Infrastructure Investment and Finance in Asia\textsuperscript{*1}

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Abstract

Finance for infrastructure investment in Asia\textsuperscript{1} has shown unique characteristics from country to country, from period to period and from sector to sector. A major part of infrastructure investment is financed by public sector funds generally and in Asia as well. Availability of foreign funds impacts infrastructure investment in some cases but not necessarily in others. The role of Official Development Assistance (ODA) for infrastructure investment is significant in many developing countries. Meanwhile, Public-Private Partnerships (PPPs) have been introduced in recent years as an alternative to public sector infrastructure investment in the face of huge demand for infrastructure under public sector funding constraints. Successful PPPs, however, can be expected only in selected countries and sectors, so the PPPs’ share in total infrastructure investment remains limited. Premature introduction of PPPs without a well-developed institutional framework and implementation capacity could end up with ex-post public sector support and remedial measures. In light of the nature of infrastructure investment, the complementary use of foreign funds to fill the deficiency of domestic savings is warranted and enhanced infrastructure investment requires well-developed capital markets to mobilize domestic savings into long-term investment. Finance for infrastructure investment and integration of regional financial markets should be pursued in this context and ideally be promoted by keeping pace with capital market development in individual countries.

Key words: Asia, Asian Bond Markets Initiative (ABMI), capital market, financial intermediation, financial market integration, infrastructure investment, Official Development Assistance (ODA), project finance, Public-Private Partnerships (PPPs)

JEL Classification: F21, F36, H54

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\textsuperscript{1} This paper defines the scope of Asia as members of the Association of Southeast Asian Nations (ASEAN); China, Japan and the ROK (“ASEAN+3”); as well as countries in the South Asia region as covered by the World Bank unless otherwise defined explicitly, for example, due to data availability constraints.
I. Introduction

One of the policy motivations for financial sector development and integration in Asia is the mobilization of savings into long-term investment, particularly in infrastructure, between countries in the region. The Asian Bond Markets Initiative (ABMI) promoted by the so-called “ASEAN + 3” (10 ASEAN members, China, Japan and the Republic of Korea (ROK)) since 2003 is one such policy effort. Against this background, this paper will review the current state of and challenges for infrastructure investment and finance in Asia and then draw policy implications for financial sector development and integration in the region. More specifically, the paper will summarize the trends and characteristics of infrastructure investment in Asia and then review how infrastructure investment has been financed. Impacts of availability of foreign funds on infrastructure investment will be examined as well. Furthermore, we will focus on PPPs as a potentially effective approach to help meet the vast infrastructure investment needs in Asia under limited availability of public funds and consider opportunities and challenges of PPPs based on lessons learned from past cases to find methods for successful implementation. In addition, the paper will discuss the role of foreign funds in light of the nature of infrastructure investment. The paper concludes by considering policy implications for enhancing finance for infrastructure investment and touches on how financial sector development and integration in Asia should be interpreted in the same context.

II. Infrastructure investment in Asia

II-1. Understanding infrastructure investment

A first step in understanding the current state of infrastructure investment requires us to specify the scope of infrastructure. This paper defines infrastructure conceptually as facilities that provide public services in support of industry and people’s lives. More specifically, for analytical purposes, we will limit the scope of infrastructure to the four sectors of energy, telecommunications, transport, and water and sewerage.

Statistics are, however, not fully available for us to understand the current state of infrastructure investment in a comprehensive and accurate way. The ADB (2017) states, “There is no single way—or international best practice—to measure infrastructure investment” because aggregate infrastructure investment data is not available. Aggregate infrastructure investment data can be created only by estimates based on national accounts data, government budget figures and collection of individual project information. Infrastructure investment in Asia is actually estimated by the ADB (2017) through the combined use of various statistics (Table 1).

Gross domestic fixed capital formation (GDFCF), one of the aggregate supply compo-

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2 Both the ADB (2017) and World Bank’s Private Participation in Infrastructure (PPI) Database cover the energy, information and communications technology, transport, and water sectors.
The components of national accounts, consists of private and public categories. A large portion of public GDFCF is considered to be infrastructure investment carried out by the public sector. Private infrastructure investment is included in private GDFCF. It is difficult, however, to have an accurate measure of how much of GDFCF contributes to infrastructure investment.

Fiscal statistics also help estimate infrastructure investment. Useful sources of information include not only data on central and local governments, but also data on other public entities such as state-owned enterprises. But the scope of data varies from country to country. The World Bank’s Private Participation in Infrastructure (PPI) Database makes available the most comprehensive data set on infrastructure investment by PPPs. This database provides data on “contractual arrangements for public infrastructure projects in low- and middle-income countries (as classified by the World Bank) that have reached financial closure,” in which private parties assume operating risks” in the energy, telecommunications, transport, and water and sewerage sectors. Publicly available sources are used to construct this data set. Investment amounts in this database represent total investment commitments at financial closure, not realized investments. Details are available for some individual projects, but not for all.

It is possible to conceptualize data on infrastructure investment by relying on various sources (Table 2). As pointed out earlier, however, aggregate infrastructure investment data compiled with common and consistent definitions does not exist. The current state of infrastructure investment can be understood by relying on country data sources. But accuracy of cross-country comparison and aggregation of individual country data are not warranted because of different methodologies adopted by individual countries. For these reasons, in this

<table>
<thead>
<tr>
<th>25 DMCs</th>
<th>2015 (Billions of US$)</th>
<th>% of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>881</td>
<td>4.6</td>
<td></td>
</tr>
<tr>
<td>24 DMCs without PRC</td>
<td>195</td>
<td>3.2</td>
</tr>
<tr>
<td>7 Southeast Asian countries</td>
<td>55</td>
<td>2.3</td>
</tr>
<tr>
<td>People's Republic of China</td>
<td>686</td>
<td>5.0</td>
</tr>
<tr>
<td>India</td>
<td>118</td>
<td>4.3</td>
</tr>
<tr>
<td>Indonesia</td>
<td>23</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Note 1: 25 Developing Member Countries (DMCs) of ADB consist of seven Southeast Asian countries (Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam), Afghanistan, Armenia, Bangladesh, Bhutan, People’s Republic of China, India, Fiji, Kazakhstan, Kiribati, Kyrgyz Republic, Maldives, Marshall Islands, Federated States of Micronesia, Mongolia, Nepal, Pakistan, Papua New Guinea, Sri Lanka.

Note 2: Percent of GDP is the author’s calculation based on data in ADB (2017).

Source: ADB (2017)
II-2. The trends and prospects of infrastructure investment in Asia

II-2-1. The trends of infrastructure investment

Our conjecture based on GDFCF in national account statistics is that the past infrastructure investment differs from country to country, from period to period and from sector to sector. It is difficult, however, as pointed out in the previous section, to have an accurate measure of how much of GDFCF contributes to infrastructure investment. In this section, we try to capture the trend in infrastructure investment on the basis of GDFCF and net investment in government non-financial assets.\(^4\)

The level of GDFCF in Asia as a whole is higher than that in other developing regions (Figure 1). Its level in East Asia and the Pacific has been around 30% of GDP since the

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\(^4\) “The net investment in nonfinancial assets equals the acquisitions minus disposals of fixed assets, minus consumption of fixed capital, plus changes in inventories, plus the net acquisition (acquisitions minus disposals) of valuables and non-produced assets.” IMF (2014).
1990s. In South Asia the level reached around 30% of GDP by the mid-2000s, also higher than in other developing regions, while showing a declining trend since the 2010s. All these data sets seem to suggest vigorous infrastructure investment in Asia compared with other developing regions.

Table 3. Gross domestic fixed capital formation (GDFCF)—comparisons between 2005 and 2011

<table>
<thead>
<tr>
<th>GDFCF in construction excluding buildings (% of GDP) in 2005</th>
<th>GDFCF in construction excluding buildings (% of GDP) in 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>High&gt;4.3%</td>
<td>High&gt;4.9%</td>
</tr>
<tr>
<td>India</td>
<td>Azerbaijan</td>
</tr>
<tr>
<td>Lao P.D.R. Republic of Korea</td>
<td>Taipei, China</td>
</tr>
<tr>
<td>Sri Lanka Vietnam</td>
<td>Fiji</td>
</tr>
<tr>
<td>Bhutan</td>
<td></td>
</tr>
<tr>
<td>Vietnam</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td></td>
</tr>
<tr>
<td>People's Republic of China</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mid=2.4-4.9%</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>Pakistan</td>
</tr>
<tr>
<td>Mongolia</td>
<td>Thailand</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>Nepal</td>
</tr>
<tr>
<td></td>
<td>Malaysia</td>
</tr>
<tr>
<td></td>
<td>Low&lt;2.4%</td>
</tr>
<tr>
<td>Armenia</td>
<td>Cambodia</td>
</tr>
<tr>
<td></td>
<td>Philippines</td>
</tr>
<tr>
<td></td>
<td>Singapore</td>
</tr>
<tr>
<td></td>
<td>Bangladesh</td>
</tr>
<tr>
<td></td>
<td>Hong Kong, China</td>
</tr>
<tr>
<td></td>
<td>China</td>
</tr>
</tbody>
</table>

Source: ADB (2017)

The ADB (2017) classifies countries in Asia into several categories on the basis of changes in the ratio to GDP of GDFCF in construction, excluding buildings, over years (Table 3). The changes and the difference among categories remain within a certain range between the two time periods.

Figure 2 shows how selected countries in East Asia and the Pacific and South Asia made net investment in government non-financial assets in terms of percent of GDP. Most remarkable is the high ratios for Malaysia and Vietnam. Indonesia, the ROK and Thailand have shown low levels in recent years. It should be noted that the notion of net investment in government non-financial assets is broader than infrastructure investment by the government.

The World Bank’s PPI Database provides information on trends in private infrastructure investment, with a focus on investment with private parties assuming operating risks (“private infrastructure projects”).

Figure 3 shows a rapid expansion of private participation in infrastructure in East Asia and the Pacific in the mid-1990s. This trend was a reflection of the emergence of independent power producers (IPPs) in response to the expanded power demand caused by high economic growth called the “East Asian Miracle.” A dramatic reversal of this trend was observed after the Asian Financial Crisis in 1997 and 1998. The total investment value of pri-
Private infrastructure projects as of today remain below the levels during the mid-1990s.

The majority of private infrastructure projects in South Asia are those in India. Figure 4 indicates that the total value of investment commitments in private infrastructure projects has varied drastically with 2010 as the peak year. This movement is a reflection of policy initiatives taken by the government of India to promote private sector participation in the power and national highway sectors.

Some available evidence suggests our proposition that past infrastructure investment differs from country to country, from period to period and from sector to sector.
II-2-2. Prospects

Forecasts and projections published by various organizations share a consensus that there is a large need for infrastructure investment in Asia. McKinsey (2016) states that nearly half of global infrastructure investment, both in the past and the future, is in Asia (Table 4). The

Table 4. Infrastructure investment needs by McKinsey & Company

<table>
<thead>
<tr>
<th>Region</th>
<th>Historical infrastructure spending 2000-2015</th>
<th>Needed investment 2016-2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trillions of US$ (at constant 2015 price)</td>
<td>31.4</td>
<td>49.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Region</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed Asia</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Western Europe</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>United States and Canada</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Africa</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>India</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Other emerging Asia</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Middle East</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Latin America</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>China</td>
<td>26</td>
<td>29</td>
</tr>
</tbody>
</table>

Source: The author based on McKinsey (2016)
prospects are that the share of developing countries in the region, most notably of China, keeps expanding while advanced countries’ share will be declining.

The ADB (2017) estimates that the need for infrastructure investment in 45 developing member countries (DMCs) of the ADB totals US$26 trillion over the period from 2016 to 2030 (US$1.7 trillion per year). The same report estimates an infrastructure investment gap per year at US$459 billion (2.4% of GDP) by comparing the infrastructure investment needs for 25 selected DMCs and estimated infrastructure investments in 2015.

Table 5. Estimated infrastructure investment needs

<table>
<thead>
<tr>
<th>45 Developing Member Countries (DMCs) of ADB</th>
<th>2016-2030</th>
<th>US$26 trillion</th>
<th>US$1.7 trillion/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 Developing Member Countries (DMCs) of ADB</td>
<td>Estimated current investment (2015)</td>
<td>US$881 billion</td>
<td>Estimated infrastructure investment needs (2016-2020)</td>
</tr>
</tbody>
</table>

Source: ADB (2017)

II-3. Determinants of infrastructure investment

Infrastructure investment needs are estimated with several assumptions. Considerations are made, for example, on how much public infrastructure services should be provided for improving national welfare, how much such services can be provided by the existing facilities, and how much additional investment is to be made to fill the gap. Furthermore, additional investment is necessary to maintain and upgrade the existing infrastructure. Taking account of these factors, the ADB (2017) uses as explanatory variables the existing physical infrastructure stock, gross domestic product per capita, shares of agriculture and industrial value-added in GDP, the urbanization rate (share of population in urban area) and population density. Also, depreciation of the existing stock reflecting physical deterioration is used to estimate investment demand for maintenance and renewal.

Estimated infrastructure investment needs cannot be materialized without finance. At a macro level, domestic savings determine the availability of financing. For economies with a negative savings-investment balance, the availability of external funds is seen as an important determinant of financing. Other determining factors should include fiscal conditions as well as institutional frameworks such as financial intermediaries to channel domestic and foreign savings into long-term investment—most notably the state of capital market development.
III. Finance for infrastructure investment in Asia

III-1. How infrastructure investment has been financed

III-1-1. Macroeconomic savings-investment balance

From a macro perspective, the share of GDFCF in GDP tends to be high in Asia. This fact suggests that economic growth in Asia has often been led by investment. Private investment is the major part of GDFCF despite differences from country to country. Macroeconomic savings-investment balance helps our understanding on how GDFCF has been financed.

Many emerging and developing countries in Asia have shown excess savings over investment since the Asian Financial Crisis while various patterns have been observed among individual economies (Figure 5). As a result, the current account balance of Asia as a whole has been in surplus. Some countries, however, have been relying on foreign savings for their domestic investment as suggested by the macroeconomic savings-investment balance. Figure 6 gives an overview of the current account balances, which is an equivalent representation of macroeconomic savings-investment balance.

Economies with lasting excess savings over investment (equivalently, current account surplus), or those with current account and financial account surpluses, continue to accumulate foreign exchange reserves. The excess of savings over investment suggests that domestic savings have not been fully and effectively utilized as sources of productive investment domestically, instead invested in foreign assets. It is equivalent to say, as discussed in Nishizawa (2012), that value-added created as part of GDP has been channeled to the developed world as relatively low-yield investments in the form of foreign exchange reserves accumulation.

The recent trends of savings-investment balance remind us of the channeling of abundant Asian savings into Asian investment as one of the important policy challenges. Further-

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**Figure 5.** Savings-investment balance in Asia (% of GDP)

Source: IMF, World Economic Outlook Database
more, against the background of diverse stages of economic development and savings-investment balance among countries, allocation of regional savings within the region for long-term investment, most notably for infrastructure investment, is considered as the rationale for regional financial integration and development.

III-1-2. Sources of finance for infrastructure investment

1) Conceptual framework

National account statistics provide a macro overview of GDFCF and domestic savings. Neither of these statistical items, however, represents infrastructure investment and finance because GDFCF itself is not equivalent to infrastructure investment, and neither is domestic savings to infrastructure finance. No statistics give a direct and comprehensive indication of how infrastructure investment is financed.

Conceptually, sources of infrastructure finance are either public or private, and either domestic or foreign (Table 6). The origin of domestic sources is either fiscal revenues—mainly taxes collected from domestic residents—or domestic savings mobilized through the banking sector and the financial and capital markets as intermediaries. Debt funds mobilized through financial intermediaries, both domestic and foreign, are to be recovered with interest by lenders eventually either through taxes collected from or payments charged on beneficiaries from infrastructure services.

2) Fiscal resources (revenues, and domestic and external borrowing)

As the ADB (2017) indicates as typical in Asia, the public sector plays a major role in finance for infrastructure investment. Infrastructure investment, which is often planned and implemented as public works, is mainly financed by central or local government budgetary expenditures. Sources of such expenditures are mostly taxes, funds mobilized by issuing securities in the market and borrowing from bilateral and multilateral organizations. Also important is the role of state-owned enterprises and banks.

The role of ODA in finance for infrastructure investment is on a declining trend. Net
Table 6. Taxonomy of capital flows for financing infrastructure investment

<table>
<thead>
<tr>
<th>Domestic</th>
<th>Public</th>
<th>Foreign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central government budget</td>
<td>Bilateral</td>
<td>Official development assistance (ODA)</td>
</tr>
<tr>
<td>Local government budget</td>
<td>Multilateral</td>
<td>Other official flows (OOF)</td>
</tr>
<tr>
<td>State-owned enterprises</td>
<td></td>
<td>Concessional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nonconcessional</td>
</tr>
</tbody>
</table>

Public-Private Partnerships (PPPs)

<table>
<thead>
<tr>
<th>Private</th>
<th>Domestic</th>
<th>Foreign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporations</td>
<td>Nongovernmental organizations (NGOs)</td>
<td>Foreign direct investment (FDI)</td>
</tr>
<tr>
<td>Individuals</td>
<td>Financial intermediaries</td>
<td>Portfolio investment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trade credits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bank loans</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Remittances</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grants</td>
</tr>
</tbody>
</table>

Source: The author based on Nishizawa (2011)

ODA received in terms of the percentage of GDFCF has been on a declining trend over the past decades and remains low in recent years (Figure 7). In South Asia, net ODA received was almost 20% of GDFCF in the 1960s, but was around 2% in the 2000s. In East Asia and the Pacific (excluding high-income countries), the same figure is no more than 1% in recent years compared to 5% in the 1960s.

(3) Private funds (domestic and foreign)

Finance for infrastructure investment depends much on public funds, but some countries are active in introducing PPPs to promote the role of private funds. Notwithstanding the ad-
vancement of PPPs in those countries, the share of private funds in the whole infrastructure finance remains small.

In some fields, private funds play an exceptional role—for example, the power sector, where the role of private funds has been prevalent with the emergence of IPPs. According to the DOE (2017), as a result of successful introduction of IPPs in the Philippines since the 1990s, 89% of its total power consumption is supplied by IPPs. According to the World Bank (2017), in Laos with its land located almost entirely within the lower Mekong basin, many foreign IPPs have invested in recent years and produce 89% of the total power generation (see Appendix).

III-2. The role of foreign funds

Foreign funds are in two categories: public (bilateral and multilateral) and private. As shown above, the role of ODA in finance for infrastructure investment is not as important as earlier. Nevertheless, many low-income countries continue to rely on ODA (Table 7). Countries with a relatively high income level tend to rely more on public funds with lower concessionality levels such as export credit.

The World Bank’s PPI Database provides data on equity and debt of infrastructure projects with private parties assuming operating risks. However, the limited availability of project information hampers our ability to know the overall picture.

Availability of foreign funds is only one of the factors to determine finance for infrastructure investment. For low-income countries, however, availability of foreign funds, particularly ODA, is of critical importance. For countries with an increasing use of IPPs in the power sector, the role of foreign funds becomes crucial. These developments indicate PPPs’ potential in certain countries or sectors.

Table 7. Countries in Asia with net ODA received exceeding 5% of gross capital formation and central government expense (2015)

<table>
<thead>
<tr>
<th>Net ODA received (% of gross capital formation)</th>
<th>Cambodia (16.7%), Nepal (14.7%), Lao P.D.R. (11.6%), Pakistan (9.0%), Bhutan (8.8%), Mongolia (7.4%), Vietnam (5.9%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net ODA received (% of central government expense)</td>
<td>Bhutan (36.7%, 2014), Nepal (35.7%), Cambodia (32.3%), Lao P.D.R. (22.0%), Mongolia (14.7%, 2013), Bangladesh (14.6%), Papua New Guinea (13.3%), Vietnam (11.0%, 2013), Pakistan (8.2%, 2014)</td>
</tr>
</tbody>
</table>

Note: Only countries with data available.
Source: World Bank, World Development Indicators
IV. The role of Public-Private Partnerships (PPPs)

IV-1. The background of PPPs

Over the past three decades, PPPs have been attracting attention as one of the promising schemes for infrastructure investment. The Private Finance Initiative (PFI) introduced in the United Kingdom in the 1980s is one of the models for PPPs. In line with these developments, the World Bank (1994) emphasized the need for transition from the conventional government-led method to promotion of private participation in infrastructure for better quality infrastructure services. This was the turning point where the role of PPPs started attracting attention as a promising approach for infrastructure investment in developing countries. In Asia, PPPs have been introduced actively in some countries and sectors since the 1990s.

The main motivation and expectation for PPPs was a growing demand for improved quality and efficiency of infrastructure services among dissatisfied users as well as policy imperatives to reduce fiscal burden faced with budgetary constraints. This trend was observed not only in advanced countries but also in developing countries with underdeveloped infrastructure considered as a constraint to economic growth.

In a PPP project, the public authority specifies the requirements of public services to be provided by private sector parties based on a long-term contract. Promotion of PPPs is one of the priority challenges for many countries in Asia with the hope of meeting infrastructure investment needs while limiting budgetary burden.

IV-2. The framework of PPPs and types

PPPs for infrastructure investment have their origin in the project finance scheme (Figure 8). With PPPs, sharing of responsibilities or of risks among various players from the public and private sectors in carrying out an infrastructure project determines its success. Figure 9 shows different types of infrastructure projects by a different configuration of risk sharing among the parties involved from the public and private sectors.

IV-3. Risk sharing

One of the fundamental principles of successful project finance is that a particular risk should be borne by the party who can manage that particular risk at the minimum cost. For example, for the construction of facilities such as power plants, water and sanitation facilities, highways and railroads, private sector contractors in charge of construction should be

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5 Ohara (1997) defines project finance as “a method of financing of a particular project with which the debt services basically come only from cash flows and revenues generated by the project, and security or collateral for lenders is limited to physical assets and contracts belonging to the project.” Project finance is called “non-recourse finance” or “limited-recourse finance” because of its characteristics of limiting the source of debt services basically to cash flows and revenues generated by the project.
responsible for construction completion as planned. If service charges are regulated by the public administration, service providers without price setting capacity might be faced with a risk of running a commercially unviable business. As long as the public authority has power to determine prices, private sector players are not able to control the demand for services by setting prices appropriately. With such a risk, it is easily conceivable that private sector parties are hesitant to participate in the project. Therefore, it is considered quite reasonable that demand risk associated with public services provision with regulated prices should be borne by the public authority responsible for price setting. Figure 10 shows examples of major risks that should be considered in structuring PPPs. The success of PPPs fully depends on determination of risk allocation among various players from the public and private sectors to achieve risk minimization or reduction.

The core task of structuring a PPP project is to reconcile the interests of various parties from the private and public sectors and to harmonize them toward a successful implementation of the project. These parties include investors, lenders (creditors), and contractors on the private sector side, and the government (central and local) and other related public entities on the public sector side. For PPPs in emerging and developing countries, foreign firms and financial institutions, foreign public entities (such as the Japan International Cooperation Agency (JICA), Japan Bank for International Cooperation (JBIC) and Nippon Export
and Investment Insurance (NEXI) from Japan), and international organizations such as The World Bank Group and Asian Development Bank (ADB) are often involved.

PPPs are characterized as long-term contractual arrangements between a public sector procurer responsible for public services provision and private sector parties responsible for actual provision of services. The PPP scheme typically involves a separate legal entity called a “special purpose vehicle” (SPV) as the project company created by private sector equity investors called “sponsors” to undertake the activity defined in the contract with the public sector procurer. With PPP projects, the public authority specifies the requirements of public services to be provided, but leaves private sector parties to decide how to meet these specific requirements. Certain risks, such as design, financing, construction, operation, maintenance and repair, are transferred to private sector parties by the division of responsibilities among public and private sector players.

One of the benefits of this mechanism is that the public authority needs to identify project risks in order to consider risk transfer to the private sector. The public authority can transfer certain risks only when it identifies various risks. For this reason, PPPs are expected to help avoid the public sector’s ignorance or neglect of project risks and also prevent future cost overrun due to an overly optimistic project proposal.

Private sector investors and lenders involved in PPP projects have capital at risk, implying loss at project failure, and are expected, therefore, to have a greater financial incentive to ensure that the service is provided as required in the contract. Moreover, lenders are expected to provide additional safeguards through independent due diligence because they want to ensure that the project is viable and that all obligations in a contract can be safely fulfilled.

Figure 10. Major categories of risk in PPPs

<table>
<thead>
<tr>
<th>Types of risk</th>
<th>Risk in general most efficiently borne by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>All risks</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Private partner (government may provide guarantee to mitigate risk)</td>
</tr>
<tr>
<td>Legal and political risk</td>
<td>Private partner</td>
</tr>
<tr>
<td>Commercial risk</td>
<td>Private partner</td>
</tr>
<tr>
<td>Demand risk</td>
<td></td>
</tr>
<tr>
<td>Supply risk</td>
<td></td>
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<tr>
<td>Supply-side operation risk</td>
<td></td>
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<tr>
<td>Construction risk</td>
<td></td>
</tr>
</tbody>
</table>

IV-4. **PPP projects reaching financial closure by sector (Figures 11 and 12)**

PPPs have been introduced most intensively and mostly successfully in the power sector. An IPP model based on a take-or-pay contract with state-owned power companies has become common since the mid-1990s in many countries in the world. With broadly successful outcomes, this model has been seen as established and has become a standard model in this field. PPPs have been successful in the information and communications sector as well.

In recent years, mega cities in Asia are faced with pressing challenges for developing urban transport networks. Building or upgrading national highways and railways is another urgent need for countries as part of national transport network development. However, there has been only a limited number of success stories of PPPs in the transport sector mainly because of difficult demand forecast.

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**Figure 11. Private participation in infrastructure by sector in East Asia and the Pacific (1990-2016)**

![Graph showing the number of projects in different sectors by billions of US$](source)

**Figure 12. Private participation in infrastructure by sector in South Asia (1990-2016)**

![Graph showing the number of projects in different sectors by billions of US$](source)
While there have been some areas where success stories of PPPs are found, the scope of successful PPPs remains limited. In terms of the number and investment commitments of PPP infrastructure projects reaching financial closure, the achievements so far are not in line with expectations.

IV-5. Challenges for PPPs

IV-5-1. Risks entailed in PPPs

A wide range of risks is entailed in PPPs. Some are common among infrastructure projects for whoever implements the project and others are unique with PPPs.

(1) Uncertain future revenues

Uncertain future revenues lead to uncertain project profitability. Demand risks are especially notable in the transport sector. Future revenue forecast at the planning stage is critical with transport projects. There are many cases initiated with an optimistic revenue forecast that ended up with project default as a result of far lower revenue levels than the initial forecast.

One of the factors for uncertain revenue forecast is availability for users of alternative means of transportation with implications for price setting. Also, ex-post creation of alternative routes could bring about large variations in demand and become a risk to worsen project profitability. It is one of the common characteristics of network services that the extent to which network services are expanded affects users’ satisfaction and thus project revenues.

(2) Price setting

Price setting is also a critical factor in determining future project revenues for public utilities such as power and water supply. If prices are set at a level to risk financial soundness of public utilities, project revenues based on contracts such as power-purchase agreement in a power project could not be received as planned or be delayed. With this, uncertainties on project revenue forecast are heightened. Furthermore, risks on price setting due to political maneuvering raise uncertainties in future revenues.

(3) Limited availability of bank lending

Infrastructure investment in need of long-term finance inevitably carries maturity mismatch with bank lending based on short-term deposit and therefore entails a roll-over risk. Prudential regulations such as exposure and single-borrower limits imposed for depositor protection and banking system soundness purposes could be another constraint to the availability of debt financing for a large scale infrastructure investment.

(4) Political risks

Policy changes following a change of government, political unrest, appropriation and nationalization, war, terrorism and riots are typical political risks.
(5) Fiscal risks

Various risks described so far are often transferred into fiscal burden in the end due to the public nature of infrastructure services. The public sector should pay due attention to contingent liabilities, or in other words a risk of creating a potential excessive fiscal burden.

PPPs in public infrastructure projects could increase fiscal risks because of the need to meet both public and private interests as well as project durations over several decades. Unless such risks are managed properly, the so-called government contingent liabilities would turn into direct liabilities or government subsidies could become an excessive burden on the budget. If a public infrastructure project were not commercially viable and faced with possible cessation, the private sector party could consider a possible withdrawal from the project. On the other hand, the public sector player virtually does not have an option to withdraw because of its responsibility to provide public infrastructure services. Because of this, the public sector’s bargaining power vis-à-vis the private sector counterpart becomes weaker when the project at its operational stage is faced with restructuring.

One of the attractive features of PPPs is that there is no need for huge initial investment by the public sector. The government, faced with budgetary constraints, expects to gain from PPPs. Ironically though, careless use of PPPs might bring about direct government liabilities originating from contingent liabilities or an excessive fiscal burden of subsidies, which are exactly opposite to the intended reduction of fiscal burden.

Investment and operating costs of an infrastructure project based on PPPs need to be recovered over the project life period. The cost of building, operating, and maintaining infrastructure facilities eventually has to be paid for by either the users or tax payers. It is obvious that there is no such thing as a free lunch with PPPs.

IV-5-2. Cases of PPPs

Performance of PPPs differs from sector to sector and has not been stable. We know PPPs’ history of trial and error in many countries. In order to learn from past PPP experiences, a few cases with materialized risks are described below.

(1) Water services in Metropolitan Manila

In the first half of the 1990s, Metropolitan Manila suffered from dysfunctional water and sewerage services. Over 60% of drinking water was lost to leaks and illegal connections and more than 70% of households in the eastern half of Metropolitan Manila lacked 24-hour services. Under such circumstances, Metropolitan Waterworks and Sewerage System (MWSS), the government agency responsible for delivering water and sewerage services to residents, was too heavily indebted to invest anew. In 1995, the Fidel Ramos Administration initiated reform to set the framework for privatization of water services by enacting the National Water Crisis Act.

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Verougstraete and Enders (2014b).
The government divided Metropolitan Manila into two geographically separate concession zones to be awarded via bidding to two private companies (the East zone for Manila Water Company and the West zone for Maynilad Water Service). Efficiency gains by privatization were realized. The level of water loss was reduced from 45% in 1997 to 12% in 2013 in the East zone with the same ratio from 66% in 1997 to 39% in 2013 in the West zone. Almost 100% of the customers now enjoy 24-hour uninterrupted water supply.

Despite the improved services, the tariff setting was not as simple and easy as expected. The tariff levels were raised by 38% to 8.56 pesos per cubic meter. Then the bidding results were 4.97 pesos per cubic meter and 2.32 pesos per cubic meter for the East and West concessions respectively, which could have been interpreted as a “loss-leader” strategy. With such tariff levels, two concessionaires were faced with worsening financial conditions and eventually had to ask for tariff renegotiations for regaining project commercial viability, triggered by an increase in foreign currency-denominated debt services after the peso depreciation during the Asian Financial Crisis in 1997.

A contract amendment with tariff adjustment was granted in 2001 to allow tariffs to increase at an accelerated pace. As a result of the amendment, tariff levels in 2012 were raised by 50% in the East concession and 100% in the West concession compared to the eve of privatization. Higher tariffs, however, were not enough to give Maynilad a chance to recover its financial health and the company went bankrupt for restructuring with public funding support.

(2) Minimum revenue guarantee in the ROK

The government of the ROK introduced the Minimum Revenue Guarantee (MRG) scheme to partially mitigate project revenue risk in order to mobilize private funds into infrastructure investment. The scheme initially guaranteed 90% of forecasted project revenues over 20 years, and the underlying assumptions of concession contracts entered into force between 1995 and 2003. The scope of projects eligible for MRG was narrowed down and the scheme was eventually abolished in 2009 because of increasing fiscal burden (Table 8).

Actual project revenues tended to be much smaller than the forecasts and led to the accumulation of fiscal burden with the MRG. Table 9 shows that actual revenues from the Incheon-Seoul Highway were far below the forecasted revenues under MRG.

(3) Bangkok Mass Transit System

The Bangkok Mass Transit System (BTS), in operation since 1990, contributes to easing heavy traffic congestion in the city. This project was initiated in 1995 on a Build-Operate-Transfer (BOT) scheme, one of the typical PPPs, with a 30-year project life span under the financial constraints faced by the Royal Thai Government and the Bangkok Metropolitan Administration (local government).

8 Verougstraete and Enders (2014a).
This project is one case that shows the difficulty with demand forecasts. The initial ridership forecast was 600,000 riders per day, but the actual ridership turned out to be only 150,000 riders per day. Revenues were far below commercially viable levels. Hit by the increased debt service burden due to the depreciation of the Thai baht during the Asian Financial Crisis in 1997, the project company defaulted on payment in 2002 and initiated discussions with creditors on a debt restructuring plan.

The project recovered with profits in 2009 helped by network extensions and improved connectivity with commercial facilities along the lines. The BTS Rail Mass Transit Growth Infrastructure Fund (BTSGIF), the first infrastructure fund listed at the Stock Exchange of Thailand (SET), successfully raised about THB62.5 billion in the initial public offering in 2013 on the basis of future net farebox revenues.

Table 8. Coverage of minimum revenue guarantee and redemption of excess revenue

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<tr>
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<tr>
<td>Solicited proposal</td>
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<td></td>
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<td></td>
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<tr>
<td>guarantee</td>
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<td>90</td>
<td>80</td>
<td>70</td>
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<tr>
<td>redemption</td>
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<td>110</td>
<td>120</td>
<td>130</td>
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<td>Unsolicited proposal</td>
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<td></td>
<td></td>
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<tr>
<td>guarantee</td>
<td>80</td>
<td>80</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>redemption</td>
<td>120</td>
<td>120</td>
<td>130</td>
<td>140</td>
</tr>
</tbody>
</table>

% of projected revenue in concession agreement


Table 9. Actual subsidy paid under minimum revenue guarantee for Incheon International Airport Expressway

<table>
<thead>
<tr>
<th>Actual/projected (%)</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRG subsidy (billions of KRW)</td>
<td>59.1</td>
<td>68.3</td>
<td>95.3</td>
<td>100.9</td>
<td>66.0</td>
<td>71.0</td>
<td>76.3</td>
<td>90.0</td>
<td>95.0</td>
<td>69.0</td>
</tr>
</tbody>
</table>

Note: Guarantee was provided for 80% of projected traffic volume over 20 years.

This project is one case that shows the difficulty with demand forecasts. The initial ridership forecast was 600,000 riders per day, but the actual ridership turned out to be only 150,000 riders per day. Revenues were far below commercially viable levels. Hit by the increased debt service burden due to the depreciation of the Thai baht during the Asian Financial Crisis in 1997, the project company defaulted on payment in 2002 and initiated discussions with creditors on a debt restructuring plan.

The project recovered with profits in 2009 helped by network extensions and improved connectivity with commercial facilities along the lines. The BTS Rail Mass Transit Growth Infrastructure Fund (BTSGIF), the first infrastructure fund listed at the Stock Exchange of Thailand (SET), successfully raised about THB62.5 billion in the initial public offering in 2013 on the basis of future net farebox revenues.  

(4) Ninoy Aquino International Airport Terminal 3 (NAIA 3)  

With limited capacity of the existing two terminals in operation since 1982 and 1999 respectively, a project to build a new terminal at Manila’s Ninoy Aquino International Airport (NAIA) for international passengers started in 1997 to meet the growing passenger demand. The contract to build and operate a new terminal was awarded by the Fidel Ramos Administration with amendments afterward under the Joseph Estrada Administration to Philippine International Air Terminals Co. Inc. (PIATCO), a consortium of Germany’s Fraport AG and

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9 Kitano (2017).
10 Villamejor-Mendoza (2011).
a Filipino group comprising Philippine Airport Ground Services (PAGS) and other local firms.

Under the Gloria Macapagal-Arroyo Administration, however, the contract was nullified in 2002 over allegations of irregularities, followed by expropriation of the nearly-completed terminal and court trials over the years. The terminal opened in 2008 with a limited capacity and six years’ delay and had to wait for 12 years since the nullification before full-scale operation began for international passengers in 2014 under the Benigno Aquino III Administration.

(5) National Highway Development Project in India\textsuperscript{11, 12}

India has a road network of over 5.23 million km, the second largest in the world, but with a substantial portion still unpaved and single-lane with insufficient maintenance. Even one-fifth of the national highways, which have a total length of about 100,000 km, are still single-lane, requiring road network development as one of the long-term challenges for the government of India.

In 1998, the government of India launched the National Highway Development Project and has been upgrading, rehabilitating and widening major highways totaling 50,000 km in seven phases. PPPs have been introduced intensively since 2006, resulting in an increasing number of newly awarded PPP highway projects supported by expanded lending by state-owned commercial banks. The rapid increase of newly awarded PPPs in the highway sector, however, has been decelerated as many of the awarded projects became non-performing due to an increasing amount of trouble regarding land acquisition and related disputes as well as reduced lending by state-owned commercial banks constrained by their exposure limit (Figure 13).

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure13}
\caption{Private participation in infrastructure in India’s transport sector (number of projects, billions of US$)}
\end{figure}

\textsuperscript{11} Verougstraete and Kang (2014).
\textsuperscript{12} Oda (2017).
IV-5-3. Pros and cons of PPPs

On the one hand, the government tends to prefer lower prices due to political and social pressures while responsible for public services provision. On the other hand, private sector players involved in PPP projects pursue sufficient cash flows by setting prices high enough to comfortably ensure that the project is commercially viable and to secure higher equity returns. If they are not confident enough about project viability, they are reluctant to join PPPs. Furthermore, when the perceived risks are high, private sector parties will ask for an additional premium for bearing such risks. Risk premium could add to the cost and might make it difficult to provide public services at a price level preferred by the public sector. Demand forecasts used to assess project profitability for private sector parties tend to show upward bias.

Private sector parties carefully look at conditions for a project to generalize revenues over project life as projected at the planning stage because this is the key for successful PPPs. In this context, such conditions as soundness of public entities involved in PPPs and suitability of government policy measures and regulatory frameworks for successful project implementation are carefully examined. If the government is not able to satisfy such requirements, private sector parties are reluctant to join PPPs. Therefore, the successful implementation of PPPs depends critically on government capacity, commitment and policy.

If overemphasized, potential benefits of PPPs, such as efficiency gains by means of risk sharing between public and private sector parties and reduced fiscal burden, could create unrealistic expectations. In reality, it is not easy to compromise conflicting preferences of public and private interests. In addition, inherent uncertainties do not allow PPP contracts to provide for all possible future eventualities as a typical “incomplete contract,” and thus discourage private sector parties to take risks over the long term.

PPPs, while sounding promising with potential merits for infrastructure development, are in reality very complex and most likely costly. Risk allocations are challenging because of the public nature of infrastructure services provision and the inherent uncertainties over the long term. The nature of public services could entail risks for the government to assume an excessive fiscal burden through subsidies or in the form of contingent liabilities.

PPPs are clearly not a panacea. Therefore, we should make judgments on whether to introduce PPPs as a means of infrastructure finance based on careful comparisons of suitability between conventional public procurement and PPPs on a case by case basis.

It is not a simple task to determine if PPPs are successful or not. Beneficiaries of infrastructure services would appreciate PPPs if high-quality services were provided sustainably at affordable prices. However, if it is only possible, for example, by using government subsidies bringing about fiscal difficulties, the government and eventually tax payers, both current and future, would not consider it successful. The success of PPPs can be achieved only when public services are accepted as reasonably satisfactory while beneficiaries or tax payers are convinced to pay the cost. In this context, positive externalities, if sufficiently large, would help justify government support or gain tax payer consent for the project.

In emerging and developing economies in Asia, while we have seen increasing availabil-
ity of domestic savings for infrastructure investment, PPPs have not necessarily been successful. Challenges should be, as correctly pointed out by Shimizu (2017), a limited pool of well-prepared “bankable” projects. PPPs can be applied successfully only for bankable projects with commercial viability acceptable to private sector parties after considering the risks entailed. Development of project formation capacity and of enabling institutional environments is the prerequisite for PPPs.

V. Relevance of financial market integration to infrastructure finance

V-1. Unique features of infrastructure finance

Infrastructure investment is almost entirely a large-scale domestic fixed capital formation for public services provision over a long period, typically several decades. For sustainable public services provision, costs for maintenance and operation as well as for replacement of aging facilities need to be covered on top of initial capital investment. Some types of infrastructure investment are characterized by a high share of domestic procurement of materials and labor services. The need for long-term financing for infrastructure investment makes a maturity mismatch inevitable if funds are provided by bank lending backed with short-term deposits. Furthermore, if local banks are not fully developed, bank lending would be far short of financing large-scale infrastructure investment and could only play a limited role for risk diversification reasons.

Public services provided by infrastructure are mostly consumed domestically and charged for in domestic currency. Some exceptions include hydropower projects in Laos, which generate revenues in foreign currencies by power sales to neighboring countries (see Appendix). The majority of infrastructure investment, therefore, relies on fiscal resources or user charges basically in local currency for the recovery of capital, maintenance and operational costs.

Because of such characteristics of infrastructure investment, financing for infrastructure investment most typically involves maturity and currency mismatches.

V-2. Country-specific conditions

For emerging and developing countries in Asia, one of the long-term policy challenges is to improve people’s income and welfare without being caught in the “middle-income trap” by achieving sustainable economic growth and development. Infrastructure development is one of the necessary conditions to achieve the goal and requires financing. While infrastructure finance shows characteristics different from country to country, from period to period and from sector to sector, a major part of funding comes from public sector sources.

Some countries are able to mobilize domestic savings while others need to greatly rely on foreign sources of funding due to the scarcity of domestic savings. Countries with sufficient domestic savings to meet their investment needs might still depend on foreign sources of funding if the domestic financial markets are not well developed to serve as an effective
financial intermediary to channel domestic savings to long-term investment. Furthermore, policies aimed at developing domestic capital markets to mobilize domestic savings might not be feasible due to the size of domestic financial markets without scale merits.

Country-specific approaches should be sought as to infrastructure finance because of the wide variety of initial conditions of individual countries as described thus far.

V-3. Complementary role of foreign funds

In light of the characteristics of infrastructure finance, it is considered most suitable to allocate domestic savings for domestic investment. This approach also contributes to providing opportunities for those savers who need to earn returns from the assets over the long-term in their life cycle. In this context, the role of institutional investors, such as pension funds and life insurance, who manage their assets to seek long-term investment returns is important. In reality, however, there are many countries unable to make infrastructure investment without mobilizing foreign funds, and also face urgent needs for infrastructure investment.

Finance for infrastructure investment is the typical case with maturity and currency mismatches. For this reason, while the complementary use of foreign funds to fill the deficiency of domestic savings is warranted, we should promote development of capital markets required to channel domestic savings into long-term investment with a view to enhancing finance for infrastructure investment.

VI. Conclusion

Finance for infrastructure investment in Asia has shown unique characteristics from country to country, from period to period and from sector to sector. A major part of infrastructure investment is financed by public sector funds. Availability of foreign funds has different impacts by country, but the role of ODA for infrastructure investment is significant in many low-income countries. Meanwhile, PPPs have been introduced in recent years as an alternative to public sector infrastructure investment in the face of huge demand for infrastructure under public sector funding constraints. Successful PPPs, however, can be expected only in selected countries and sectors. Premature introduction of PPPs without a well-developed institutional framework and implementation capacity could end up with ex-post public sector support and remedial measures.

PPPs require recovery of capital investment and operational costs by means of payment by either users or taxpayers. PPPs do not enable a free lunch. Despite abundant domestic savings becoming available in emerging and developing countries in Asia with a better chance for financing infrastructure investment, PPPs have not been introduced as expected. Successful use of PPPs requires the capacity building and institutional development to design and prepare bankable projects with profitability levels acceptable for private sector parties after risk consideration.
In light of the nature of infrastructure investment, finance for infrastructure investment most typically involves maturity and currency mismatches. For this reason, while the complementary use of foreign funds to fill the deficiency of domestic savings is warranted, enhanced infrastructure investment requires well-developed capital markets to mobilize domestic savings into long-term investment.

In reality, while some countries are able to mobilize domestic savings, others need to greatly rely on foreign sources of funding due to the scarcity of domestic savings. Countries with sufficient domestic savings to meet their investment needs might still depend on foreign sources of funding if the domestic financial markets are not well-developed to serve as a financial intermediary. Furthermore, policies aimed at developing domestic capital markets to mobilize domestic savings might not be feasible due to the size of domestic financial markets without scale merits. Country-specific approaches should be sought for financing infrastructure investment because of the wide variety of initial conditions of individual countries.

Finance for infrastructure investment and integration of regional financial markets should be pursued in this context and ideally be promoted by keeping pace with capital market development in individual countries.

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Appendix

—Hydropower development and foreign-currency denominated bonds in Lao P.D.R.—

For Laos, with its land located almost entirely within the lower Mekong basin, hydropower generation is considered not only as a means to satisfy domestic power demand but also as the most promising source of foreign exchange earnings. This is why hydropower projects on a PPP basis have been actively promoted in Laos in recent years. The installed power generation capacity in Laos was 4,168 MW in 2015 with the majority by hydropower. The major part of hydropower generation is managed by IPPs with revenues coming from the power sale to the Electricity Generating Authority of Thailand (EGAT).
Typical hydropower projects in Laos rely on equity investment and debt financing on commercial terms for a special purpose company (SPC) to implement the project. One of the examples is Nam Ngiep 1 Hydropower Project with 45% equity by KPIC Netherlands, a subsidiary of Japan’s Kansai Electric Power, 30% by EGAT International of Thailand and 25% by the Lao Holding State Enterprise, the Lao government investment company. Foreign-currency denominated loans are provided by a consortium of international banks. Profits generated from the project are given to investors as dividends, but what the Lao government receives is in proportion to the share of ownership. On top of dividends, the Lao government receives royalties from project concessions and corporate tax collected from

Appendix Table 1. Lao P.D.R.: Key fiscal indicators

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<tr>
<td>% of GDP</td>
<td></td>
<td></td>
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<tr>
<td>Revenue and grants</td>
<td>23.2</td>
<td>24.0</td>
<td>18.5</td>
<td>19.4</td>
<td>19.7</td>
</tr>
<tr>
<td>o/w Hydro power</td>
<td>1.0</td>
<td>0.9</td>
<td>1.2</td>
<td>1.3</td>
<td>1.2</td>
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<tr>
<td>Mining</td>
<td>2.0</td>
<td>1.3</td>
<td>0.9</td>
<td>0.8</td>
<td>0.6</td>
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<tr>
<td>Expenditure</td>
<td>27.8</td>
<td>26.7</td>
<td>24.4</td>
<td>24.6</td>
<td>24.9</td>
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<tr>
<td>o/w Interest payments</td>
<td>0.9</td>
<td>1.1</td>
<td>1.3</td>
<td>1.6</td>
<td>1.7</td>
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<tr>
<td>o/w external</td>
<td>0.2</td>
<td>0.9</td>
<td>1.1</td>
<td>1.1</td>
<td>1.2</td>
</tr>
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</table>

Note: Fiscal years are from October to September until 2015/16.
Source: IMF (2017)

Appendix Table 2. Lao P.D.R.: Balance of payments

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<tr>
<td></td>
<td>Millions of US$</td>
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<td>Exports, f.o.b.</td>
<td>4,687</td>
<td>4,387</td>
<td>4,804</td>
<td>5,124</td>
<td>5,596</td>
<td>5,842</td>
<td>6,107</td>
<td>6,705</td>
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<tr>
<td>Imports, c.i.f.</td>
<td>8,107</td>
<td>7,533</td>
<td>7,684</td>
<td>8,708</td>
<td>9,565</td>
<td>10,215</td>
<td>10,558</td>
<td>10,917</td>
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<tr>
<td>Capital and financial account</td>
<td>2,609</td>
<td>2,290</td>
<td>2,842</td>
<td>2,924</td>
<td>3,218</td>
<td>3,628</td>
<td>3,226</td>
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<td>Mining and hydropower</td>
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<td>Exports, f.o.b.</td>
<td>1,846</td>
<td>1,827</td>
<td>2,395</td>
<td>2,374</td>
<td>2,172</td>
<td>2,421</td>
<td>2,764</td>
<td>2,304</td>
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<td>Imports, c.i.f.</td>
<td>2,951</td>
<td>2,692</td>
<td>2,449</td>
<td>2,194</td>
<td>1,797</td>
<td>1,628</td>
<td>1,266</td>
<td>776</td>
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<tr>
<td>Dividends and profit repatriation</td>
<td>-241</td>
<td>-247</td>
<td>-318</td>
<td>-243</td>
<td>-241</td>
<td>-296</td>
<td>-419</td>
<td>-447</td>
</tr>
<tr>
<td>Foreign direct investment (net)</td>
<td>2,267</td>
<td>1,850</td>
<td>1,537</td>
<td>1,962</td>
<td>1,758</td>
<td>1,583</td>
<td>1,061</td>
<td>820</td>
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<tr>
<td>Gross official reserves</td>
<td>816</td>
<td>987</td>
<td>1,476</td>
<td>1,587</td>
<td>1,622</td>
<td>1,733</td>
<td>1,321</td>
<td>1,170</td>
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<tr>
<td>In months of imports</td>
<td>1.2</td>
<td>1.5</td>
<td>1.9</td>
<td>1.9</td>
<td>1.8</td>
<td>1.9</td>
<td>1.4</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Source: IMF (2017)
project companies. At present, the total amount of these revenues only accounts for around 5% of total fiscal revenues.

The Lao government has been issuing baht-denominated bonds since 2013 and dollar-denominated bonds since 2015. According to the IMF (2017), the outstanding amount is US$840 million as of end-2015, which is 12.8% of total public and publicly-guaranteed debt outstanding. The fund mobilized by issuing bonds is allocated for general government spending, including deficit financing, without any link to hydropower projects with foreign exchange earnings. The government has to allocate budgetary revenues for debt services in foreign currencies on commercial terms. The Lao government takes foreign exchange risks by issuing foreign currency-denominated bonds.

Debt sustainability analysis by the IMF (2017) conducted at the annual Article IV Consultation concludes that public and publicly-guaranteed debt outstanding at 51.7% of GDP at end-2015 is vulnerable to exchange rate movements and increases the risk of high debt distress. The low level of foreign exchange reserves, at less than two months of imports, is another risk for foreign-currency debt services.