

Sustainable Growth ---Infrastructure Structure Finance---

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Challenges

$$Y=AF(N, Kp, Kg)$$

Enhancing Infrastructure Investment and Financial Stability

- Maintain macroeconomic and financial stability
- Create an exchange rate mechanism
- Recycle savings into Investments
- Maintain fiscal soundness
- Avoid future crises and contagion

Supporting Equitable Growth

- Improve income equality (Education, Tax System, Equal Opportunity)

Promoting Competitiveness and Innovation

- Strengthen competitiveness of the agricultural sector, manufacturing and services sectors, SMEs and large firms

Protecting the Environment

- Reduce CO² emissions, Coal, Technology, Water supply, Sanitation

Enabling Factors

Developing Infrastructure Finance

$$Y=AF(N, Kp, Kg)$$

Develop efficient markets in support of infrastructure and the real sector

Increase effectiveness of financial intermediation

Improve recycling of regional savings into regional infrastructure investment

Harnessing Human Capital

Education and Training

Building Seamless Connectivity

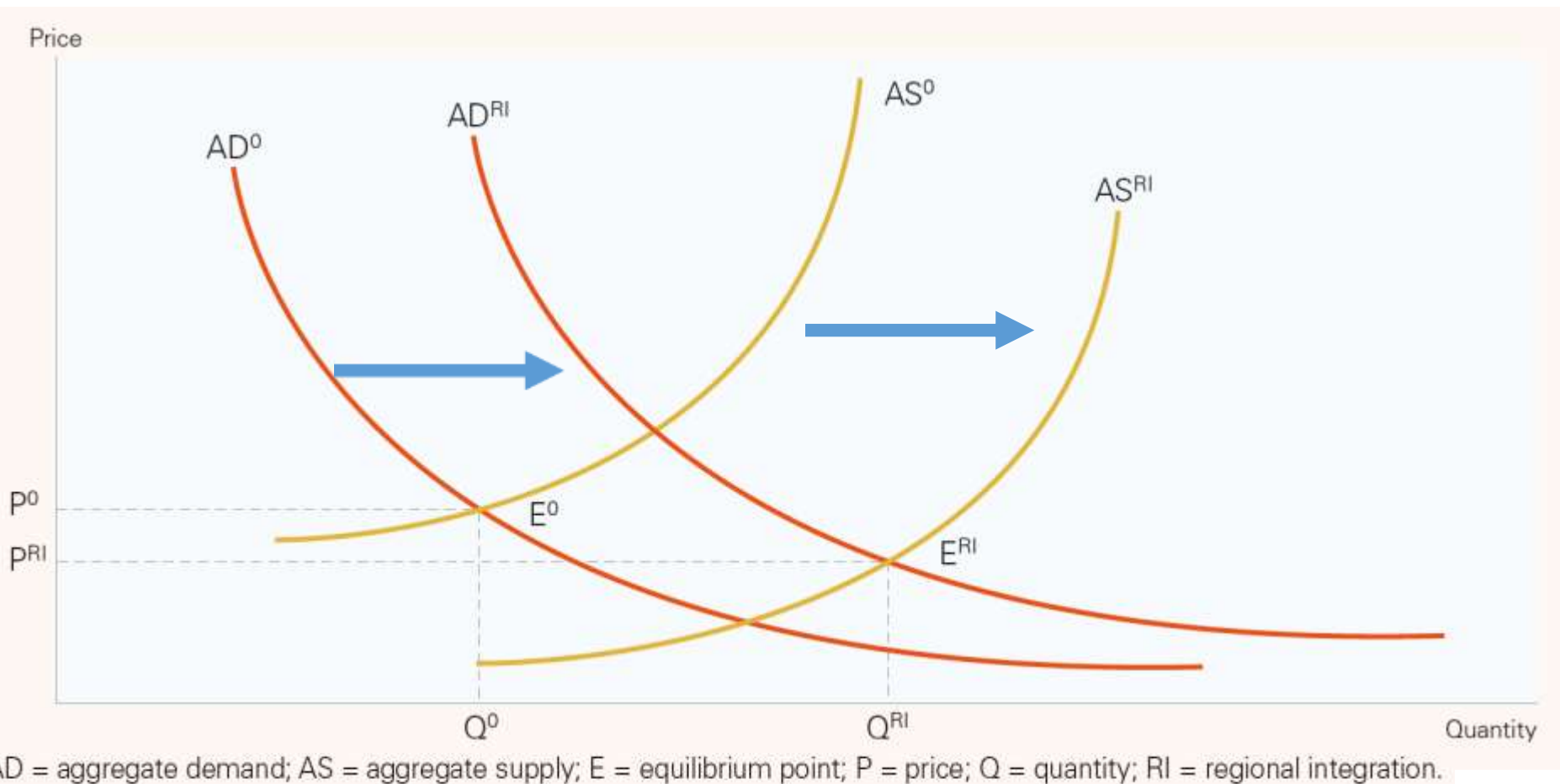
$Y=C+I+G+EXP-IMP$ ← Investment, Exports and Imports

Infrastructure Investment and AS $Y=AF(N, Kp, Kg)$

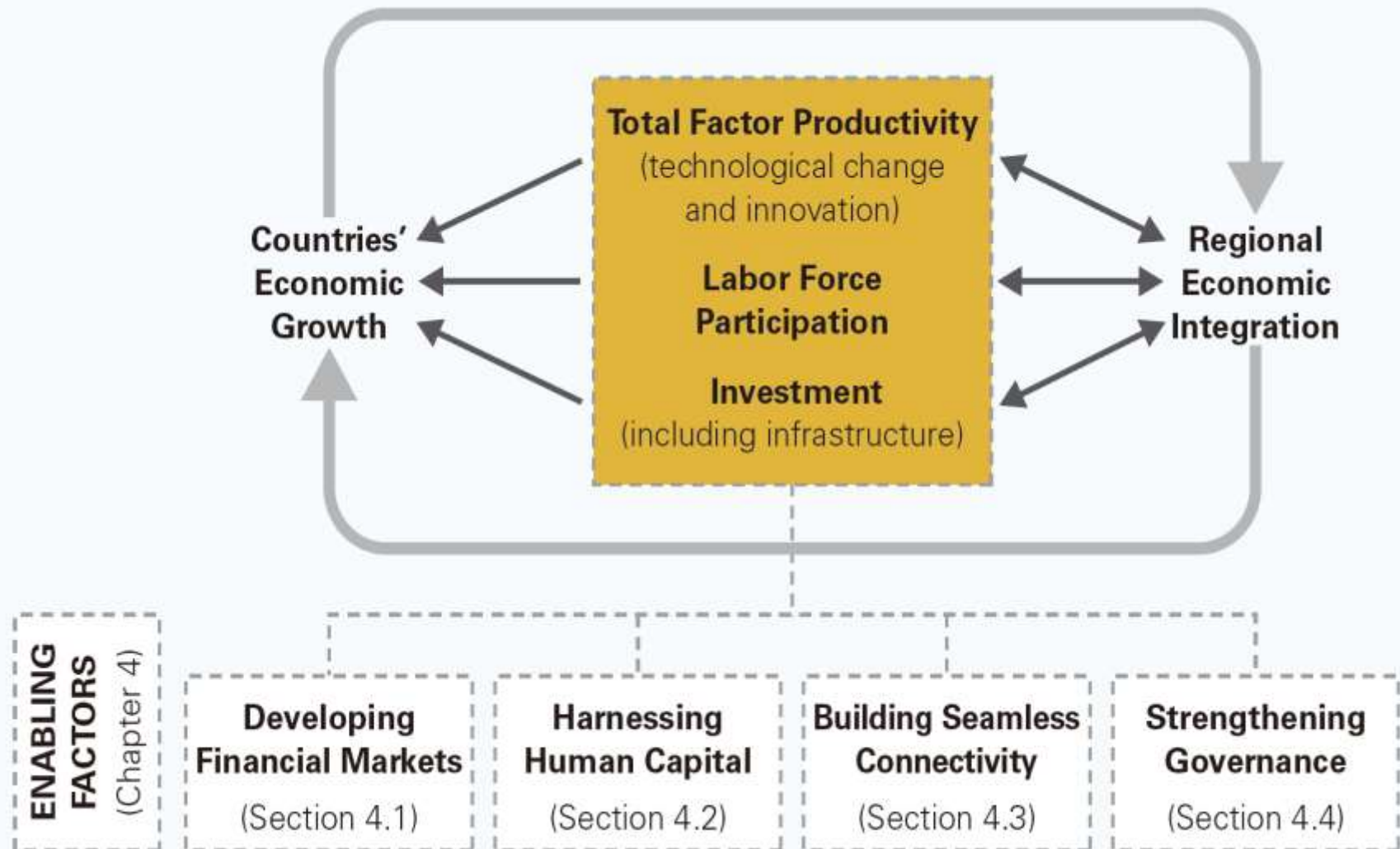
Strengthening Governance

Institutional Architecture

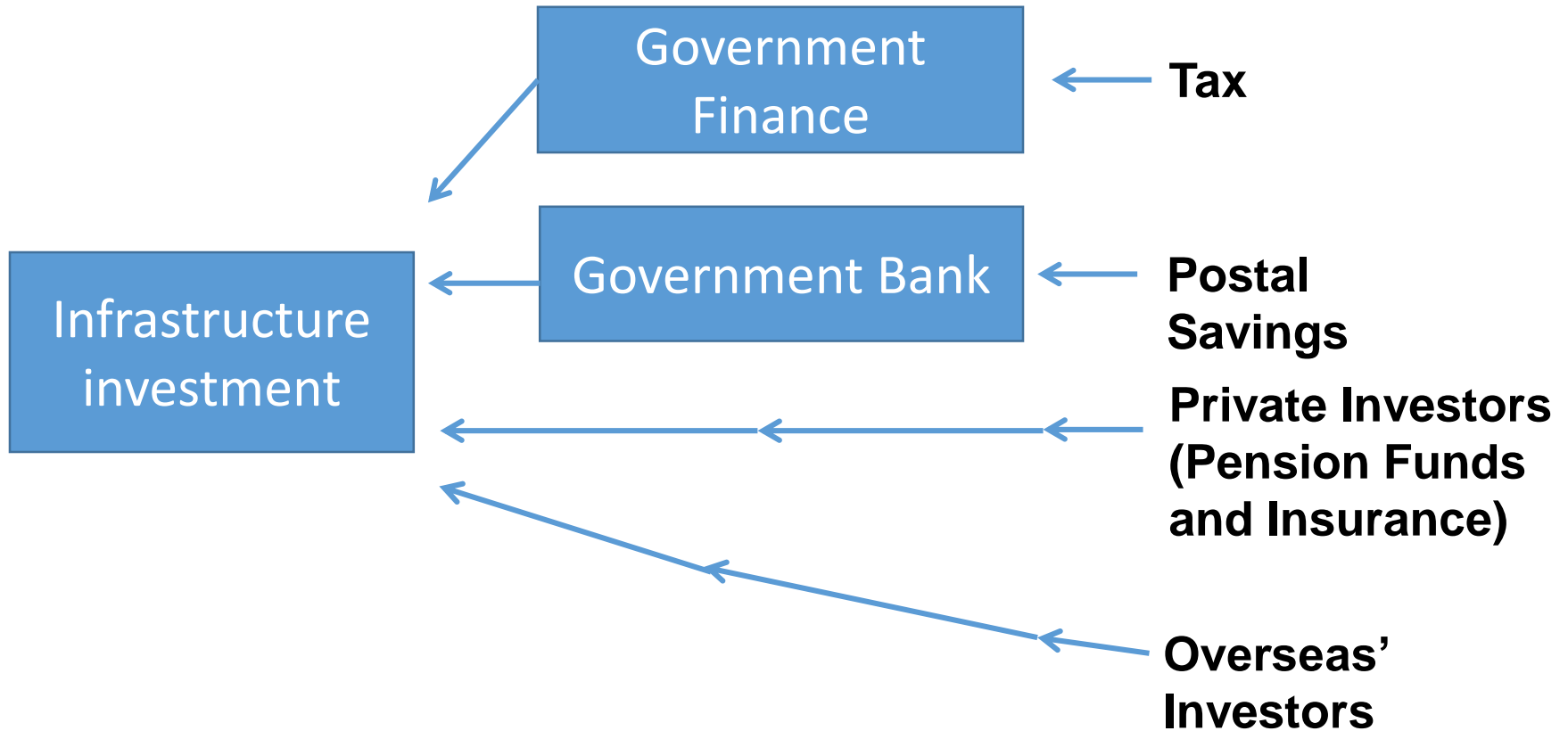
Effect of Infrastructure investment on Aggregate Demand and Aggregate Supply



Effect of Infrastructure Investment and Seamless connectivity on Economic Growth: Transmission Channels



Infrastructure Finance

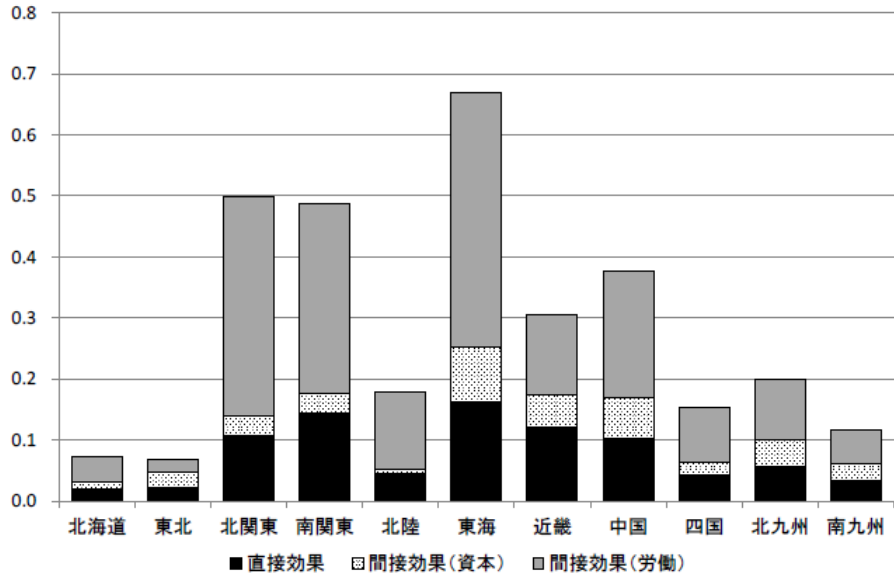


Economic Effect of Infrastructure Investment

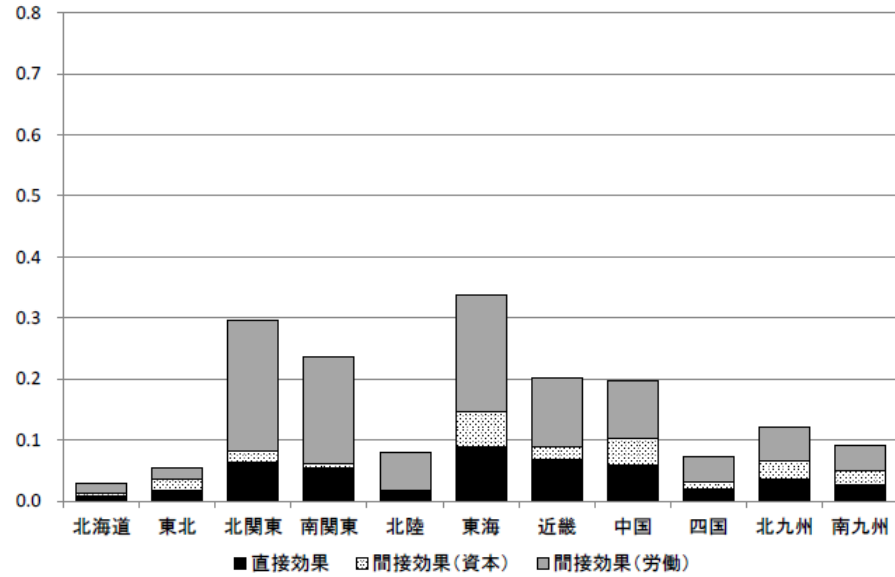
Regional Disparities (Manufacturing Industry)

図1 第2次産業における社会資本の生産力効果の変化

(1) 1990 年度



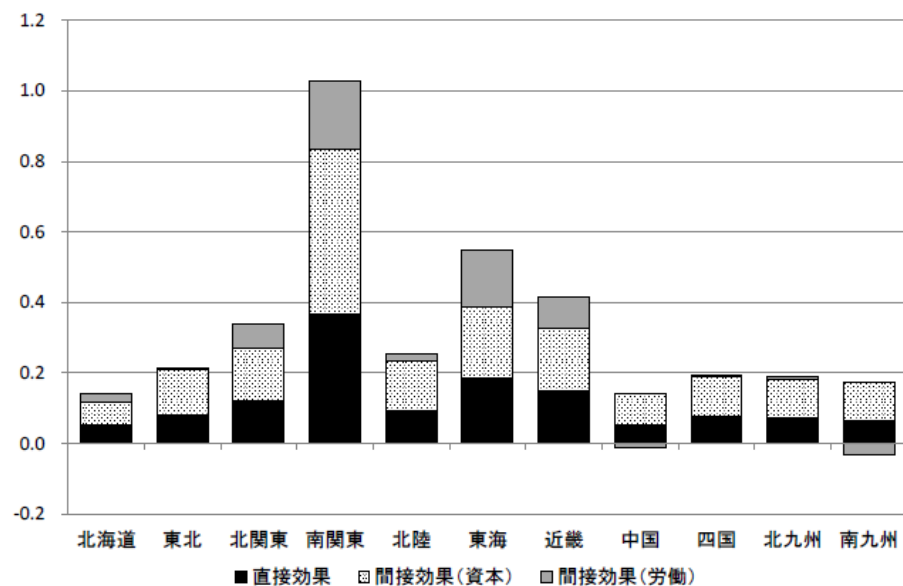
(2) 2010 年度



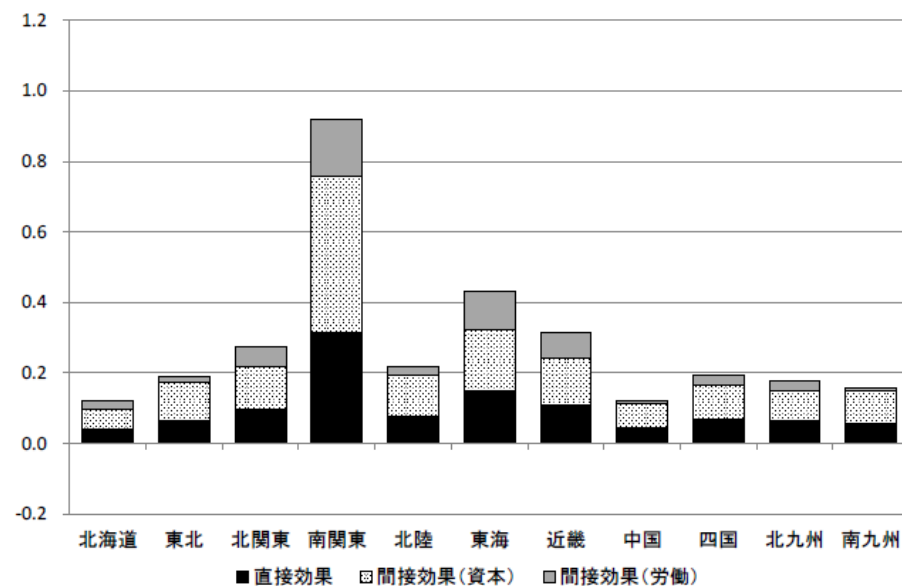
(出所) Nakahigashi-Yoshino (2015)

Economic Effect of Infrastructure Regional Disparities (Services Industry)

(1) 1990 年度



(2) 2010 年度

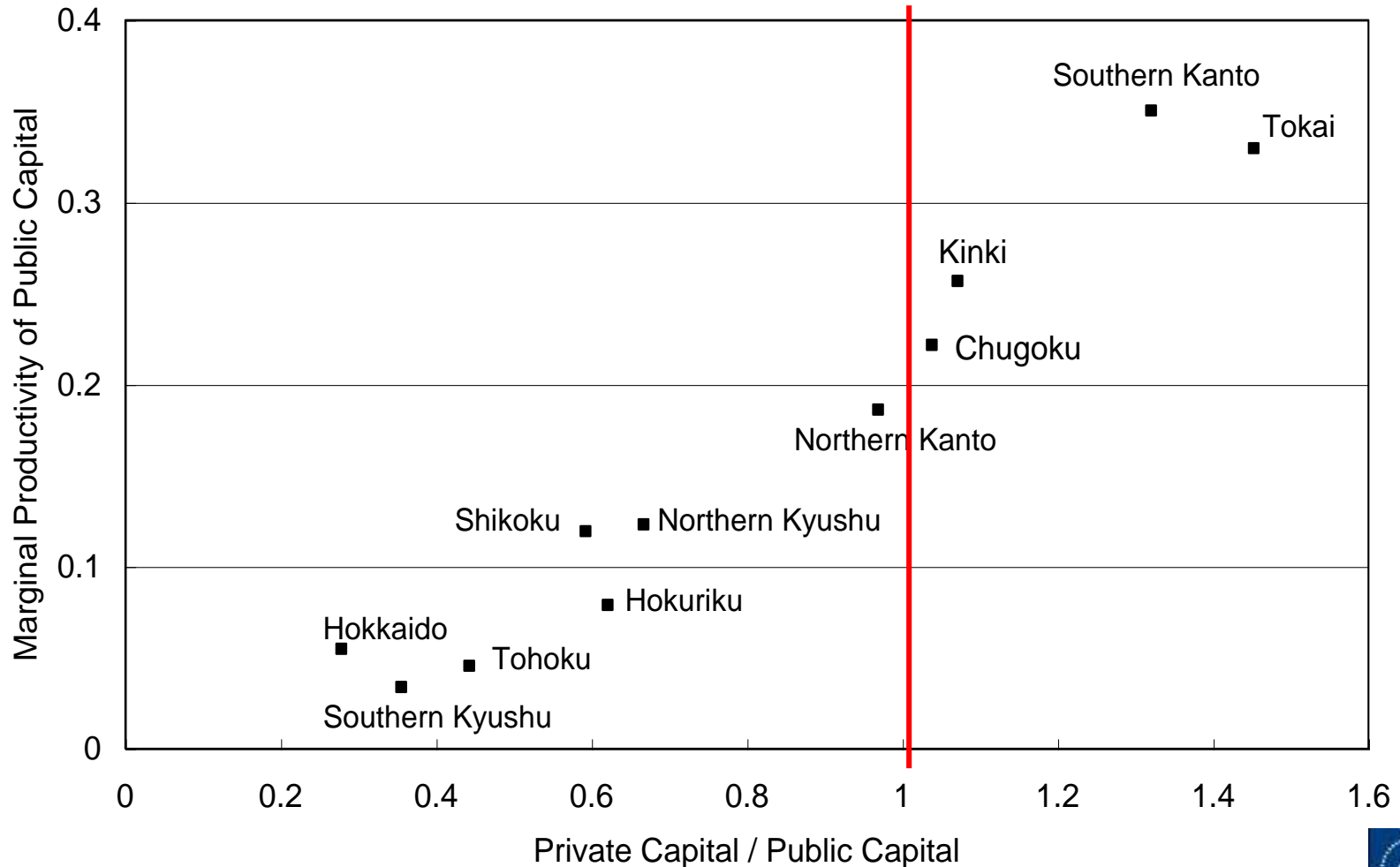


(出所) Nakahigashi-Yoshino (2015)

Effectiveness of Public Investment

- “Private capital/Public capital ratio” to “Marginal productivity of Public capital” -

Secondary Industry (Industrial Sector)



Thailand (Effectiveness of Infrastructure Investment)

		Private capital	Public capital			
				Direct effect	Indirect effect	
					Capital	Labor
Agriculture, forest, hunting and fishing						
	1971-1980	0.971	0.778	0.086	0.618	0.074
	1981-1990	0.912	0.516	0.107	0.323	0.087
	1991-2000	0.859	0.101	0.068	-0.059	0.092
	2001-2012	0.814	-0.185	0.018	-0.293	0.090
Manufacturing						
	1971-1980	0.710	0.526	0.191	0.111	0.224
	1981-1990	0.623	0.426	0.163	-0.004	0.266
	1991-2000	0.554	0.409	0.135	0.190	0.083
	2001-2012	0.631	0.902	0.173	1.081	-0.351

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

- 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.

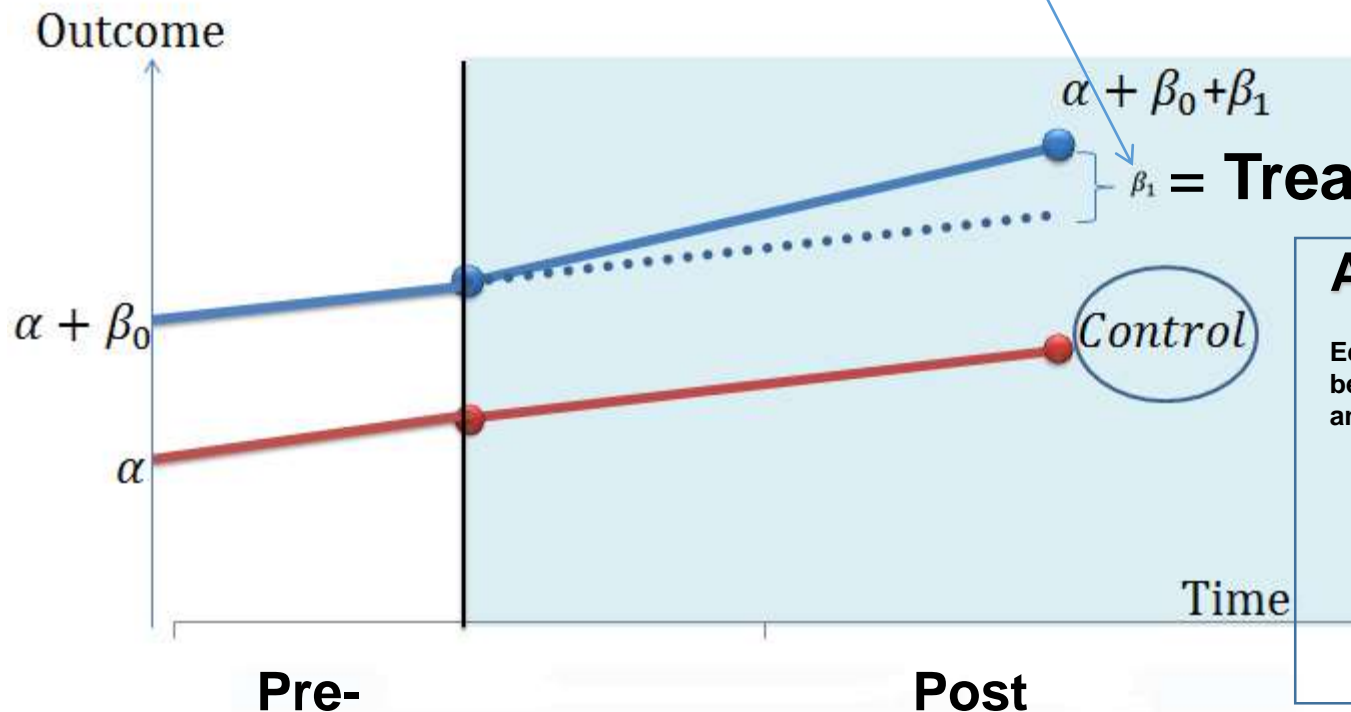


Method: Difference-in-Difference (DiD) Analysis

$$\text{Outcome} = \alpha + \beta_0 D + \sum_{t+2}^{t-4} \beta_1 D \times T + \varepsilon$$

where: $D = 1$ (Treatment group)
 $D = 0$ (Control group)

$T =$ Treatment period



Assumption:

Equal trends
between Treatment
and Control groups

Difference-in-Difference Regression: Spillover

	(1) Property tax	(2) Property tax	(3) Business tax	(4) Business tax	(5) Regulatory fees	(6) Regulatory fees	(7) User charge	(8) User charge
Treatment D	1.5535 (1.263)	0.736 (0.874)	1.067 (1.316)	0.438 (1.407)	1.372 (1.123)	0.924 (1.046)	0.990 (1.095)	0.364 (1.028)
Treatment D × Period _{t+2}	0.421** (0.150)	-0.083 (0.301)	1.189*** (0.391)	0.991** (0.450)	0.248*** (0.084)	-0.019 (0.248)	0.408*** (0.132)	-0.010 (0.250)
Treatment D × Period _{t+1}	0.447** (0.160)	0.574*** (0.118)	1.264*** (0.415)	1.502*** (0.542)	0.449** (0.142)	0.515*** (0.169)	0.317** (0.164)	0.434** (0.167)
Treatment D × Period _{t0}	0.497*** (0.128)	0.570** (0.223)	1.440*** (0.417)	1.641*** (0.482)	0.604** (0.183)	0.642*** (0.181)	0.350 (0.271)	0.422 (0.158)
Treatment D × Period _{t-1}	1.294** (0.674)	0.387 (0.728)	2.256** (0.957)	1.779** (0.470)	1.318** (0.649)	0.838* (0.448)	0.959 (0.714)	0.197 (0.560)
Treatment D × Period _{t-2}	1.163* (0.645)	0.336 (0.594)	2.226** (0.971)	1.804** (0.531)	1.482** (0.634)	1.044** (0.413)	0.941 (0.704)	0.247 (0.531)
Treatment D × Period _{t-3}	1.702* (0.980)	0.450 (0.578)	2.785** (1.081)	2.070*** (0.544)	1.901*** (0.630)	1.238*** (0.369)	1.732*** (0.598)	0.676 (0.515)
Treatment D × Period _{t-4} forward	2.573*** (0.900)	1.100 (0.758)	3.428*** (0.928)	2.560*** (0.350)	2.288*** (0.563)	1.509*** (0.452)	2.030*** (0.607)	0.787 (0.745)
Construction		2.283** (1.172)		1.577 (1.196)		1.207 (0.855)		1.942* (1.028)
Constant	14.69*** (0.408)	-2.499 (8.839)	14.18*** (0.991)	2.230 (9.094)	13.66*** (0.879)	4.597 (6.566)	13.08*** (0.649)	-1.612 (7.84)
N	80	73	79	73	80	73	77	73
R ²	0.29	0.41	0.37	0.44	0.43	0.50	0.26	0.39

Clustered standard errors, corrected for small number of clusters; * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

The Southern Tagalog Arterial Road (STAR) Philippines, Manila

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

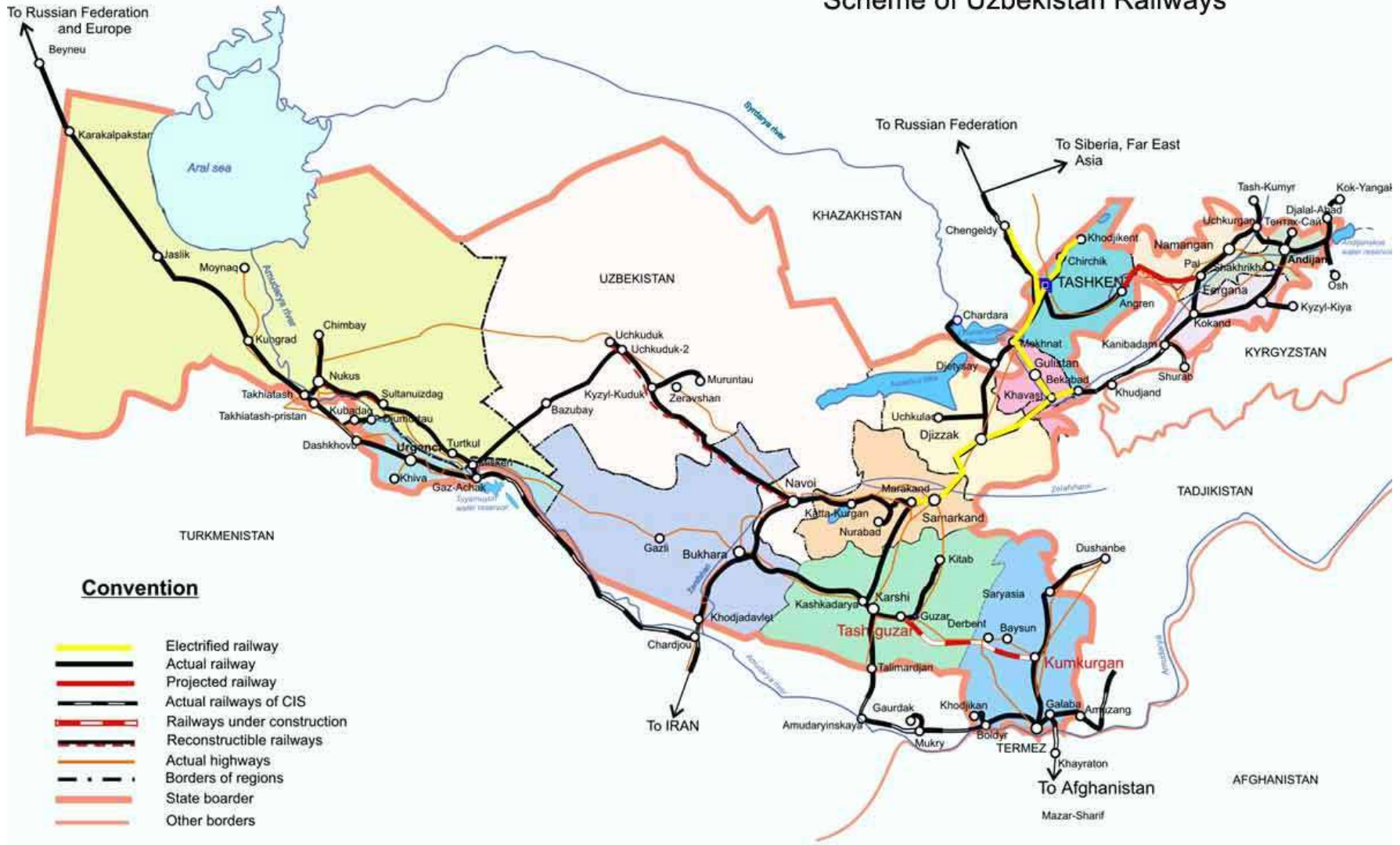
(単位：100 万ペソ)

	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

Uzbekistan: Railway

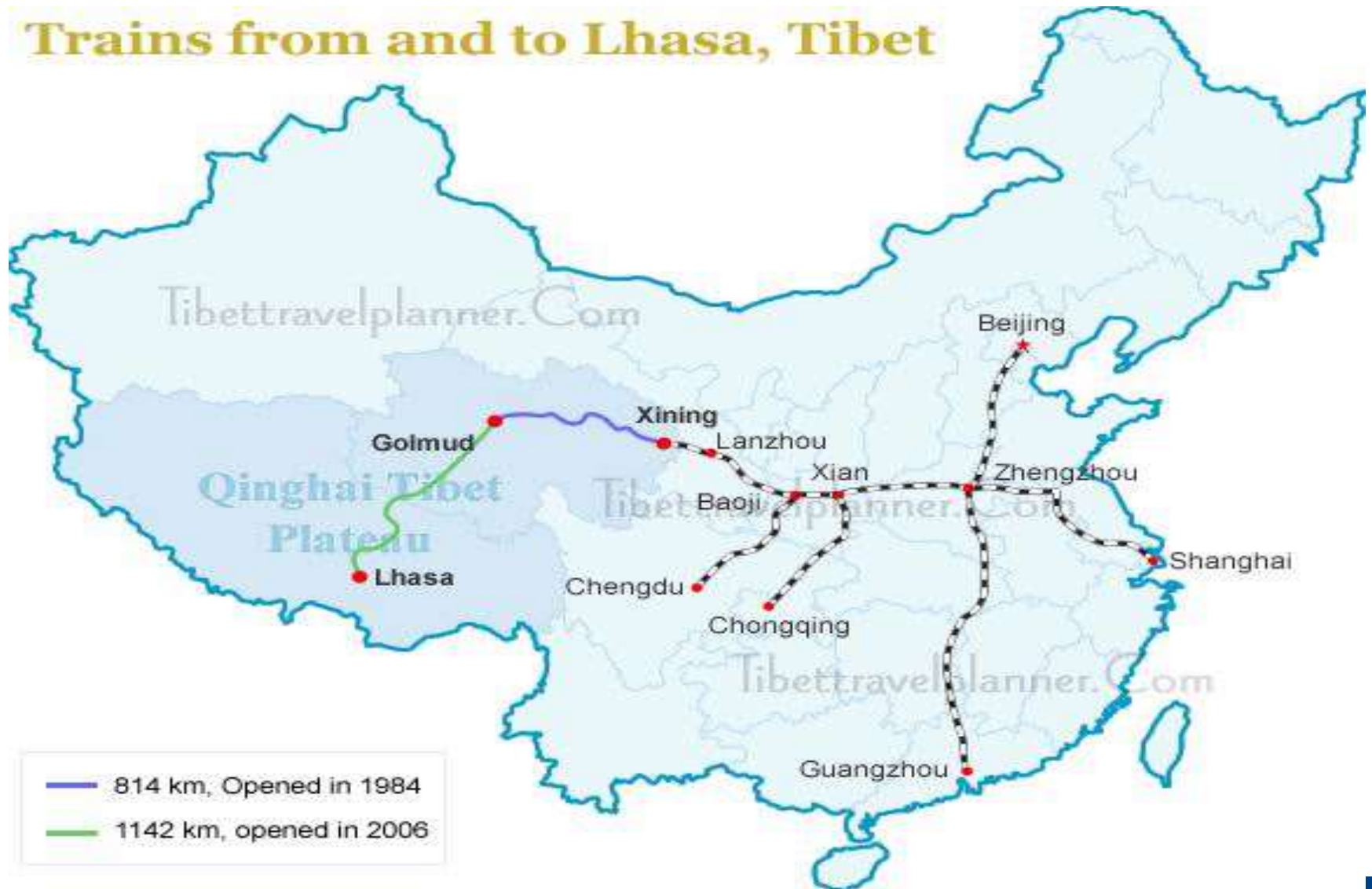
Scheme of Uzbekistan Railways



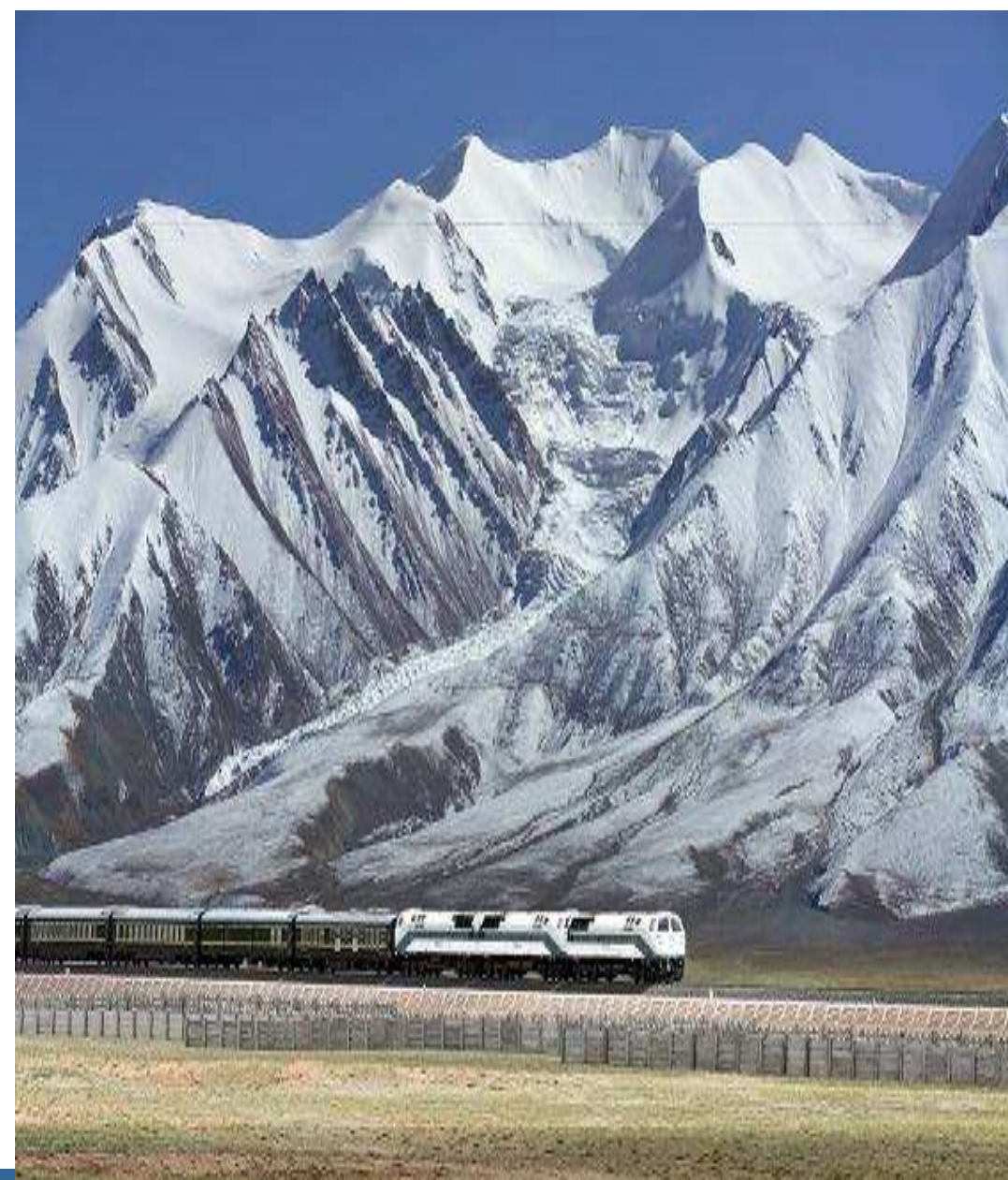
Regions	Outcome	Pre-railway period	Post-railway period	Difference
Non-affected group	GDP growth rate	8.3	8.5	0.2
Affected Group	GDP growth rate	7.2	9.4	2.2

Qinghai-Tibet Railway Map

Trains from and to Lhasa, Tibet



Tibet Railway



Source	SS	df	MS	Number of obs =	72
Model	8.28173613	6	1.38028935	F(6, 65) =	7.73
Residual	11.6075298	65	.178577382	Prob > F =	0.0000
Total	19.8892659	71	.280130506	R-squared =	0.4164
				Adj R-squared =	0.3625
				Root MSE =	.42258

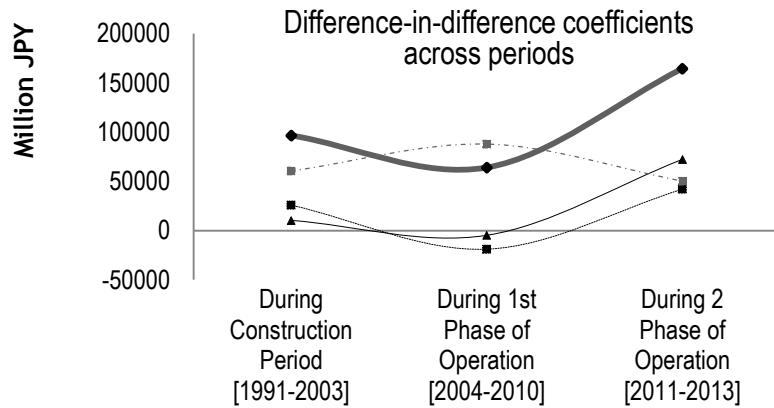
difference1	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
govspending1	.0118414	.0028554	4.15	0.000	.0061389	.017544
population1	.0034233	.0013616	2.51	0.014	.000704	.0061426
population0	-.0102002	.0037957	-2.69	0.009	-.0177808	-.0026196
govspending0	-.0206841	.0055783	-3.71	0.000	-.0318248	-.0095435
Dummy	.0924005	.2097625	0.44	0.661	-.3265242	.5113252
Dummy2	.061252	.1937049	0.32	0.753	-.3256034	.4481074
_cons	.4984291	.2045091	2.44	0.018	.0899961	.906862

Japanese Bullet Train

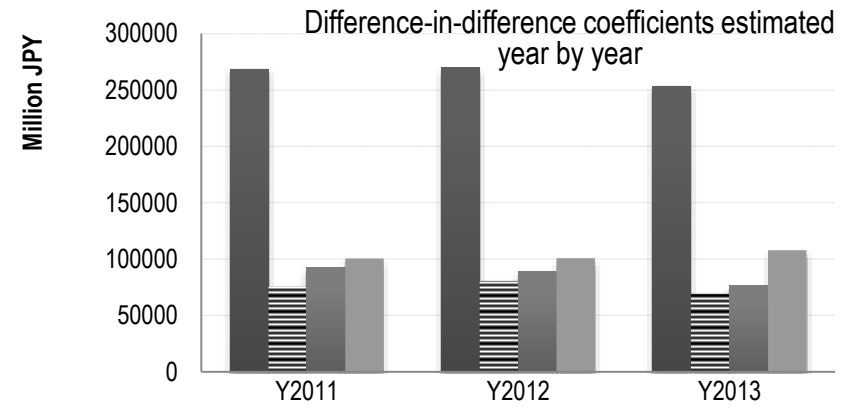


Japanese Bullet Train

Estimation results by group of prefectures



● Total Tax
 ■ Personal Income Tax
 ▲ Corporate Tax
 □ Other Taxes

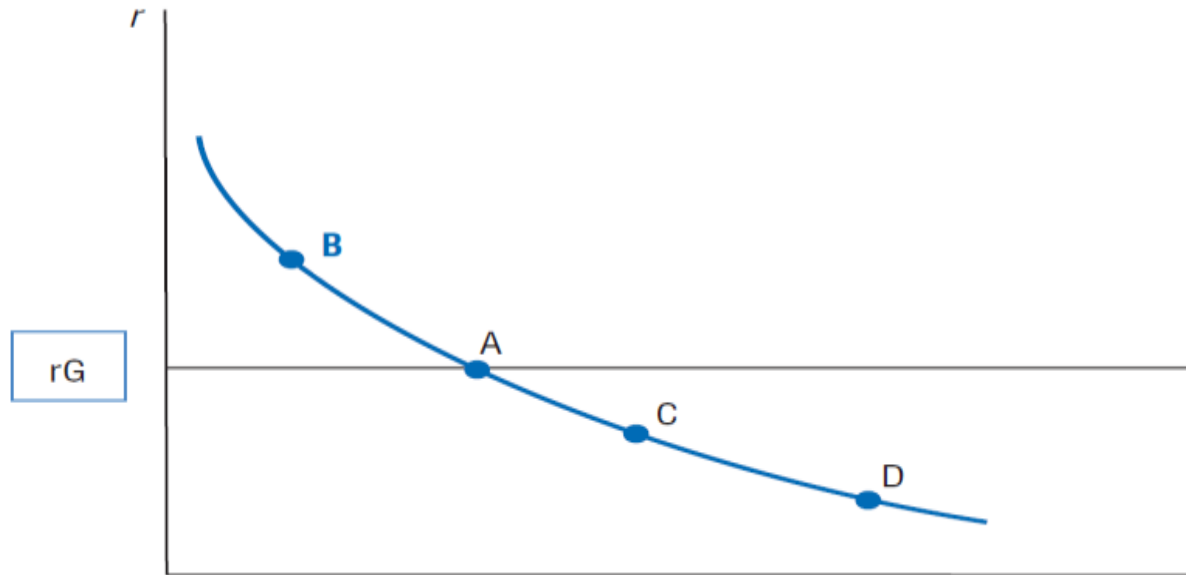


■ Total Tax
 ▨ Personal Income Tax
 ■ Corporate Tax
 ■ Other Taxes

Note: Numbers for tax revenue amount adjusted for CPI with base year 1982. Pre-shinkansen construction period covers years from 1982 to 1990. Non-affected groups include rest of the prefectures

Treated groups: Group 2: Kagoshima, Kumamoto
 Group 3: Kagoshima, Kumamoto, Fukuoka
 Group 5: Kagoshima, Kumamoto, Fukuoka, Oita, Miyazaki
 Group 7: Kagoshima, Kumamoto, Fukuoka, Oita, Miyazaki, Saga, Nagasaki
 Group Con.: Kagoshima, Kumamoto, Fukuoka, Yamaguchi, Hiroshima, Okayama, Hyogo, Osaka

Expected rates of return on project bonds vs. benchmark yield



	No Efforts		Efforts to improve	
No Efforts	(50, r) Operating Company	Investors	(50, αr) Operating Company	Investors
Efforts to improve	(100, r) Operating Company	Investors	(100, αr) Operating Company	Investors

Public Private Partnership (PPP)

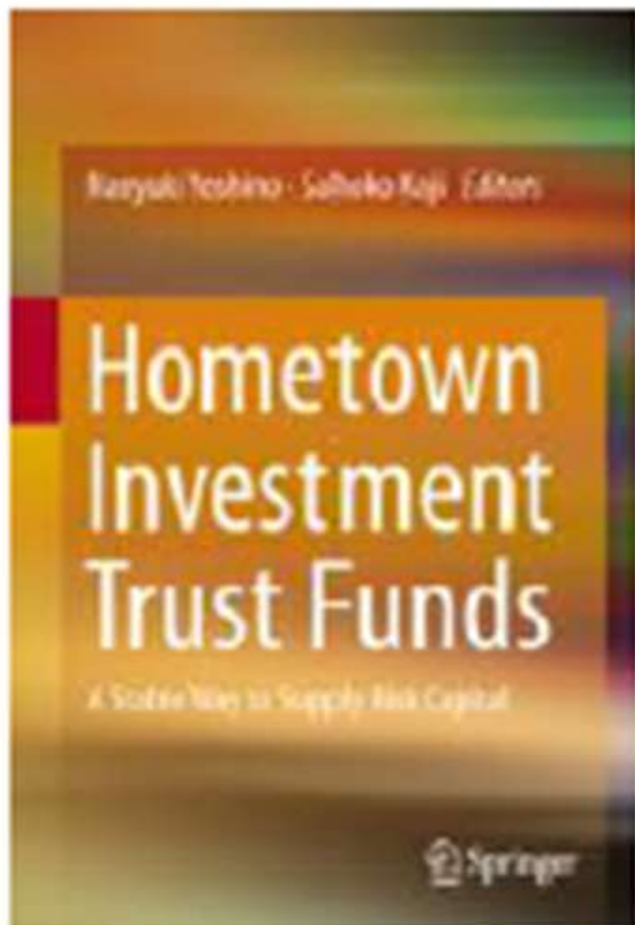
- (1) **Risk sharing** between private and public sector
- (2) Incentive cut costs and to increase revenue
 - Avoid political intervention
 - **Bonus payment for employees who run infrastructure**
- (3) Many projects could be started by PPP
 - **Utilize domestic savings**
 - life insurance and Pension funds (**long term**)
- (4) **Indirect Effects are important (tourism, manufacturing, agriculture, services)**

Risks Associated with Infrastructure

- 1、 Risk sharing between private and public
- 2、 too much reliance on overseas' money
→ future burden for the country
- 3、 Loans vs Investment
- 4、 bankable projects or not ?
- 5、 Various Risks (political risk, operational risk, demand risk, ex-post risk, maintenance risk, earthquakes, natural disaster risk)

Possible Solutions

Start up businesses, farmers



Hometown Investment Trust Funds

-
A Stable Way to Supply Risk Capital

Yoshino, Naoyuki; Kaji Sahoko (Eds.)
2013, IX, 98 p. 41 illus., 20 illus. in color

Available Formats:

ebook

Hardcover

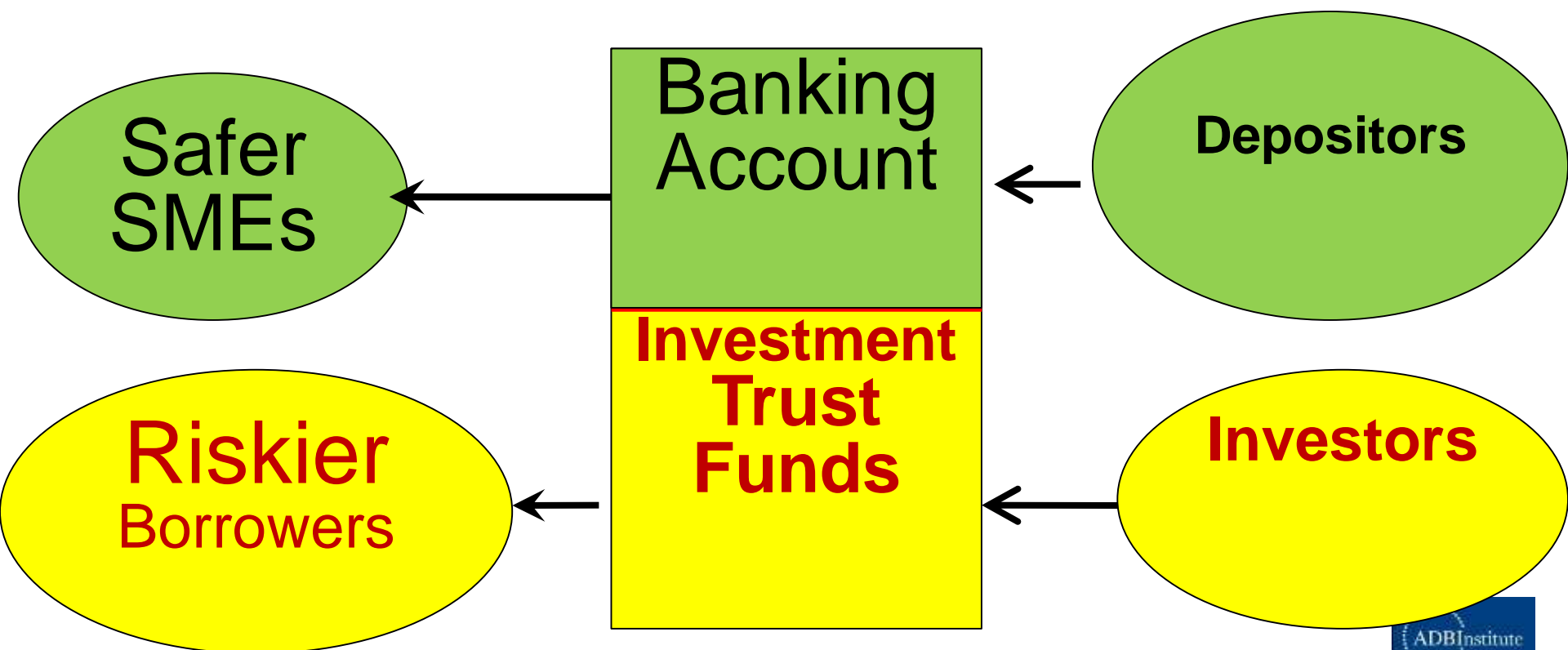
Springer

**Japan, Cambodia
Vietnam, Peru**

Bank-based SME financing and regional financing to riskier borrowers

1. Bank Loans to relatively safer borrower
2. Hometown Investment Trust Funds/

E-Finance, Internet financing





Investment in SMEs and start up businesses



-Financial Access for All-



すべてを失い再起を断念しようになった時の

Agricultural Funds

Beans and Wine



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