



POLICY BRIEF

QUALITY INFRASTRUCTURE INVESTMENT IN THE FACE OF THE COVID-19 CRISIS: SUSTAINABILITY, PROFITABILITY, AND DEMAND VERSUS RESILIENCE



Task Force 3

**INFRASTRUCTURE INVESTMENT
AND FINANCING**

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موجز السياسة استثمارات البنية التحتية النوعية في مواجهة أزمة فيروس كورونا المستجد (كوفيد-١٩): الاستدامة والربحية والطلب مقابل المرونة

فريق العمل الثالث
الاستثمار في البنية التحتية وتمويلها



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ABSTRACT

Adequate infrastructure is key for economic development, along with macroeconomic stability and a long-term development strategy. The recent COVID-19 pandemic has pushed governments to prioritize economic recovery, and thus the fiscal space for allocating money for investment has been limited. Nevertheless, infrastructure should not be set aside. Post-pandemic, infrastructure investment will aid economic recovery by helping accelerate economic growth back to normal levels and even higher. This policy brief proposes some policy responses and new concepts for governments to keep quality infrastructure development as a priority, especially during and after the COVID-19 pandemic. The recommendations range from utilizing part of spillover tax revenue created by infrastructure investments to compensate for risk and finance further expenditures to supporting small and medium-sized enterprises, secondary markets, technology advantages, and environmental protection in infrastructure development.

البنية التحتية المناسبة هي مفتاح التنمية الاقتصادية، إلى جانب استقرار الاقتصاد الكلي ووجود استراتيجية تنمية طويلة الأجل. دفعت جائحة فيروس كورونا المستجد (كوفيد-19) الأخيرة الحكومات إلى العمل على التعافي الاقتصادي كأولوية أولى، ومن ثم أصبح الحيز المالي لتخصيص الأموال للاستثمارات محدودًا. ومع ذلك، ينبغي عدم إهمال استثمارات البنية التحتية. فبعد زوال الجائحة، سيكون للاستثمار في البنية التحتية دور في التعافي الاقتصادي من خلال تسريع وتيرة النمو الاقتصادي للعودة إلى مستوياته الطبيعية، بل وأعلى. يعرض ملخص السياسة هذا بعض استجابات السياسة والمفاهيم الجديدة للحكومات لمواصلة تطوير البنية التحتية النوعية باعتبارها أولوية، خاصة خلال جائحة فيروس كورونا المستجد (كوفيد-19) وبعدها. وتتراوح التوصيات بين استخدام جزء من عائدات الضرائب الفائضة الناتجة عن استثمارات البنية التحتية للتعويض عن المخاطر، وتغطية المزيد من النفقات لدعم الشركات الصغيرة والمتوسطة والأسواق الثانوية والمزايا التقنية وحماية البيئة فيما يتعلق بتطوير البنية التحتية.



CHALLENGE

Infrastructure investment is widely recognized as a crucial driver of economic development as addressed in the Group of 20 (G20) principles for quality infrastructure investment. However, economic infrastructure's quality, quantity, and accessibility in developing countries are considerably lower than expected. Therefore, the scaling up of infrastructure investment is important for boosting global economic growth.

Developed nations, like Japan, the United States, and those in Europe, face the challenge of maintaining their existing infrastructure. COVID-19 will increase budget deficits in many advanced countries as spending will rise dramatically for medical care and support for small and medium-sized enterprises (SMEs) and the unemployed. This will make it more difficult for governments to maintain existing infrastructure because of lack of financing.

Revenues for infrastructure maintenance come mainly from user charges. Water supply, electricity, and trains are necessary, so it is difficult to raise user tariffs for these. Furthermore, COVID-19's impact on economic growth will lower infrastructure operating companies' revenue. However, infrastructure requires yearly maintenance costs. Increased budget deficits will result in insufficient funding for maintaining infrastructure. Spillover tax returns must be developed.

Many implementers of infrastructure projects fail to appropriately calculate project costs and economic benefits. The appraisal, selection, and construction of infrastructure projects are often initiated with underestimated costs, overestimated revenue, undervalued environmental and social impacts, or overvalued economic development or spillover effects to win project approval. Most infrastructure investments are either debt- or tax-financed by the government. Therefore, overinvesting in unproductive projects results in debt buildup, government budget instability, and monetary expansion if the debt was purchased by the central bank.

Among the many reasons for these failures are inconducive institutional environments and limited local capacity, in addition to weak regulatory frameworks. One of the most prominent reasons, and potentially the simplest to resolve, is the low rate of return from infrastructure projects. Other challenges include huge costs paid to acquire land and anticipating natural disasters that could stop construction.

Further shortages of financial resources for infrastructure are expected after the COVID-19 outbreak. Reallocating budgets to mitigate COVID-19's negative impacts may lead to huge budget deficits in developing countries. Additionally, sudden reversals in capital outflows can worsen the fiscal space. Nevertheless, infrastructure should not be set aside, and continuous financial support for infrastructure will be needed. Post-pandemic, infrastructure will aid economic recovery by helping accelerate economic growth back to normal levels and even higher. It will also help countries that have suffered to regain confidence from the market by maintaining higher rates of return and lowering infrastructure-associated risk. This will in turn bring in private sector finance and overseas investment.

The COVID-19 outbreak will bring huge budget deficits and declines in infrastructure investment by governments. Existing infrastructure will face a shortage of maintenance funds, which could lead to accidents and infrastructure malfunction affecting water supply, sewage, electricity, trains, and roads, among others. The pandemic has forced many countries to shut down factories, restaurants, and other businesses for long periods, and significant proportions of the manufacturing and services sectors have faced no income for several weeks or even months. These conditions are pushing governments to subsidize those who have been forced to close, leading to increases in government spending. Meanwhile, government tax-collection revenue will decline due to the closure of many business activities. Consequently, significant budget increases are unavoidable in the near future. Although many countries may issue government bonds to be purchased by central banks to finance emergency spending, budget deficits will still negatively affect infrastructure financing by governments for the next several years.

Thus, this brief proposes new concepts for reducing risk in infrastructure financing, shortening project-preparation time, and managing mitigation and adaptation costs of natural disasters that affect infrastructure. Furthermore, regarding adapting to the current COVID-19 pandemic, this brief also provides some policy responses for infrastructure investment resilience. Specifically, it amplifies the concept of spillover tax revenue for infrastructure financing. Policy responses include enhancing private sector involvement, bringing back capital outflows, and SME financing.



PROPOSAL

1. Enhancing private sector involvement

During many past economic contractions, private sector financing has recovered much more quickly than government budget deficits. Hence, preparing more attractive private financing instruments can effectively promote sustainable infrastructure. If countries rely only on conventional financing concepts, infrastructure construction will halt dramatically. To attract private finance to infrastructure investment, governments should make preparations to ensure the private sector can attain the highest expected rates of return. These returns could be in the form of tax revenue increases from infrastructure-related positive impacts to the surrounding region; this revenue can be shared with the private sector as an investment incentive. This policy action would be timely and attractive during the COVID-19 outbreak, considering that currently, tax revenue is at its lowest and will reach a new dip during recovery.

Water and electricity supply attract new residential areas and commercial businesses into regions. Property prices rise, and many new businesses begin operation after water supply and sewage services are installed. Property taxes, corporate income taxes, sales taxes, and individual income taxes rise because of new increases in business and job opportunities. These tax increases result from the creation of water and electricity infrastructure. Without the construction of this infrastructure, regional economies would not develop. Water and electricity operators rely on user charges as their main source of revenue, but these charges are insufficient to cover operation and maintenance costs, and since water and electricity are necessary goods, user cost is kept low. Further, spillover tax revenues created by the water and electricity supply are taken by the government and not returned to infrastructure operating companies.

The difference-in-differences (DID) method used by Yoshino and Abidhadjaev (2017a; 2017b) can identify how much tax revenue is produced by each infrastructure investment. Generally, the amount of tax revenue after water and electricity supply are provided is compared to tax revenue with no new utility supply. The difference between the two lines in Figure 1 shows the spillover tax revenue created by the water and electricity supply. If 50% of the tax revenue is shared with infrastructure operators, those companies can count user charges plus the spillover tax revenue as their income. Furthermore, some spillover tax revenues can be designated for maintenance costs every year, allowing infrastructure companies to use them for repairs/maintenance.

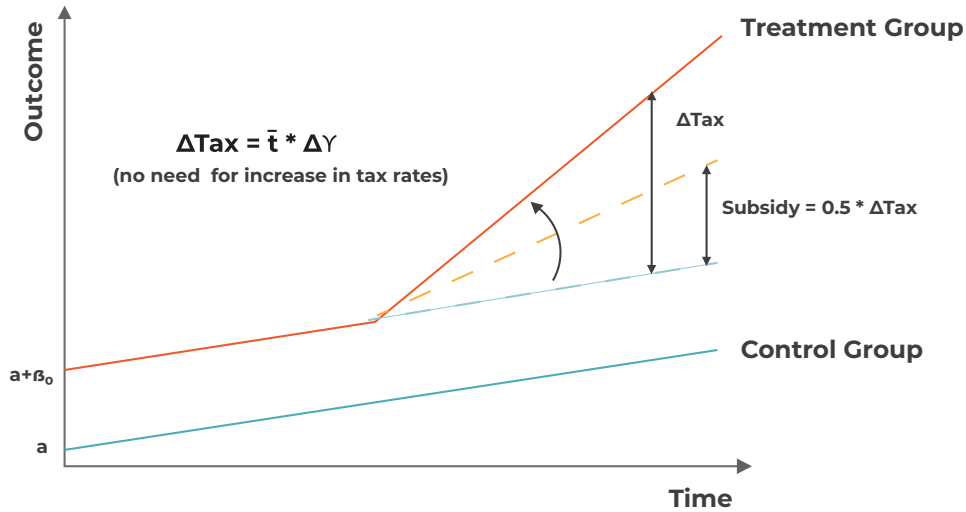


Figure 1. **Concept of subsidy based on additional flow of tax revenue from infrastructure creation**

2. Strengthening governance structure to avoid corruption

Substantial benefits can be realized through better governance of public infrastructure. International organizations have provided frameworks, guidance, and tools for countries to enhance governance for infrastructure development (OECD and IMF 2019). Multilateral institutions, such as the Asian Development Bank, World Bank, African Development Bank, International Bank for Reconstruction and Development, and European Bank for Reconstruction and Development, provide development lending with low interest rates and accessible requirements to countries, sometimes through grants and technical assistance. Through this, multilateral development banks help countries establish their regulatory framework and government structure as well as encourage transparency. Together with country governments, multilateral development banks can identify obstacles in the field and find solutions.

In many developing countries, infrastructure investment is associated with corruption. One step that involves a high corruption risk is the procurement process, which includes land acquisition. Issues during this process can hinder the infrastructure construction stage, leading to substantial losses for investors and unpredicted changes in government plans. Meanwhile, land mafias often prevail in

developing countries. They act as informal intermediaries between governments/construction companies and landowners. Despite no written legal arrangement with landowners, they ask an extraordinarily high price from construction companies/governments and report substantially lower prices to landowners. They receive large amounts of money as intermediaries and leave landowners feeling dissatisfied with the government for underestimating their land value. Creating a land trust as a legal, independent institution representing the landowners to the government and construction companies can be a solution. As a legal institution, a land trust should follow good corporate governance and promote transparency. With the assistance of fast-developing technology, land trusts can create a publicly accessible platform containing information on land prices in that area. This would help reduce the existence of land mafias. Furthermore, the land trust aims to bridge the relationship between the government and landowners in cases where the government rents land for public infrastructure. For this function, land trust institutions can conduct independent assessments on rent values and collect these for landowners. Therefore, landowners can still have the benefit of their land and enjoy the spillover effects created by the new infrastructure (Yoshino, Abidhadjaev, and Hendriyetty 2019).

3. Prioritizing financing for infrastructure maintenance

Policymakers have little incentive to spend funds on maintenance, making it less likely to be a priority for infrastructure investment. In some types of public infrastructure, such as sanitation systems (Hendriyetty, et. al., forthcoming), funding for facility construction comes from the central government and the private sector. However, maintenance costs mostly rely on user charges or tariffs established by the local government. Collecting user charges is unsustainable, and they are usually lower than expected and hence insufficient for covering maintenance costs.

Lawrence Summers argues that poorly maintained infrastructure increases costs, and deferring maintenance makes repairs more expensive later (Summers 2017). Further, some infrastructure needs continuous maintenance. A lack of maintenance of railways, subways, and roads, for example, causes accidents and hinders smooth running of transportation. Therefore, maintenance should be prioritized along with infrastructure projects themselves. To secure maintenance costs, infrastructure operators must be able to receive not only user charges but also spillover tax returns to finance operation costs. Income from spillover tax returns would allow these operators a continuous revenue source in addition to user charges.

4. Re-attraction of overseas capital to infrastructure investment

As the crisis hits developing countries, overseas investors will bring their investments back to their home countries. Consequently, infrastructure projects receiving financing from abroad will find it difficult to continue functioning well. Not only infrastructure finance, but also other capital investment from abroad, will shrink drastically as the crisis impacts developing countries. To bring overseas investors back to infrastructure investments, the rate of return must be secured, and governments need to demonstrate political will to ensure projects will continue regardless of economic turbulence. In this case, risks associated with infrastructure investment must be kept low through public-private partnerships. Additionally, infrastructure investment's attractiveness can be enhanced through increased rate of return through tax revenue spillover effects.

The composition of infrastructure projects' overseas financing depends on how fast overseas investors can withdraw their funds compared to domestic investors when economic turbulence occurs. Foreign investors tend to move their money much more quickly than domestic investors due to their home-country bias and asymmetry of information. If foreign investors move three times more quickly than domestic investors, the ratio of overseas investment should be less than one-third to maintain stability in the domestic financial market. If foreign investors move five times as fast as domestic investors, the ratio of overseas investment should be less than one-fifth. For sustainable infrastructure financing, it would be better to attract long term and stable investors, such as pension funds and insurance from overseas, into Infrastructure investments.

5. Deepening of the secondary market to attract long-term investors

Infrastructure financing should be long-term as projects have extended horizons. Insurance and pension funds are suitable because of their long-term nature. However, infrastructure investments in developing countries are dominated by domestic savings, such as bank loans with maturities below five years.

Some countries issue infrastructure bonds to finance infrastructure projects. However, the private sector needs deep secondary markets to allow the bonds to be traded easily. In developing countries, secondary markets are shallow and not liquid. Therefore, encouraging people to invest in insurance and pension funds will deepen the capital market. Furthermore, developing insurance markets and pension fund systems is also important for countries facing aging populations. Financial literacy and education can help citizens understand the importance of saving their money in insurance and pension funds.

6. Easing requirements and innovative financing for SMEs

When financial institutions face a crisis, they tend to stop risky lending and become reluctant to lend money to SMEs. Worldwide, small businesses have been among the most affected by COVID-19. Many small restaurants, for example, have not been able to open for long periods and need liquidity to finance their immediate costs, like rent and overhead. Meanwhile, banks often take longer to decide on loans for SMEs compared to large businesses because of their risks.

Additionally, infrastructure can allow SMEs to operate in strategic areas, like alongside roads and railways. To develop regions in terms of various infrastructure, both large firms and SMEs must be able to conduct their business at these key spots. If SMEs can open restaurants or small shops, for example, at train stations and along roadways, they can receive steady income, which can reduce income inequality and provide job opportunities. When their business develops, their revenue will also increase, which will eventually increase the tax revenue in their region. Therefore, SMEs play an important role in enhancing the rate of return to infrastructure investors. Facilitating SMEs' ability to continue to operate their business will also maintain regional development and reduce income inequality in the region.

Three policies are recommended for SME finance.

a. Credit guarantees for SME lending.

Loans to SMEs are needed to enable them to survive in these difficult circumstances, and some liquidity in their balance sheets will help SMEs cope with the economic slowdown. However, banks are reluctant to provide credit to SMEs because of their lack of credit history and their categorization as relatively high-risk businesses, especially during the economic turbulence of the COVID-19 outbreak. Credit guarantees for SME lending will make it easier for banks to make loans to SMEs. Governments can increase the credit guarantee ratio to support unproblematic lending from banks to SMEs (Yoshino and Taghizadeh-Hesary, 2015). If SMEs still have trouble obtaining bank loans, then they will have to borrow from local money lenders or loan sharks and pay very high interest rates, which could bankrupt many SMEs.

Credit guarantees can effectively support private bank loans to SMEs; however, this could lead to the moral hazard problem. Private banks tend to make risky loans if they are backed by credit guarantees, which, if defaulted on, lead to large deficits for the credit guarantee system. To avoid the moral hazard problem, two policies can be introduced. The first is a differentiated credit guarantee ratio. If a bank submits very risky SME loans to the credit guarantee corporation that become default losses,

the credit guarantee ratio should be lowered. In other words, the credit guarantee ratio can be differentiated by lower and higher default losses. The second policy involves charging higher credit guarantee fees to banks whose default losses are high (Yoshino and Taghizadeh-Hesary 2019).

b. Direct loans from government banks to SMEs.

In the case of crises, SMEs are the first to be affected by bank loan and liquidity shortages. Government banks can provide immediate loans to suffering SMEs during crises. For example, Japan's government bank provided emergency loans to SMEs with a zero-interest rate after the COVID-19 outbreak. Some SMEs will be only temporarily affected by COVID-19; these will recover when business normalizes. However, SMEs who were already facing structural problems may be unable to recover sales even after the pandemic. This group of SMEs should be rescued by government banks. However, they should be given loans to restructure their businesses rather than temporary assistance loans.

Governments should avoid crowding out private bank loans after COVID-19. When business eventually reverts to normal, government emergency bank loans should be shifted to private bank loans to avoid driving down these loans. Private banks can start providing normal loans after the economy recovers (Yoshino, Hendriyetty, and Taghizadeh-Hesary 2020).

c. Loans from hometown crowdfunding or hometown investment trust (HIT) funds to SMEs and startups.

COVID-19 will increase business failures, especially for startups and SMEs. This will make banks reluctant to lend them money. In this situation, hometown crowdfunding could offer an alternative source of financing. HIT funds collect money from individuals in a region to help local startups and SMEs. People in the region know each other, and the community lenders can monitor whether the startups/SMEs in the same region work seriously for their business or not. Furthermore, hometown crowdfunding investors are often buyers of products. This mechanism has been successfully developed in Peru, Cambodia, Vietnam, Japan, and many other Asian countries. Companies that offer hometown crowdfunding can help startups/SMEs sell their products, expand sales, and stabilize their business by facilitating online sale of products or at local train stations, for example.

7. Harnessing the benefits of digital and technological development to address the gap in infrastructure projects.

Digital technology has transformed how human beings live, work, and interact and has become essential to life, providing indisputable benefits. Information technology is developed by national broadband networks, which provide digital information even to remote areas through wireless networks and/or satellite technology. Through this sharing of information, new businesses are created, and their product sales are advertised via the Internet to customers countrywide. New residential areas are constructed, which use the Internet and other information devices; this in turn leads to increased corporate and income tax revenues. If some of these tax revenue increases are returned to digital companies, they could be used to expand information networks nationwide. Information technology also allows children to learn remotely over the Internet. Finally, human capital development brings higher country productivity, which contributes to economic growth and income equality.

To achieve these benefits, countries need to innovate in three areas: government policies, financing, and technology itself.

a. Government policy innovation

The development of technology alone for infrastructure development is insufficient to achieve fully functioning markets. It must be complemented by an enabling ecosystem that includes an appropriate level of regulation. Simultaneously, a competitive environment must be maintained by allowing new entries into the market.

Strict regulations can sometimes hinder technology innovation. Therefore, government policies to support the Internet should follow two criteria. First, infrastructure policies should be designed with sufficient flexibility to be adaptable to future needs and technological advancements. As infrastructure projects have very long life cycles, demand, technology, and circumstances will change over time. Second, government policies should be better coordinated and stimulate cross-sector synergies to improve efficiency. For example, synergies are needed for road systems, water piping systems, sewage systems, housing developments, and road construction. The combination of various infrastructure, including transport networks, will enhance the spillover effects of infrastructure investments in a region. For example, the development of a train station area will induce private businesses and residential areas to be developed nearby.

b. Innovation in financing and use of land trusts

The main challenge in infrastructure financing is that investors do not tolerate a project's low rate of return and high-risk nature because of uncertainty from the long lifecycle of the construction, the land acquisition process, impacts from political changes, and low user charges. Issuing revenue bonds is one way to guarantee minimum returns and encourages investors to develop the area alongside the infrastructure. This increases their rate of return through increased tax revenues created by infrastructure investment.

Governments should also create incentives for businesses to be well-developed in an area. Crowdfunding could be one solution to bring start-up businesses to a region alongside new infrastructure.

Regarding land trusts, technology can be used to create a platform for land price transparency. The land trust itself can transfer land right of use to infrastructure companies without transferring land ownership (Yoshino, Abidhadjaev, and Hendriyetty 2019).

c. Technology innovation

Breakthrough technologies are rapidly transforming the way infrastructure is built and operated, reshaping the way the infrastructure industry operates and bringing major implications for every participant in the value chain. The utilization of drones, 3D printing, and navigation systems in airports and railways are some examples of technologies that can accelerate the process of infrastructure development and boost the economic impact of infrastructure itself. Tax evasion, for example, can be mitigated by using satellite photos to identify the number of people using a restaurant or the number of trucks that come to a factory to transport a company's products each month. These data can help prevent tax evasion, which will increase the spillover taxes returned to infrastructure investments, leading to an increase in bankable infrastructure.

8. Preparing scenarios to anticipate natural disasters that could affect infrastructure projects.

Scenario for adaptation policy: Creating reserves or pooling fund for disaster management

As mentioned in Proposal #1, infrastructure investment positively affects regional economies, creating new jobs and housing, which impacts regional prosperity. The

concept proposed for anticipating natural disasters is similar, but instead of creating a positive effect, the DID method measures the negative impact from natural disasters. The original DID model that calculated the increase in GDP, $Y=F(Kp,L,Kg)$, is modified by adding d , $Y=F(Kp,L,Kg,d)$, where d stands for a disaster that would destroy public infrastructure (Kg), negatively impacting companies' private capital (Kp) and employment (L). When calculating the impact, we can focus on three channels: infrastructure, private business, and employment. This calculation is then compared to those for other regions where disaster has not occurred. Regions that have been affected by floods or typhoons, and how much their GDP has declined, could be compared to other regions.

For example, the Nagoya flood in Japan in 2000 affected more than 19 cities. For this example, we focus on three cities and use the impact from the Lehman Brothers investment bank collapse, which shocked the area's agricultural industry, as a comparison. First, in the agricultural district of Iwakura City, the Nagoya flood negatively affected the economy for three years; the city's GDP shrank by 35%. Conversely, the Lehman crisis led to a decline of around 13%. Thus, the Lehman crisis' impact was less than the flood (Yoshino 2019). Second is the business and commercial district of Nagoya City. After the Nagoya flood, the city's GDP declined by 23% for four years. While this decline was smaller than that of Iwakura City, the impact of the Lehman shock was greater. The third example is Toyota City, a manufacturing area. The impact from the flood lasted only one year, with only a 13% decline in GDP and a quick recovery. However, the Lehman crisis effects were much bigger than the flood's (Yoshino 2019).

Using the data from these three cities, we can see that the impacts differed in each area. The impact on the agriculture region was -35% in three years, the business region -23%, and the manufacturing region -13%.

These estimations can be used as a basis of calculation for governments to collect financing for disaster management, called "reserves." There are three financing steps related to this issue: i) ex ante accumulation of reserves; ii) fiscal spending when disasters have occurred; and iii) ex post accumulation of reserves. Ex ante accumulation occurs before a disaster happens. Governments create both a compulsory and a mandatory disaster insurance option. Everyone must buy the compulsory disaster insurance, while the mandatory insurance is in addition to the compulsory option. Governments can assign a single insurance company to keep and manage the fund or create a special vehicle for this purpose. Fiscal spending occurs right after the disaster event, and the money is used for rescue and recovery. When the accumulation of

funds is not sufficient to finance the recovery after the disaster, then governments should conduct ex post accumulation of reserves. There are many ways to finance these accumulations. Disaster loans are one option; the government could also create another funding pool. However, with careful estimation in the early stage of disaster recovery, ex-post accumulation of reserves could be avoided.

Scenario for mitigation policy: Levying tax on waste, such as CO₂, NOX, or plastics

Currently, the environmental factor is treated as a separate component when investors consider portfolio allocation. However, the current method detailed in the Sustainable Development Goals (SDGs) involves each consulting company separately measuring the environmental aspect. This leads to unoptimized portfolio allocation because each company uses a different definition of the environment.

In this proposal, CO₂, NOX, and plastic waste could be used as sources for tax levies based on the assumption that investors would focus on two conventional parameters—rate of return and risk—rather than separately consider SDGs and environmental components. Furthermore, rising ocean temperatures and global sea levels are the major effects of global warming, mostly caused by the emission of CO₂, NOX, and plastic waste. Therefore, to lower temperatures by 2°C by 2030, which is part of the SDGs, levying taxes on waste such as CO₂, NOX, and plastics will be more feasible than those of current SDG investment methods (Yoshino, Taghizadeh-Hesary, and Otsuka 2020).

In general, many consulting companies have been trying to answer the investor question of how to allocate assets to different companies or sectors, and many criteria have been developed to measure SDG achievement. KPMG designated demographics, income growth, technology (including renewable energy sources and knowledge-sharing cultures), and collaboration among governments, companies, international organizations, and academia as SDG indicators. The Nomura Research Institute set four key performance indicators to investigate business activities: innovation, business opportunity, impact, and cost. Using the example of hydrogen energy, technological growth through innovation is essential to create the hydrogen energy market. PriceWaterhouseCoopers set SDG indicators to include leadership (business and financial strategies), employee engagement (awareness and bottom-up initiatives), reporting (risk assessment and management), and collaboration (among suppliers, consumers, government, and nongovernment organizations). This variation among models is ineffective because of inconsistency and is not in line with the investors' actual interest, that is, risk and return.

Taxing waste products can achieve optimal portfolio allocation for the following reasons: (i) by taxing waste such as CO₂, NOX, or plastics with identical mechanisms or at the same rate for each type of waste internationally, investors can narrow their focus to the rate of return and risk; and (ii) regional taxation will lead to optimal asset allocation and sustainable growth.

The generated tax revenues can be allocated to green sectors to increase their rate of return, which will attract private investors to green energy projects.

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Disclaimer

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REFERENCES

Hendriyetty, Nella S., Paramita D. Dey, Chul Ju Kim and Nicolas J.A. Buchoud. Forthcoming. Urban Sanitation and Waste Management for All. Urbanization 20 White Paper. Location: U20 Saudi Arabia.

OECD and IMF. 2019. OECD/IMF Reference Note on the Governance of Quality Infrastructure Investment. Organisation for Economic Co-operation and Development; International Monetary Fund. https://www.mof.go.jp/english/international_policy/convention/g20/annex6_5.pdf

Summers, Lawrence. 2017. "Lawrence Summers: Infrastructure Maintenance." Filmed January 2017 at Bridges to Education: Best Bets for Public Investment, Washington DC. Video, 1:01:21. <https://www.brookings.edu/events/from-bridges-to-education-best-bets-for-public-investment>.

Yoshino, Naoyuki. 2019. "Economic Impact of Disaster to Regional GDP and Portfolio Allocation to Green." Building Resilient Critical Infrastructure and The Role of Insurance: Sharing Lessons from Japan – ASEAN Collaboration in DRR." Tokyo: United Nations University.

Yoshino, Naoyuki, and Umid Abidhadjaev. 2017a. "An Impact Evaluation of Investment in Infrastructure: The Case of a Railway Connection in Uzbekistan." *Journal of Asian Economics* 49: 1–11. <https://doi.org/10.1016/j.asieco.2017.02.001>.

Yoshino, Naoyuki, and Umid Abidhadjaev. 2017b. "Impact of Infrastructure on Tax Revenue: Case Study of High-Speed Train in Japan." *Journal of Infrastructure, Policy and Development* 1, no. 2: 129–48. <http://dx.doi.org/10.24294/jipd.v1i2.69>.

Yoshino, Naoyuki, Umid Abidhadjaev, and Nella Hendriyetty. 2019. "High-quality Infrastructure and Land Acquisition For Infrastructure Development Through Land Trusts." *Global Solutions Journal* 4: 156-163. https://www.global-solutions-initiative.org/wp-content/uploads/2019/09/gsj_4_e-mag_1198.pdf

Yoshino, Naoyuki, Nella Hendriyetty, and Farhad Taghizadeh-Hesary, 2020. "Economists' Views on the Global Economy: How a Big Impact from Covid-19 on SME Finance & Infrastructure Maintenance Can Be Avoided." *Japan Spotlight: The World Trade System with Covid-19 July/August*: 64–7. https://www.jef.or.jp/journal/pdf/232nd_EVGE.pdf

REFERENCES

Yoshino, Naoyuki, and Farhad Taghizadeh-Hesary. 2015. "Analysis of Credit Ratings for Small and Medium-Sized Enterprises: Evidence from Asia." *Asian Development Review* 32, no. 2: 18–37. https://doi.org/10.1162/ADEV_a_00050.

Yoshino, Naoyuki, and Farhad Taghizadeh-Hesary. 2019. "Optimal Credit Guarantee Ratio for Small and Medium-Sized Enterprises' Financing: Evidence from Asia." *Economic Analysis and Policy* 62: 342–56. <https://doi.org/10.1016/j.eap.2018.09.011>.

Yoshino, Naoyuki, Farhad Taghizadeh-Hesary, and Miyu Otsuka, 2020. "COVID-19 and Optimal Portfolio Selection for Investment in SDG." *Finance Research Letters*: 101695. <https://doi.org/10.1016/j.frl.2020.101695>.



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