

High-quality infrastructure and land acquisition for infrastructure development through land trusts

The authors:

Naoyuki Yoshino

Dean/CEO, Asian Development Bank Institute (ADBI)
Professor Emeritus, Keio University

Umid Abidhadjaev

Research Associate, Keio University

Nella Sri Hendriyetty

Economist, Asian Development Bank Institute (ADBI)

The institution:



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1. INTRODUCTION

Land acquisition is one of the main difficulties in infrastructure investment. When the construction of a road is planned, city officials must first negotiate with many landowners – a huge investment of time and money during periods of infrastructure construction. Japan experienced a massive problem building commercial building and condominiums, and as a result, started using land trusts extensively. Land trusts allow landowners to keep their property rights while leasing the land to commercial and condominium developers and collecting an annual rent.

In this paper, the quality of infrastructure investment can be measured by assessing how much each respective infrastructure helped develop the region. Two measures were used to evaluate the spillover effects of infrastructure investment: One is to examine the changes in GDP along

railways and roads compared to other regions where no impact of infrastructure investment can be observed. Another is to look at changes in tax revenue along the infrastructure investment compared to the region where no impact was created by the infrastructure investment.

High-quality infrastructure increases business activities and creates new employment in the region. It also provides opportunities to encourage more female participation in the workforce and to narrow income disparities. To increase spillover effects resulting from infrastructure investments, local government and railway companies must work together to further develop the regions found alongside these railways and roads. New depot stations must broaden opportunities for SMEs to start their business and by providing new residential districts, to also increase the

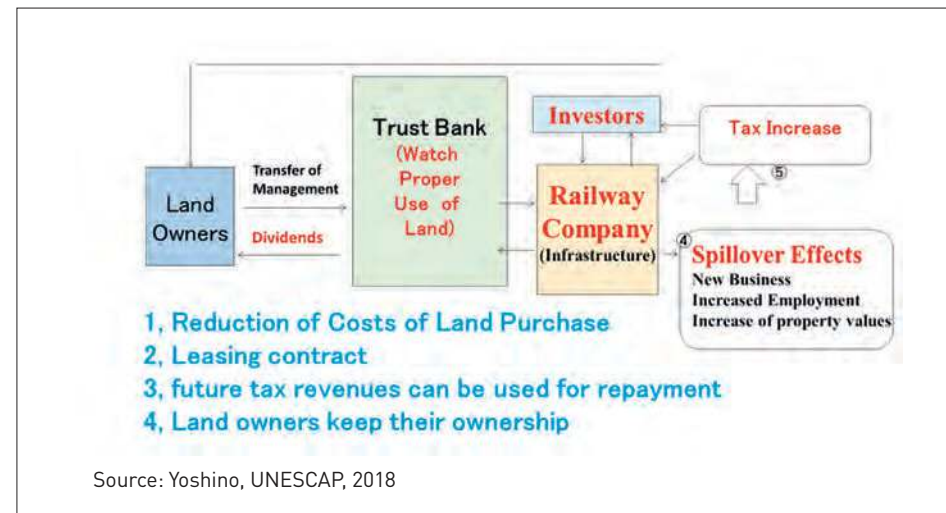
revenue collected from property and corporate taxes. Previous findings (Yoshino and Abidhadjaev (2016)) show that secondary school education and university education together with infrastructure development increases the spillover effects of infrastructure investments. Secondary school education provides workers with basic skills and a university education further enhances high-quality workers.

2. SCHEME OF LAND TRUST

The proposed land trust is shown in Figure 1. In Japan, landowners entrust the property to a trust bank. While many developing countries do not have trust banks, it is possible to give trust licenses to ordinary banks if their function as a trust bank can be established.

After landowners entrust their land either to a trust bank or the local govern-

Figure 1: Land trust for infrastructure investment



ment, these bodies ensure the land is used for developing infrastructure. They monitor the net revenue of the infrastructure entity and a portion of this net revenue is given back to the landowners every year as rent. In some cases, landowners lease the land for 99 years. Furthermore, if stipulated in the contract, landowners can also receive an additional monetary incentive, which is also drawn from the fixed entity's net revenue.

Land trusts work better than directly purchasing the property from landowners. When farmers sell their agricultural land they receive one lump sum of money, which is used to purchase any number of expensive items, like cars or home appliances. Within several years, all the money has been spent. Land trusts, on the other hand,

provide landowners with an annual payment that is generated by the net revenue of the respective infrastructure investment, be it roads, railways, water supply or electricity.

The trustee (in this case, the trust bank) must manage the entrusted land asset by following three rules:

- Manage with care and prudence. The trustee must manage the entrusted land prudently
- Duty of loyalty. The trustee must manage the entrusted land for the beneficiary as was outlined in the trust. The trustee must not use the land for his or her own benefit.
- An obligation to separately manage trust assets. The trustee must ensure management of the entrusted land is kept sepa-

rate from the beneficiary's property or from any other properties.

In developing countries that do not have trust banks, ordinary banks can obtain a trust bank license from a regulator.

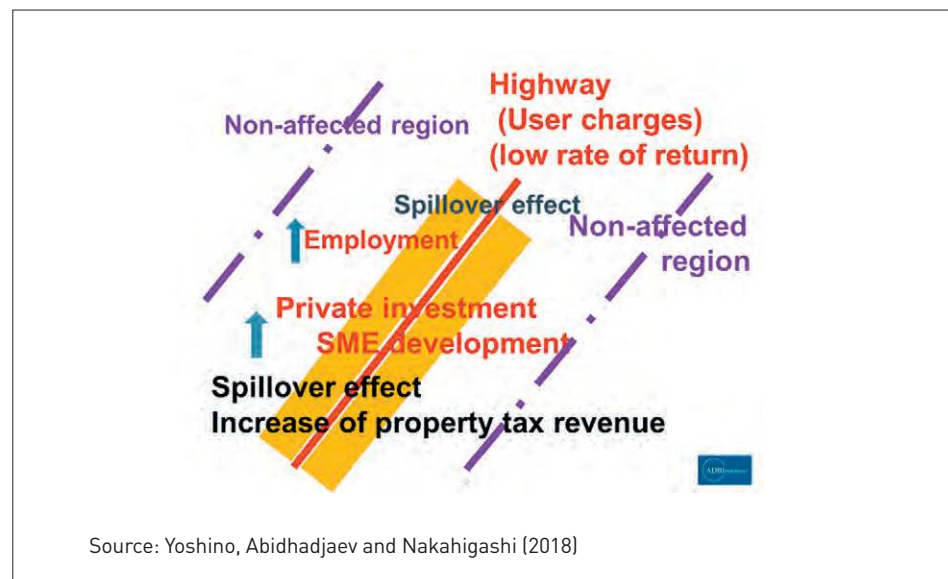
3. SPILLOVER TAX REVENUES AND HIGH-QUALITY INFRASTRUCTURE

Traditionally, infrastructure investors collected only user charges from the infrastructure, such as train tariffs or tolls. However, in this paper, we propose the spillover tax revenue, which is captured into infrastructure investments, be partly added to an infrastructure investor's revenue. Yoshino, Abidhadjaev and Nakahigashi (2018) and Yoshino, Helble and Abidhadjaev (2018) argue that infrastructure projects can generate spillover effects

through an increase in property tax, corporate tax, income tax and so on. This is also a potential incentive for private landholders. As demonstrated in Figure 2, the area highlighted in yellow benefits from a newly built highway (as shown by the red line). This positive spillover effect is possible if the new highway leads to more employment as private businesses and private investments along both sides of the highway increase.

In macro estimations, Nakahigashi and Yoshino (2016) used a trans-log production function in Japan to estimate the direct effect of infrastructure investment and spillover effects (i.e. indirect effects). The direct effect of infrastructure investment is created by the construction of infrastructure that will increase output

Figure 2: Expansion of infrastructure investment: Capturing spillover tax revenues.



Source: Yoshino, Abidhadjaev and Nakahigashi (2018)

Table 1: Spillover effect estimated from a macroeconomic trans-log production function

	1956-60	1961-65	1966-70	1971-75	1976-80	1981-85
Direct effect	0.696	0.737	0.638	0.508	0.359	0.275
Indirect effect(Kp)	0.452	0.557	0.493	0.389	0.270	0.203
Indirect effect(L.)	1.071	0.973	0.814	0.639	0.448	0.350
20% returned	0.305	0.306	0.261	0.206	0.144	0.111
% increment	0.438	0.415	0.410	0.404	0.400	0.402

	1986-90	1991-95	1996-00	2001-05	2006-10
Direct effect	0.215	0.181	0.135	0.114	0.108
Indirect effect(Kp)	0.174	0.146	0.110	0.091	0.085
Indirect effect(L.)	0.247	0.208	0.154	0.132	0.125
20% returned	0.084	0.071	0.053	0.045	0.042
% increment	0.392	0.392	0.390	0.390	0.391

Source: Authors' estimation Nakahigashi and Yoshino (2017)

from the region. Spillover effects function via two channels. The first channel is that road and railways prompt the development of new office buildings and housing, which increases efficient use of the land. Furthermore, transport infrastructure invites manufacturers to settle alongside the fixed installation. The second channel is by increasing employment in the region. Or rather, that the infrastructure, such as water supply, railways and roads, increases employment in the region. New businesses bring new employment to the region, which contributes to increased consumption and housing. As a result, GDP in the region increases further.

Table 1 shows an estimate of the direct effects of infrastructure investment and its spillover effects, using macro data from

Japan. The detailed method of estimation can be found in Nakahigashi and Yoshino (2016). In 1966–70, the direct effect of infrastructure investment that increased output was 0.638 (the first row of Table 1). The spillover effect of increasing output induced by an increase of private capital was 0.493 (the second row of Table 1), and the spillover effect of increasing output by increasing employment was 0.814 (the third row of Table 1). The biggest spillover effect was to increase employment, which contributed to an increase in output (the third row of Table 1).

These increases in output will increase tax revenues whose average rate is 20% in Japan. The amount of incremental tax revenues is shown in the fourth row of Table 1. If 50% of the increased tax revenues were

returned to investors in infrastructure, how much would it increase the rate of return? The last row of Table 1 shows that the rate of return would have increased by 43.8%. In 2006–2010, if 50% of incremental tax return were returned to infrastructure investors, they would have increased the rate of return for infrastructure investors by 39.1%. These significant increases of the rate of return would have attracted private investors into infrastructure investments. In the past, these increases in tax revenues were simply taken by the government and not returned to infrastructure investors.

4. INCREASES IN TAX REVENUES BY NEW INFRASTRUCTURE INVESTMENT (MICRO DATA)

In microeconomic estimations, Yoshino and Pontines (2015) estimated the impact of highways in Manila, Philippines. Yoshino and Abidhadjaev (2017) also estimated the impact of the Kyushu rapid train in Japan. Both papers predicted what the spillover effects of the respective infrastructure investments would be and concluded that an increase in spillover effects raises tax revenue.

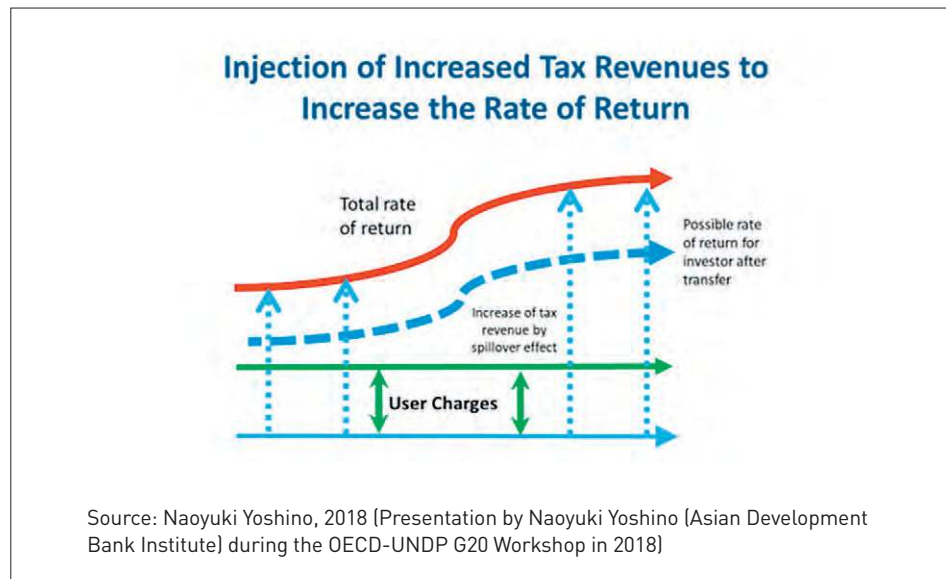
Figure 3 (opposite) shows usage fees and increased tax revenue created by infrastructure investments. The green line at the bottom represents usage charges. Traditionally, private investors for infrastructure relied only on charges, such as railway tariffs, highway tolls, water tariffs, and so on. As water and electrical supply are public and necessary goods for all members of society, the government regulates these infrastructure user charges in order to keep them as low as possible. However, water supply can generate big spillover effects in the region. An increase in regional GDP

will increase tax revenues, as shown by the red line. If we suppose that 50% or 60% of the increased tax revenue is returned to the investors, the blue dotted line becomes

»Land trusts allow landowners to keep their property rights while leasing the land to commercial and condominium developers and collecting an annual rent.«

the investors' total revenue, increasing the rate of return from the user charges (green line). This means if these spillover tax revenues created by the new water supply were partly returned to the infrastructure investors, then their actual rate of return on investment would rise significantly. This could entice private investors to participate in water supply infrastructure. Currently, Manila is the only example of a city where a water supply company is also benefiting from revenues that come from residential

Figure 3: User charges and spillover tax revenues



development. This water supply company benefits from the increase of property value after the infrastructure investment by purchasing the land before the water supply is completed, hence the increase in revenue. However, the land grab is a one-shot gain for the company. If the spillover tax revenues, which are collected by the government, were returned to the infrastructure investors, the rate of return would continue rising for the entire period.

Table 2 showcases the Star Highway in Manila (Yoshino and Pontines (2015)). The periods t-1 and t indicate periods under construction. At the end of t, the highway was completed and operation had started. In the last row, Batangas City, t-2 was a period when construction had not started, and t-1 and t were periods when construction had started. As indicated, tax revenues increased from 490 to 622 and 652 (last row). During the highway's construction, construction workers and other related construction works came to the region, increasing regional GDP. At the end of t, the Star Highway had been completed. Then at t+2, the tax revenue diminished compared to the construction period, but after the fourth year (t+4) the tax revenue increased

drastically: The tax revenue jumped to 1,208, about twice as much as before construction. This jump was caused by the spillover tax increases that resulted from the infrastructure investment, in this case, the Star Highway. If the highway had not been constructed, the tax revenues would have been 490 (t-2) because there would not have been an increase in economic activities in the area. If the part of these incremental tax revenues (1208 - 490) were returned to private investors, they would be incentivized to invest their money in building the highway. Similar effects are seen with the construction of a high-speed railway on Japan's Kyushu Island (Yoshino and Abidhadjaev (2017)).

CONCLUSION

In this paper, we have demonstrated two new ideas. One is to use land trusts for the construction of infrastructure: Landowners maintain ownership of their land but lend it to the infrastructure company for 99 years. Land trusts help simplify an infrastructure company's land-usage rights as they do not negotiate land prices or concern themselves with direct sales from landowners.

Table 2: Changes in tax revenues in three cities along Manila's Star Highway

	t ₋₂	t ₋₁	t ₀	t ₁	t ₂	t ₃	PHP Million t ₄ forward
Lipa City	134.36	173.50	249.70	184.47	191.81	257.35	371.93
Ibaan City	5.84	7.04	7.97	6.80	5.46	10.05	12.94
Batangas City	490.90	622.65	652.83	637.89	599.49	742.28	1,208.61

Source: Yoshino and Pontines (2015)

Secondly, the paper proposes that investors who invest in infrastructure benefit from the increased tax revenues created by the infrastructure. Star Highway in Manila demonstrates a significant increase in tax revenue. If 50% of those increased tax revenues were returned to investors that invest in infrastructure, the rate of return would increase 40% according to data from Japan. Private investors, such as insurers

and pension funds, can put their money into infrastructure investment if the spillover tax revenues were partially returned to those who invest. Allowing private investors to contribute would increase efficiency and transparency of infrastructure investments. Furthermore, if these methods were used for green energy, the rate of return for energy investments would also rise (Yoshino and Taghizadeh-Hesary (2019)).

Nakahigashi, M and Yoshino, N. (2016) "Changes in Economic Effect of Infrastructure and Financing Method", Public Policy Review, Vol.12, No.1.

Yoshino, Naoyuki and Victor Pontines (2015) "The Highway Effect on Public Finance: Case of the STAR Highway in the Philippines", Asian Development Bank Institute (ADBI) Working Paper No.549.

Yoshino, Naoyuki and Umid Abidhadjaev (2017), "Impact of infrastructure on tax revenue: Case study of high-speed train in Japan", Journal of Infrastructure, Policy and Development, Vol.1, Issue 2.

Yoshino, Naoyuki, Umid Abidhadjaev and Makaki Nakahigashi (2018), "Closing the Asian Infrastructure Gap", HORIZONZ, Journal of International Relations and Sustainable Development, Issue No.10, Winter 2018.

Yoshino, Naoyuki, Matthias Helble and Umid Abidhadjaev (2018), Financing Infrastructure in Asia and the Pacific: Capturing Impacts and New Sources, Asian Development Bank Institute.

Yoshino, Naoyuki, Farhad Taghizadeh-Hesary and Masaki Nakahigashi (2019), "Modelling the social funding and spill-over tax for addressing the green energy financing gap" forthcoming, Economic Modelling.