Good Governance of Infrastructure investment

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March 8--2019
UNESCAP
Case A
\(\beta\) is large
\(\alpha < 1\)

Case B
\(\beta\) is small
\(\alpha < 1\)

Case C
\(\beta\) is large
\(\alpha = 1\)

Case D
\(\beta\) is small
\(\alpha = 1\)
Circulation of Savings into Domestic Investment

**Domestic Savings**
- Bank Deposits
- Mutual funds
- Hometown Crowd Funding
- Insurance
- Pension Funds

**Loans**
- Large Corporates
- SMEs
- Government Expenditures
- Infrastructure

**Bond Market**

**Stock Market**
Growing Savings Ratio in Asian Countries

(1) Savings $\rightarrow$ Bank Loans $\rightarrow$ SME $\rightarrow$ Economic Growth $\rightarrow$ Deposits

(2) Increase of domestic Savings is Important in Asian Growth

(3) 1997 Financial Crisis of Asia $\rightarrow$ Lack of Asian domestic Savings

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<td>37.5</td>
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</table>

Average a/
Figure 20. Institutional investors, domestic versus foreign, as of end 2016

*Note: FactSet, OECD calculations. See methodology for details.*
Pension Funds and Insurance
Institutional Investors

1. Increase Long term Savings (Insurance)
2. Pension Funds to cope with aging population
3. Asset Management of Insurance and Pension Funds
   → Invest into Overseas’ Bond
   → Put their assets into bank deposits
      (Myanmar, Cambodia)
4. Infrastructures are needed in Asian
User Charges are not enough

Increase in tax revenues by spillover effects

user charges
Direct Effect and Spill-over Effects

Production Function

Output

\[ Y = F( K_p, L, K_g ) \]

Spillover effects

Direct Effect

Quality of Infrastructure is measured by the spillover effects

\[ Y = \text{Output}, \]
\[ K_p = \text{private capital}, \]
\[ L = \text{labor}, \]
\[ K_g = \text{public capital (infrastructure)} \]
Spillover Effects of Infrastructure Investment

\[ \frac{dY}{dK_G} = \eta_{KG} \frac{Y}{K_G} + \eta_{KP} \frac{\eta_{KG} \eta_{KP} + \beta_{KG}}{\eta_{KP} (1 - \eta_{KP}) + \beta_{KL}} \frac{Y}{K_G} + \eta_L \frac{\eta_{KG} \eta_L - \beta_{KG}}{\eta_L (1 - \eta_L) + \beta_{KL}} \frac{Y}{K_G} \]
The Southern Tagalog Arterial Road (STAR Highway), Philippines, Manila

Tax Revenues in three cities
Yoshino and Pontines (2015)
ADBI Discussion paper 549

### Table 3.3  Calculated Increase in Business Beneficiary Group Relative to Nonbeneficiary

<table>
<thead>
<tr>
<th></th>
<th>t-2</th>
<th>t-1</th>
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<th>t+2</th>
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<td>Batangas City</td>
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<td>637.89</td>
<td>599.49</td>
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<td>1,208.61</td>
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Construction | Operation period
Highspeed Rail Network

Usual Lines of JR
Narrow Gauge 19,835 km

High speed railway
Lines of JR
Standard Gauge
2,765 km

800 series, JR Kyushu
Estimation results (Connectivity increased tax revenues)

High speed railways

<table>
<thead>
<tr>
<th></th>
<th>△ Total Tax</th>
<th>△ Personal Income Tax</th>
<th>△ Corporate Tax</th>
<th>△ Other Taxes</th>
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<td>Operation 2 [2011-2013]</td>
<td>194790</td>
<td>48690</td>
<td>80998</td>
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</table>
Increases in Tax Revenues

Estimation results

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.

Affected 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 8: Kagoshima, Kumamoto, Fukuoka, Yamaguchi, Hiroshima, Okayama, Hyogo, Osaka
Railway Station in India
Hotel Business

Promote Tourism

Restaurants at Various Stations

JR Farm
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.

<table>
<thead>
<tr>
<th>Normal Case</th>
<th>Effort Case</th>
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<td>(( 50, r ))</td>
<td>(( 50, \alpha r ))</td>
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<tr>
<td>Operating Entity</td>
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<td>Investors</td>
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<tr>
<td>(( 100, r ))</td>
<td>(( 100, \alpha r ))</td>
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<tr>
<td>Operating Entity</td>
<td>Operating Entity</td>
</tr>
<tr>
<td>Investors</td>
<td>Investors</td>
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</table>
Long term bond (Floating rate)

Return

Fixed Interest Rate

$\tau \rightarrow \bar{R}$
Concept of subsidy based on additional flow of tax revenue due to infrastructure

\[ \Delta \text{Tax} = \bar{t} \times \Delta Y \]

(no need for increase in tax rates)

\[ \text{Outcome} = \alpha + \beta_0 D_i + \sum_{t=1}^{N} \beta_0 \times D_i \times T_t + \epsilon_{i,t} \]
Case study of Tashguzar-Baysun-Kumkurgan (TBK) Rail connection in Uzbekistan

Uzbekistan Railway
(Yoshino and Abidhadjaev, 2017)
An impact evaluation of investment in infrastructure: The case of a railway connection in Uzbekistan

Naoyuki Yoshino\textsuperscript{a}, Umid Abidhadjaev\textsuperscript{b,}\textsuperscript{*}

In the spectrum of economic sectors, the positive effect reflected in regional GDP seems to be driven by approximate increases of 5\% in industrial output and of 7\% in aggregate services. The effect on agricultural output is moderate relative to other sectors, constituting around 1\% for connectivity effects, which is consistent with previous literature on the impacts of public capital.
Hometown Investment Trust Funds: A Stable Way to Supply Risk Capital

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

Japan, Cambodia, Vietnam, Peru, Mongolia

Access to Digital Technology, Internet
Financing for Start-ups along Roads and Railways (Hometown crowd funding)
Infrastructure & Education
Yoshino and Umid Abidhadjaev (2016)

Education

In a study of 44 companies, 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.
Land Trust for Infrastructure Investment

1. Reduction of Costs of Land Purchase
2. Leasing contract
3. future tax revenues can be used for repayment
4. Land owners keep their ownership

Transfer of Management

Trust Bank (Watch Proper Use Of Land)

Dividends

Investors

Railway Company

Tax Increase

New Business Increased Employment

Spill Over Effects
Benefits of Land Trust

1. Annual Income rather than one time receipt of huge income
2. Even if Land owners are not in the country trust bank keeps the rent
3. Smooth construction
4. Need Trust Laws
5. Give Trust license to bank by the Central Bank

No need to establish trust bank
Various Risks associated with Infrastructure

1, Risks:
(i) political risk
   (International organization ADB, WB)
(ii) construction risk,
(iii) Natural Disaster
(iv) operation and maintenance risks,
(v) exchange rate risk (overseas’ investors)

2, User charges cannot be set too high
   User charges <<< Total costs

3, How to maintain stable income stream?
   Utilize Spillover Tax Revenues

4, Infrastructure Oriented Developments
Figure 1. Banks' provision of domestic credit to the private sector, 2016

Percentage of GDP
References


