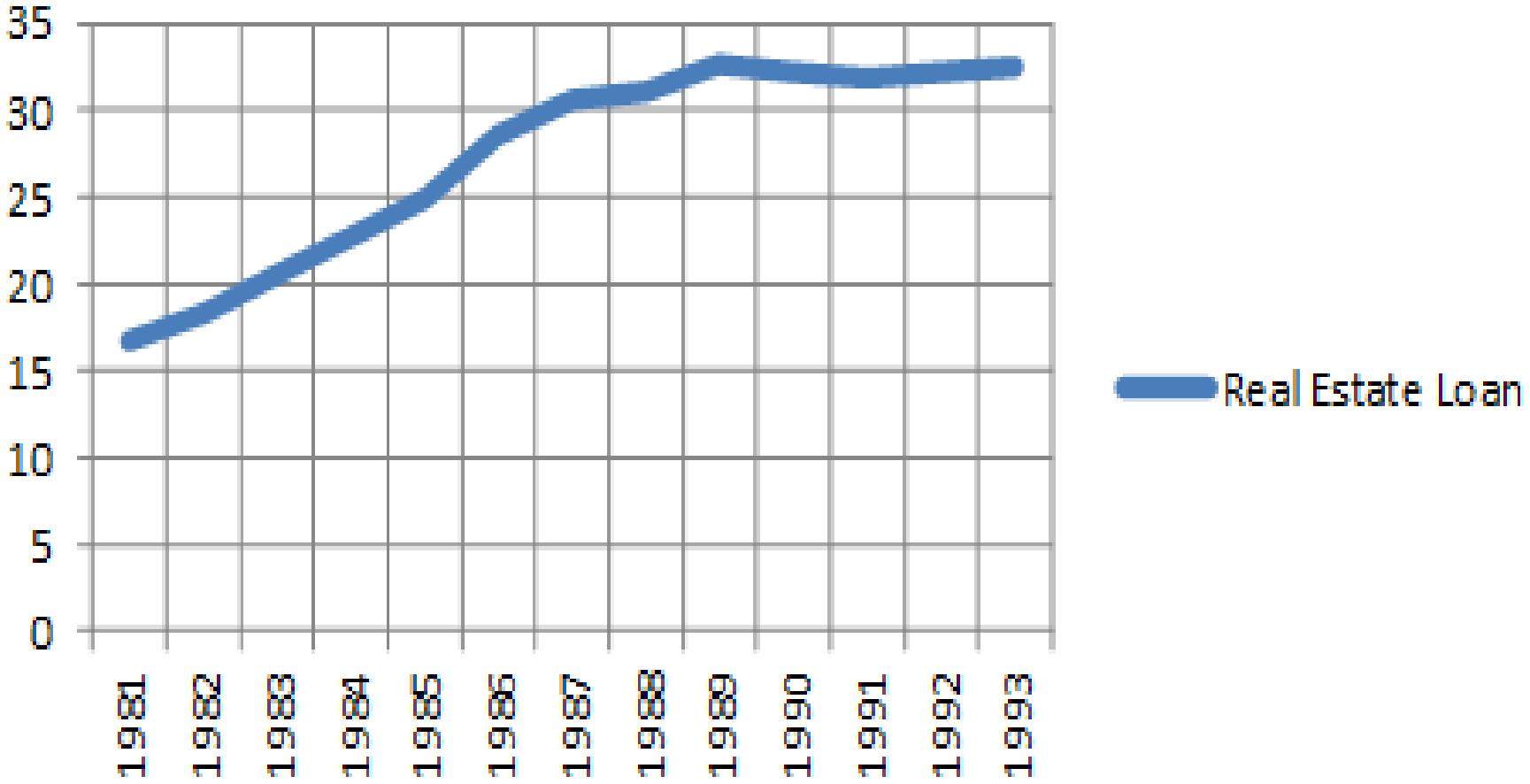
$$\frac{P_H(1)}{Y} = \frac{(1+r)+(1+g)}{r-\theta}$$

Growth Rate of Banking Loan to Housing Sector (USA)

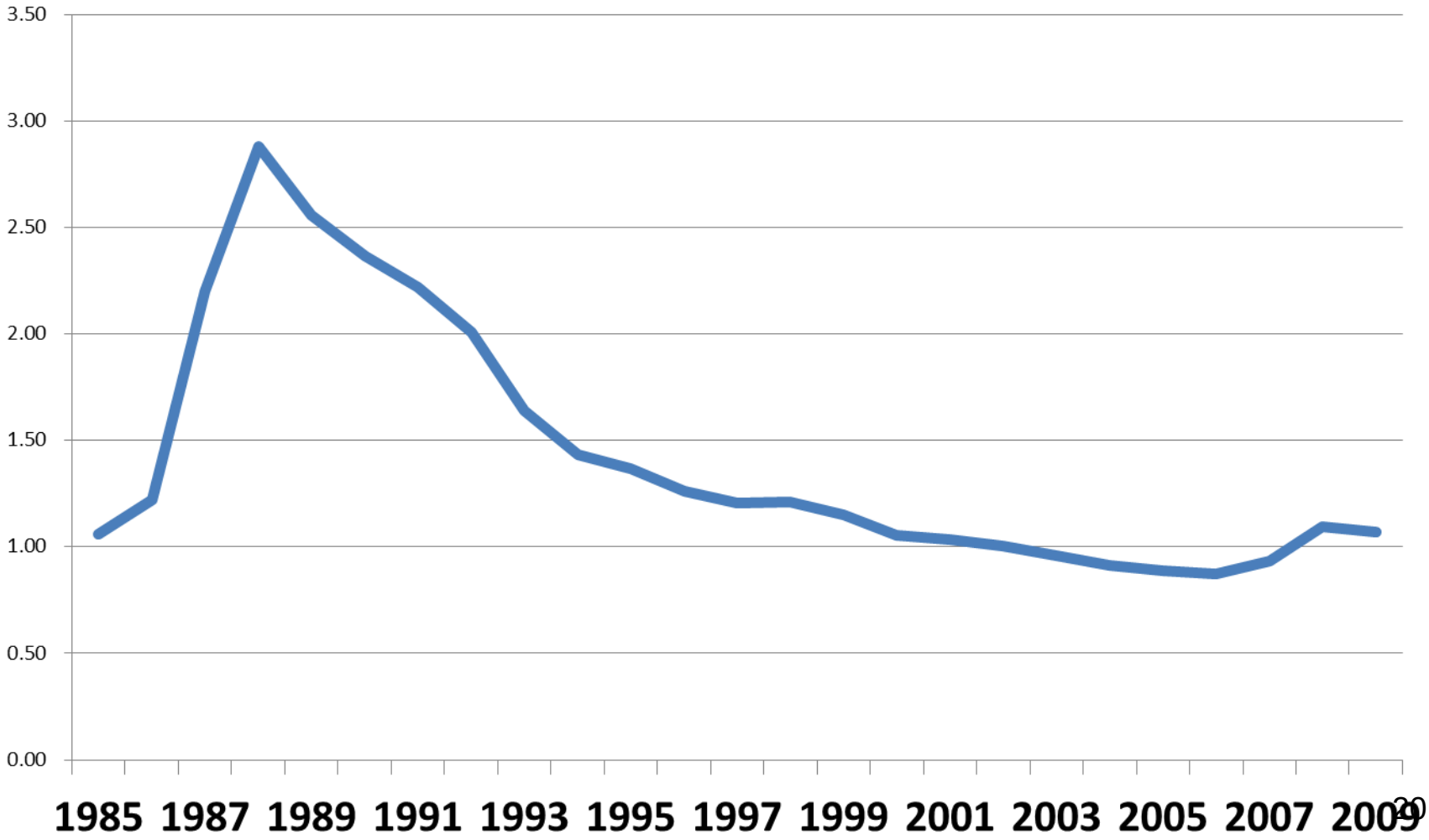



Mortgage Loan/Total Bank Loan, USA
0.25
0.2
0.15
0.1
0.05
0
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
Mortgage/Total

Real Estate Loan/ Total Bank Loan (Japan)



Japanese Housing Price/National Income



US Housing Price/Income

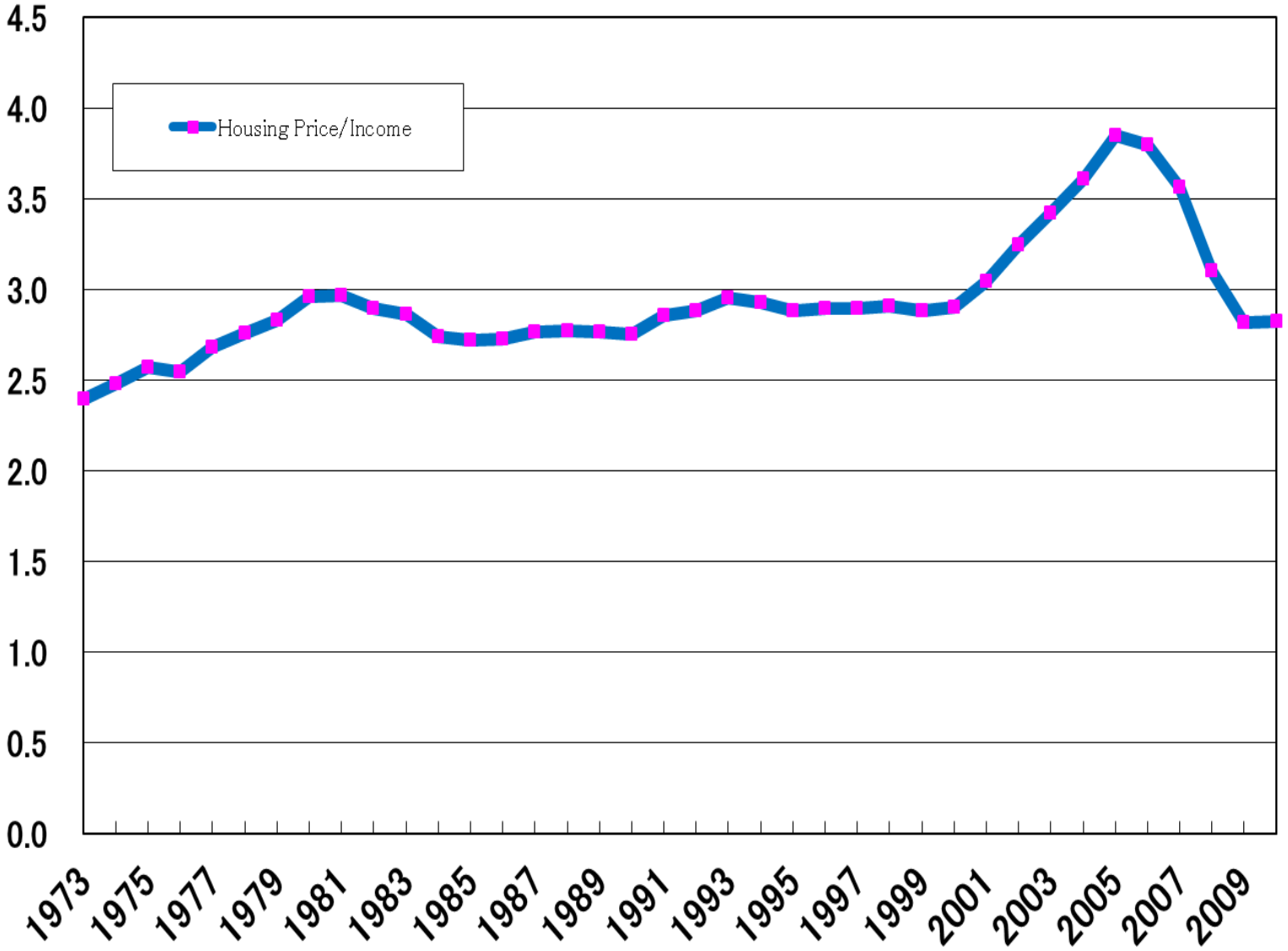


Table 1: Loan Supply Function f or Japanese Banks

Notes: Figures in parenthesis are t-values.

	Period I (1982–1989) $Loans_{it}$	Period II (1990–1995) $Loans_{it}$
Deposits_it	**0.658**	
	(19.69)	
$Market\ Share_{it}$	**0.426**	
	(1.48)	
(Loan rate – Call Rate)	**16.298**	**21.351**
	(2.611)	3.028)
$Call\ Rate_t$	**8.564**	**6.755**
	(2.568)	2.904)
$BIS\ Ratio_{it}$	**8.658**	
	(-2.353)	
$Competitors'\ Total\ Loans_{it-1}$	**0.066**	**0.038**
	(3.675)	(2.333)
$Land\ Price_t$	**0.123**	**−1.760**
	(2.546)	−1.449)
$Constant$	**−36.302**	
	(−0.874)	
Adjusted R^2	0.892	
Hausman Statistic, CHI-SQUARE	0.923	
P-Value	0.820	

Bank Loan Supply

USA

$Difference\ Rate_t$	6.13E+08***
Loan Rate – FF Rate	(4.30)
$FF\ Rate_t$	-1.51E+06**
	(-2.34)
$Deposits_{it}$	0.28***
	(3.52)
$Competitors'\ Total\ Loans_{it-}$	-0.22***
	(-4.53)
$Housing\ Index_t$	1.23E+06***
	(4.69)
$Constant$	-1.99E+09***
	(-4.31)
Number of Observations	*320*
Adjusted R2	0.5701

Typical Profit-Maximizing and Actual Loan Amounts

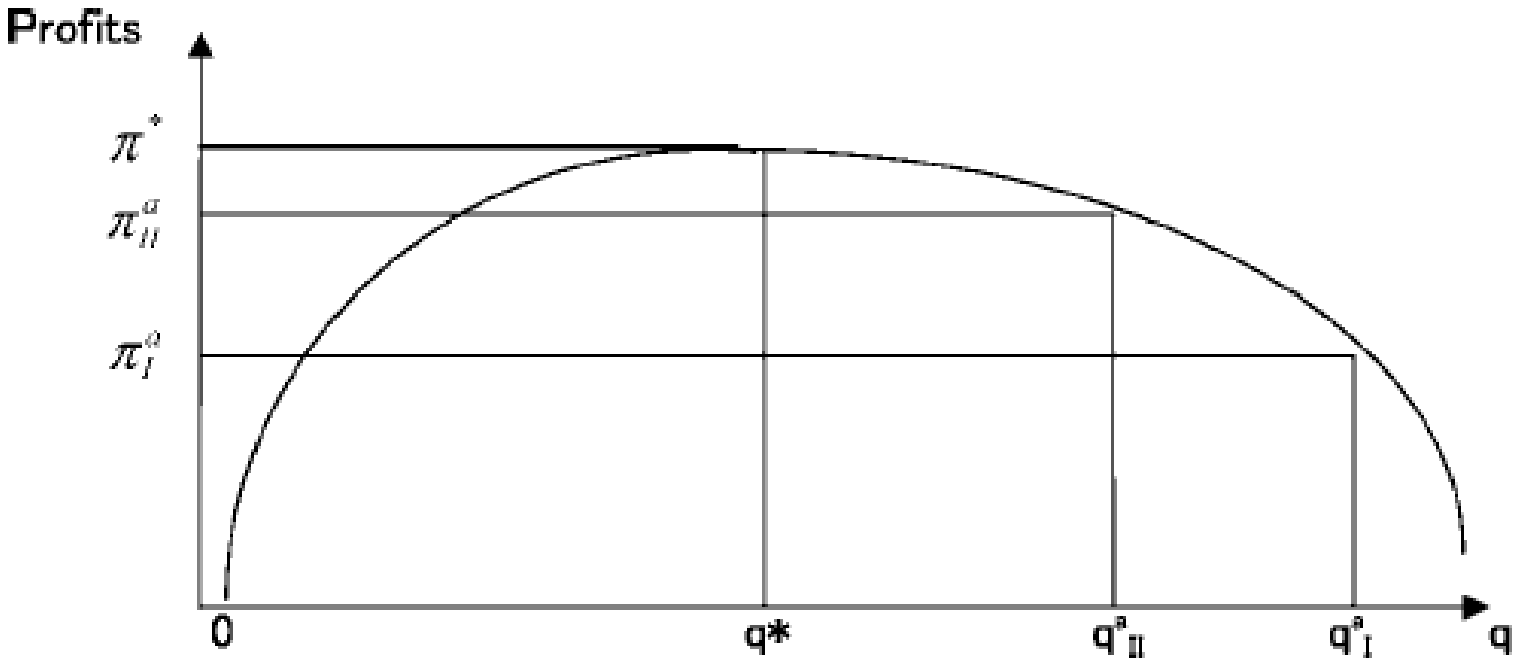
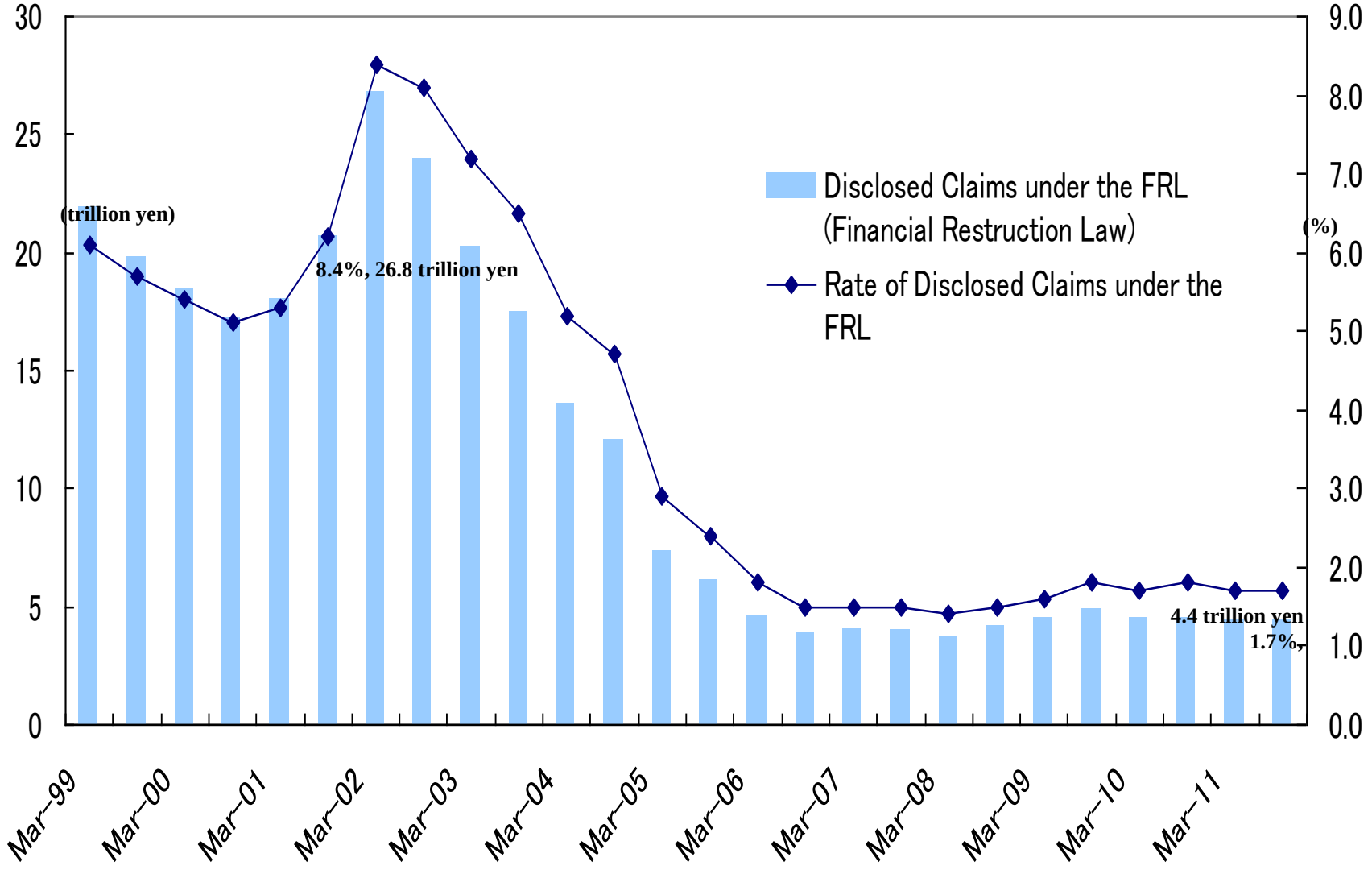
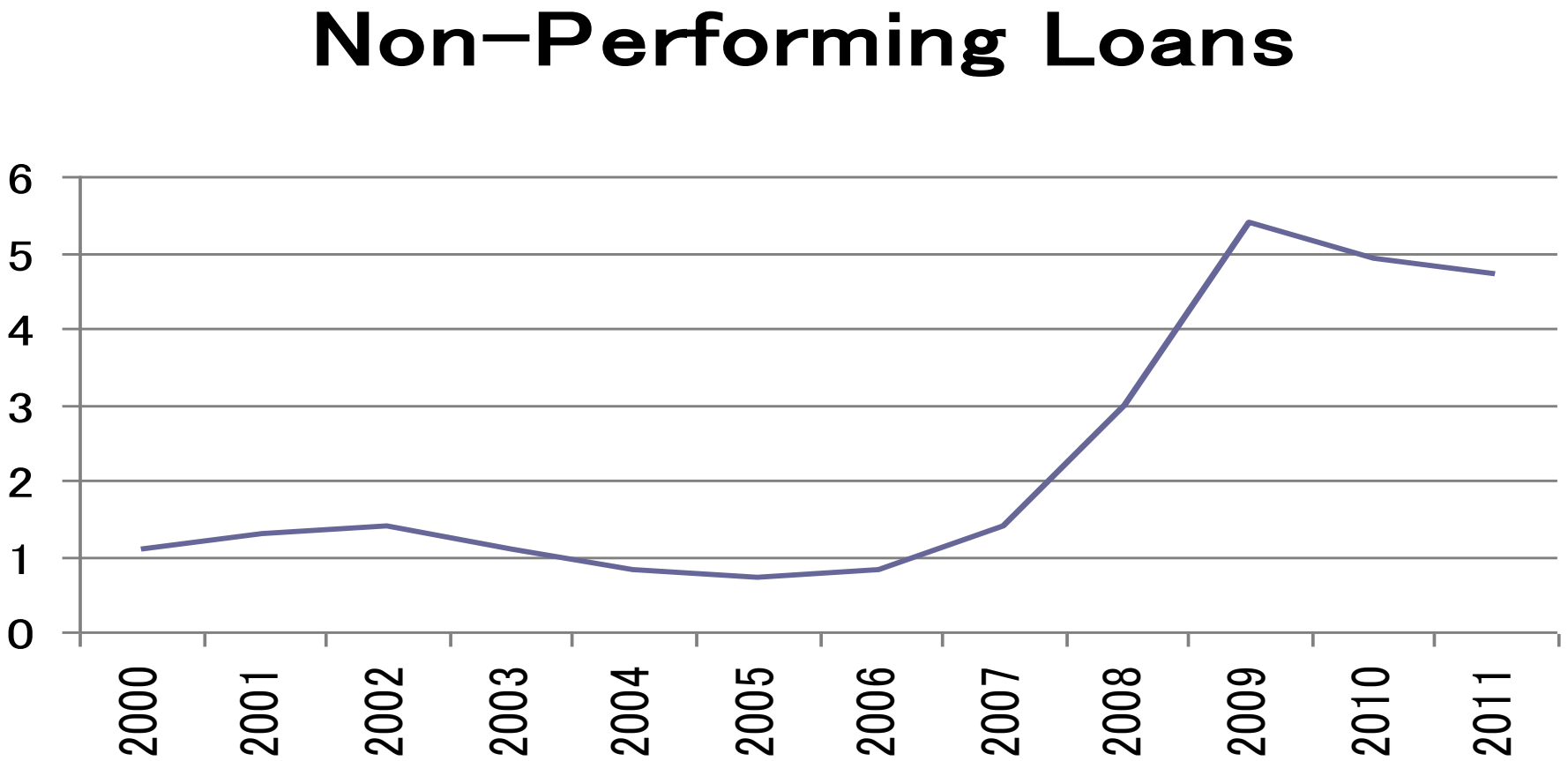


Figure 2. Actual profits (π^a_I, π^a_{II}) and maximum profits (π^*).

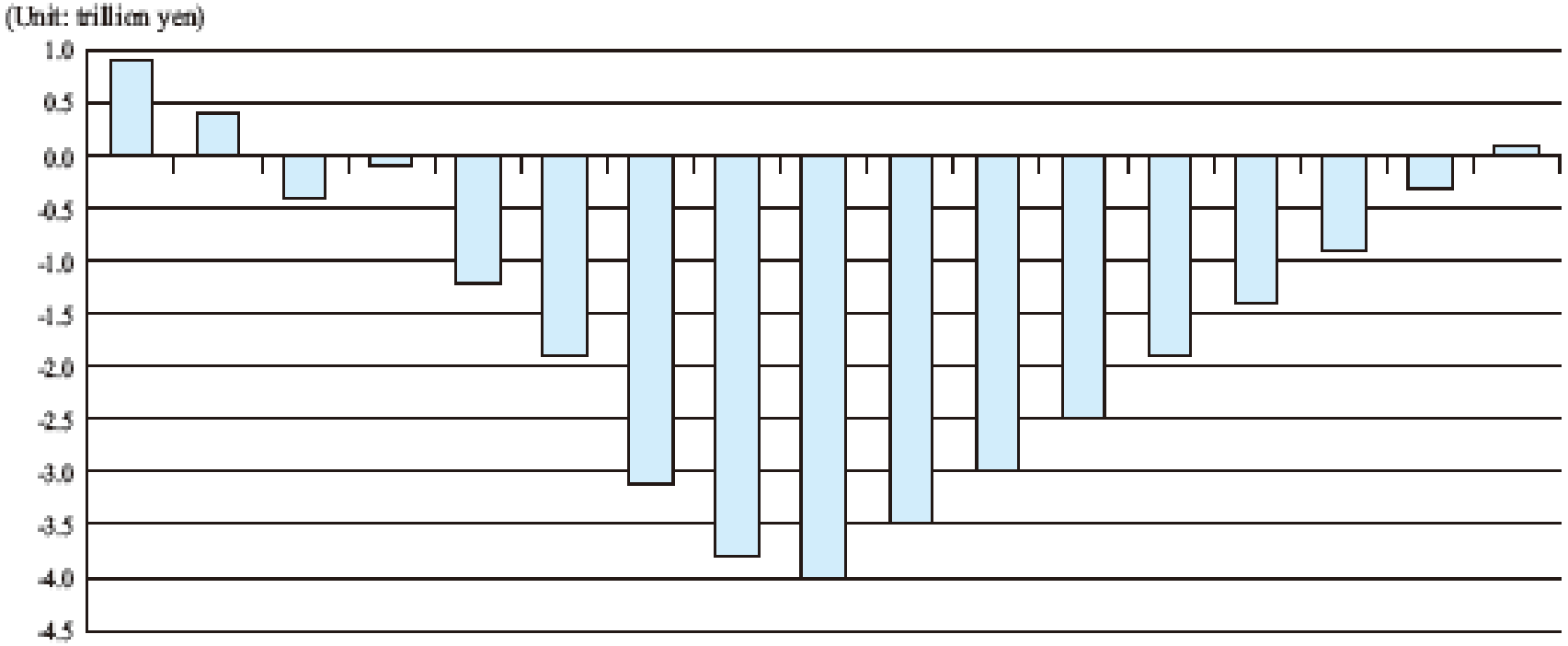
Non-performing Loans in Japan



Non-performing Loans in US



Balance of Liability Reserves/Retained Loss Deposit Insurance



(Unit: trillion yen)

Balances of liability reserve/ retained loss	FY1994	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010
	0.9	0.4	-0.4	-0.1	-1.2	-1.9	-3.1	-3.8	-4.0	-3.5	-3.0	-2.5	-1.9	-1.4	-0.9	-0.3	0.1

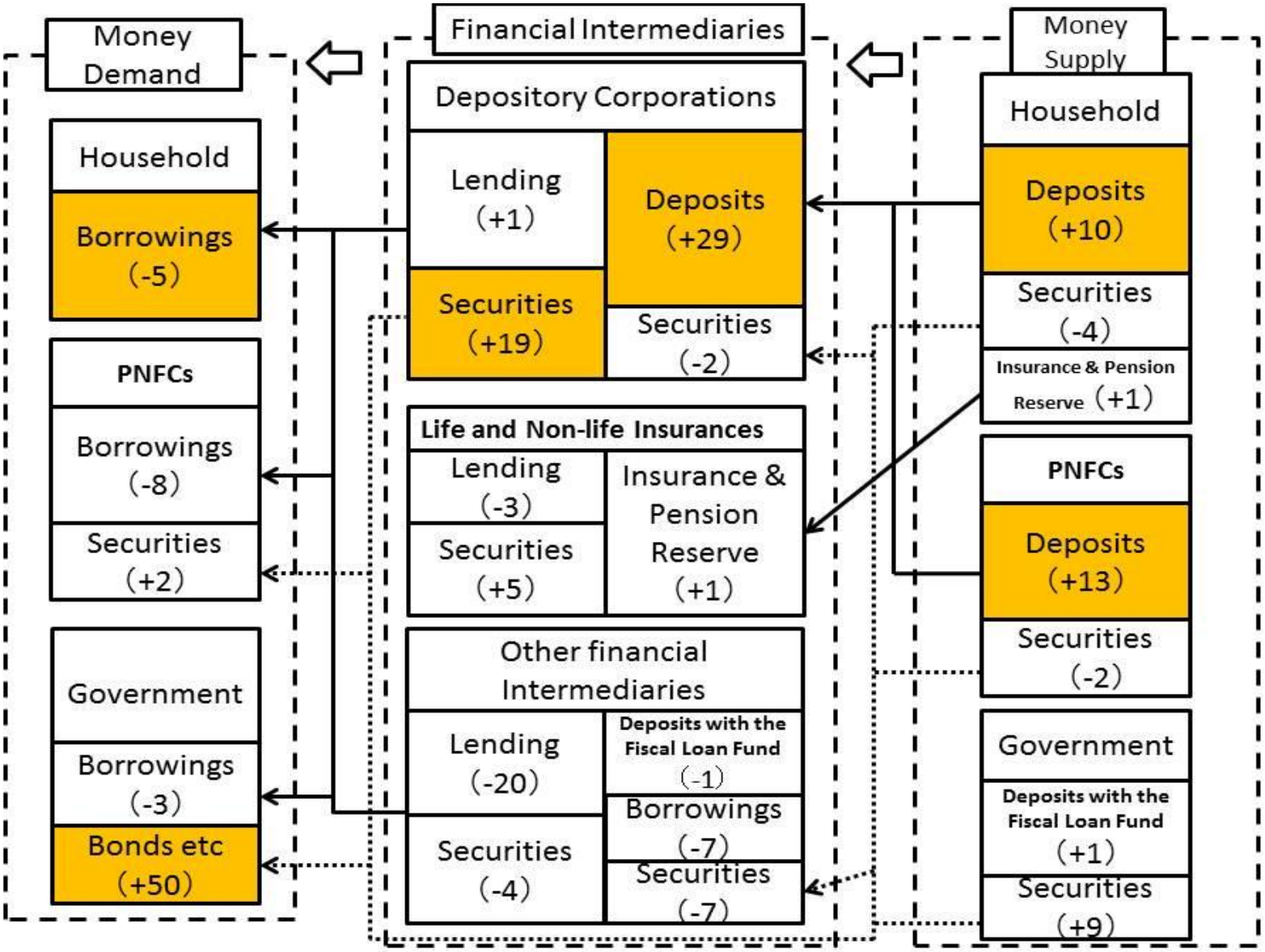
Financial Assistance in the Resolution of Failed Financial Institutions.

(as of March 31, 2011).

(Unit: billion yen)

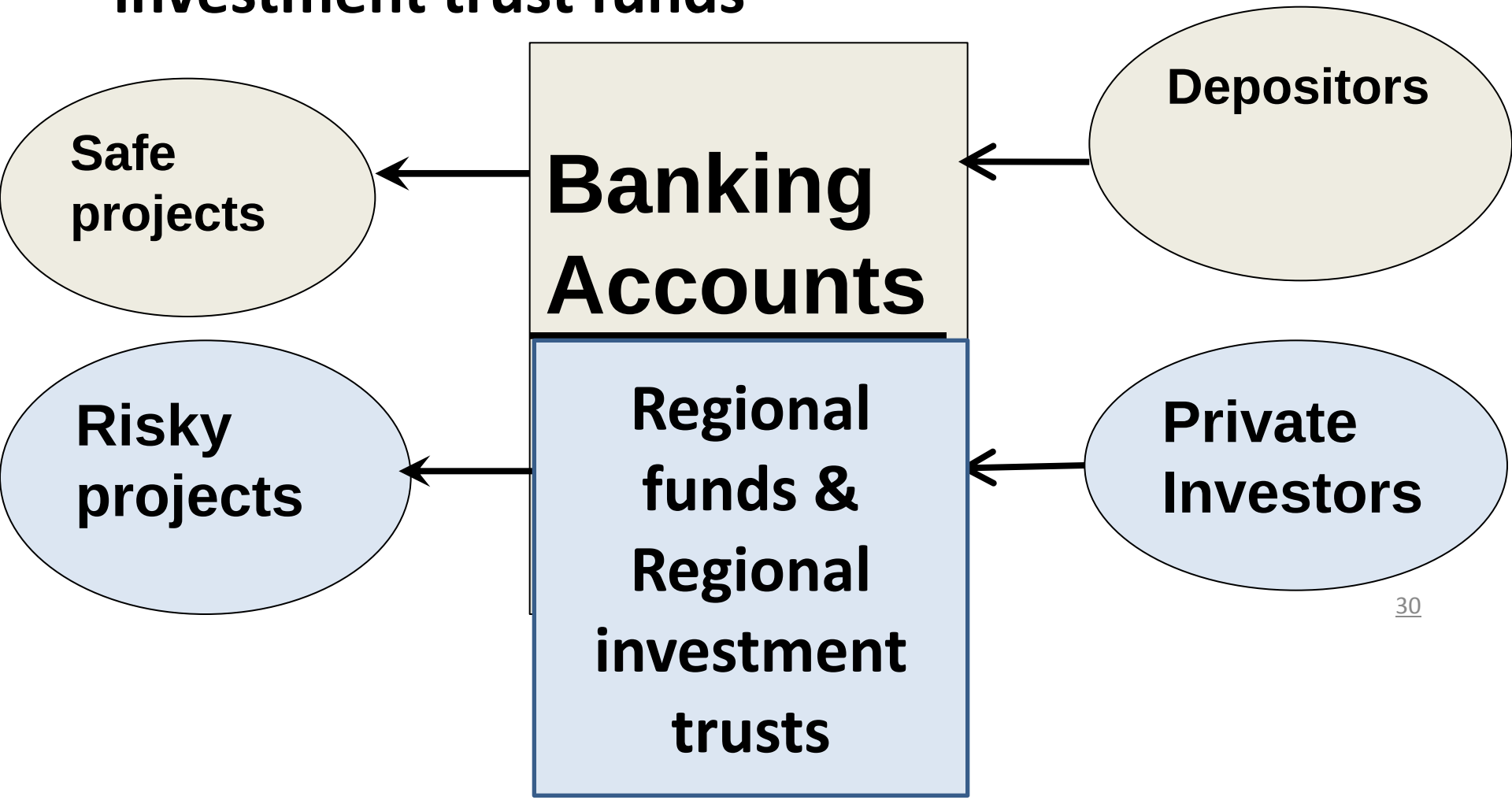
Fiscal year	Number of cases	Monetary grants	Asset purchases	Lending	Debt assumption
1992	2	20.0	—	8.0	—
1993	2	45.9	—	—	—
1994	2	42.5	—	—	—
1995	3	600.8	—	—	—
1996	6	1,315.8	90.0	—	—
1997	7	152.4	239.1	—	4.0
1998	30	2,674.1	2,681.5	—	—
1999	20	4,637.4	1,304.4	—	—
2000	20	5,154.6	850.1	—	—
2001	37	1,639.4	406.4	—	—
2002	51	2,325.5	794.9	—	—
2003	0	—	—	—	—
2004	0	—	—	—	—
2005	0	—	—	—	—
2006	0	—	—	—	—
2007	0	—	—	—	—
2008	1	256.3	1.7	—	—
2009	0	—	—	—	—
2010	0	—	—	—	—
Total	181	18,864.8	6,368.0	8.0	4.0

Recent Money Flow of Japan



Source:
BOJ Flow of Funds

Investment funding provision to higher risk projects through banks' OTC selling of regional investment trust funds



Examples of Hometown Trust Funds by Internet in Japan; E-fund

1, Solar Power Panel

2, Japanese Sake (=Japanese wine) producers' fund

3, Fishing Boat fund

4, SME---Shark fin, Seaweed

5, Wind Power Generator fund

6, Green Finance

Donation and Investment to community

おひさま発電所
「さんぽちゃん1号」
明
星

Japanese wine (Japanese Sake) Fund

Investors

Large Projects and Professional Investors

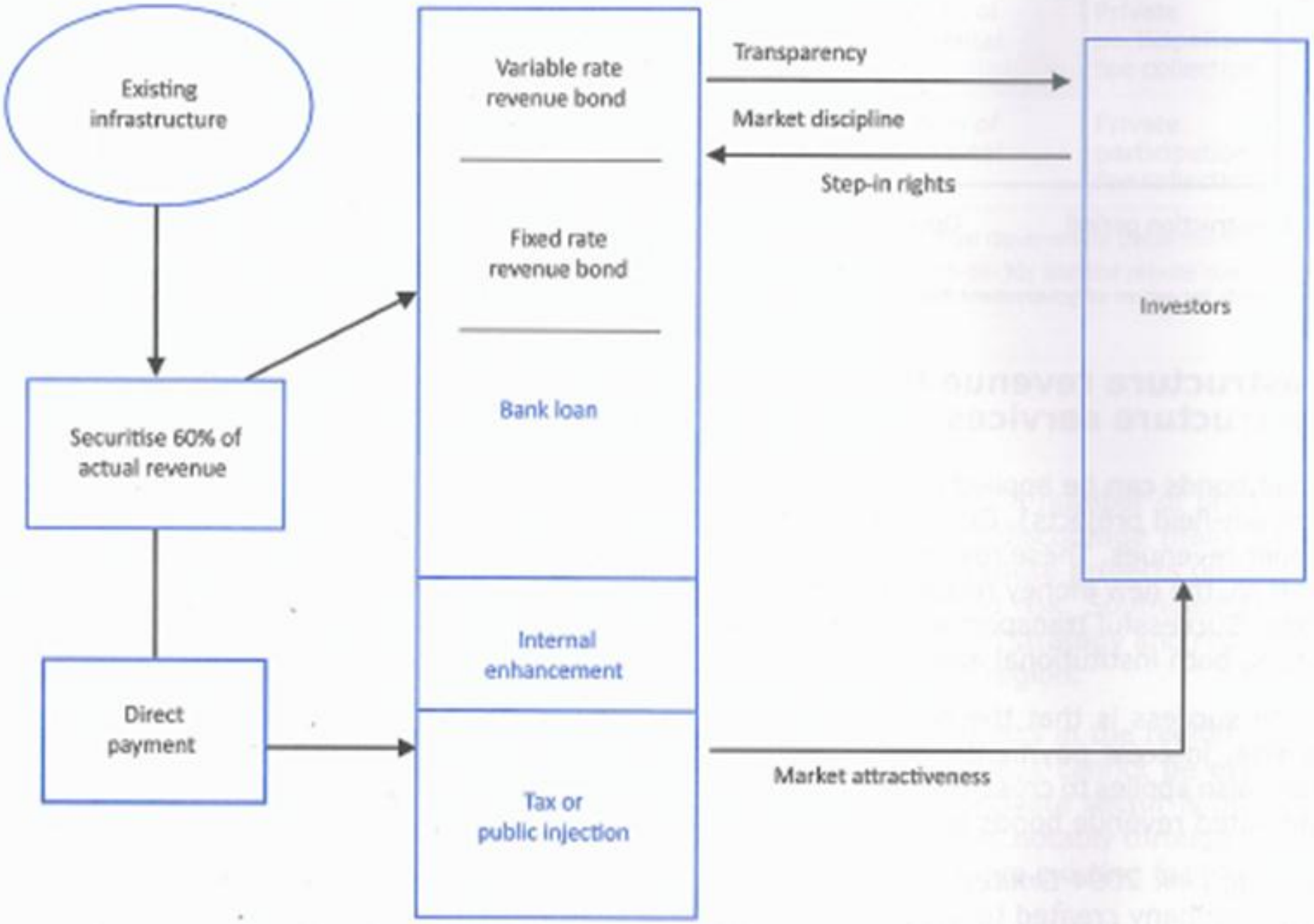
- Pension Funds
- Insurance companies
- Mutual Funds

Community Type Infrastructure

- Wind power Generator Funds
- Japanese Wine Fund

SME finance

Figure 6.3. Revenue bond schemes in Asia



Reference

(1) US-Japan's Common features and Early Warning Indicators of Households
Naoyuki YOSHINO（Keio University）, Yuko KAWAMOTO (Waseda university）, Makoto TSURUSAWA（Mizuho Bank, Waseda University) , *FP association of Japan*、2011. Sepember. in Japanese

(2) Revankar N. and Yoshino, N., (2008) "An Empirical Analysis of Japanese Banking Behavior in a Period of Financial Instability," *Keio Economic Studies,* 2008.

(3) Yoshino, N. "Global Financial Crisis and Policy Issues in Japan, *Managing Economic Crisis in Asia*, East Asian Institute, Singapore, 2010.

(4) Yoshino, N. "Global imbalances and the development of capital flows among Asian countries", *OECD Journal, Financial Market Trends*, 2012, Volume 2012/1.

(5) Yoshino, N. and Kaji, S, *Hometown Investment Trust Funds*, Springer, March, 2013

(6) Yoshino, N., Nakamura, T. and Sakai, Y. (2013) "Competition and Innovation for Smart and Creative Society," forthcoming in *Competition and Innovation for Smart and Creative Society*, Sang Chul Park, edition, Springer.