Non-performing loans, Aging population and Infrastructure Investment

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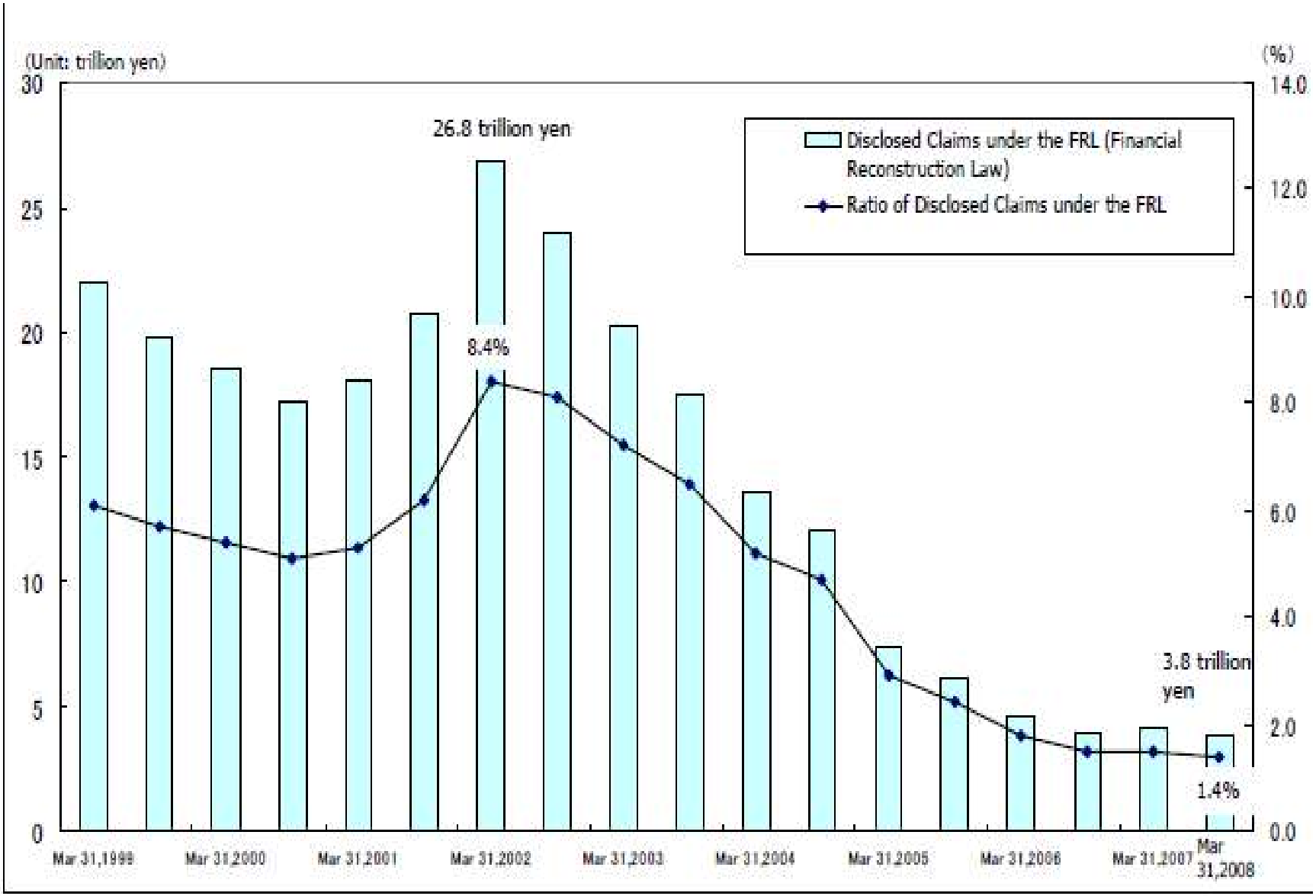
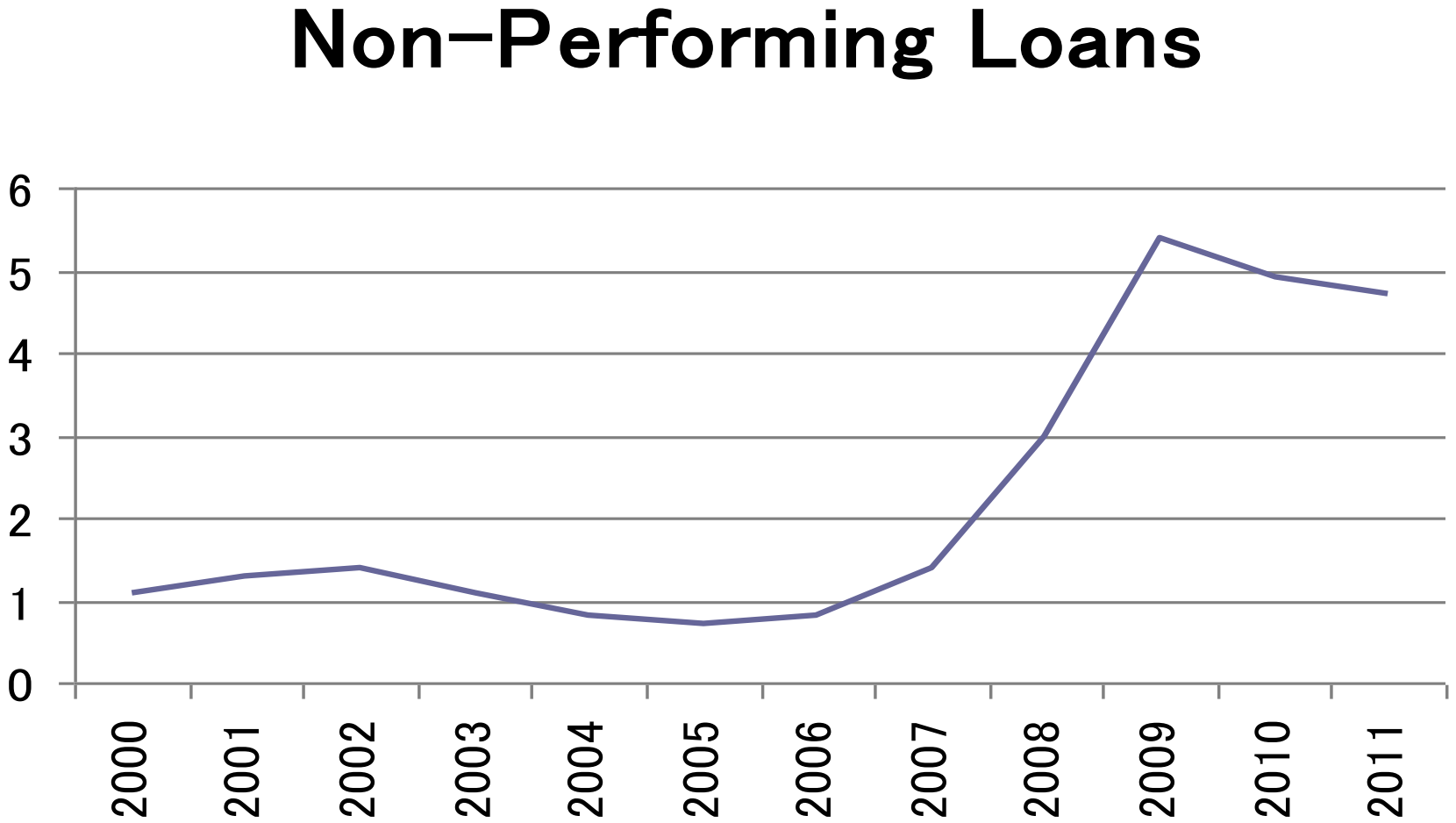
Nonperforming Loans, Japan



Non-performing Loans in US



Why does Bubble Occur in Many Countries ?

1, Easy Monetary Policy → Excess Liquidity

2, Share Price starts to rise

3, Wealth effect → higher consumption
expansion of sales

4, Improvement of Business Condition

5, Increases in Investment

6, Consumption, Investment→ Higher growth

7, Everybody seems happy

8, Difficult for the central bank to stop

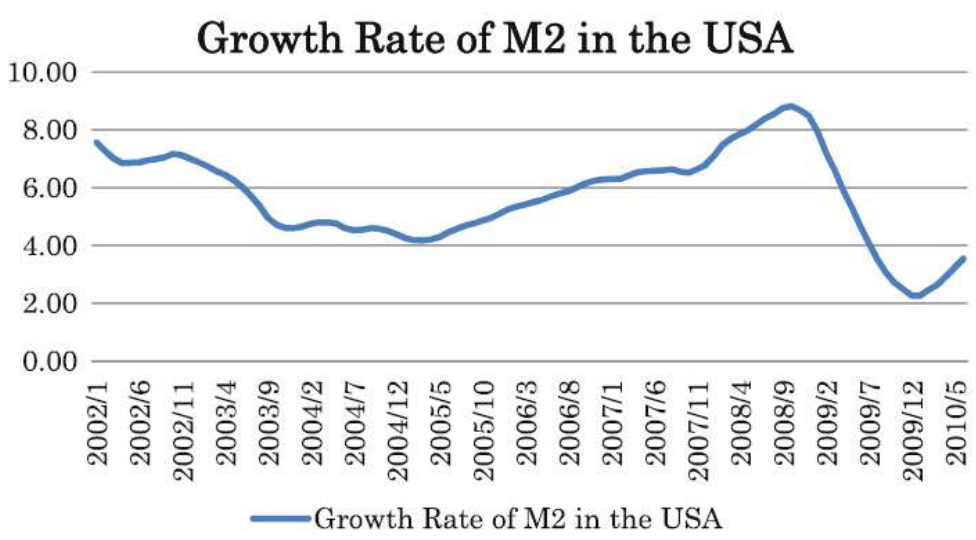
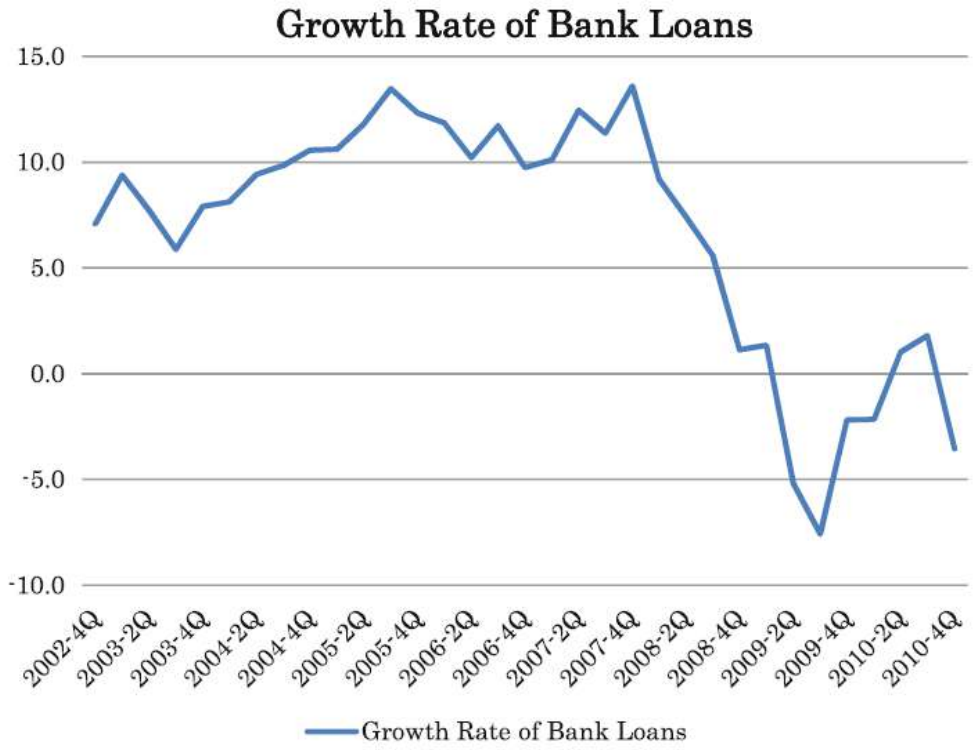


Fig. 1 Growth rate of US money supply



Bank Regulation and Supervision

1, Good performance of Banking sector

→ Bank supervision becomes weaker

2, Expected default loan ratio

3, Post Crisis policy

→ Capital Injection and Rescue Plans

→ Deposit Insurance (Dual system)

→ Transactions' account (Full guarantee)

4, Announce the safety of Financial System

5, Bridge bank to succeed

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%,

$$L_r > L_{total}$$

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

$$\Delta L_r / L_r > \Delta Y / Y$$

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

$$P_h > \alpha Y$$

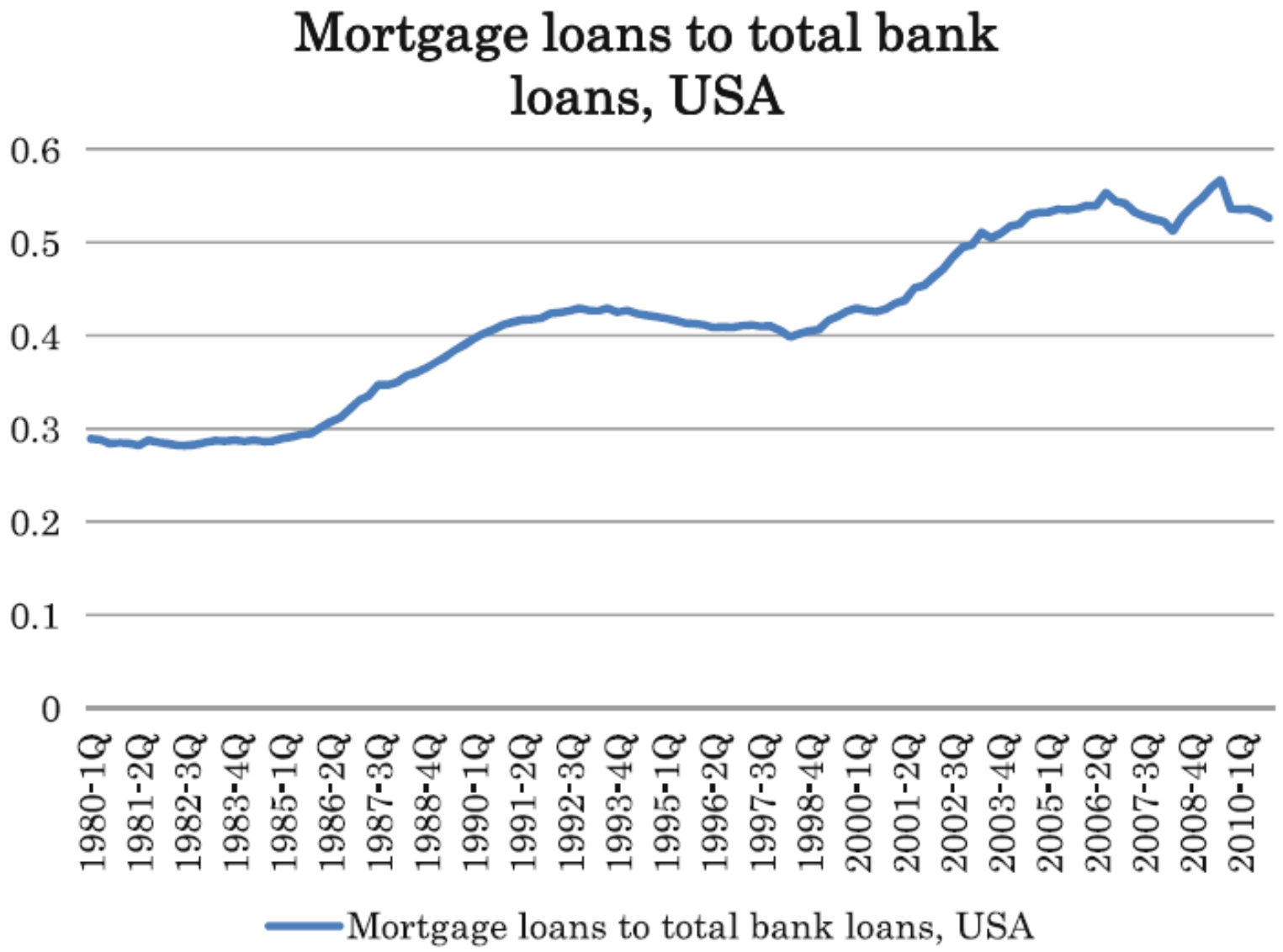
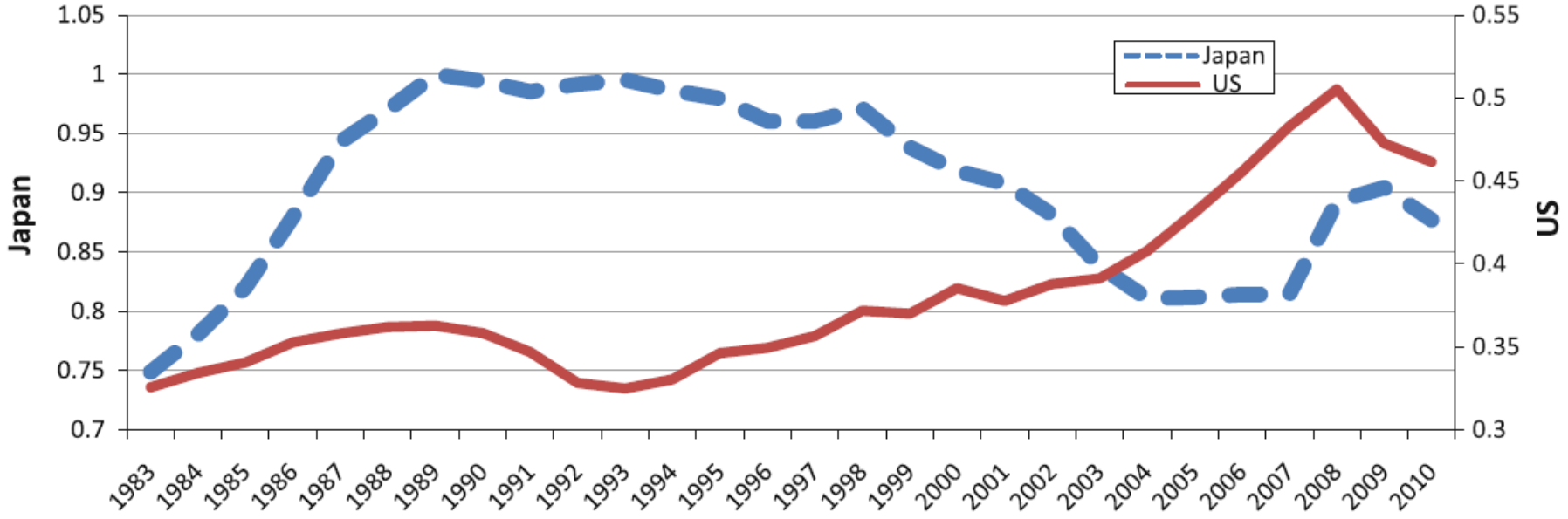
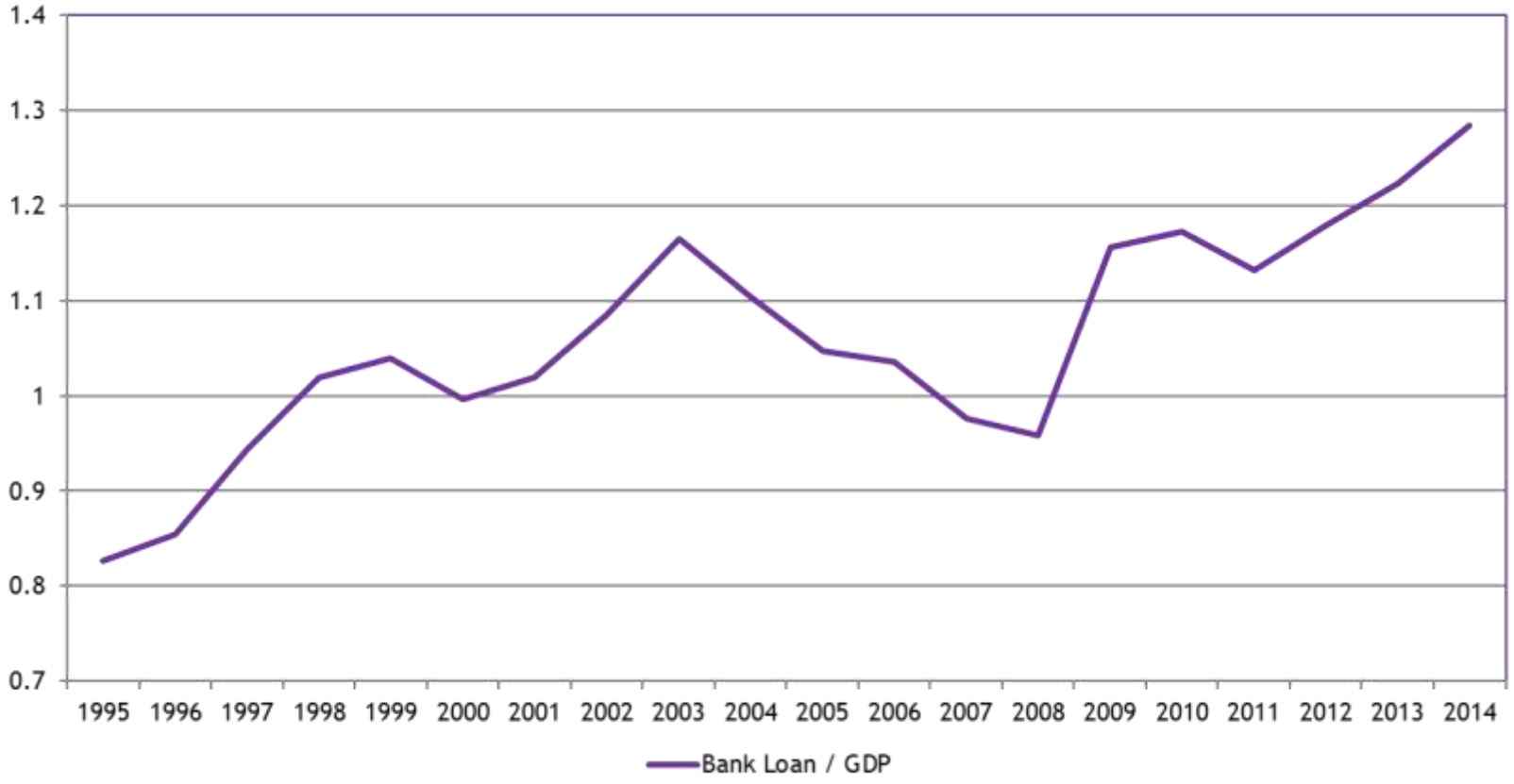


Fig. 6 Mortgage loans to total banks loans in the United States

Bank Loans/GDP Ratio Japan and USA



(China's Bank Loan)/(GDP) ratio



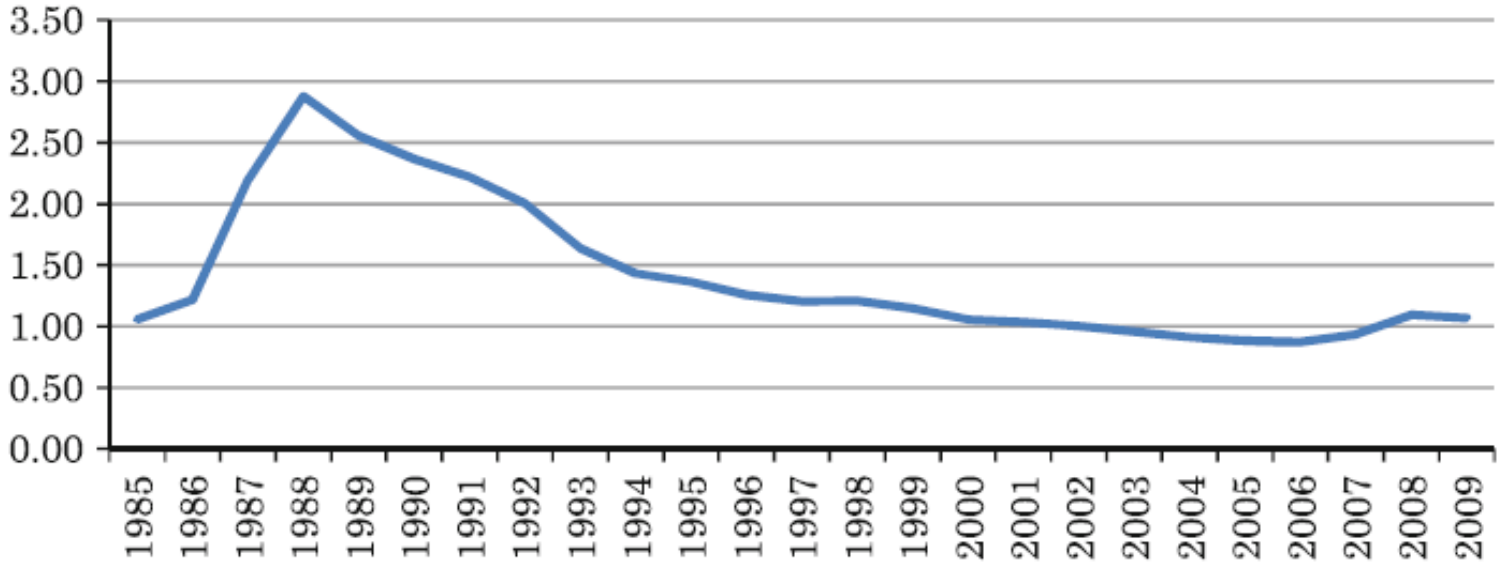
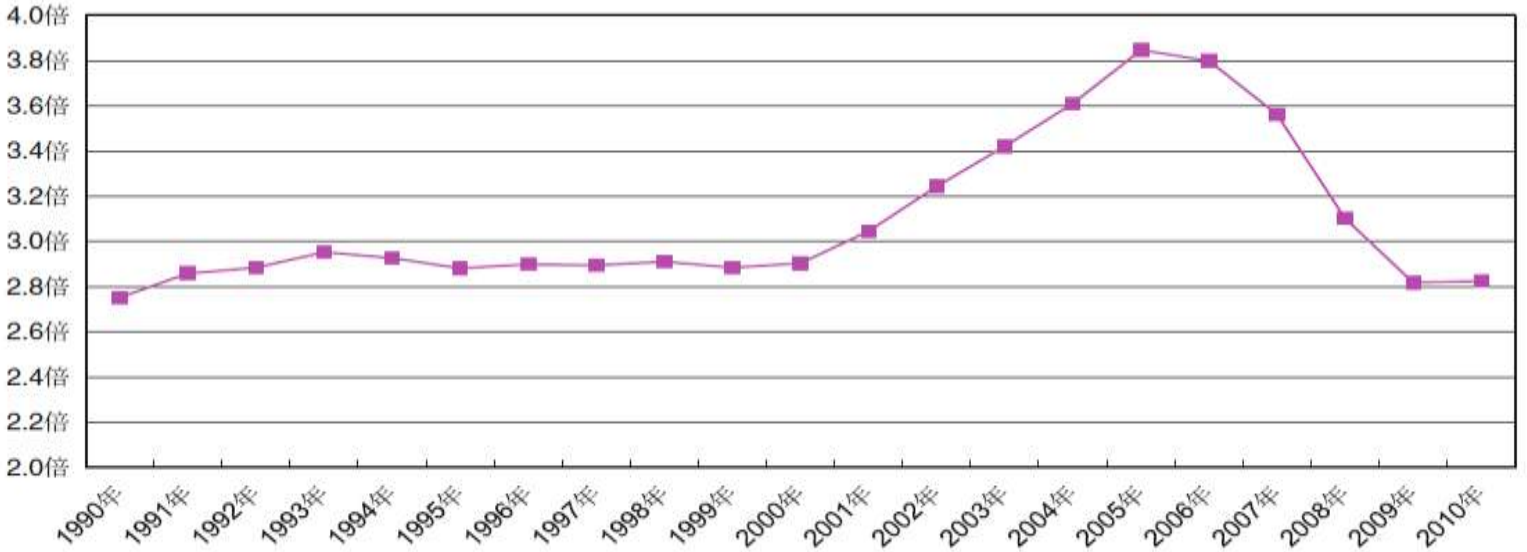


Fig. 9 Housing price/income ratio of Japan



0 Housing price/income ratio of USA

PRC: House Price / Income ratio

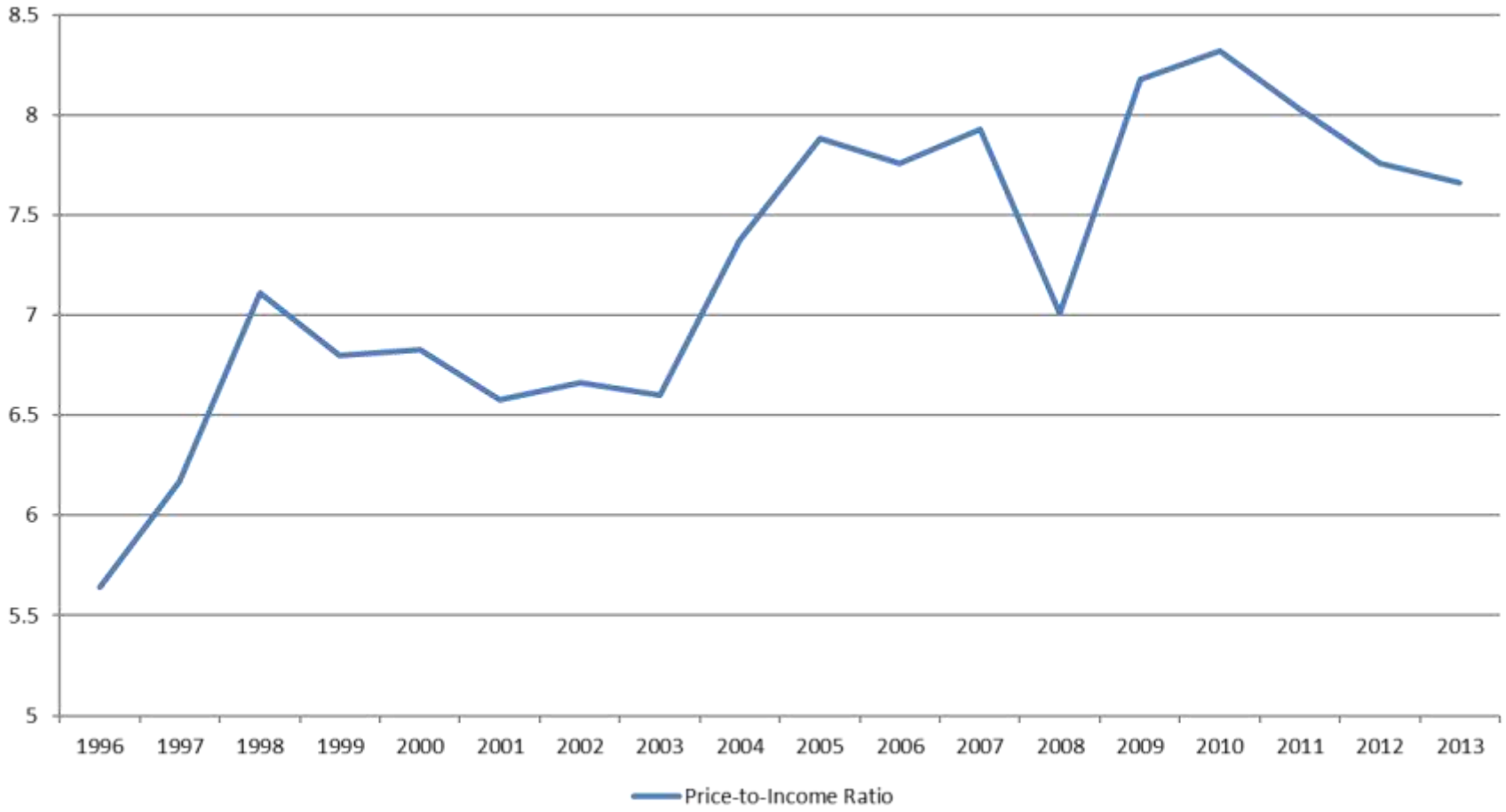


Table 2 Loan supply function for Japanese banks

	Period I (1982–1989) $Loans_{it}$	Period II (1990–1995) $Loans_{it}$
Difference $rate_t$	16.298	21.351
	(2.611)	(3.028)
Call $rate_t$	8.564	6.755
	(2.568)	(2.904)
$Deposits_{it}$	0.658	
	(19.69)	
Competitors' total $loans_{it-1}$	0.066	0.038
	(3.675)	(2.333)
Land $price_t$	0.123	−1.760
	(2.546)	(−1.449)
BIS $ratio_{it}$	8.658	
	(−2.353)	
Market $share_{it}$	0.426	
	(1.48)	
Constant	−36.302	
	(−0.874)	
Adjusted R^2	0.892	
Hausman statistic, Chi-square	0.923	
P value	0.820	

Figures in parenthesis are t values. Difference $rate_t$ is defined as lending $rate_t$ − call $rate_t$

Table 2 Loan Supply Function for Major Commercial Banks in the PRC (2007-2014)

	Model of Loan
Lending Rate – Shibor Rate	6.235*** (13.75)
Shibor Rate	2.671*** (3.68)
Deposits	0.357*** (20.93)
Competitors' Total Loan	-0.671*** (-71.17)
Housing Price Index	0.166*** (58.87)
Market Share	-0.655*** (-8.02)
BIS Ratio	3.365* (1.70)
Constant	-15.746*** (-53.92)
Adjusted R-squared	0.897
D-W Statistics	1.88
Number of Observations	364

Bank's Balance Sheet and Basel Capital Requirement

Assets	Liabilities
Bank Loans Good Assets	Deposits
Non Performing Loans (NPL) Bad Assets	Capital=$A(q_2)$

Aging Population of Japan and Negative Interest Rate Policy

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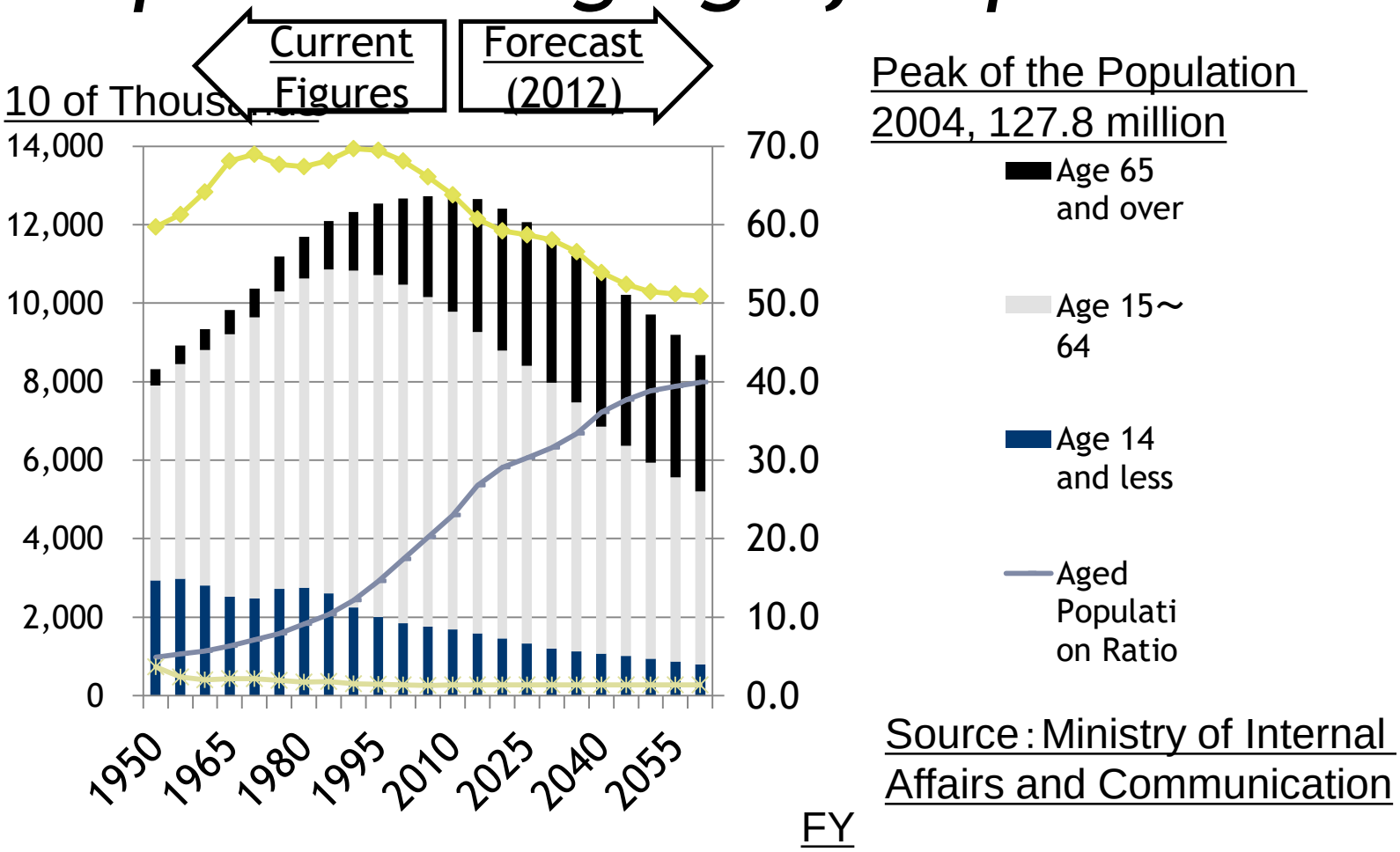
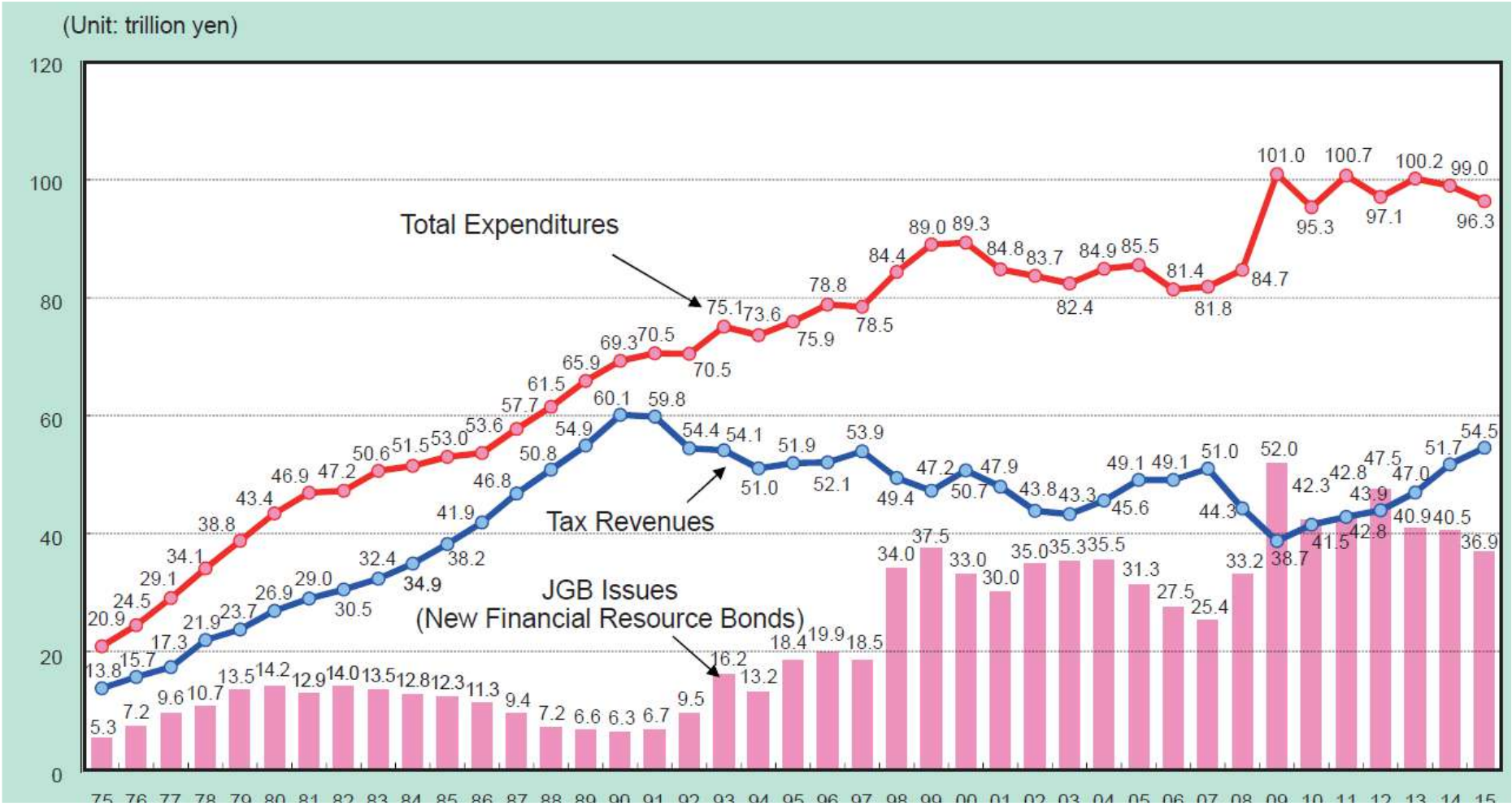
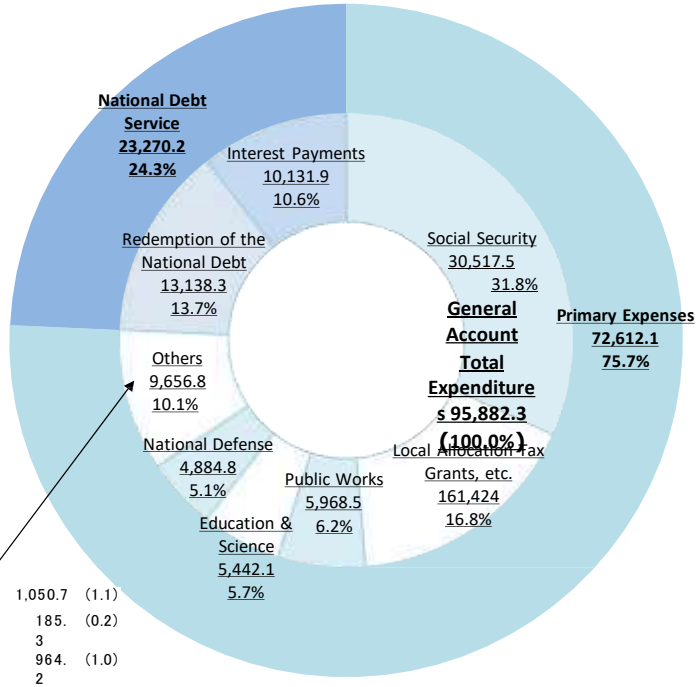
Senior Advisor, Financial Research Institute, FSA

Population Aging of Japan




(Unit: trillion yen)
120
100
80
60
40
20
0
Total Expenditures
Tax Revenues
JGB Issues
(New Financial Resource Bonds)
20.9 24.5 29.1 34.1 38.8 43.4 46.9 47.2 50.6 51.5 53.0 53.6 57.7 61.5 65.9 69.3 70.5 70.5 75.1 73.6 75.9 78.8 78.5 84.4 89.0 89.3 84.8 83.7 82.4 84.9 85.5 81.4 81.8 84.7 101.0 95.3 100.7 97.1 100.2 99.0 96.3
13.8 15.7 17.3 21.9 23.7 26.9 29.0 30.5 32.4 34.9 41.9 38.2 46.8 50.8 54.9 60.1 59.8 54.4 54.1 51.0 51.9 52.1 53.9 49.4 47.2 50.7 47.9 43.8 43.3 45.6 49.1 49.1 51.0 44.3 52.0 38.7 42.3 41.5 42.8 42.8 43.9 47.5 47.0 40.9 51.7 40.5 54.5 36.9
5.3 7.2 9.6 10.7 13.5 14.2 12.9 14.0 13.5 12.8 12.3 11.3 9.4 7.2 6.6 6.3 6.7 9.5 16.2 13.2 18.4 19.9 18.5 34.0 37.5 33.0 30.0 35.0 35.3 35.5 31.3 27.5 25.4 33.2
75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15

General Account Budget -Breakdown of Expenditure



Food Supply	1,050.7	(1.1)
Promotion of SMEs	185.3	(0.2)
Energy	964.2	(1.0)
Former Military Personal Pensions	444.3	(0.5)
Economic Assistance	509.8	(0.5)
Miscellaneous	6,152.6	(6.4)
Contingency Reserves	350.0	(0.4)

(Note1) Figures may not add up to the totals due to rounding.

(Note2) The ratio of Social Security expenses to General Expenditures*: 54.0%
*General Expenditures equals to the Primary Expenditure minus Local Allocation Tax Grants, etc.

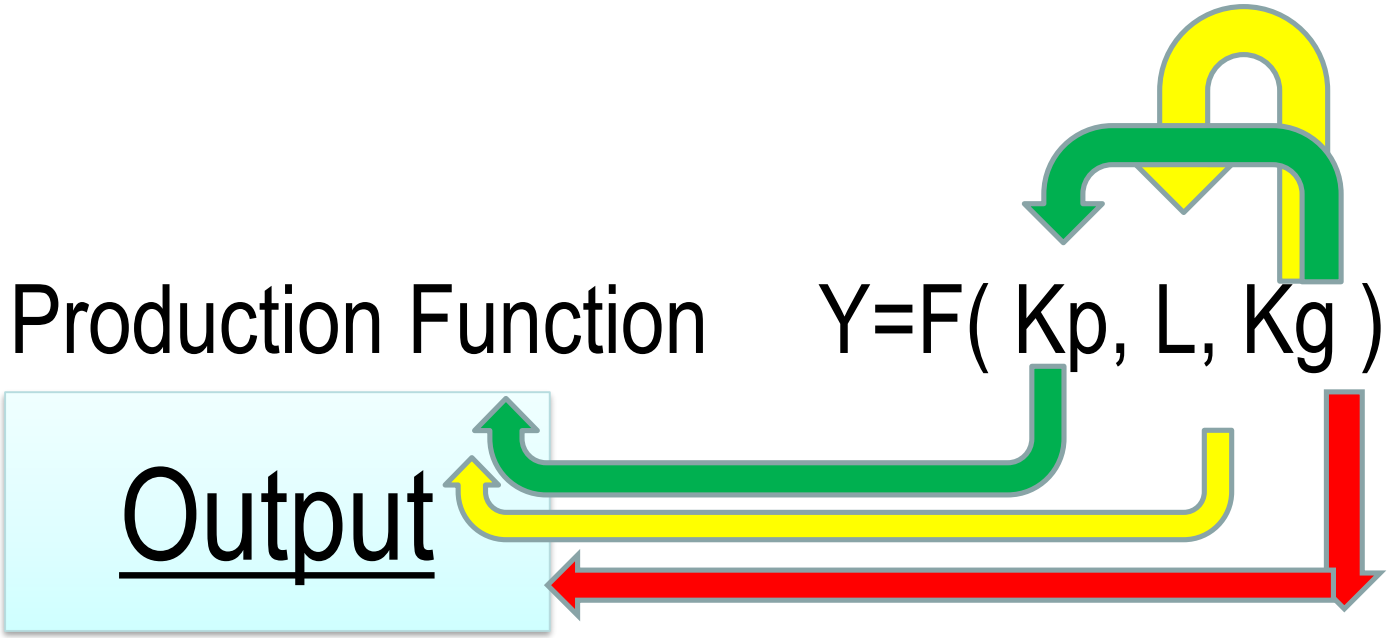
Main results

- Population aging reduces aggregate output, consumption, and investment by reducing total labor supply in the long-run
- Population aging weakens the effectiveness of fiscal and monetary policies to boost an economy
- Implication: necessary policy to cope with population aging is to keep the elderly people working and productivity base wage rate rather than seniority wage system.
  - Reform the seniority-based wage system

Outlines (Infrastructure)

1. **Infrastructure investors are difficult to obtain adequate rate of return despite its risks. Therefore, the bankable infrastructure projects were scarce in Asian region.**
2. **This paper proposes the increment of tax revenues along the highway or railway which are derived from the spillover effects of infrastructure should contribute certain fraction of tax revenues (say 20% or 30%) to investors in infrastructure.**
3. **Furthermore, tax revenues accrued from spillover effects were paid every year to next neighbor countries where the highway or the railway will run through, the cross border infrastructure will become easier to construct.**
4. **The paper addresses the importance of financing local companies including SMEs so that they can utilize the benefits of infrastructure.**

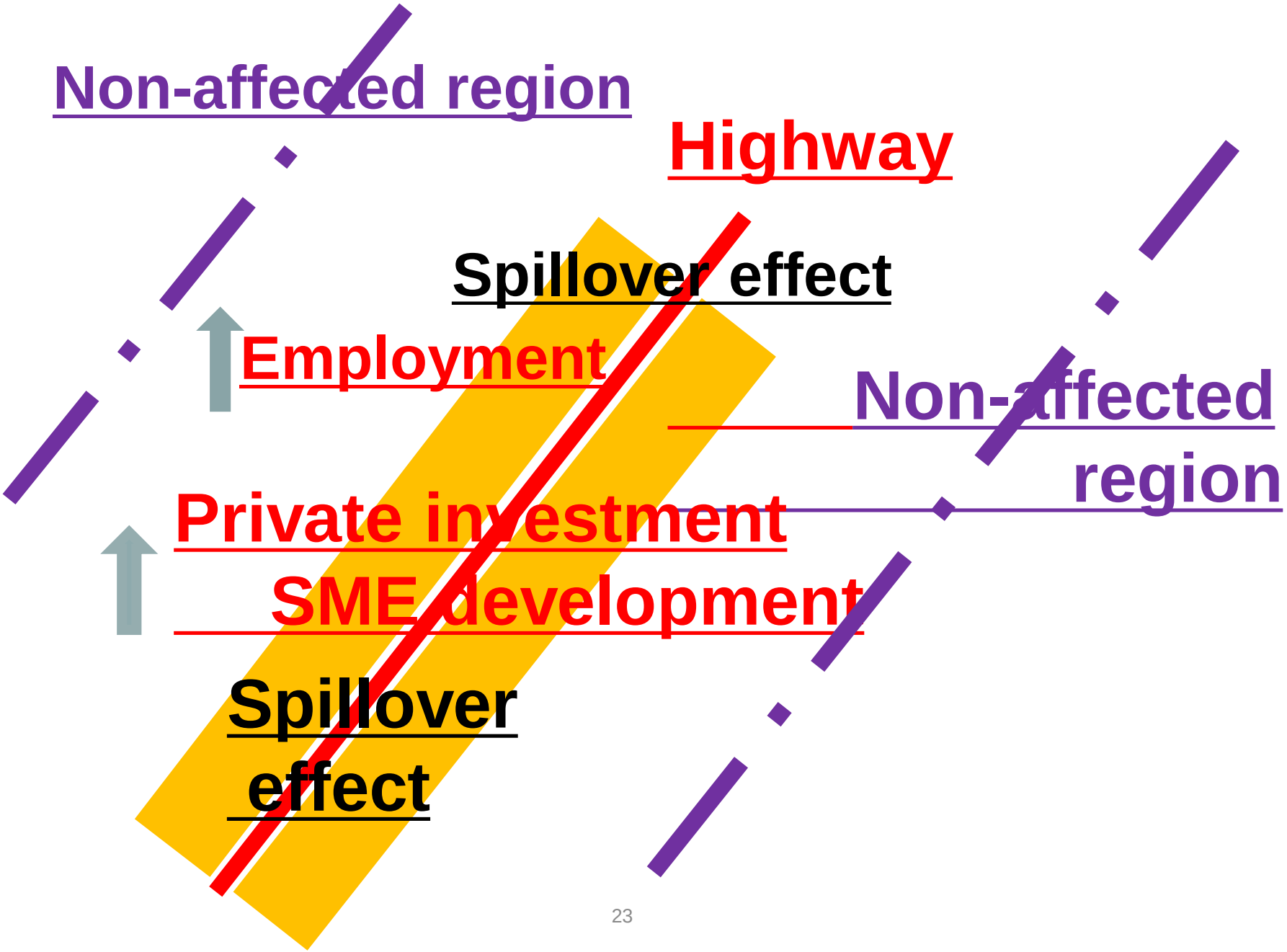
Direct Effect and Spill-over Effects



Direct Effect

Y= Output, Kp= private capital, L = labor

Kg = public capital (infrastructure)


Non-affected region
Highway
Spillover effect
Employment
Non-affected region
Private investment
SME development
Spillover effect

Spillover effects → Return to investors

	1956-60	1961-65	1966-70	1971-75	1976-80	1981-85
Direct Effect (Kg)	0.696	0.737	0.638	0.508	0.359	0.275
Indirect Effect (Kp)	0.453	0.553	0.488	0.418	0.304	0.226
Indirect Effect (L)	1.071	0.907	0.740	0.580	0.407	0.317
20%Returned	0.3048	0.292	0.2456	0.1996	0.1422	0.1086
%Increment	43.8	39.6	38.5	39.3	39.6	39.5

1986-90	1991-95	1996-00	2001-05	2006-10
0.215	0.181	0.135	0.114	0.108
0.195	0.162	0.122	0.1	0.1
0.193	0.155	0.105	0.09	0.085
0.0776	0.0634	0.0454	0.038	0.037
36.1	35.0	33.6	33.3	34.3

Case Study: Southern Tagalog Arterial Road (STAR) , Philippines Micro-data

- The Southern Tagalog Arterial Road (STAR) project in Batangas province, Philippines (south of Metro Manila) is a modified Built-Operate-Transfer (BOT) project.

- The 41.9 km STAR tollway was built to improve road linkage between Metro Manila and Batangas City, provide easy access to the Batangas International Port, and thereby accelerate industrial development in Batangas and nearby provinces.

The Southern Tagalog Arterial Road (STAR Highway), Philippines, Manila

Tax Revenues in three cities

Yoshino and Pontines (2015) ADBI Discussion paper 549

表 8　フィリピンの STAR 高速道路の影響のない地域と比較した事業税の増加額

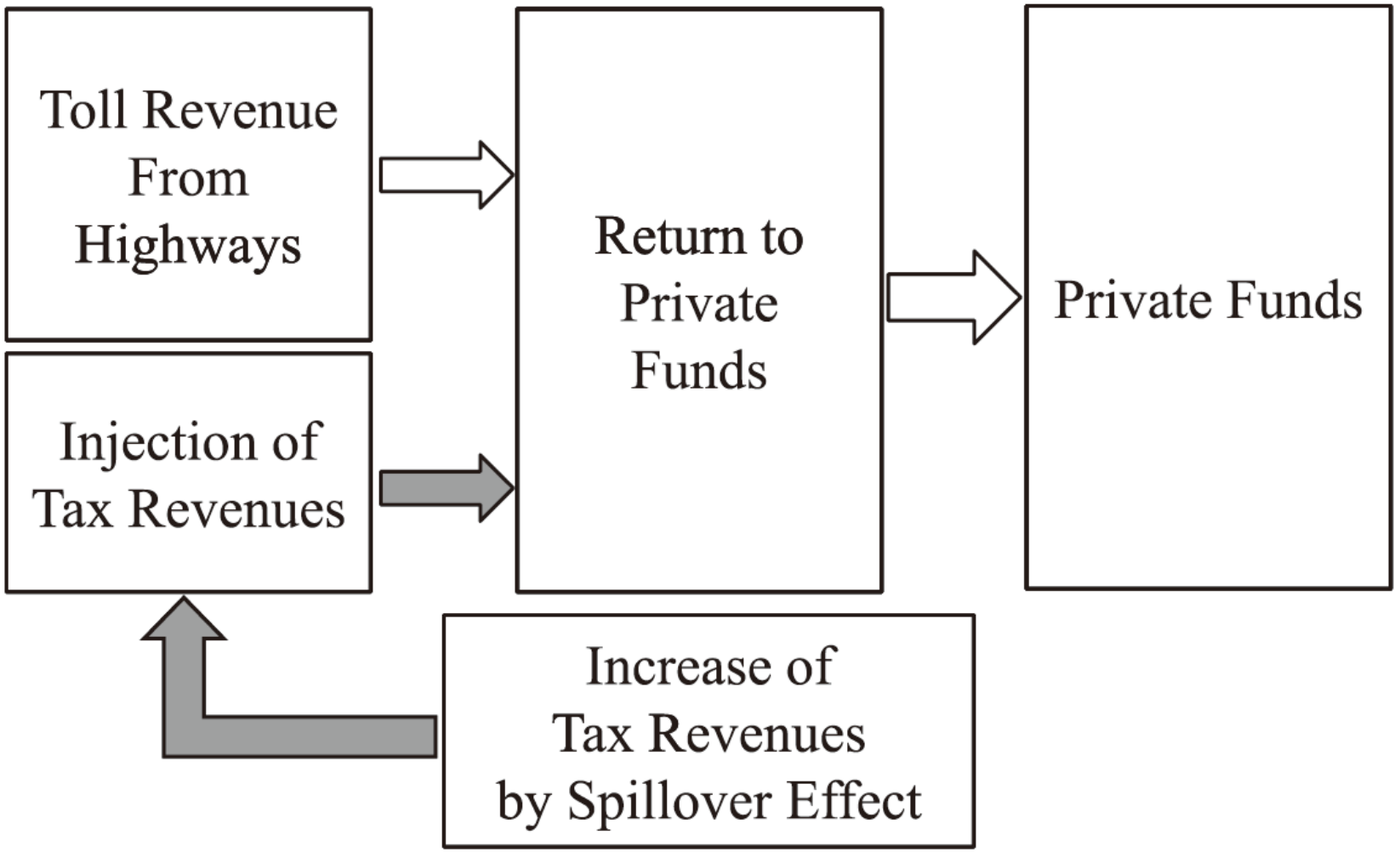
（単位：100 万ペソ）

	t_{-2}	t_{-1}	t_0	t_{+1}	t_{+2}	t_{+3}	t_{+4}以降
Lipa 市	134.36	173.50	249.70	184.47	191.81	257.35	371.93
Ibaan 市	5.84	7.04	7.97	6.80	5.46	10.05	12.94
Batangas 市	490.90	622.65	652.83	637.89	599.49	742.28	1208.61

（出所）Yoshino and Pontines (2015)より筆者作成

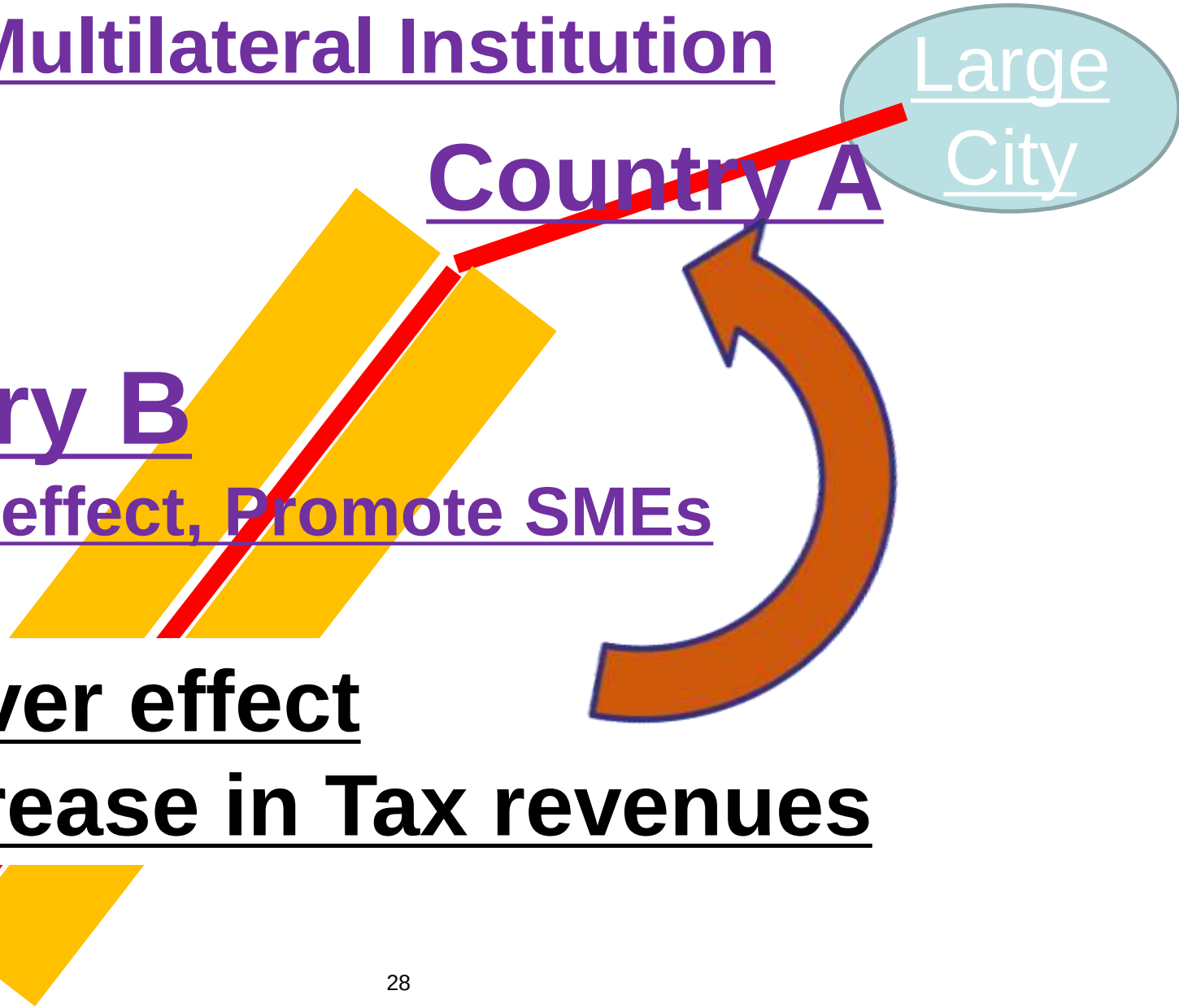
Completion

Figure 4
Injection of a fraction of tax revenues gained from spillover effect



Cross-border Infrastructure Investment

Role of Multilateral Institution

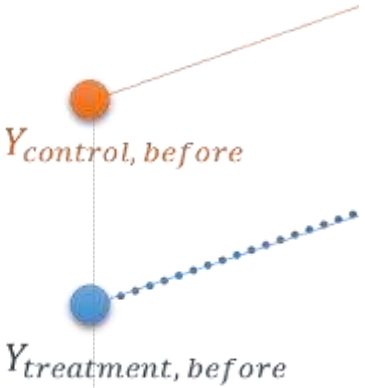


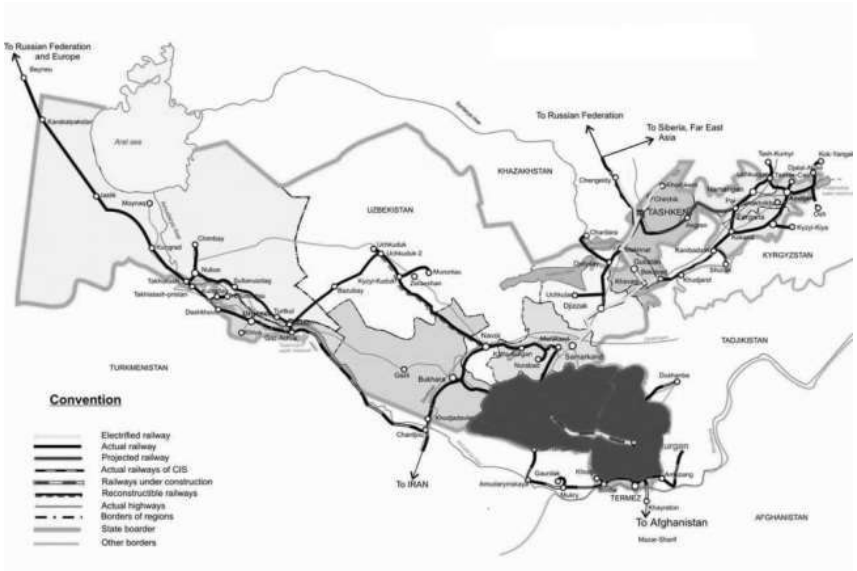
Spillover effect

→ Increase in Tax revenues

Uzbekistan Railway

GDP growth rate

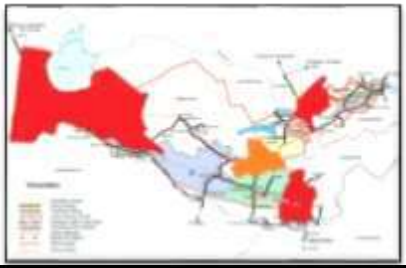
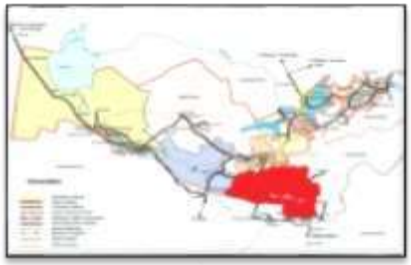




Time

Divide regions affected and not affected by railway connection to “Treated group” and “Control group”

GDP


GDP	Term	Connectivity spillover effect	Regional spillover effect	Neighboring spillover effect
Launching Effects	Short	2.83***[4.48]	0.70[0.45]	1.33[1.14]
	Mid	2.5***[6.88]	0.36[0.29]	1.27[1.46]
	Long	2.06***[3.04]	-0.42[-0.29]	2.29**[2.94]
1 year Anticipated	Short	0.19[0.33]	0.85[1.75]	-0.18[-0.20]
	Mid	0.31[0.51]	0.64[1.30]	-0.02[-0.03]
	Long	0.07[0.13]	-0.006[-0.01]	0.50[0.67]
Postponed Effects		1.76*[1.95]	-1.49[-0.72]	2.58*[2.03]
2 years Anticipated	Short	-1.54[-1.66]	1.42[0.78]	-1.32[-0.92]
	Mid	0.32[0.44]	0.84[1.42]	0.13[0.13]
	Long	0.11[0.15]	0.10[0.16]	0.87[1.19]
Postponed Effects		-0.14[-0.20]	-1.71[-1.35]	1.05[1.44]

Note: t-values are in parenthesis. t-value measures how many standard errors the coefficient is away from zero.

legend: * p<.1; ** p<.05; *** p<.01

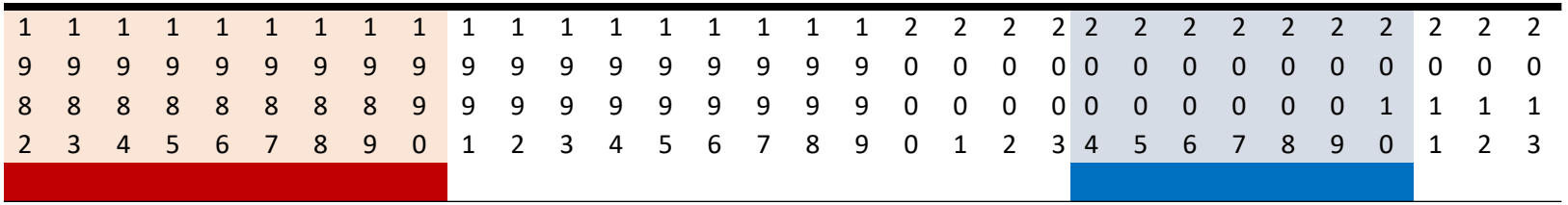
Additional tax revenue, Regional GDP growth and Railway Company Net Income, LCU (bln.)

Period	Coefficients	T(20)*ΔY (Tax revenue)	ΔY Affected (Direct + Spillover effects)	Company net income (Revenue - Costs)
Short term (2009-2010)	2.83*** [4.48]	**16.0**	**79.9**	**315.5**
Mid-term (2009-2011)	2.48*** [6.88]	**16.3**	**81.5**	**411.7**
Long-term (2009-2012)	2.06*** [3.04]	**14.7**	**73.5**	**509.0**

Source: Authors' calculations

Japanese Bullet Train

Impact of Kyushu Shinkansen Rail on CORPORATE TAX revenue during 1st PHASE OF OPERATION period {2004-2010} , mln. JPY (adjusted for CPI, base 1982)



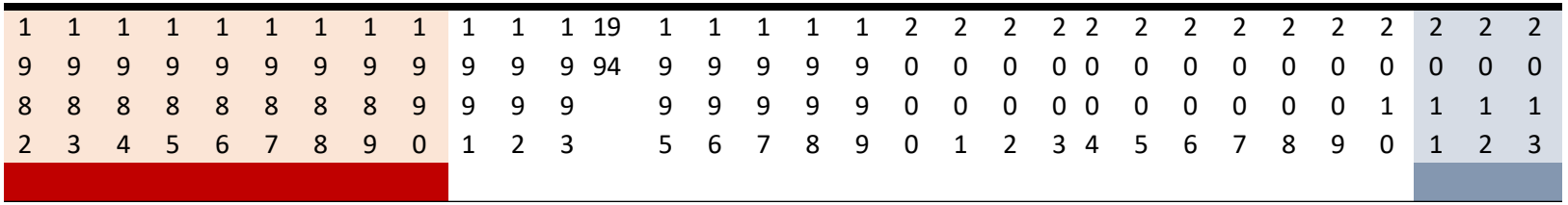
Variable	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5
Treatment2	-4772.54				
	[-0.2]				
Number of tax payers	5.8952514*	5.8957045*	5.896112*	5.8953585*	5.8629645*
	[1.95]	[1.95]	[1.95]	[1.95]	[1.91]
Treatment3		-15947.8			
		[-0.87]			
Treatment5			-13250.4		
			[-1.06]		
Treatment7				-6883.09	
				[-0.7]	
TreatmentCon					-28030.8
					[-0.65]
Constant	-665679	-665418	-665323	-665358	-658553
	[-1.35]	[-1.35]	[-1.35]	[-1.35]	[-1.32]
N	799	799	799	799	799
R2	0.269215	0.269281	0.269291	0.269241	0.269779
F	1.934589	2.106448	2.074548	2.100607	8.497174

COMPOSITION OF GROUPS

Group2	Group5
Kagoshima	Kagoshima
Kumamoto	Kumamoto
	Fukuoka
Group3	Oita
Kagoshima	Miyazaki
Kumamoto	
Fukuoka	
	GroupCon
Group7	Kagoshima
Kagoshima	Kumamoto
Kumamoto	Fukuoka
Fukuoka	Osaka
Oita	Hyogo
Miyazaki	Okayama
Saga	Hiroshima
Nagasaki	Yamaguchi

Note: Treatment2 = Time Dummy {1991-2003} x Group2. etc. t-values are in parenthesis. Legend: * p<.1; ** p<.05; *** p<.01.
Clustering standard errors are used, allowing for heteroscedasticity and arbitrary autocorrelation within a prefecture, but treating the errors as uncorrelated across prefectures

Impact of Kyushu Shinkansen Rail on CORPORATE TAX revenue during 2nd PHASE OF OPERATION period {2011-2013} , mln. JPY (adjusted for CPI, base 1982)

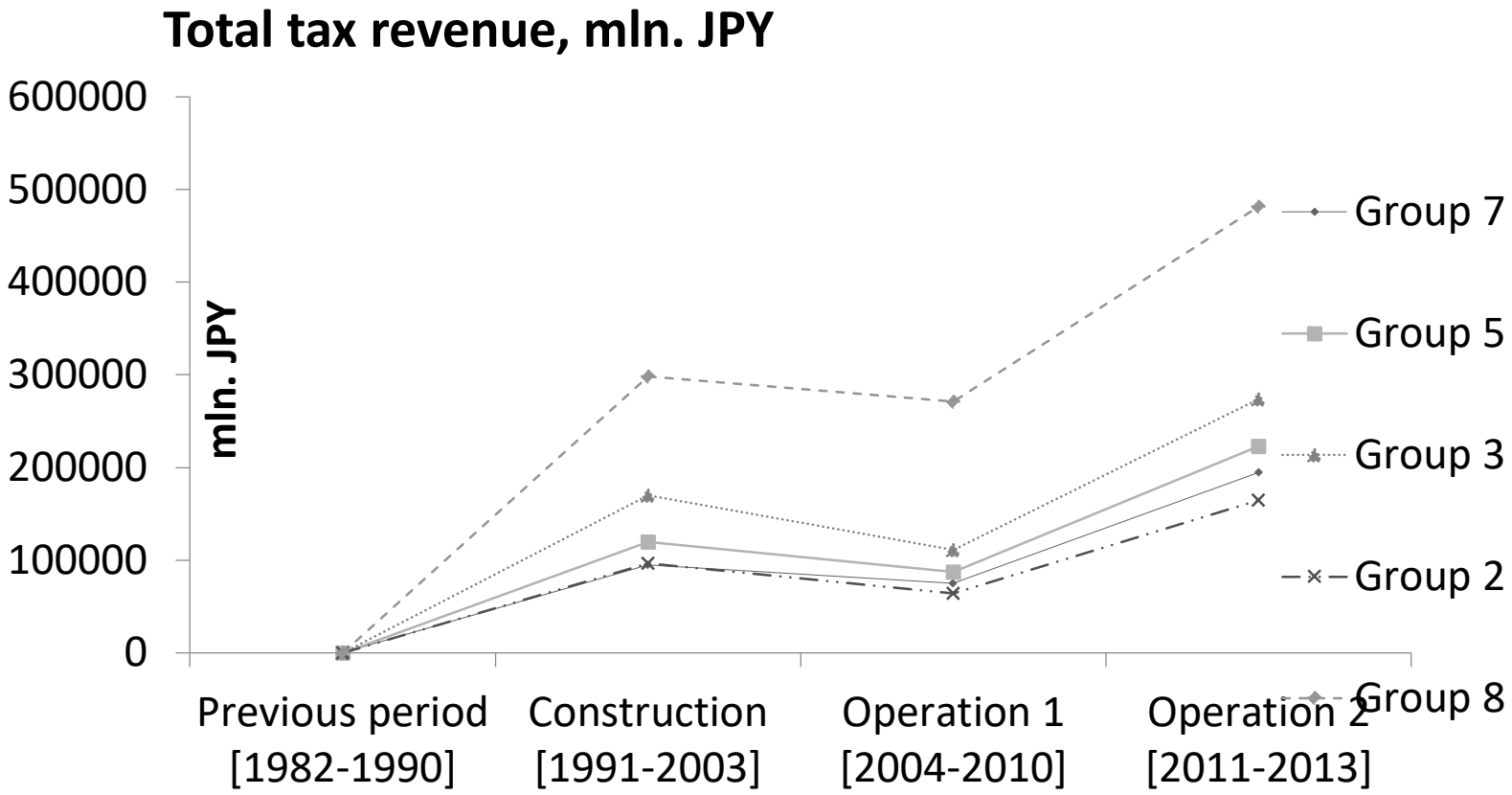


Variable	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5
Treatment2	72330.012**				
	[2.2]				
Number of tax payers	5.5277056***	5.5585431***	5.558603***	5.5706545***	5.9640287***
	[3.13]	[3.14]	[3.14]	[3.14]	[3.07]
Treatment3		104664.34*			
		[2]			
Treatment5			82729.673**		
			[2.1]		
Treatment7				80998.365**	
				[2.34]	
TreatmentCon					179632
					[1.58]
Constant	-568133.98**	-573747.28**	-574245.87**	-576867.56**	-642138.87**
	[-2.07]	[-2.08]	[-2.08]	[-2.09]	[-2.1]
N	611	611	611	611	611
R2	0.350653	0.352058	0.352144	0.352874	0.364088
F	5.062509	5.486197	5.351791	5.431088	16.55518

COMPOSITION OF GROUPS

Group2	Group5
Kagoshima	Kagoshima
Kumamoto	Kumamoto
	Fukuoka
Group3	Oita
Kagoshima	Miyazaki
Kumamoto	
Fukuoka	
	GroupCon
Group7	Kagoshima
Kagoshima	Kumamoto
Kumamoto	Fukuoka
Fukuoka	Osaka
Oita	Hyogo
Miyazaki	Okayama
Saga	Hiroshima
Nagasaki	Yamaguchi

Note: Treatment2 = Time Dummy {1991-2003} x Group2. etc. t-values are in parenthesis. Legend: * p<.1; ** p<.05; *** p<.01. Clustering standard errors are used, allowing for heteroscedasticity and arbitrary autocorrelation within a prefecture, but treating the errors as uncorrelated across prefectures


Total tax revenue, mln. JPY
600000
500000
400000
300000
200000
100000
0
mln. JPY
Previous period [1982-1990]
Construction [1991-2003]
Operation 1 [2004-2010]
Operation 2 [2011-2013]
Group 7
Group 5
Group 3
Group 2
Group 8

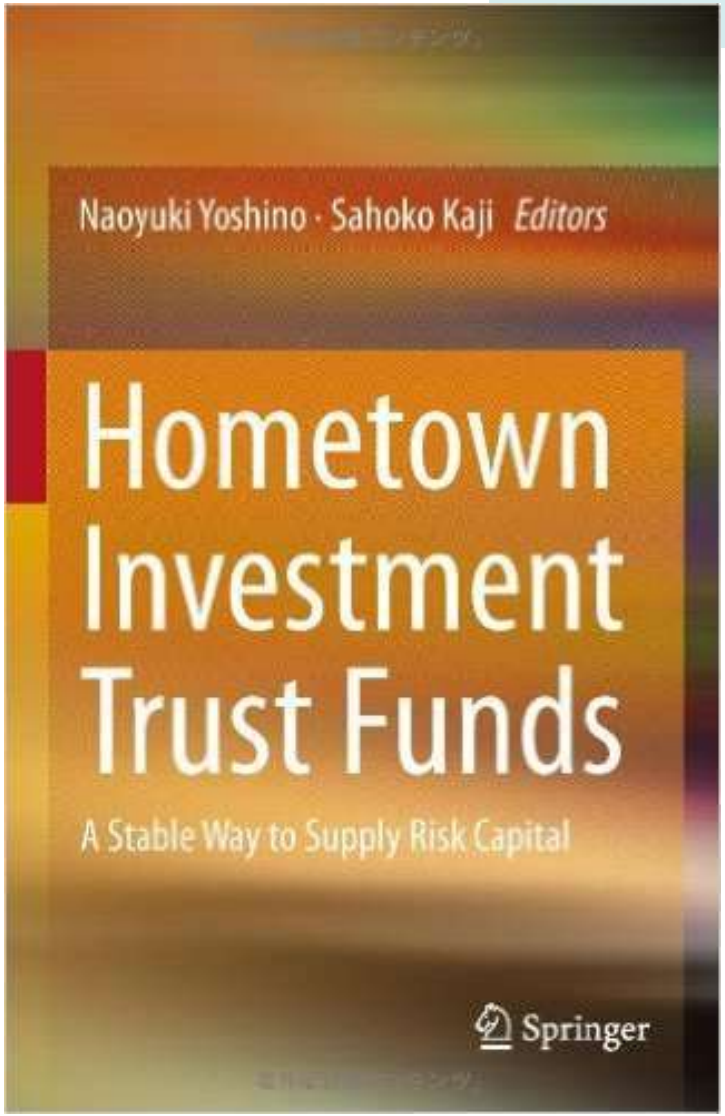
Public-Private Partnership (PPP)
Give incentives to operating entity

Payoff table for infrastructure operating entity and investors

	Normal Case	Effort Case
Normal Case	$(50, r)$ Operating Entity Investors	$(50, \alpha r)$ Operating Entity Investors
Effort Case	$(100, r)$ Operating Entity Investors	$(100, \alpha r)$ Operating Entity Investors

Enhance regional economy

Start up businesses, farmers, SMEs



Hometown Investment Trust Funds

A Stable Way to Supply Risk Capital

Yoshino, Naoyuki; Kaji, Sahoko (Eds.)
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Japan, Cambodia Vietnam, Peru

Investment in SMEs and start up businesses

Agricultural Funds

Beans and Wine

Societal changes & retail location

Traditional trade

- Papa Mama store where owner live in
- Wet market selling perishables

Modern trade

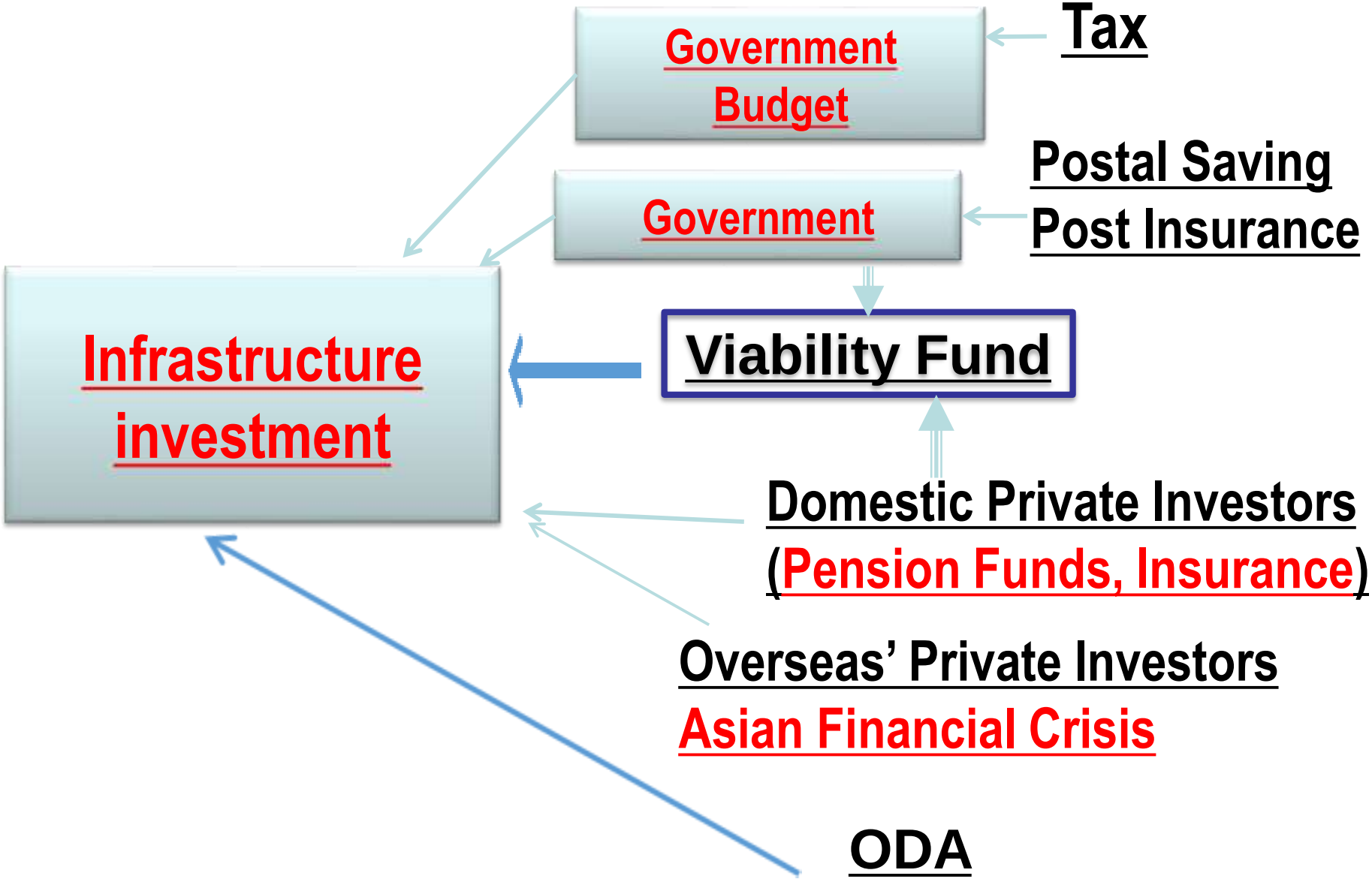
- Shopping mall as one stop shopping
- Super market with wide assortment

In-station shopping mall

Medical floor

小児科	Pediatrics	兒科
予防接種	Vaccines	疫苗接種
内　科	Internal Medicine	內科
皮膚科	Dermatology	皮膚科
旅行医学	Travel Medicine	旅行醫學

Infrastructure Finance



Long term and Patient investors are needed

1. Bank deposits – Bank loans (2-5 years)
2. Life insurance (20 years, 30 years)
3. Pension funds (20, 30, 40 years)

Long term financing

4. Asset Management of long term instruments
5. Financial education has to be improved

SME finance, innovation and Credit Scoring of SMEs

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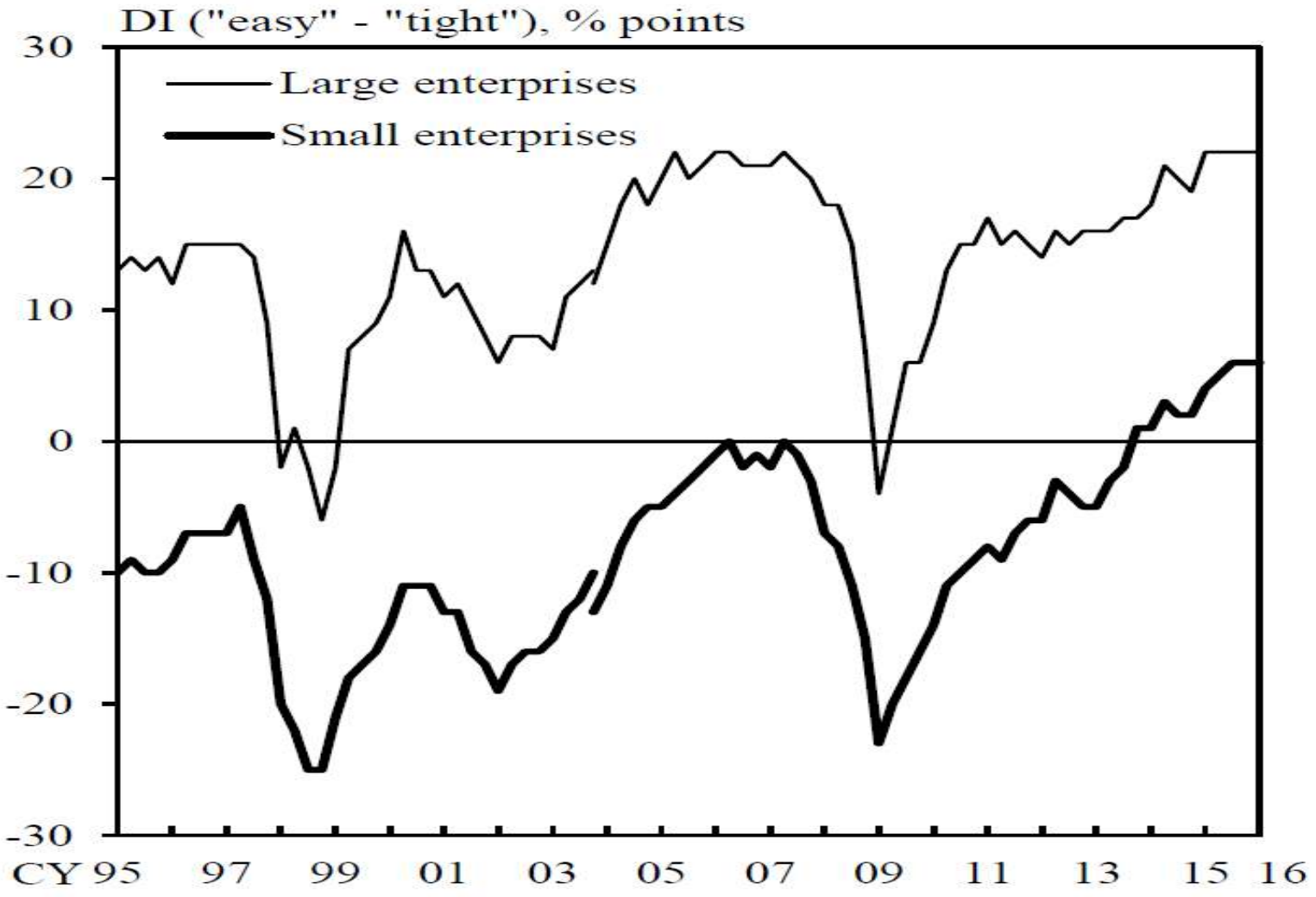
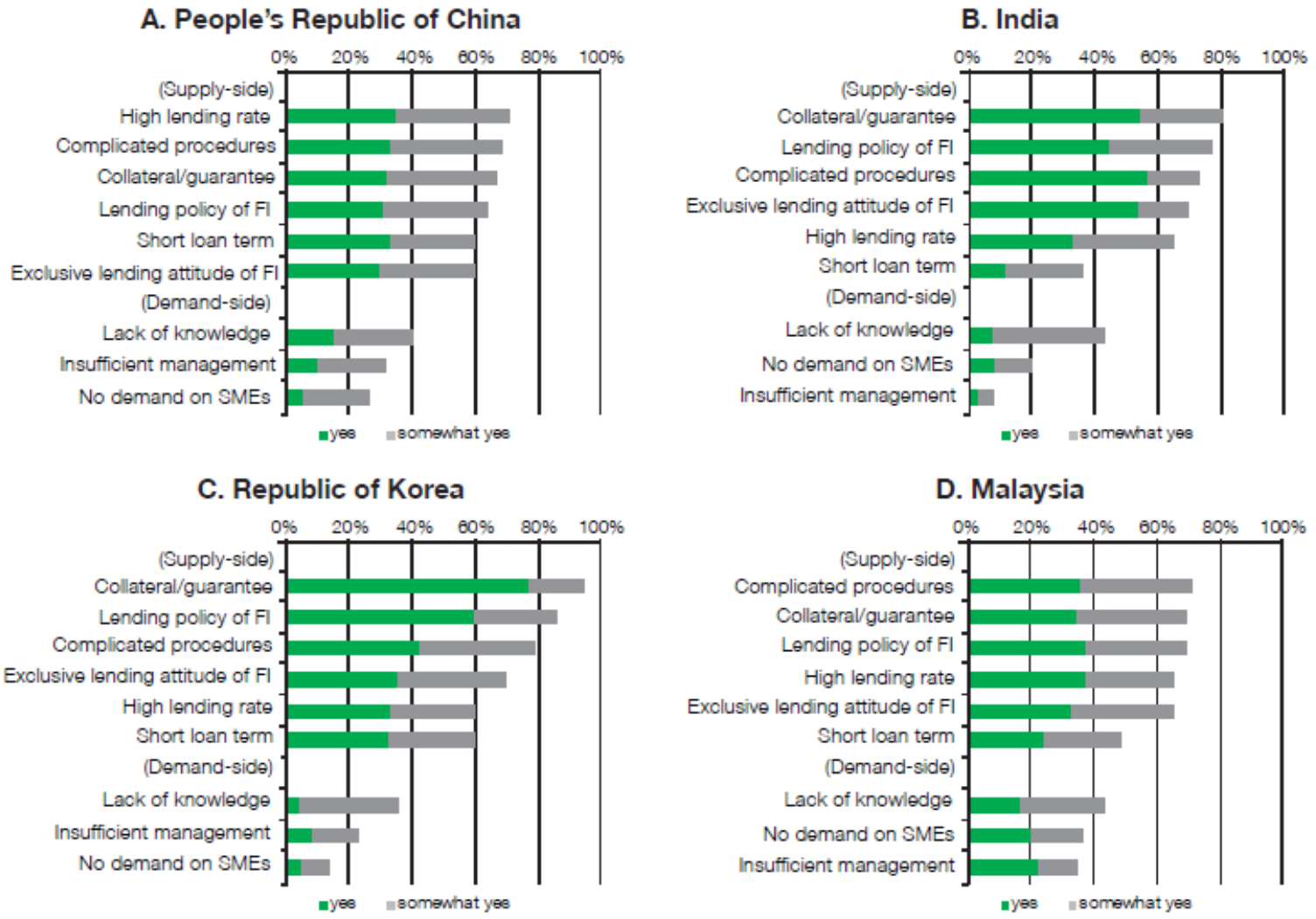
Access to Finance by SMEs and Large Firms in Japan

(2) Financial Position
(a) *Tankan*



Barriers for SMEs in Accessing Financial Institutions, Collateral,Higher rate



Source: ADB–OECD study on enhancing financial accessibility for SMEs: Lessons from recent crises. Mandaluyong City, Philippines: Asian Development Bank, 2013

SMEs in the People's Republic of China

Item	2007	2008	2009	2010	2011*	2012*
Number of SMEs						
SMEs (number)	333,858	422,925	431,110	449,130	316,498	334,321
SMEs to total (%)	99.1	99.3	99.3	99.2	97.2	97.3
Employment by SMEs						
SME employees ('000)	60,521	68,671	67,877	72,369	59,357	...
SMEs to total (%)	76.8	77.7	76.9	75.8	64.7	...
SME Exports						
SME exports (CNY billion)	4,303	4,773	4,152	4,919	4,142	4,423
SMEs to total exports (%)	58.6	57.9	57.6	54.7	41.6	41.5

Small and Medium Sized Enterprise (SME)

Venture business

Toyota,Honda,**SevenEleven**,Nintendo

Nintendo could not borrow from Mitsubishi.

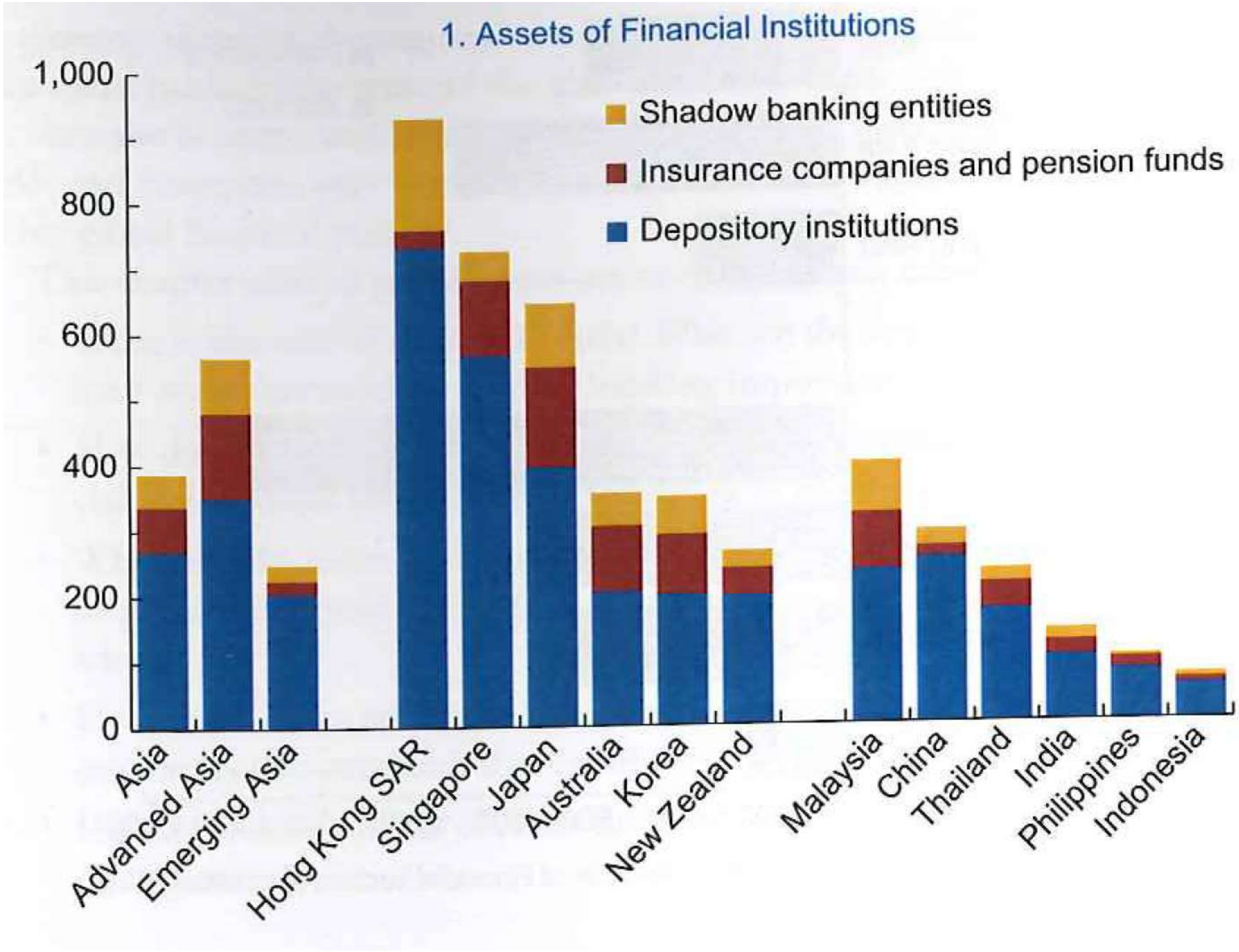
HONDA was not supported by government.

Mr. HONDA worked at SME as a repairman.

HONDA could not borrow money

Mitsubishi-bank made loans to HONDA.

How to finance start-up business ?


1. Assets of Financial Institutions
1,000
800
600
400
200
0
Shadow banking entities
Insurance companies and pension funds
Depository institutions
Asia
Advanced Asia
Emerging Asia
Hong Kong SAR
Singapore
Japan
Australia
Korea
New Zealand
Malaysia
China
Thailand
India
Philippines
Indonesia

Regulation of Money Lenders in Rural Regions

1, Money lenders, **Interest rate = 96% in Japan**

2, License --- Banks

Registration --- Finance companies

3, **New Finance Company Law**

(i) Highest interest rate = 20%

(ii) Amount of borrowing < 1/3 of Income

(iii) Minimum Capital requirement

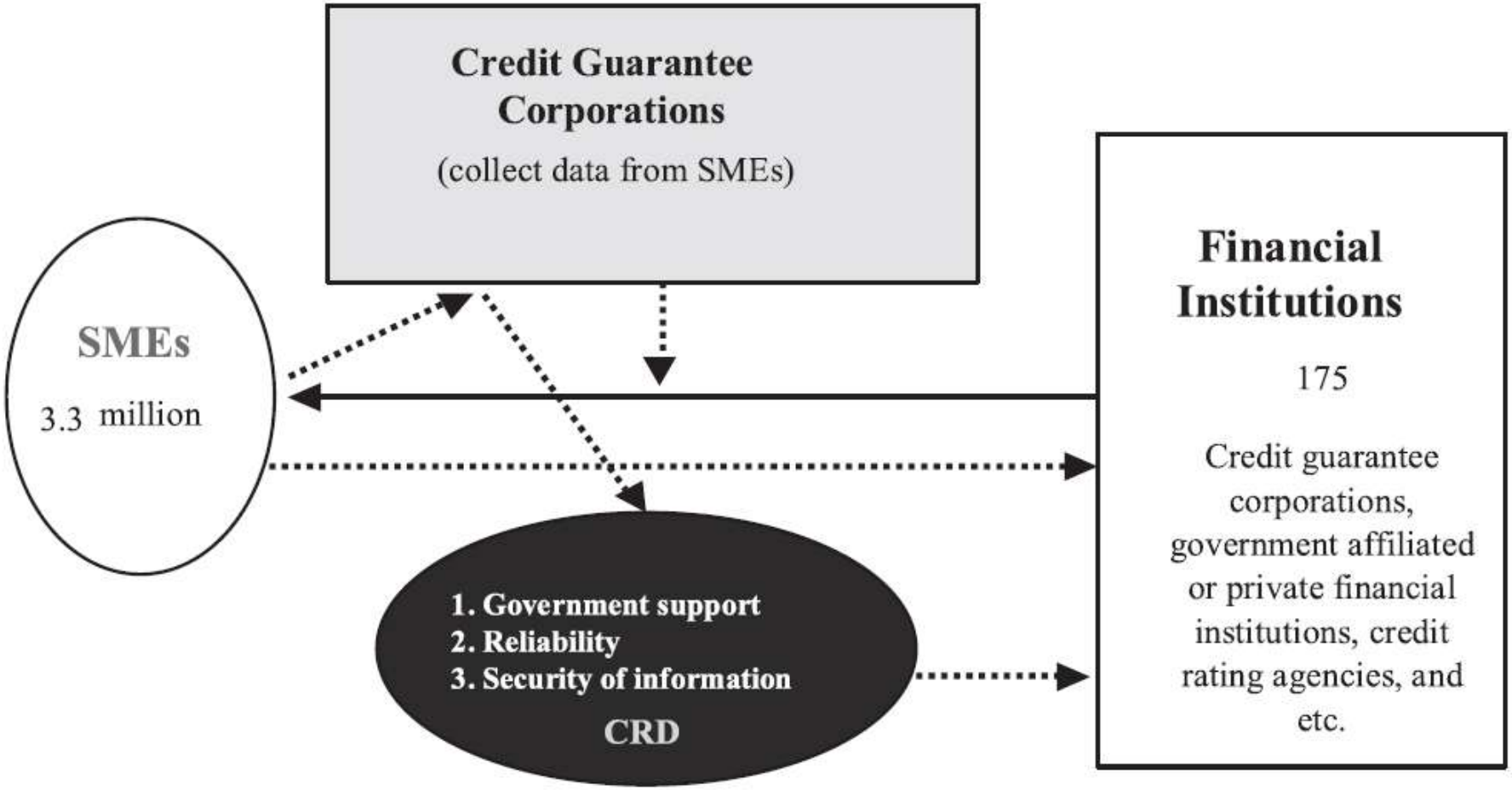
(iv) Paper test to run business

(v) Self regulatory organization was set up

two steps of monitoring and supervision

(vi) Consumers' complaints (hotline)

Figure 5. **Credit Risk Database of Small and Medium-Sized Enterprises**



3.1 Policy Objective Function

The equation below shows the policy objective function of the government:

$$U = w_1\left(L - L^*\right)^2 + w_2\left(\rho - \rho^*\right)^2 \tag{1}$$

From equation 2, we can write the interest rate on the loan as below:

$$r_L = \frac{1}{l_1}\left(l_o + l_2 Y^e - L\right) \tag{5}$$

In the next step, in order to get the amount of loan in equilibrium, we get first-order condition of the bank's profit function with respect to loan *L* as:

$$\frac{\partial \Pi}{\partial L} = -\frac{1}{l_1} \times L + \left[\frac{1}{l_1}\left(l_o + l_2 Y^e - L\right)\right] - \rho\left(g, Y, P_L, P_S, M, Z\right) - r_D - \rho'_L = 0 \tag{6}$$

Then we write equation 6 for *L*. The result is equation 7, which shows the amount of loan in equilibrium:

$$L = \frac{l_1}{2}\left[\frac{l_0}{l_1} + \frac{l_2}{l_1} Y^e - \rho\left(g, Y, P_L, P_S, M, Z\right) - r_D - \rho'_L\right] \tag{7}$$

Optimal Credit Guarantee Ratio

$$\rho = f\left(g, Y, P_L, P_S, M, Z\right) = -\alpha_1 g - \alpha_2 Y - \alpha_3 P_L - \alpha_4 P_S + \alpha_5 M - \alpha_6 Z \tag{11}$$

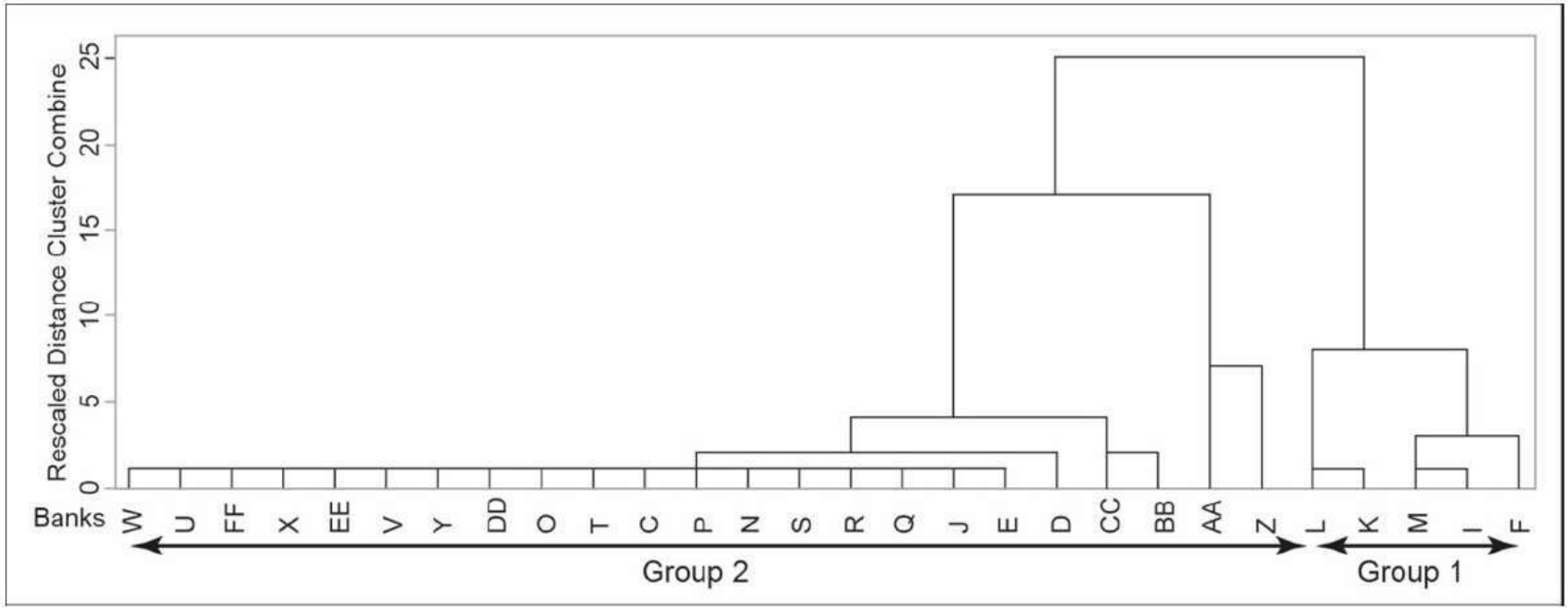
In the next step, we insert the loan demand function from equation 2 in equation 9, and write the expanded version of ρ as in equation 11, in equation 9 and then write it for g, yielding the result below:

$$g = -\frac{1}{\alpha_1\left(\frac{w_1 l_1^{\,2}}{4} + w_2\right)} . w_1 \frac{l_1^{\,2}}{4}\left(\frac{l_0}{l_1} + \frac{l_2}{l_1} y^e - r_D - \rho_L'\right) + \tag{12}$$

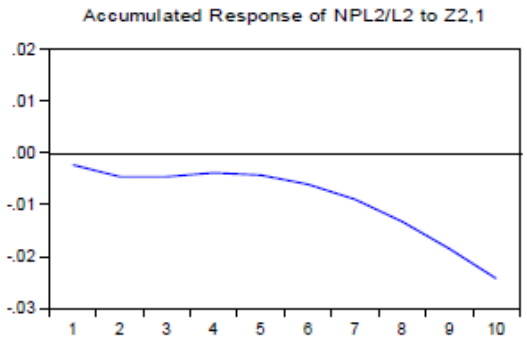
$$\frac{l_1}{2\alpha_1} L^* - \frac{w_2}{\alpha_1}\rho^* - \frac{\alpha_2}{\alpha_1} Y - \frac{\alpha_3}{\alpha_1} P_L - \frac{\alpha_4}{\alpha_1} P_S + \frac{\alpha_5}{\alpha_1} M + \frac{\alpha_6}{\alpha_1} Z$$

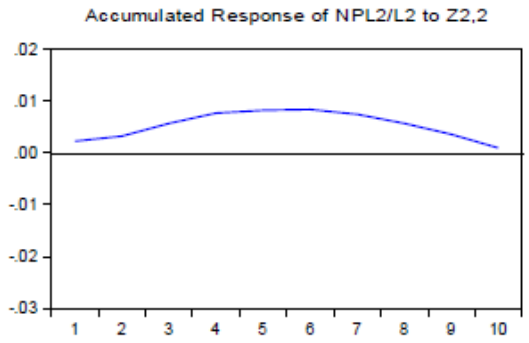
Cluster Analysis of SMES

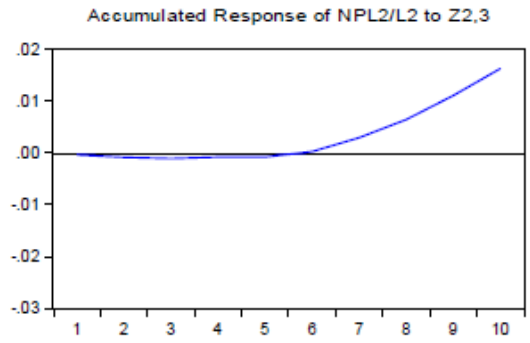
Figure 5: Dendrogram

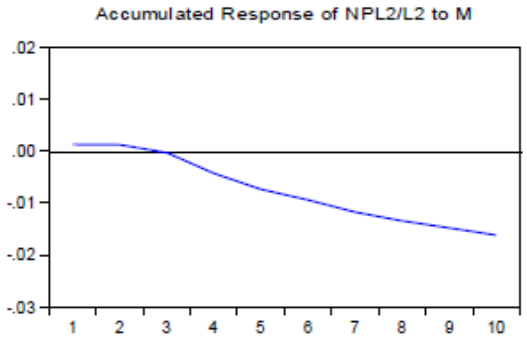


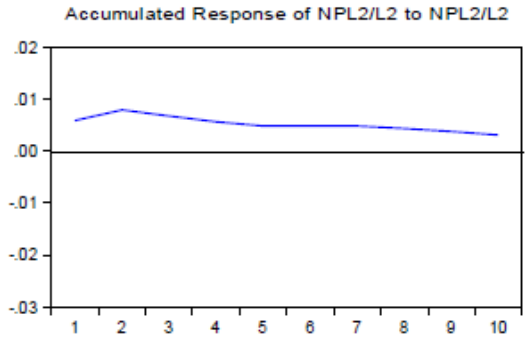
Impulse Response Analysis: Group 2 of banks

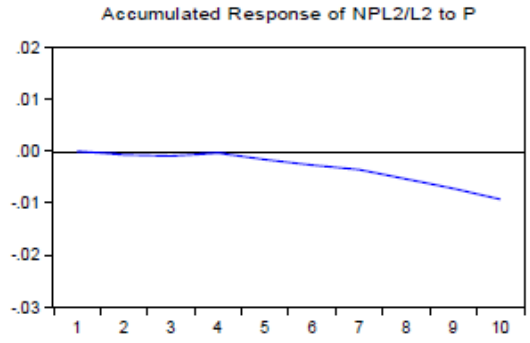


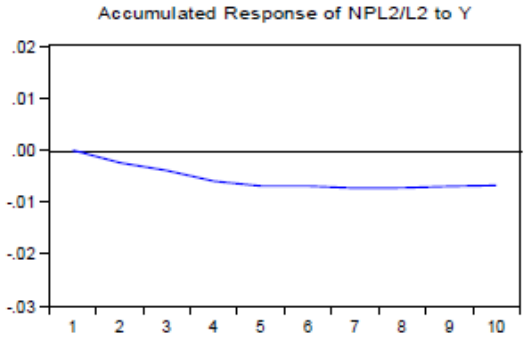












Calculated Optimal credit Guarantee ratios:

Group 1 of banks: 0.775
Group 2 of banks: 0.683

Data Collected

No.	Symbol	Definition	Category
1	Equity_TL	Equity (book value)/total liabilities	Leverage
2	TL_Tassets	Total liabilities/total assets	
3	Cash_Tassets	Cash/total assets	Liquidity
4	WoC_Tassets	Working capital/total assets	
5	Cash_Sales	Cash/net sales	
6	EBIT_Sales	Ebit/sales	Profitability
7	Rinc_Tassets	Retained earnings/total assets	
8	Ninc_Sales	Net income/sales	
9	EBIT_IE	Ebit/interest expenses	Coverage
10	AP_Sales	Account payable/sales	Activity
11	AR_TL	Account receivable/total liabilities	

Note: Retained earnings = the percentage of net earnings not paid out as dividends, but retained by the company to be reinvested in its core business or to pay debt. It is recorded under shareholders' equity in the balance sheet. Ebit = earnings before interest and taxes. Account payable = an accounting entry that represents an entity's obligation to pay off a short-term debt to its creditors. The accounts payable entry is found on a balance sheet under current liabilities. Account receivable = money owed by customers (individuals or corporations) to another entity in exchange for goods or services that have been delivered or used, but not yet paid for. Receivables usually come in the form of operating lines of credit and are usually due within a relatively short time period, ranging from a few days to a year.

Factor Loadings of Financial Variables after Direct Oblimin Rotation

Variables (Financial Ratios)	Component			
	Z1	Z2	Z3	Z4
Equity_TL	0.009	0.068	0.113	**0.705**
TL_Tassets	-0.032	**-0.878**	0.069	-0.034
Cash_Tassets	-0.034	-0.061	**0.811**	0.098
WoC_Tassets	-0.05	**0.762**	0.044	0.179
Cash_Sales	**-0.937**	0.021	0.083	0.009
EBIT_Sales	**0.962**	0.008	0.024	-0.004
Rinc_Tassets	0.014	**0.877**	0.015	-0.178
Ninc_Sales	**0.971**	-0.012	0.015	0.014
EBIT_IE	0.035	0.045	**0.766**	-0.098
AP_Sales	**-0.731**	-0.017	-0.037	-0.016
AR_TL	0.009	-0.041	-0.104	**0.725**

Note: The extraction method was principal component analysis, The rotation method was direct oblimin with Kaiser normalization.

Credit Rating of SMEs using Asian Data

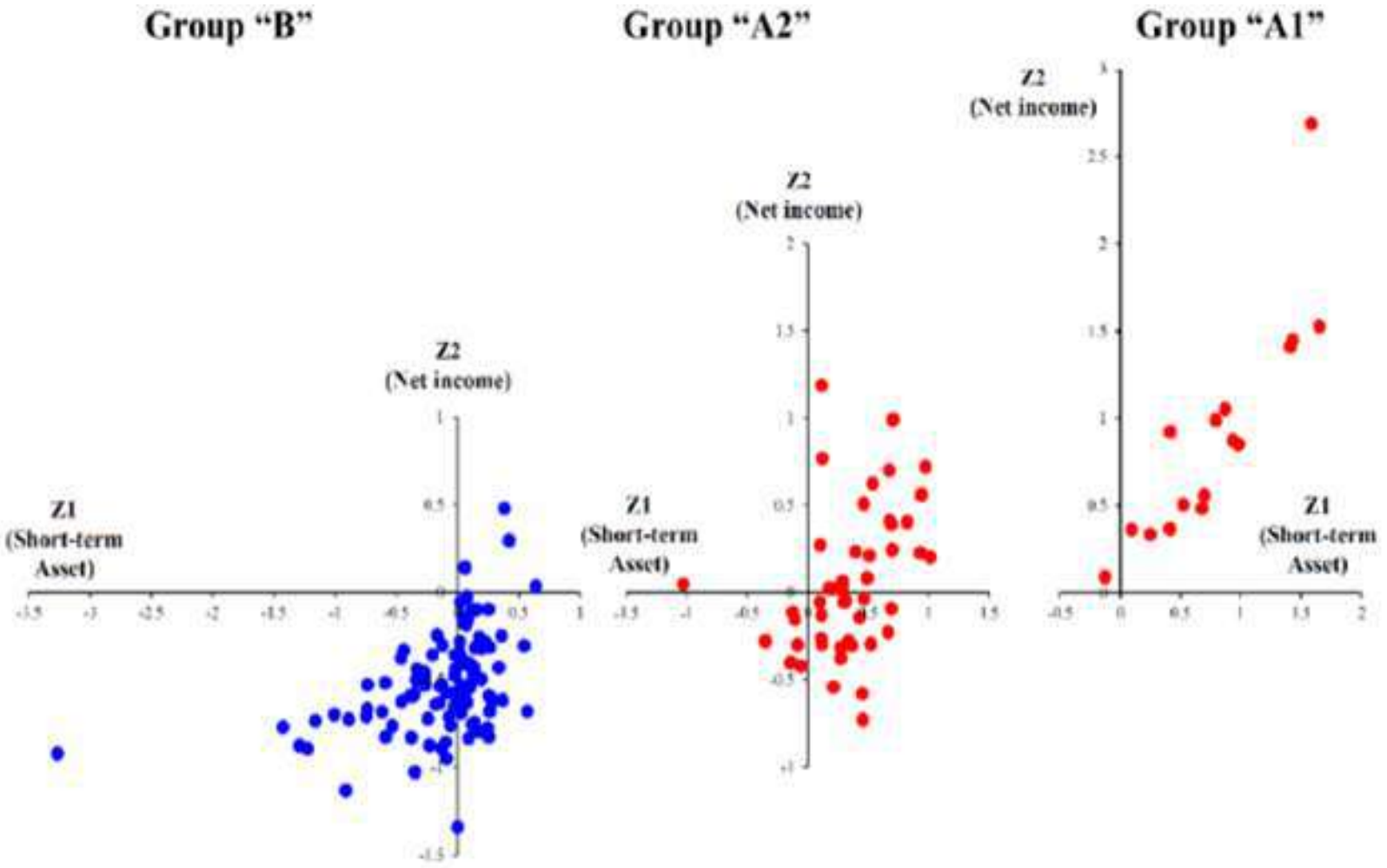
(i) Sales

(ii) Assets

(iii) Liquidity (Cash)

(iv) Total Debt

Grouping Based on Principal Component (Z1-Z2) and Cluster Analysis



A maximum likelihood-binary probit (Quadratic hill climbing) model and we ran the regression by using ordinary least square method. Using probit models for assessing the impact of macro-level variables as well as micro-level variables on default is popular among scholars since decades ago up to the most recent (Mizen and Tsoukas, 2012, Amaral et al. 2014, and Moulton et al., 2015). However, the advantage of our method comparing to a normal probit just by employing financial ratios as the explanatory variables is that our prediction is based on the factors analysis. Each of these factors are containing information of several of variables (financial ratios), and in preparation of these factors the unnecessary information is eliminated by statistical techniques.

Table 6. Probit Regression Result

Variable	Definition	Coefficient	Std. Error	Z-Statistic	Prob.
C	Constant	1.14	0.09	13.06**	0
A_1	liabilities	1.00	0.16	6.31**	0
A_2	short-term asset	−2.17	0.14	−15.40**	0
A_3	liquidity	−1.02	0.21	−4.75**	0
McFadden R-squared[10]: 0.76					

Note: dependent variable in this regression is default, Regression method is ordinary least square, **shows significant result in 0.01.

Credit Rating for SMEs
by Use of SME Database

1, Credit Rating is only applicable to large companies

2, Credit Rating for SMEs based on SME Data

3, Three ranking of SMEs (Asian country)

Five ranking of SMEs (Japan's case)

4, SME data can produce default risk ratio

5, Risk based Interest rate

Financial Education for SMEs

1, Bookkeeping

2, Daily revenue and expenses

3, Long-term planning

4, Accurate reporting of their business

5, Reduce default loan losses

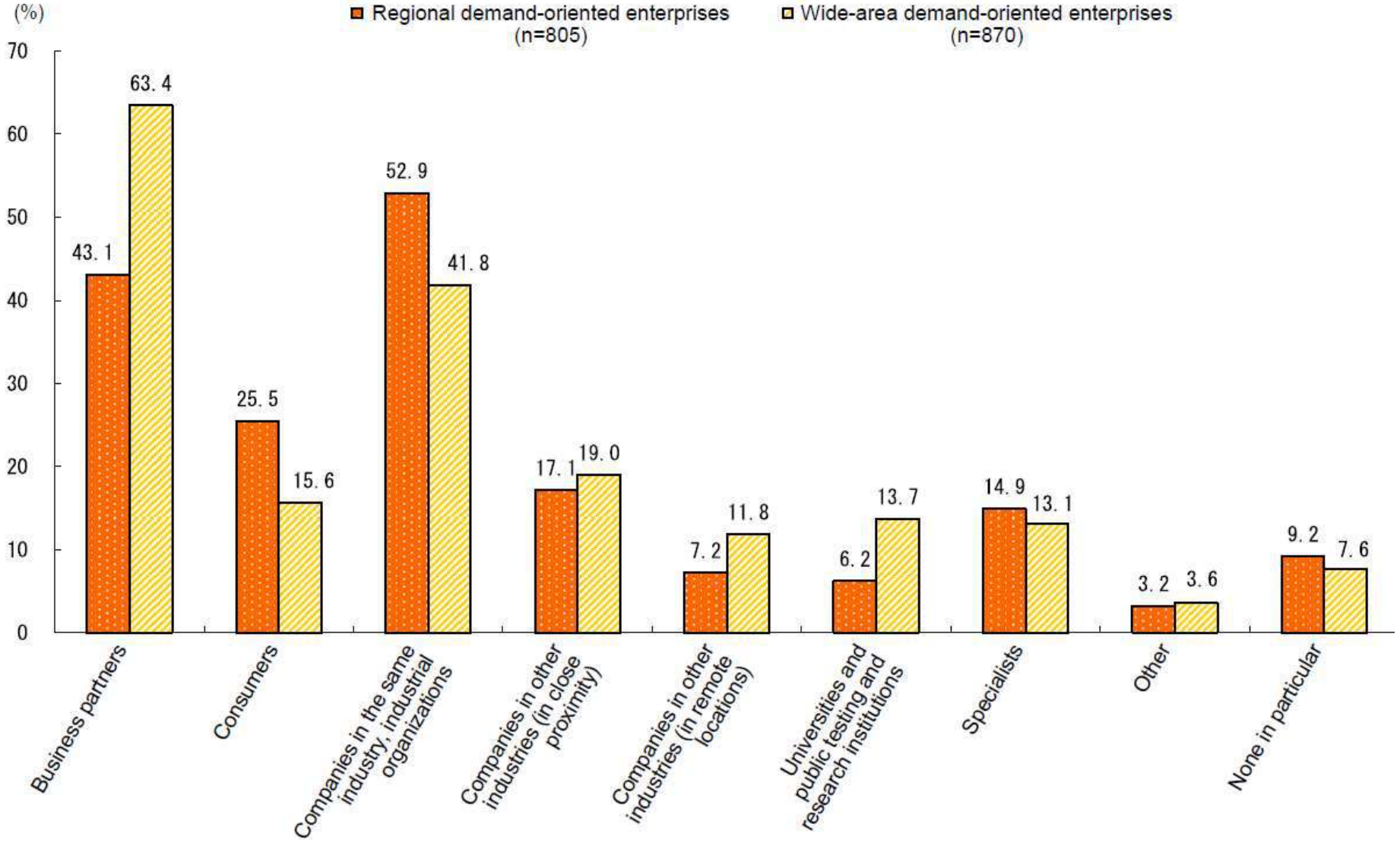
SME database

6, Asset Management by SME

7, Pension Contribution by SME (50%)

Asset Management of Reserves

Fig. 2-1-19 Organizations to confer with as motivation to seek innovation



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