Increasing Infrastructure Investment in the CAREC Region with Spillover Tax Revenues

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Value of Infrastructure Investment

- **Infrastructure investment** is a crucial driver of economic development and public sector efforts alone will not be enough to finance infrastructure needs
- **Significant private sector contributions** are required for the sustainability of such projects;
- This presentation will examine the following:
  - **Quantifying positive spillover effects** of infrastructure
  - **Harnessing the benefit of digital and technology** for infrastructure
  - **SMEs and startup financing** for infrastructure
  - Mitigating bottlenecks in **the land acquisition process**
  - **Land Trust**

Added Value of Infrastructure Investment

By easing the requirements and innovative financing for **small and medium-sized enterprises (SMEs),** it can lead to an increased spillover effects from infrastructure investment.

High quality infrastructure allows for owners of SMEs and agribusinesses to develop (i.e. restaurants, retail, agriculture, etc.)

- Credit guarantees for SME lending
  - Loans to SMEs to support their normal functions
  - Encouraging private credit creation: credit guarantees for SME lending
- Hometown crowd funding
  - Hometown investment trust funds (HIT funds)
  - Provide loans to SMEs and startup businesses.
  - Can help startups and SMEs to sell their products by creating platforms for sales expansion.

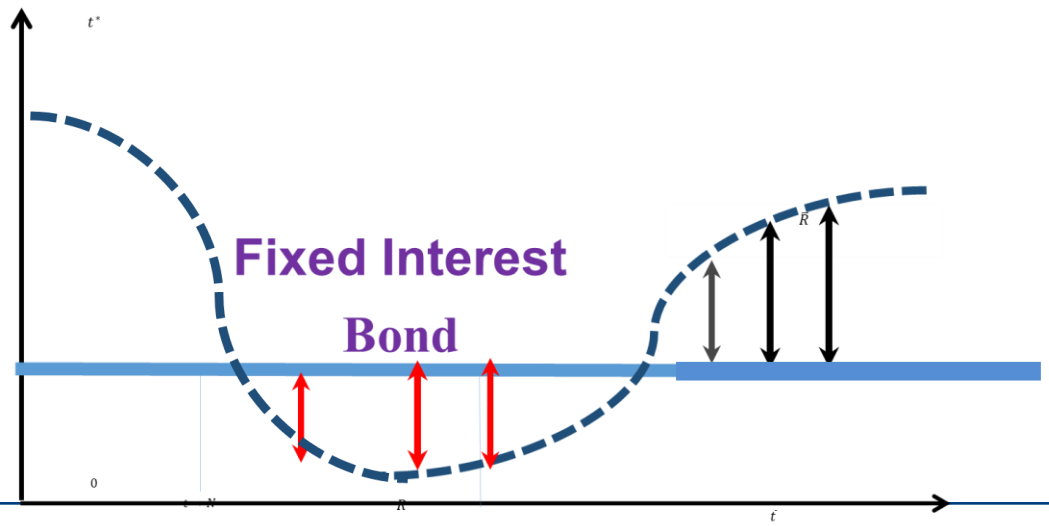
Infrastructure Needs to be Resilient

Governments collect financing for disaster management, called "reserves"

(i) ex ante accumulation of reserves;

(ii) fiscal spending when floods or disasters have occurred;

(iii) ex post accumulation of reserves



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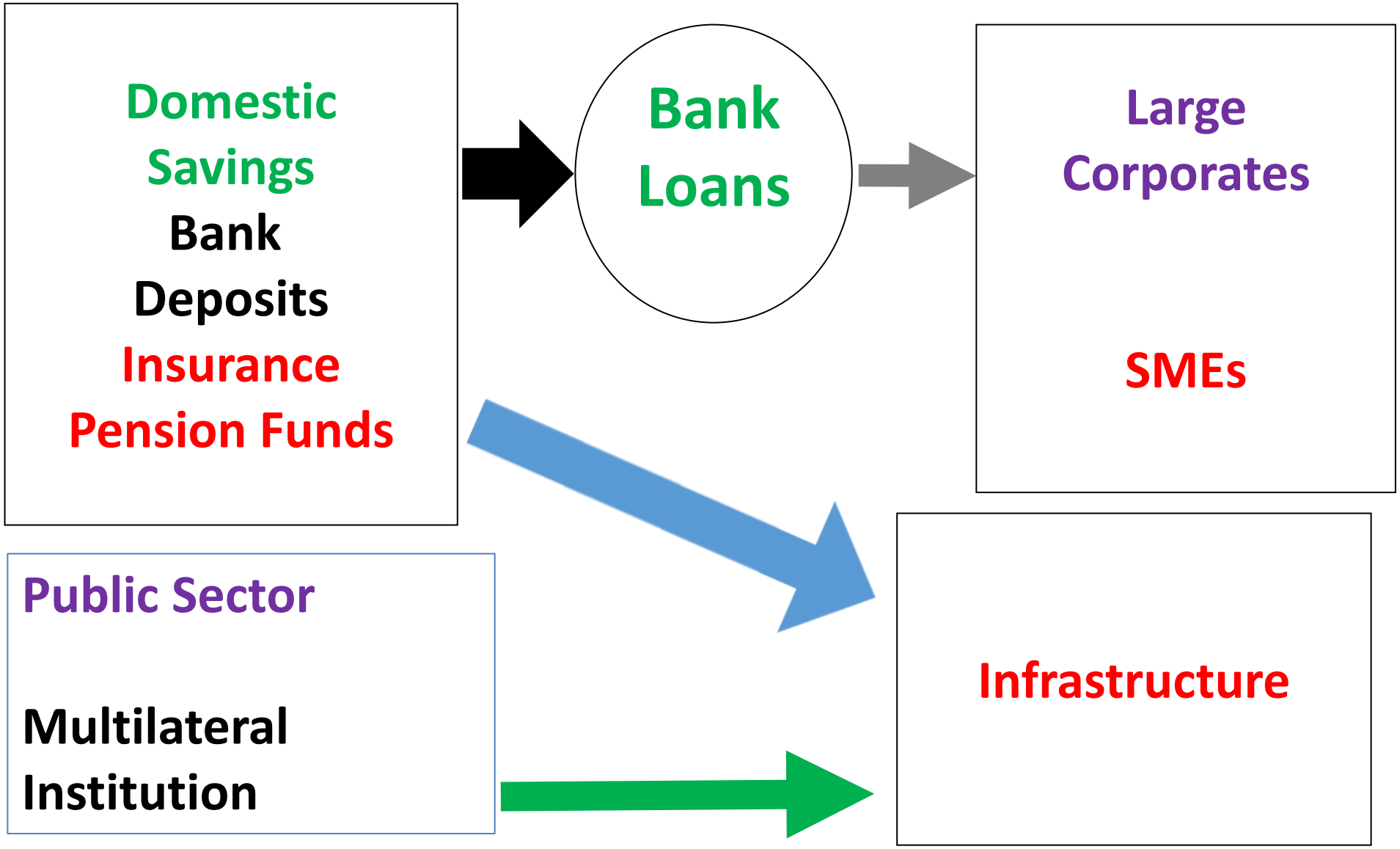
Governance for Infrastructure

- Substantial benefits can be realized through **better governance** of public infrastructure.
- **MDBs provide lending for development, grants and technical assistance** →help countries to set up regulatory frameworks, government structure and encourage transparency
- A high risk is **corruption** in the procurement process (land procurement or land acquisition)
- **Land Trust** eliminates land illegal (e.g. mafia) practices and allows landowners to enjoy the economic value of their land

Circulation of Savings into Domestic Investment



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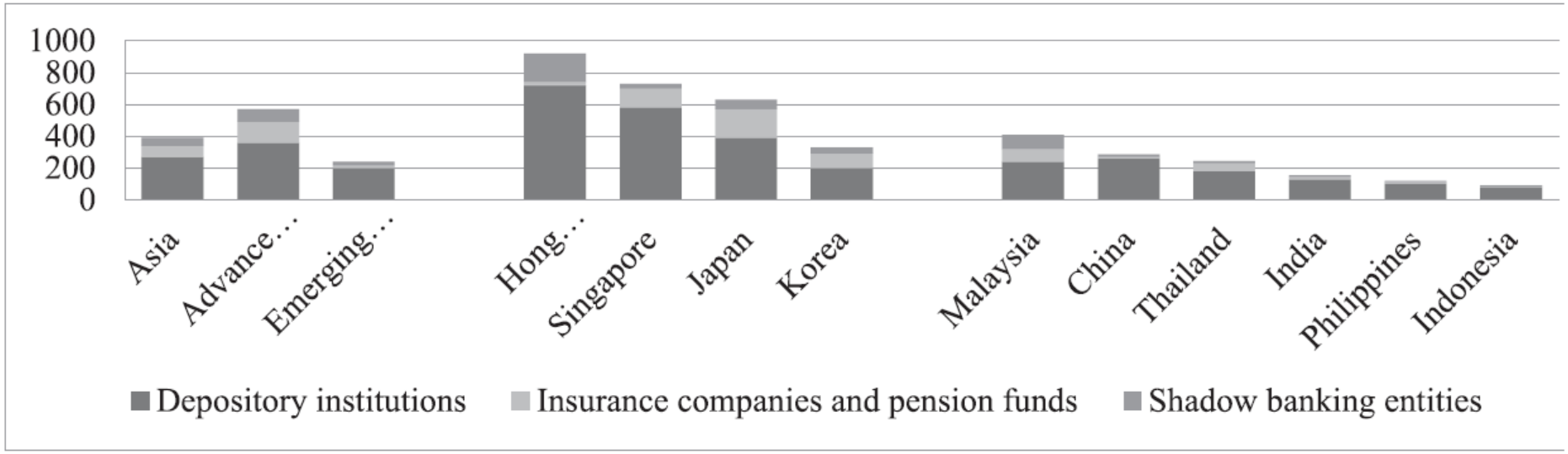
Bank dominated economies in Asia

Lack of long-term investors in Asia

Figure 1. Assets of financial institutions in Asia (US$ billion)



Source: *IMF (2018).*

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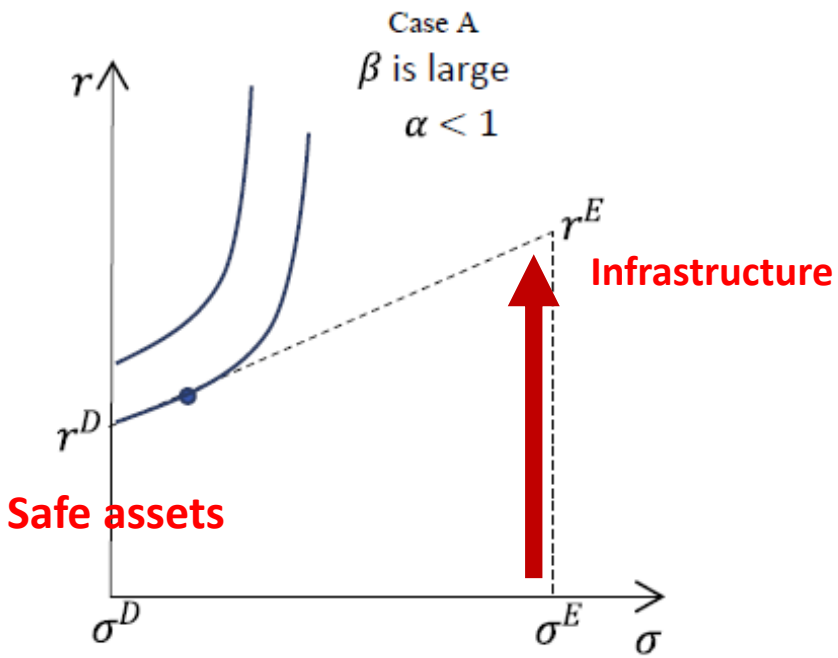

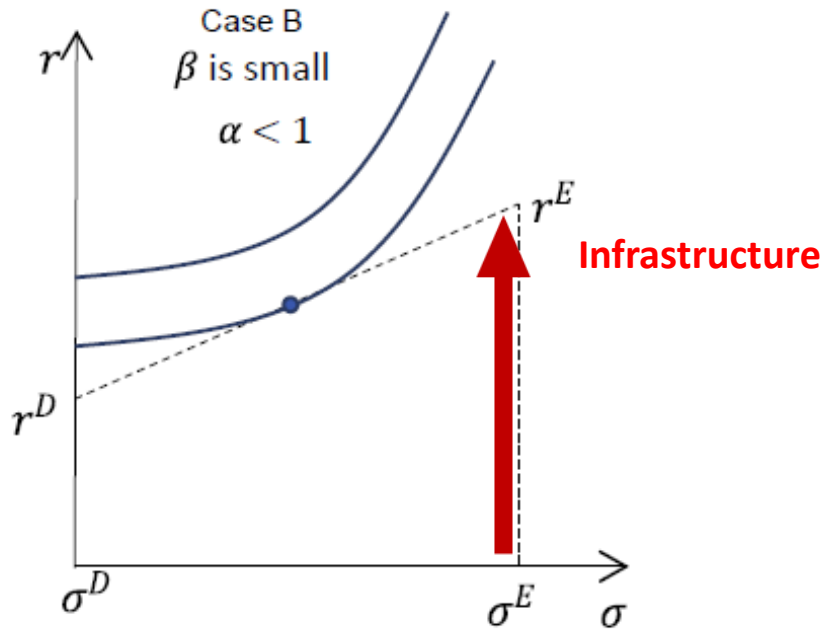

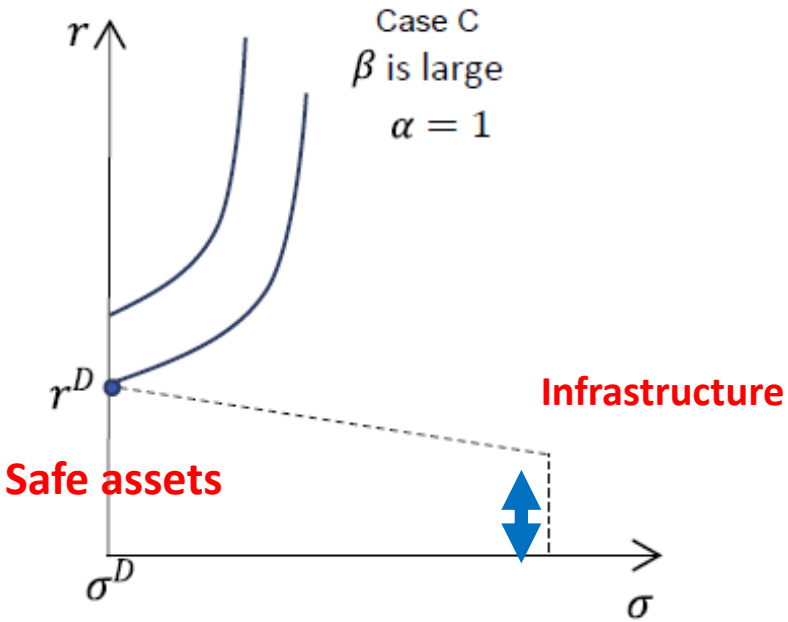

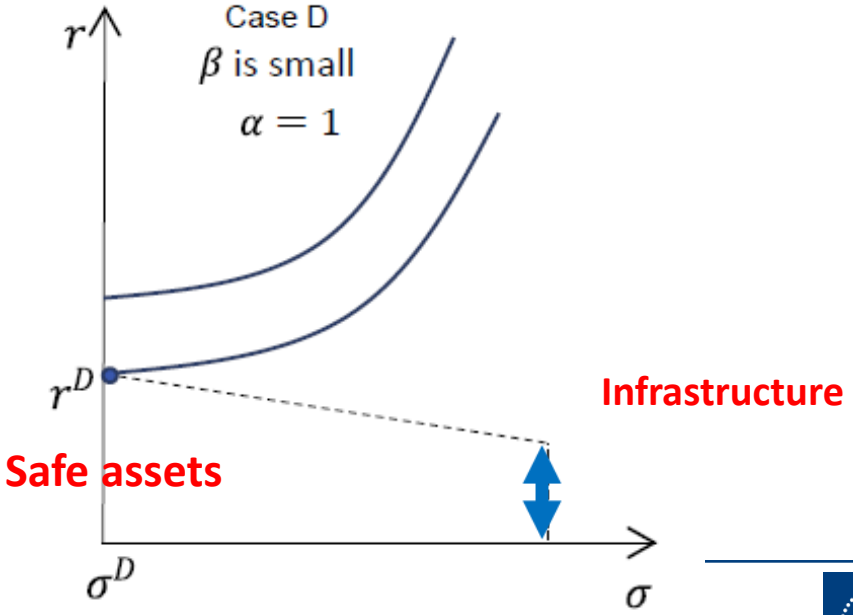

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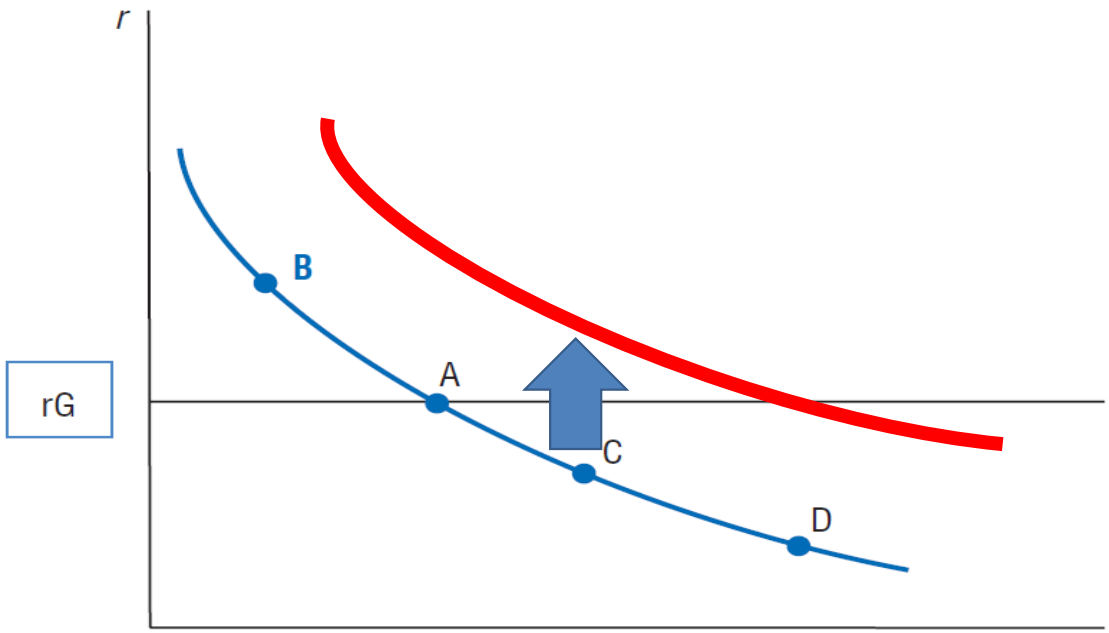
Public-Private Partnership (PPP)

Expected rate of return on projects bond vs benchmark yield

Expected rates of return on project bonds vs. benchmark yield



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Spillover Effects of IT Infrastructure

Railway, Road, Water, Digital Infra.

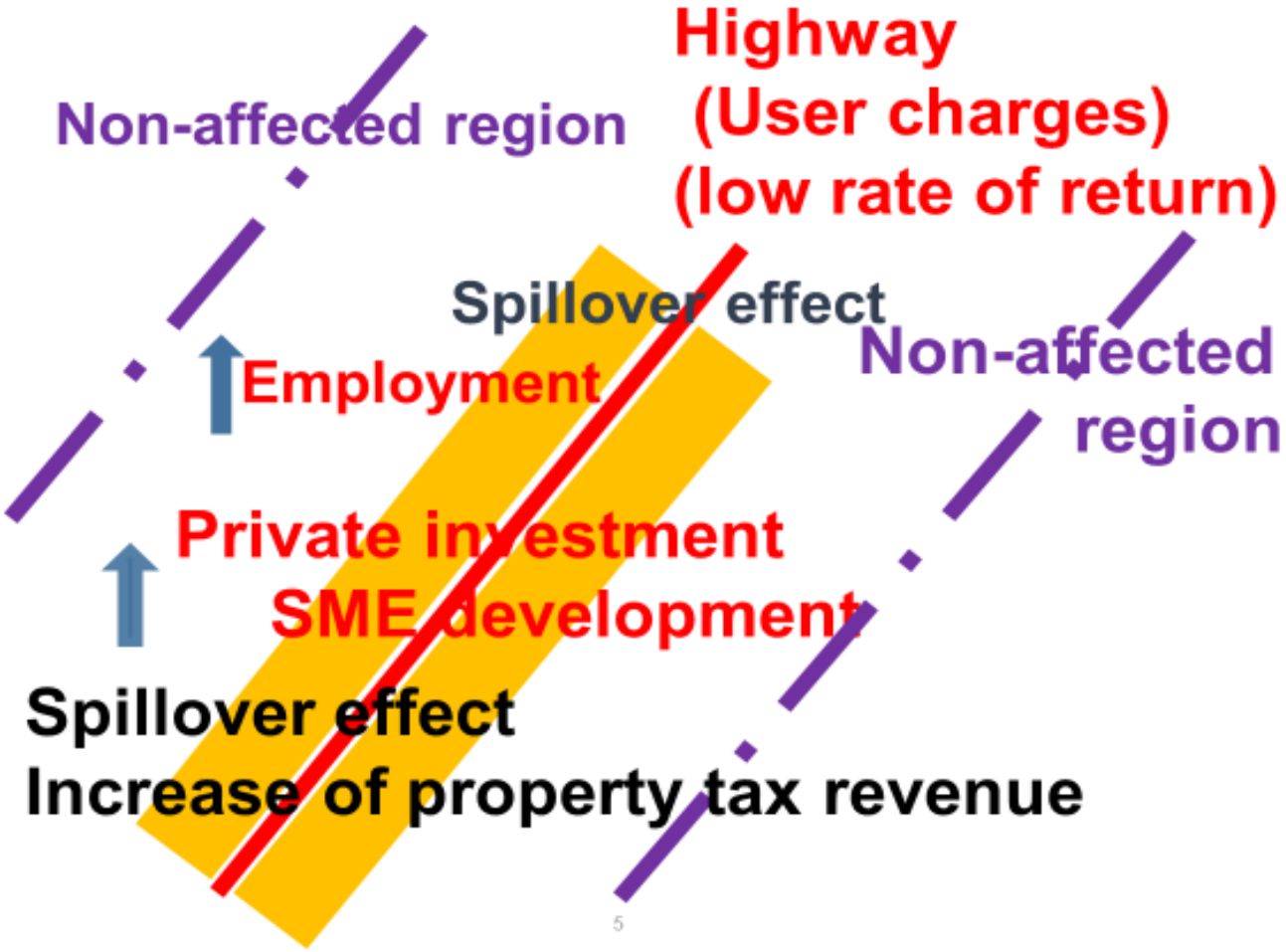


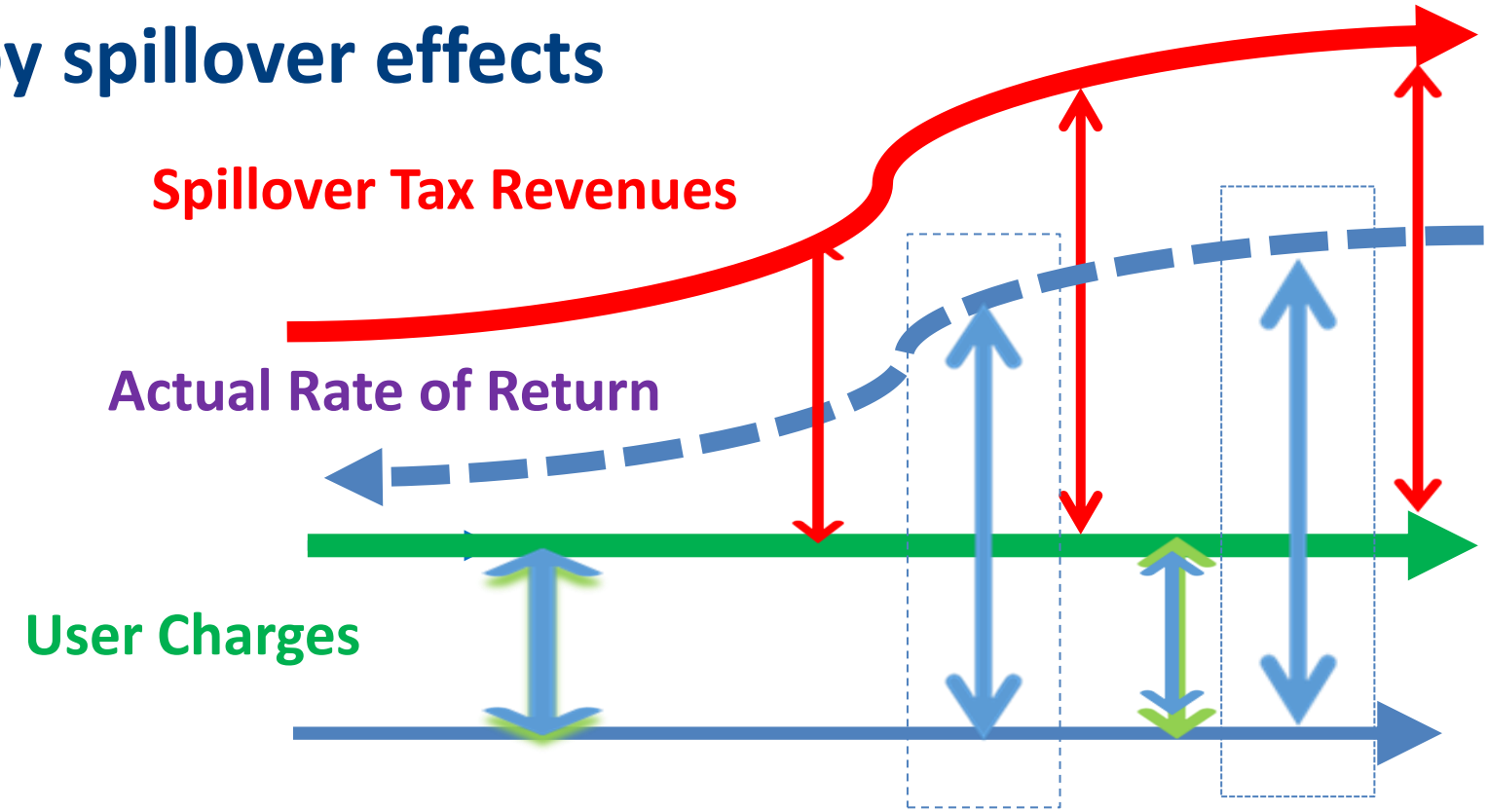
Table 2. Japanese Macroeconomic Estimates of Spillover Effects

	1956–1960	1961–1965	1966–1970	1971–1975	1976–1980	1981–1985
Direct effect of infrastructure investment	0.696	0.737	0.638	0.508	0.359	0.275
Spillover effect through private capital (Kp)	0.452	0.557	0.493	0.389	0.270	0.203
Spillover effect through employment (L)	1.071	0.973	0.814	0.639	0.448	0.350
Spillover effects of infrastructure investment (%)	68.644	67.481	67.210	66.907	66.691	66.777

	1986–1990	1991–1995	1996–2000	2001–2005	2006–2010
Direct effect of infrastructure investment	0.215	0.181	0.135	0.114	0.108
Spillover effect through private capital (Kp)	0.174	0.146	0.110	0.091	0.085
Spillover effect through employment (L)	0.247	0.208	0.154	0.132	0.125
Spillover effects of infrastructure investment (%)	66.222	66.200	66.094	66.122	66.139

User charges are not enough

Increase in tax revenues by spillover effects



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Uzbekistan's Railway

Contribution to GDP growth = 2.2 %

Table 4. Numerical estimation of the difference-in-differences coefficient using regional data for Uzbekistan (2005–08 and 2009–12)

Region group	Outcome	Pre-railway period	Post-railway period	Difference
Non-affected group	Average GDP growth rate (%)	8.3	8.5	0.2
Affected group	Average GDP growth rate (%)	7.2	9.4	2.2
Difference				2.0

Source: *Yoshino and Abidhadjaev (2017).*

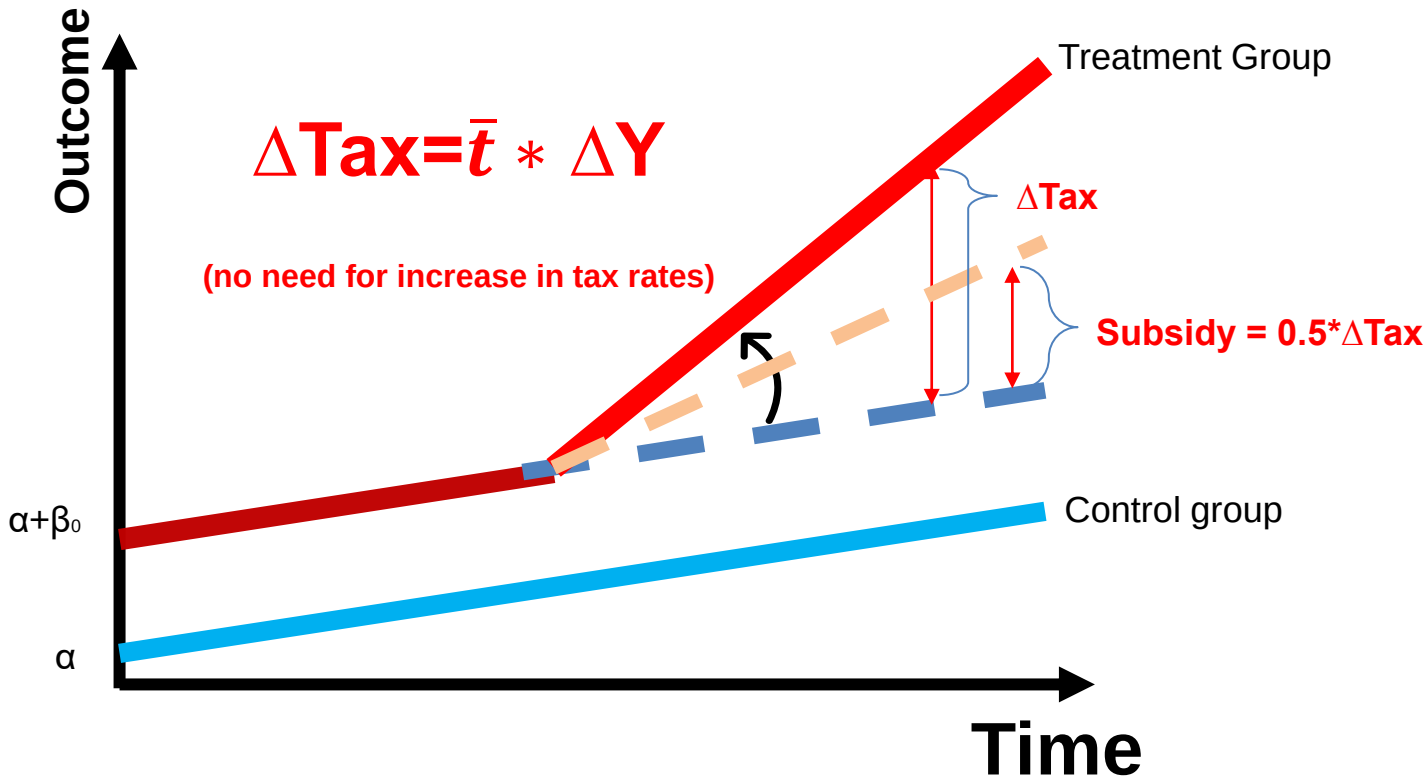
Note: *The affected group includes the regions of Samarkand, Surkhandarya, Tashkent, and the Republic of Karakalpakstan. The rest of the observations are included in the non-affected group. GDP = gross domestic product.*

Estimation results of Increased tax revenues

Figure 2. Changes in Tax Revenues by C

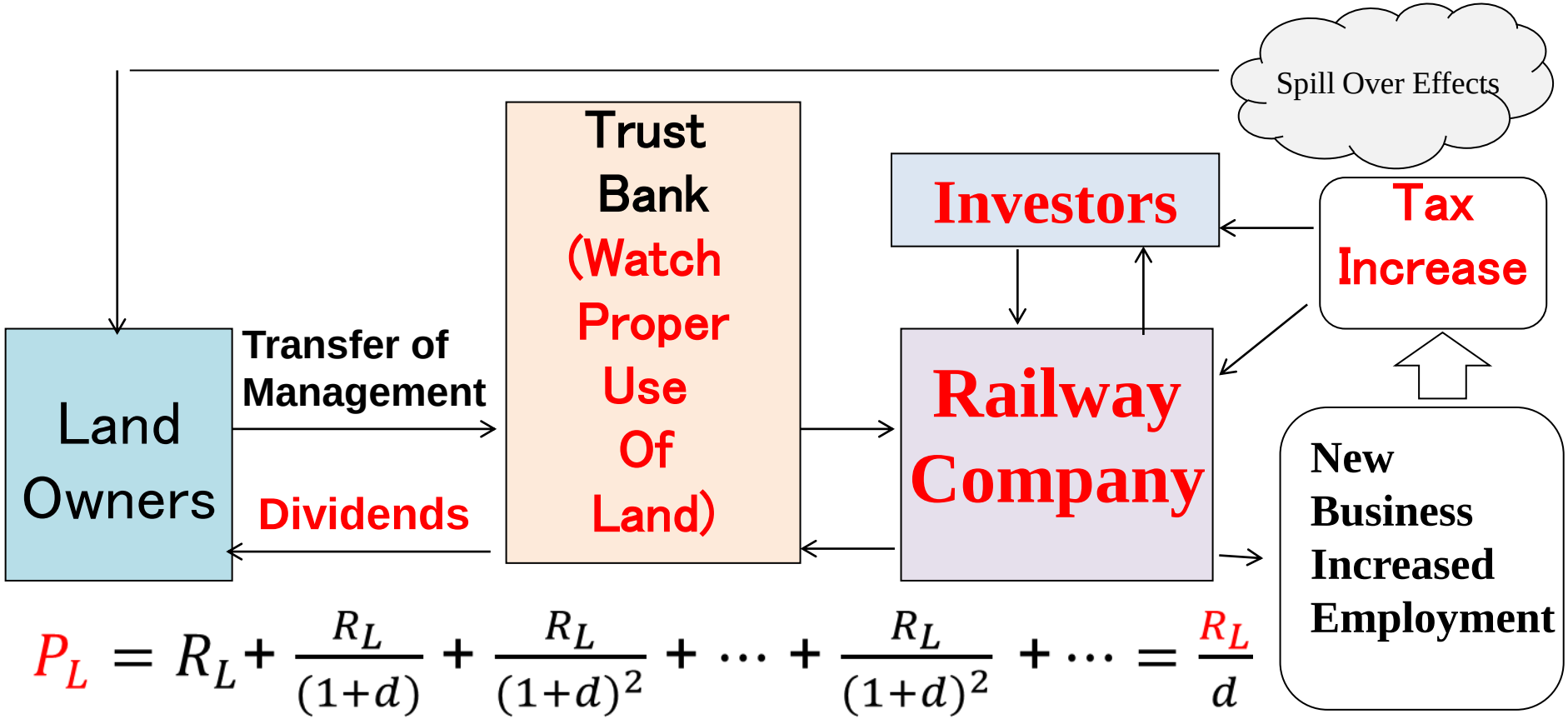
Source: Yoshino and Abidhadjaev (2017b)

Concept of subsidy based on additional flow of tax revenue due to infrastructure



$$Outcome = \alpha + \beta_0 D_i + \sum_{t=1}^{N} \beta_0 * D_i * T_t + \varepsilon_{i,t}$$

Land Trust for Infrastructure Investment



$$P_L = R_L + \frac{R_L}{(1+d)} + \frac{R_L}{(1+d)^2} + \cdots + \frac{R_L}{(1+d)^2} + \cdots = \frac{R_L}{d}$$

1, Reduction of Costs of Land Purchase

2, Leasing contract

3, future tax revenues can be used for repayment

4, Landowners keep their ownership

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Land Trust Structure

The entrustee must manage the trust asset by following the three rules:

Due Care of Prudent Manager

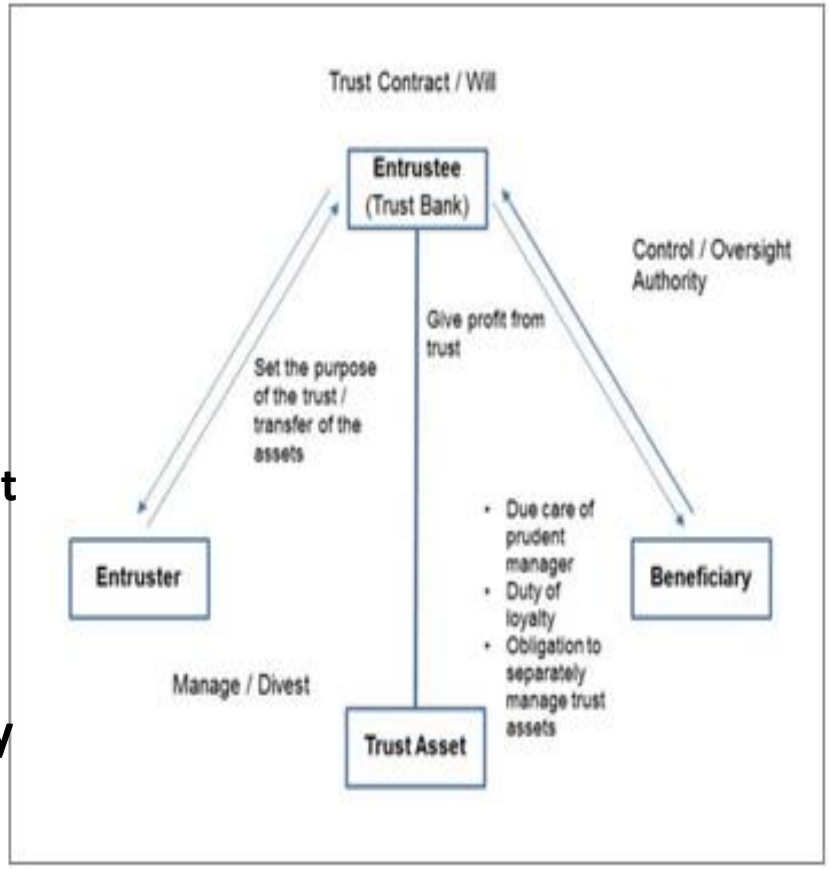
- **Entrustee must manage the trust asset with care of prudent manager**

Duty of Loyalty

- **Entrustee must manage the trust asset for the beneficiary following the purpose of the trust**
- **Entrustee must not use the trust asset for benefit of himself of the third party**

Obligation to Separately Manage Trust Assets

- **Entrustee must manage the trust asset apart from the beneficiary's property or any other properties**



Real Estate Transaction Price Search

Give incentives to operating companies

SOE Reform → Increase efficiency and rate of return

Incentive Mechanism

In order to enhance efficiency and increase the rate of return on infrastructure development, it is necessary to vary the dividend payment for private investors based on the project's revenues, including both user fees and spillover tax revenues. It is also necessary for infrastructure operating entities to exert efforts to increase income. Table 5 shows the payoff matrix, depending on the presence or absence of effort by investors and the infrastructure-operating entity.

Payoff table for infrastructure operating entity and investors

Normal Case	Effort Case
(50 , r) perating Entity Investors	(50 , αr) Operating Entity Investors
(100 , r) perating Entity Investors	(100 , αr) Operating Entity Investors

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Infrastructure & Education

Yoshino and Umid Abidhadjaev (2016)

Education

In a study of 44 Countries Professor Yoshino found that education played a significant role in impacting the quantum of the spillover effect. Secondary schools provided basic skills for blue collar workers. Universities provided education for highly skilled workers. Workers' education level impacted businesses' productivity.

Dependent variable: log difference GDP per capita in 1991-2010			
Regression number	REG.1	REG.2	REG.3
Variables	Coef.	Coef.	Coef.
lnY_1991	-0.06	-0.14	-0.14
	(-0.54)	(-1.35)	(-1.38)
ln(n+g+d)	-3.09	-5.75	-4.36
	(-0.59)	(-1.23)	(-0.77)
ln(Kg)	0.23	0.31	0.53
	(1.17)	(2.00)	(3.30)
ln(Sec)			0.00
			(0.46)
ln(Kg)xln(Sec)	0.20		
	(1.59)		
ln(Uni)			0.21
			(2.07)
ln(Kg)xln(Uni)		0.24	
		(2.76)	
Constant	-0.28	0.56	0.48
	(-0.33)	(0.69)	(0.57)
Number of observations	44.00	44.00	44.00
R-squared	0.21	0.30	0.30
F-statistic	2.62	4.14	3.29

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Important role of Digital Infrastructure

1, Work from Home and remote working after COVID-19

2, On-line trading, On-line banking

3, ZOOM conferences

4, Education by Use of Digital Technology

Distance learning

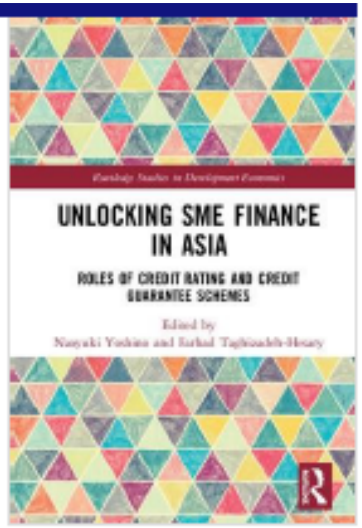
Best teacher in each country can teach very well

students can listen the lecture any time

5, Digital Government

Unlocking SME Finance in Asia

Roles of Credit Rating and Credit Guarantee Schemes, 1st Edition



Edited by **Naoyuki Yoshino (/products/search?author=Naoyuki Yoshino), Farhad Taghizadeh-Hesary (/products/search?author=Farhad Taghizadeh-Hesary)**

Routledge

400 pages | 110 B/W Illus. (Black and White Illustrations)

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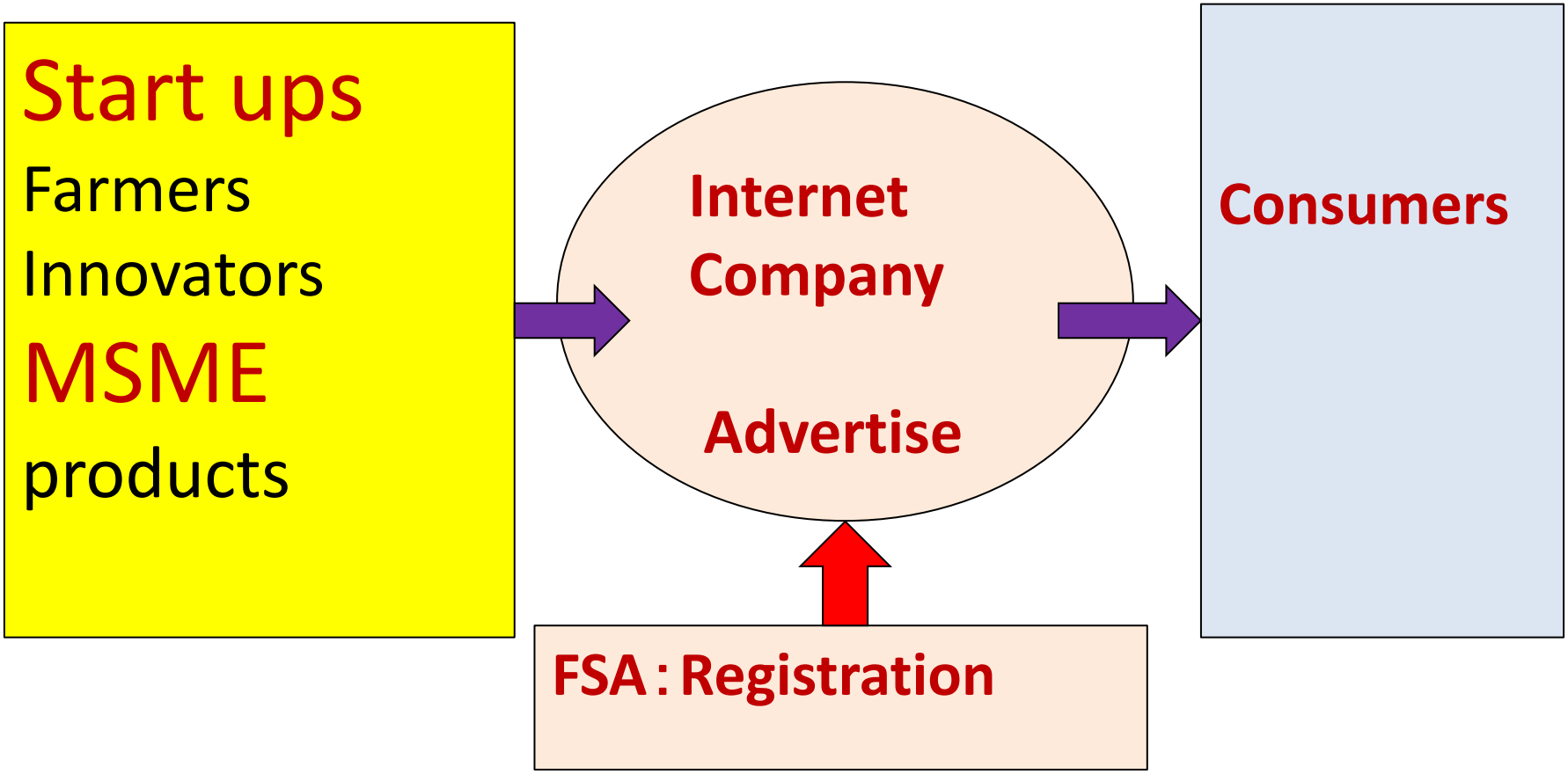
Table 1.2 SME employment share, selected Asian economies

	SME Employment as a Share of:	*SME Share (%)*	*Year*
Rep. of Korea	Enterprise employment	87.7	2012
Thailand	Enterprise employment	80.3	2014
Uzbekistan	Total employment	78.2	2016
Bangladesh	Non-agricultural employment	75.0	2014
Cambodia	Enterprise employment	71.8	2014
Japan	Enterprise employment	69.7	2012
PRC	Industry employment	64.7	2011
Philippines	Enterprise employment	63.7	2013
Singapore	Total employment	68.0	2012
Malaysia	Total employment	65.0	2014
Viet Nam	Total employment	46.8	2012
Kazakhstan	Total employment	35.9	2016
Sri Lanka	Total employment	35.0	2013

PRC = People's Republic of China, SME = small and medium-sized enterprise.

(1) Internet On-line trading



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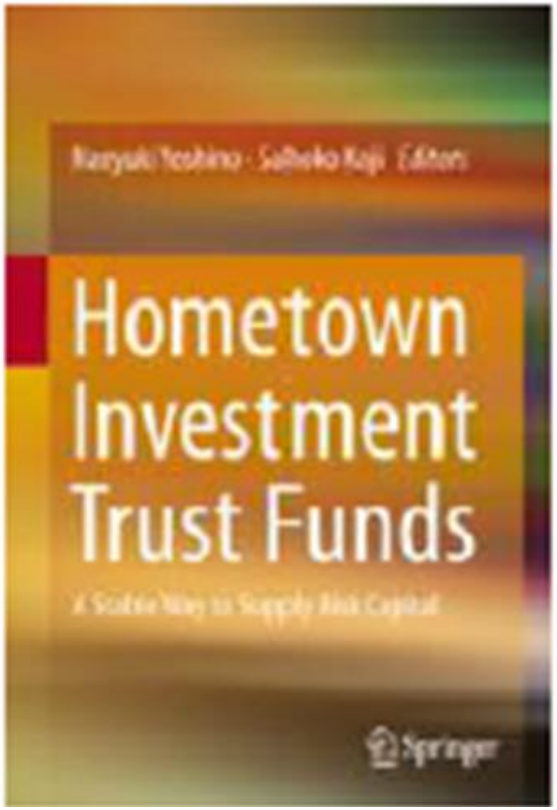
Start up businesses and SME promotion

Springer



Hometown Investment Trust Funds (Springer)

A Stable Way to Supply Risk Capital

Yoshino, Naoyuki; Kaji Sahoko (Eds.) 2013,

Japan, Cambodia Vietnam, Peru, Mongolia

Access to Digital Technology, Internet

(1) Purchasing Type of Hometown Trust
(2) Investment Type of Hometiwn Trust

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Financing for Start-ups along Railway (Hometown crowd funding)

(2) Investment Type

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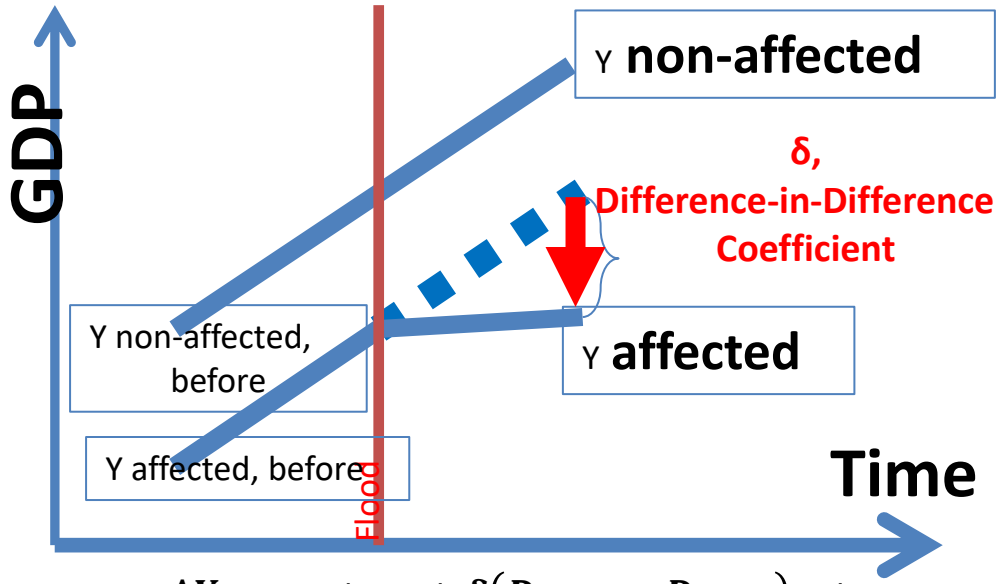
Graphical explanation of the model

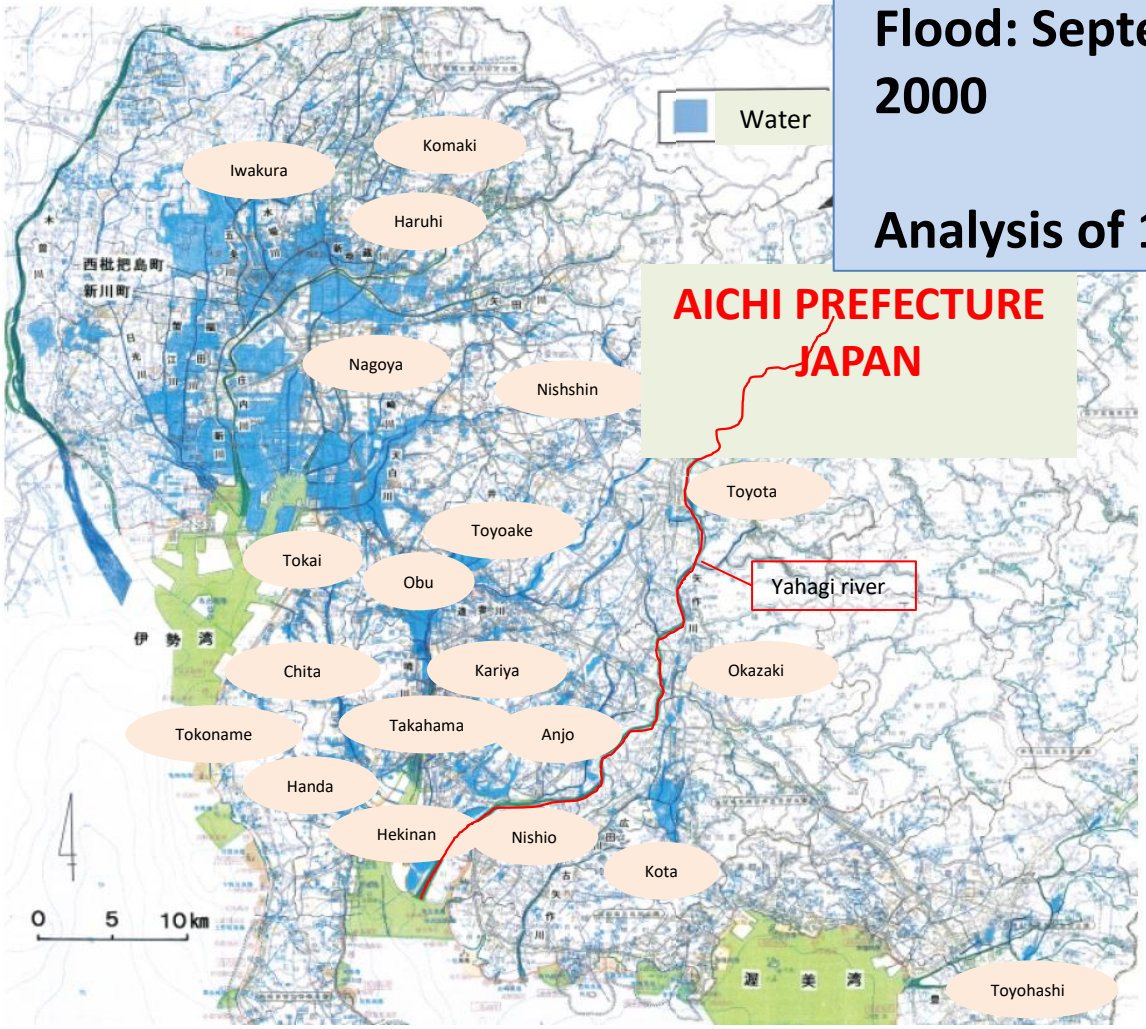


$$\Delta Y_{it} = \alpha_i + \varphi_t + \delta\left(D_{flood} \times D_{after}\right)_{it} + \epsilon_{it}$$

ΔY_{it} - GDP growth rate; α_i - sum of autonomous and region-specific rate of growth; φ_t- year specific growth effect; $\left(D_{flood} \times D_{after}\right)_{it}$- dummy variable indicating that observation belong to affected group after flood period; δ- difference in difference coefficient; ϵ_{it}- error term.

Flood: September 2000

Analysis of 19 cities

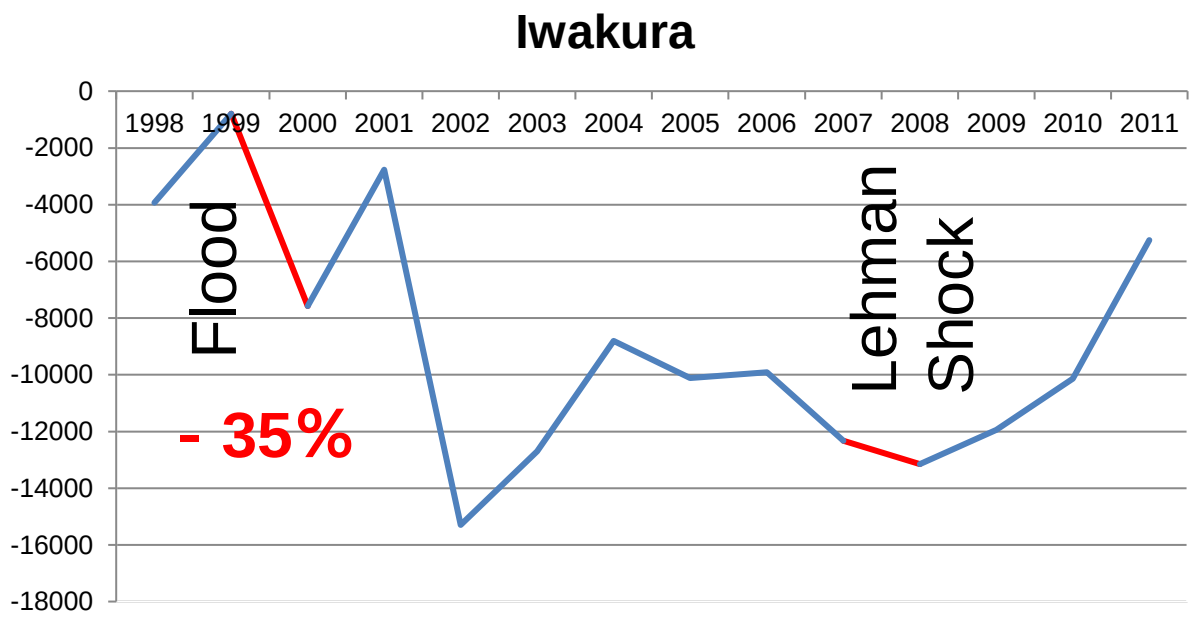


1 Anjo
2 Chita
3 Handa
4 Haruhi
5 Iwakura
6 Kariya
7 Komaki
8 Kota
9 Nagoya
10 Nishio
11 Nishshin
12 Obu
13 Okazaki
14 Takahama
15 Tokai
16 Tokoname
17 Toyoake
18 Toyohashi
19 Toyota

Difference in difference estimation coefficients, million. JPY

Agricultural Region: Big Drop

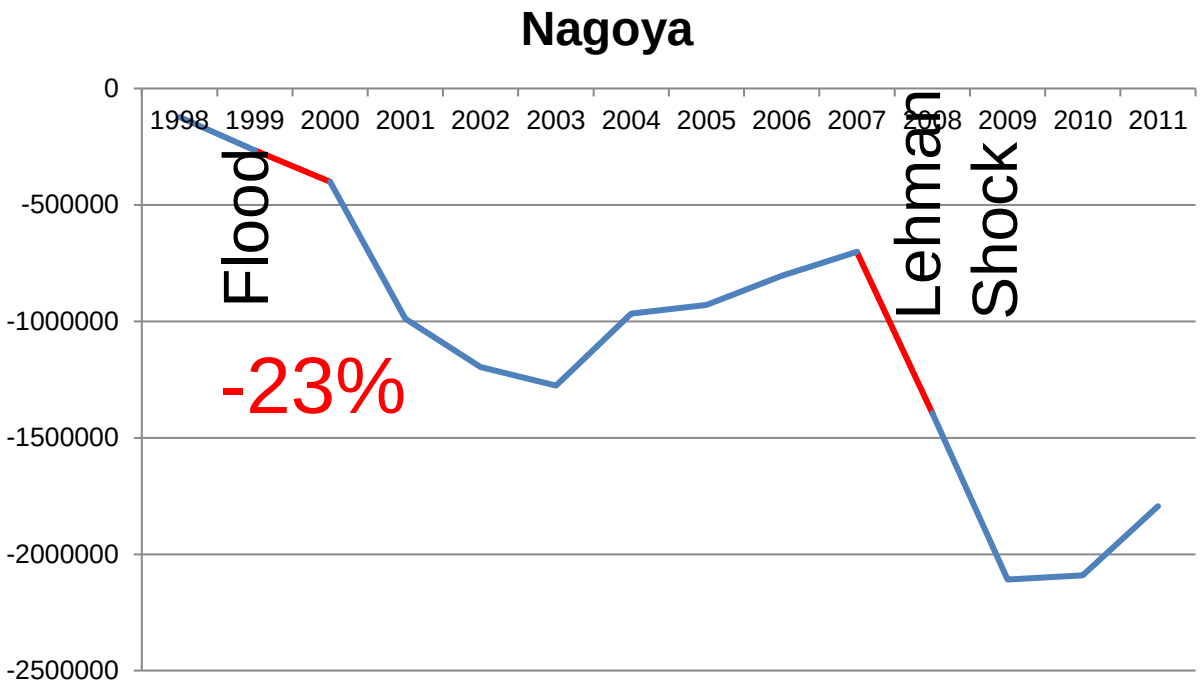
It took 3 years for the recovery



Agriculture

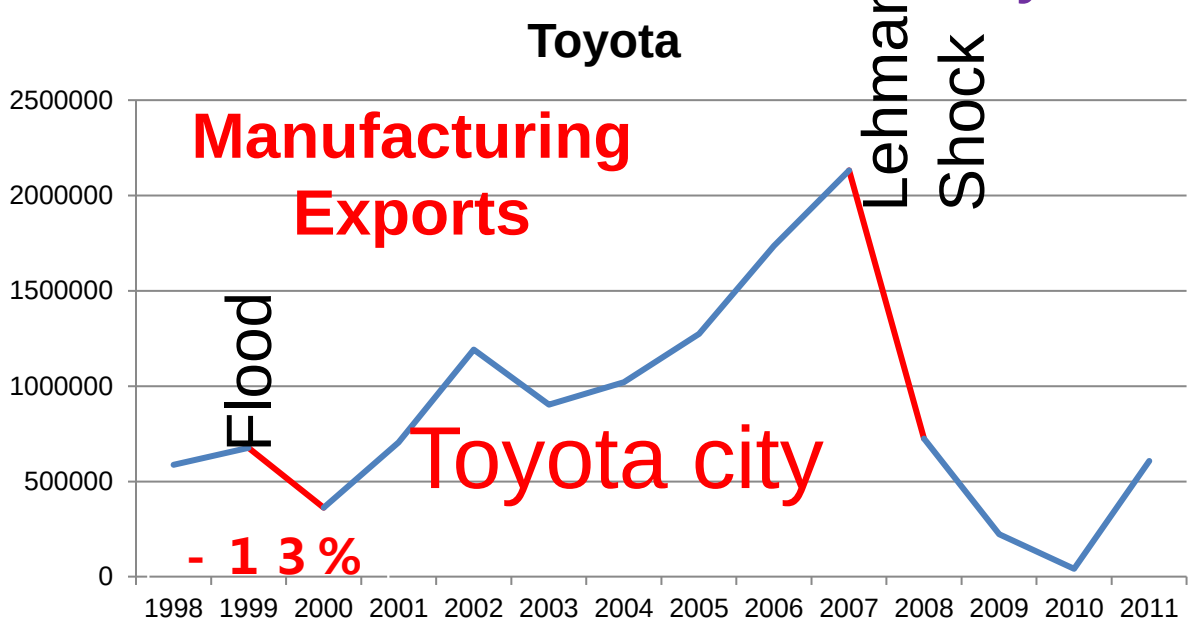
Difference in difference estimation coefficients, million. JPY

Services sector : 4 years decline



Difference in difference estimation coefficients, million JPYen (Exports)

Only 1 year damage: Lehman was bigger 3 years



Reserves for Disaster Expenses

1, Ex ante Reserve accumulation

(i) Compulsory Disaster insurance

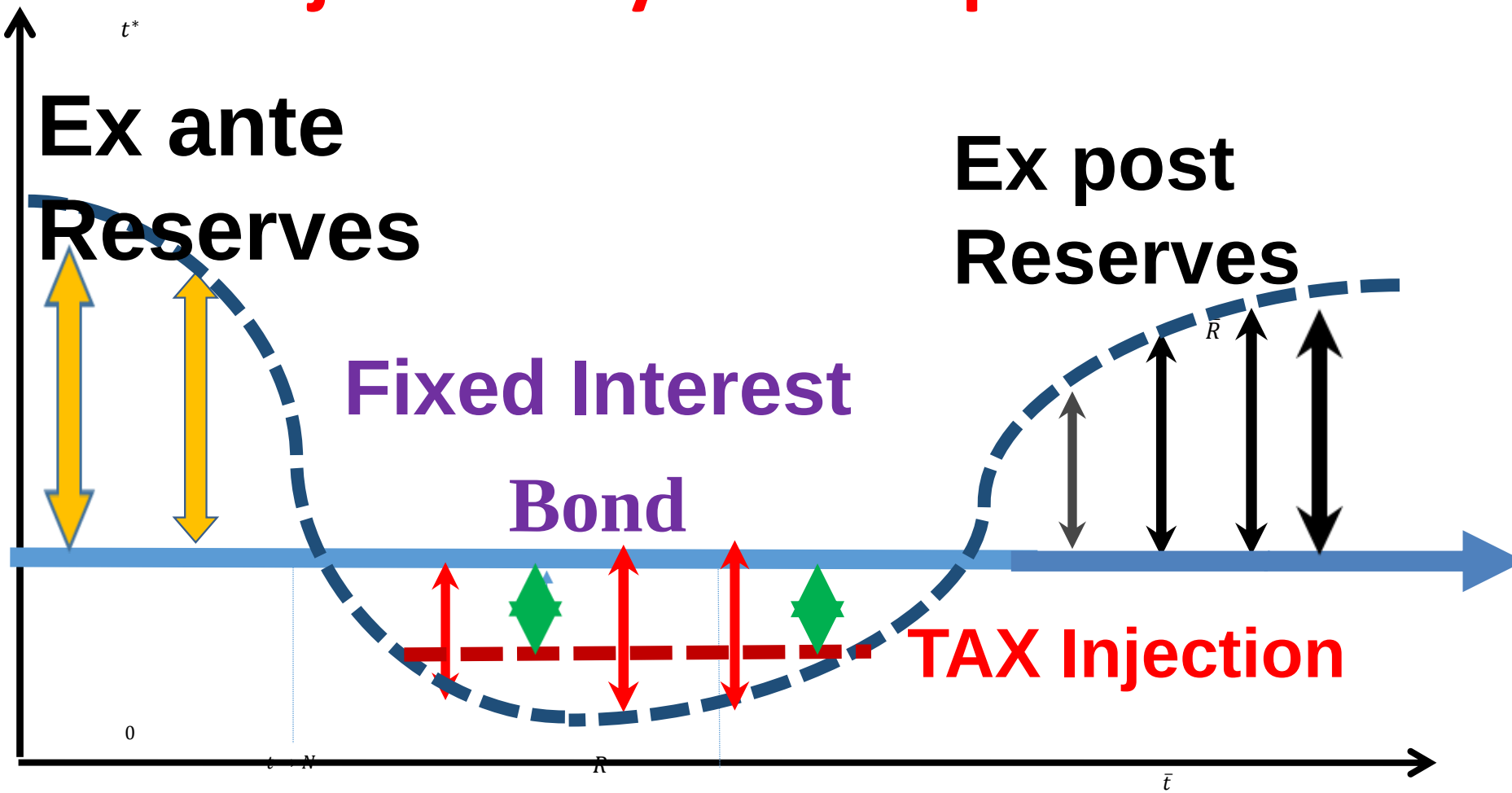
(ii) Mandatory Disaster insurance

2, Fiscal Support at the event

3, Ex-post Reserve accumulation

Disaster Prevention → smaller disaster damage

Disaster bond
and
Tax Injection by use of Spillover Tax



Environmental Issues associated with Infrastructure

$$f(Y, CO2) = F(L \;\; K_P \;\; K_g) \quad (1)$$

Y= Output CO2 emission

L= labor K_P= Private capital,

K_g =infrastructure

$$Y = F(L \;\; K_P \;\; K_g) \quad (2)$$

Traditional Production Function

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(1) ESG Investment
Environmental, Social and Governance

(2) SDG Investment
Sustainable Development Goals

(3) Green Investment

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Covid-19 and Optimal Portfolio Selection for Investment in Sustainable Development Goals

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[a] *Professor Emeritus, Keio University and Visiting Professor, National Graduate Institute for Policy Studies (GRIPS), Tokyo, Japan*
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[c] *Alumnus, Graduate School of Economics, Keio University, Tokyo, Japan*

KPMG, NRI, PWC (different definition of ESG, SDGs)

PricewaterhouseCoopers International Limited (PwC) is the world's second largest professional service (financial audit, tax, and

Deciding on the right company to meet the SDG strategy is crucial in the global market. The indicators include *leadership* (business and financial strategies); *employee engagement* (awareness and bottom-up initiatives); *reporting* (risk assessment and management); and *collaboration* (among suppliers, consumers, government, nongovernment organizations) (PwC 2016).

Table 1
Criteria of 3 major consulting firms for measuring the SDGs based on different indicators
Source: Compiled by the authors based on KPMG & UN Global Compact (2016); NRI (2019) and (PwC, 2016).

Consulting firm	Criteria for measuring the SDGs
KPMG	*demographics* (the population prediction in specific country or region), *income growth, technology* (renewable energy sources, knowledge sharing cultures, among others), and *collaborations* (between governments, companies, international organizations, academia among others)
NRI	*innovation, business opportunity, impact, and cost*
PwC	*leadership* (business and financial strategies), *employee engagement* (awareness and bottom-up initiatives), *reporting* (risk assessment and management), and *collaborations* (among suppliers, consumers, government, NGO and more)

Two parameters: (1)Rate of return, (2)Risk

(1)Rate of return (R) (2) Risk (σ^2) (3)

$$U(R_t,\ \sigma_t^2,\ SDG_t) = R_t - \beta\sigma_t^2 + \gamma(SDG_t)$$

$$\text{s. t.}\quad R_t = \alpha_t R_t^A + (1-\alpha_t)R_t^B$$

$$\sigma_t^2 = \alpha_t^2(\sigma_t^A)^2 + (1-\alpha_t)^2(\sigma_t^B)^2$$

$$SDG_t = \alpha_t(SDG_t^A) + (1-\alpha_t)(SDG_t^B)$$

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(1)Rate of return, (2) Risk, (3) Greenness

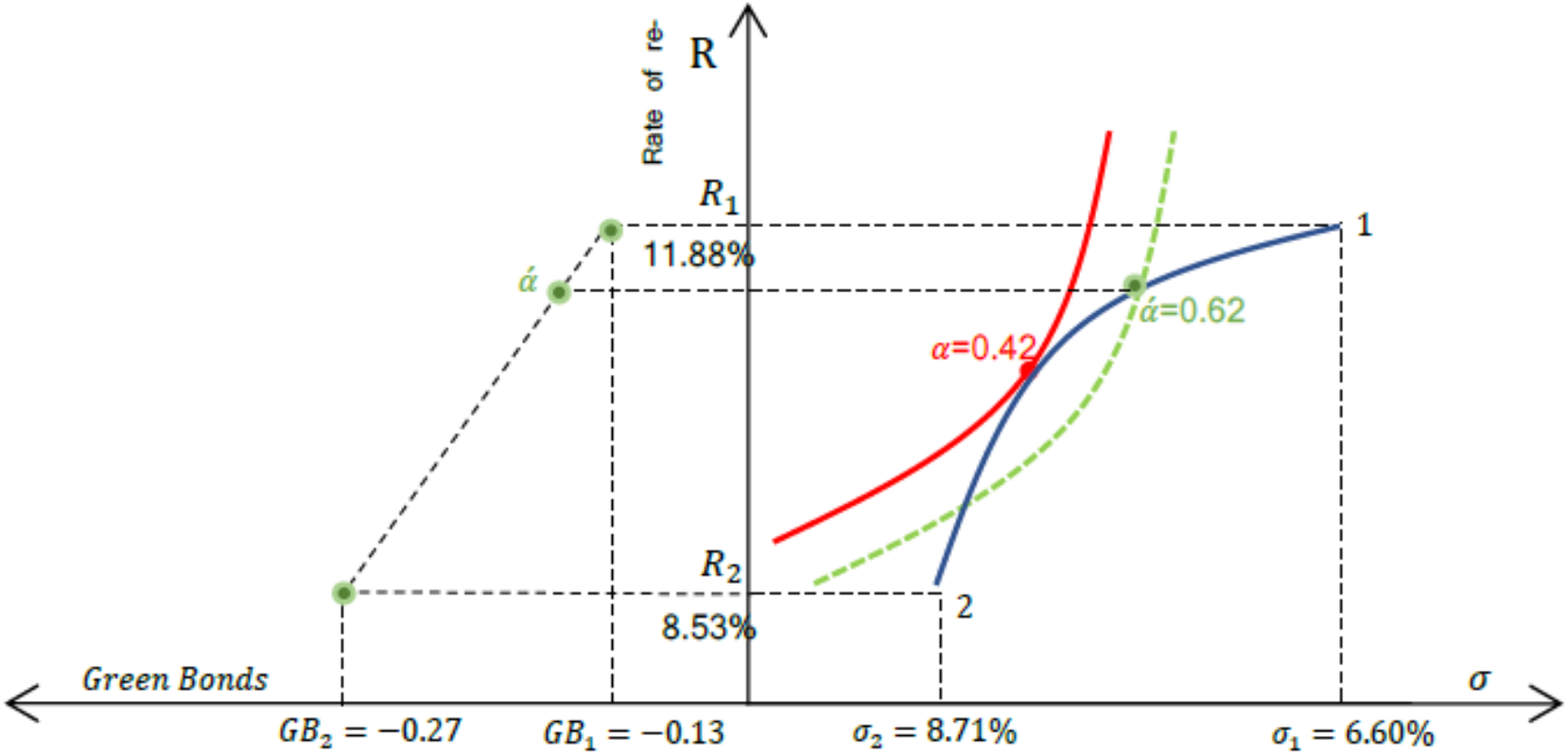

Fig. 1: Utility function: rate of return, riskiness and green bonds

June 2018
Green Bond Principles
Voluntary Process Guidelines for Issuing Green Bonds

International Capital Market Association

ICMA Paris Representative Office

62 rue la Boétie

75008 Paris

France

Tel: +33 1 70 17 64 70

greenbonds@icmagroup.org

- **renewable energy** (including production, transmission, appliances and products);
- **energy efficiency** (such as in new and refurbished buildings, energy storage, district heating, smart grids, appliances and products);
- **pollution prevention and control** (including reduction of air emissions, greenhouse gas control, soil remediation, waste prevention, waste reduction, waste recycling and energy/emission-efficient waste to energy);
- **environmentally sustainable management of living natural resources and land use**

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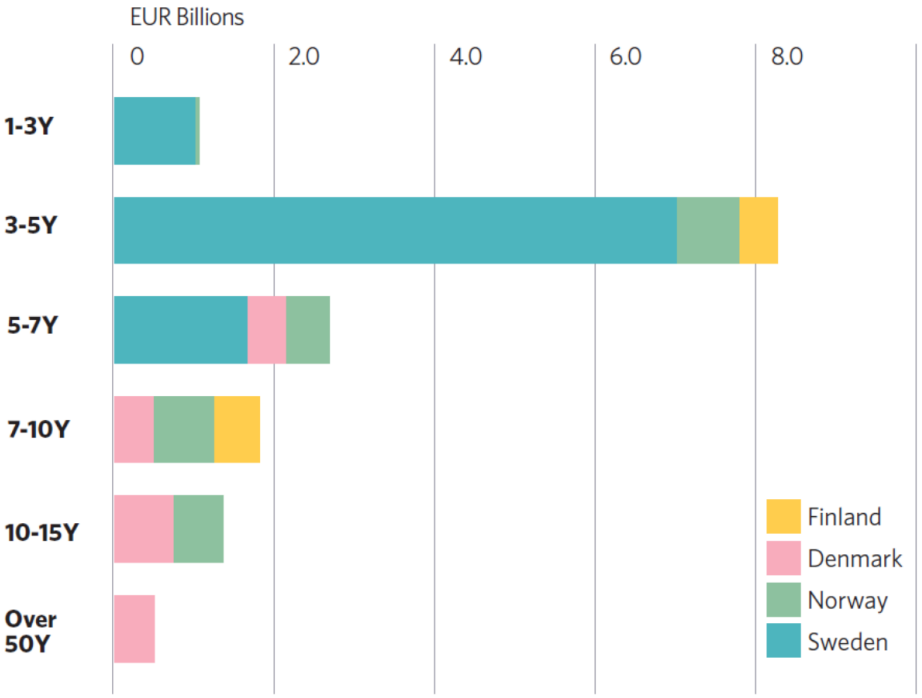
Sweden		10,239
State Bank	SBAB Bank	397
	Swedish Export Credit	444
LGFA	Kommuninvest	1,511
Bank	Nordea Bank	500
	SEB	500
	Swedbank	500
Local government	City of Gothenburg	601
	City of Lunds	77
	City of Malmö	131
	City of Norrköping	62
	City of Västerås	76
	Örebro Kommun	133
	Region Skåne	124
	Stockholms Läns Landsting	518
Agri/Forestry	Södra Skogsägarna	107
	Svenska Cellulosa AB	170
Agri/Forestry GBE	Sveaskog	213

SEK issuance dominates for outstanding green bonds



Optimal portfolio allocation can be achieved by taxing on CO_2

1, By taxing wastes such as CO2, NOX, Plastics etc. by identical international tax rate, the investors can only look for “rate of return” and “risks” as they were conventionally focused on.

2, International taxation will lead to optimal asset allocation and achieve sustainable growth

$$\tilde{R}_t^A = R_t^A - T_A \tag{16}$$

$$\tilde{R}_t^B = R_t^B - T_B \tag{17}$$

Equations (16) and (17) show the after-tax rate of return of company A and company B. We can compute the optimal allocation of assets between company A and company B as in equations (18) and (19), which show the optimal rate of return and risks, respectively:

$$\tilde{R}_t = \tilde{\alpha}_t \tilde{R}_t^A + (1 - \tilde{\alpha}_t)\tilde{R}_t^B \tag{18}$$

$$\tilde{\sigma}_t^2 = \tilde{\alpha}_t^2 (\tilde{\sigma}_t^A)^2 + (1 - \tilde{\alpha}_t)^2 (\tilde{\sigma}_t^B)^2 + 2\tilde{\alpha}_t (1 - \tilde{\alpha}_t)\tilde{\sigma}_t^{AB} \tag{19}$$

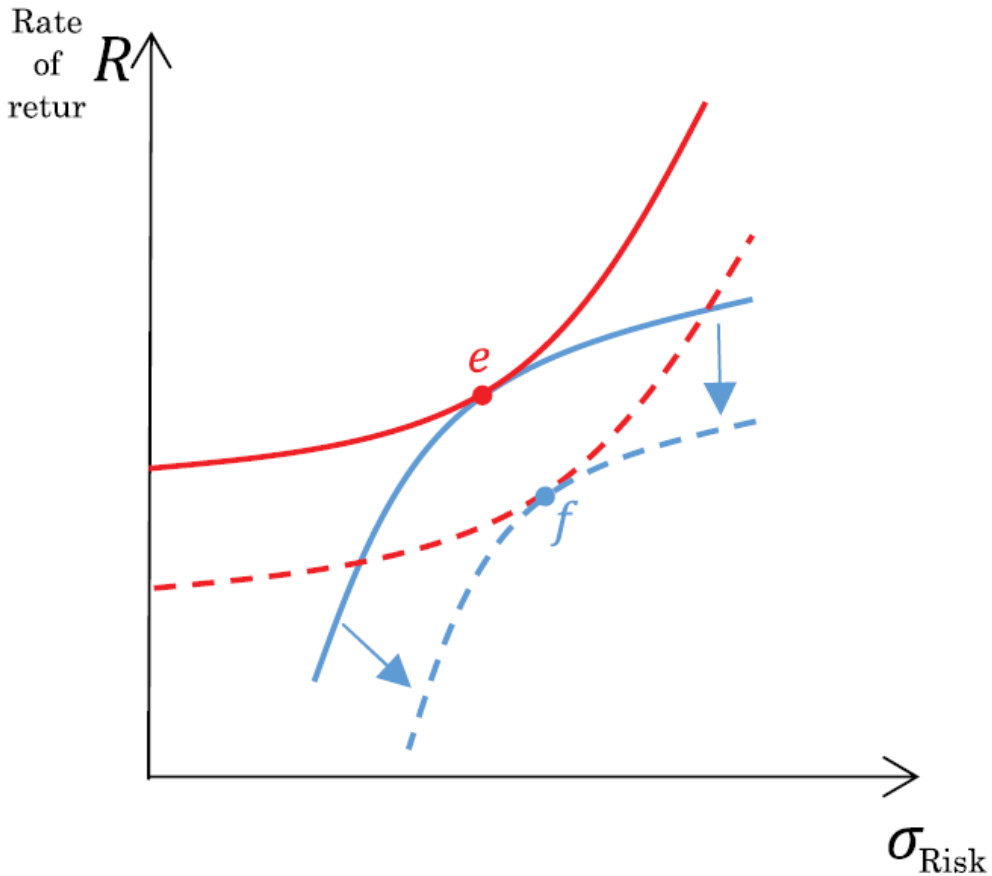


Figure 3. International GHG taxation scheme Source: Authors' depiction.

Thank you for your Attention

Direct Q&A:

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