

1. Introduction

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This book is inspired by a vision of a seamless Asia-Pacific region – with physical, economic and financial integration and connectivity across borders facilitating the movement of people, goods, services, capital, knowledge and ideas. Infrastructure connectivity has the power to integrate economies by deepening trade, investment, business and financial links. It can expand and strengthen regional production networks and supply chains of goods and services, thereby improving productivity and competitiveness; and stimulate economic activity, trade and investment. Good connecting infrastructure enables countries to benefit from a better allocation of resources and a better provision of basic services.

Growth can be made more inclusive if poorer groups and communities, particularly those in remote areas and small and landlocked countries, can share its benefits. Studies in several Asian developing countries have shown that the presence of basic infrastructure such as road transport and electricity are key factors in terms of helping people climb out of poverty.

Despite recent progress, the quantity and quality of the region's infrastructure is generally lower than the global average and has not kept pace with the region's economic growth. The state of infrastructure is also not uniform across Asia – it varies from country to country and from region to region within a country. Rapid economic growth, increasing populations, urbanization and a rising middle class have gone hand in hand with the depletion and rising prices of resources, particularly energy, in several major developing countries. The result has been a visible strain on existing infrastructure facilities. In some countries, lack of maintenance of existing infrastructure further aggravates the situation. For example, poor maintenance of roads in India erodes as much as 40 000 km of rural roads and 10 000 km of secondary roads every year, causing economic losses of about US\$7.65 billion per year (Dutta 2011).

The weak infrastructure in Asia is also a constraint on the region's future competitiveness and growth. Competitiveness in international trade has been the key factor in Asia's remarkable growth performances. Since

Table 1.1 Global Competitiveness Index (GCI) and Infrastructure Quality Index of selected Asian developing and emerging economies

Country	GCI (2010–11)		Infrastructure (2010–11)	
	Rank	Score	Rank	Score
People's Republic of China (PRC)	27	4.84	50	4.44
Malaysia	26	4.88	30	4.97
Thailand	38	4.56	35	4.84
India	49	4.51	86	3.49
Indonesia	44	4.43	82	3.56
Viet Nam	59	4.27	83	3.56
Sri Lanka	62	4.25	70	3.82
Philippines	85	3.96	104	2.92
Pakistan	123	3.48	110	2.75
Bangladesh	107	3.64	133	2.15
Nepal	130	3.34	139	1.81

Notes:

Ranking out of 139 total countries surveyed.

Score: 1 – poorly developed, inefficient; 7 – among the best in the world.

Source: World Economic Forum (2010).

infrastructure is an important supply-side component for competitiveness and productivity, the nearly exhausted infrastructure capacity may choke Asia's growth in the coming years. As shown in Table 1.1, many of the emerging and developing economies of Asia rank poorly in the Global Competitiveness Index and the Quality of Infrastructure Index of the World Economic Forum (2010). In terms of competitiveness, Malaysia ranks highest among the countries mentioned in the table, with a global rank of 26 among 139 covered countries and a score of 4.88 out of 7, whereas Nepal ranks 130th with a score as poor as 3.34. For infrastructure, Malaysia leads the Asian developing countries with a score of 4.97 and ranks 30th. Nepal, ranked 139th with a score of 1.81, ranks lowest globally. In view of the above, it is not surprising that a significant portion of Asia's potential has so far remained untapped.

Another infrastructure-specific challenge that has implications for almost all aspects of Asia's developmental efforts is weak or underdeveloped regional connectivity. Working together for Asian connectivity, countries in Asia can unlock their vast economic potential, achieve sustained and inclusive rapid growth, and reduce poverty. Regional

and subregional collective actions to improve physical connectivity will support trade and investment expansion, promote financial market development, and strengthen regional macroeconomic stability as well as improve environmental, health and social conditions. Better connectivity will considerably enhance the scale and quality of regional economies. It will also facilitate minimizing information asymmetry and communication gaps, reduce inequalities between people, and will help in terms of conflict avoidance and mitigation. Therefore connectivity, at the national, subregional and regional levels, can not only provide improved access to resources and services but can also work as a 'bridge for peace' in Asia (DFID 2005).

To maximize gains from the region's diversity, it is important that the Asian economies create adequate regional infrastructure connectivity. Regional infrastructure connectivity projects range from simple road links or bridges across borders between two countries, to airports and seaports that can stimulate trade and economic activities between several countries. Connectivity has several dimensions, such as physical infrastructure (physical connectivity), effective institutions, mechanisms and processes (institutional connectivity) and empowerment (people-to-people connectivity).¹ Despite some growth in physical connectivity particularly, in land, sea and air transportation networks, there are still significant gaps in both energy and transport networks. More importantly, Asia is still facing significant challenges in different dimensions of almost all sectors of infrastructure in its efforts to improve regional connectivity.

As explained in Chapter 2 of this volume, Asia's need for national infrastructure investment is estimated to be about US\$8.22 trillion for the period 2010–2020. In addition, Asia needs to spend approximately US\$320 billion on some 1202 regional infrastructure projects in transport, energy and telecommunications during the same period. Meeting the financing needs, however, is a major challenge, as the Asian economies face a number of constraints including a lack of public funds, various risks and uncertainties associated with regional investments, and inadequacies in the planning and implementation of various national and regional projects, among others.

The issue is further aggravated by the absence of proper and adequate legal, regulatory, governance and institutional frameworks. Complex systems and procedures and political risks in Asian countries are additional impediments to the development of regional infrastructure connectivity. At the national level, private participation through public–private partnerships (PPPs), such as 'build, operate and transfer' (BOT) schemes, has made some moderate progress in a few countries, but there is hardly any private financing in the subregional and regional-level infrastructure

projects. A number of economic and non-economic issues discourage private sector participation. For example, political uncertainties in many countries of the region, or discriminatory and ineffective laws, regulations and policies against private and foreign investors increase the risks of investing even in profitable infrastructure projects.

Another burgeoning issue for prioritizing, planning and implementing national and regional infrastructure projects is the detrimental effects of infrastructure development on environment and climate change. Recent data show that several Asian economies – such as the People’s Republic of China (PRC), India and Indonesia – are turning into both the major energy consumers and the major sources of greenhouse gas (GHG) emissions in the world. Furthermore, emission from transport infrastructure is significant in many Asian countries. In view of the above, Asia needs to develop sustainable or green infrastructure connectivity to mitigate the aforementioned adverse impacts.

Asia needs both ‘hard’ infrastructure (physical assets that provide connectivity such as transport, energy, information and communication technology, water and sanitation) and ‘soft’ infrastructure (policies, regulations, systems and procedures, knowledge and capacity, strategies and institutions to support the development and efficient operation of physical structures). Regional trade and investment will benefit enormously from harmonized rules, standards and procedures, particularly regional or cross-border customs procedures. For instance, regional transport and logistics services will be faster and smoother if countries can simplify and standardize their rules, procedures, and standards and effectively use information and communications technology (ICT). The development of physical connectivity through improvement of both hard and soft infrastructure is essential for a smooth, timely and cost-effective flow of goods and services within and across borders of the Asian economies.

This book is the culmination of a flagship study by the Asian Development Bank (ADB) and the Asian Development Bank Institute (ADBI). The first publication from this study, *Infrastructure for a Seamless Asia (ISA)* (ADB and ADBI 2009), found that Asian economies are characterized by their heterogeneity and diversity, which has provided opportunities for trade, investment and economic growth. The economies of many Asian countries have flourished as they have become more intertwined with each other and the rest of the world. Without adequate infrastructure connectivity, however, Asia’s diversity can breed isolation. The *ISA* book therefore stressed the need for building better connections across Asia and with the rest of the world. It presented an overview of Asian infrastructure challenges, needs assessments, cost–benefit estimates and evaluations,

making recommendations for existing and future regional infrastructure financing needs, programs, policies and institutions.

This publication contains 11 further chapters based on 11 background papers selected from 30 papers prepared for the study. The book provides details on the issues and challenges raised and the solutions suggested in the *ISA* book, including: (1) revised estimates of national and regional infrastructure demand and benefits; (2) best practices and lessons learned; (3) empirical results regarding the cost and benefits of regional infrastructure for economies and households; (4) sources and instruments of finance; (5) lessons learned from European experiences; (6) the impact of infrastructure development on the environment and climate change; and (7) experiences of public–private partnerships projects within and outside Asia. In addition, this book provides new estimates of the national infrastructure financing needs of 32 Asian economies (that is, going beyond the 30 economies featured in the *ISA* book) and revised estimates of 1202 bilateral, subregional and pan-Asian regional projects (compared with the 1077 projects covered in the *ISA* book) as well as revised cost estimates of some regional projects. These new estimates cover two additional countries – Afghanistan and the Solomon Islands – and 125 additional regional projects, and cost estimates for some projects have been revised. Asia faces very large demands for funding its infrastructure development: about \$800 billion a year during 2010–2020. This estimate is higher than the \$750 billion infrastructure financing need estimated previously in the *Infrastructure for a Seamless Asia* book, as the current estimate covers more countries and more projects.

The chapters were prepared by international experts on topics such as institutional and policy frameworks, best practices and policies, infrastructure demand, benefits, investment, and public–private frameworks. The chapters examine major challenges and issues associated with regional and national infrastructure financing needs, ways and means to mobilize investment to address these needs, and benefits of infrastructure investment in the Asian region, and attempt to provide a full picture of the costs and benefits of regional infrastructure, including robust assessments of impacts on growth, households, poverty reduction and social inclusion. This volume also provides national and regional examples, global best practices and policy recommendations for achieving the goal of Asian connectivity by developing regional infrastructure projects through regional cooperation.

The book is divided into three parts: (I) demand for and benefits of national and regional infrastructure networks; (II) policies and institutions for effective infrastructure; and (III) addressing infrastructure financing needs.

PART I: DEMAND FOR AND BENEFITS OF NATIONAL AND REGIONAL INFRASTRUCTURE NETWORKS

International and intraregional trade has played a central role in Asia's rapid growth and development over recent decades. Asia has become a global hub for production, trade, capital formation and productivity. However, continued expansion of this model is becoming increasingly constrained by both soft and hard infrastructure deficits. Part I of the book first estimates national and regional infrastructure national financing demands as well as financing needs for regional projects during 2010–2020, and discusses the mechanisms and policies for meeting the financing needs. Through empirical analyses and case studies, the subsequent chapters of this part analyze the benefits of national and regional infrastructure investment in each country as well as the cost and benefits of regional projects on the economy and households of countries in Southeast Asia and in South Asia.

Chapter 2 discusses national and regional infrastructure projects and financing needs in a selection of countries in Asia. It estimates new physical capacity needs as well as the need to maintain and replace existing infrastructure assets during 2010–2020 for 32 Asian countries, using a top-down econometric approach. The projections cover transport, energy, telecommunications, and water and sanitation. This chapter also estimates demand for planned regional infrastructure projects that are economically viable for the same period. It uses a conservative bottom-up approach to identify individual infrastructure projects, estimate the implementation costs of these projects and then compile the data to generate total infrastructure financing demand at the regional, subregional and sectoral levels. The results show that during 2010–2020, Asia's overall national infrastructure investment needs will be \$8.22 trillion (in 2008 US dollars). In addition, the chapter estimates demand for regional projects based on a bottom-up approach, highlighting 1202 specific projects with a total value of about \$320 billion during the same period. A key feature of this chapter is that it expands the coverage of countries and updates estimates in the *ISA* book, which projected Asia's overall financing needs during 2010–2020 to be \$7.99 trillion (in 2008 US dollars) and \$287 billion for specific regional infrastructure projects in 30 countries for 1077 projects. These estimates also show that, by subregion, the biggest investment needs are in East and Southeast Asia at \$5.47 trillion, or 67 percent of the total; and South Asia at \$2.37 trillion, or 29 percent of the total. A breakdown by sector shows that of the total investment, approximately 49 percent will be needed for energy infrastructure, 35 percent for transport, 13 percent

for ICT and 3 percent for water and sanitation. It also highlights 21 high-priority regional projects in the transport and energy sectors costing an estimated \$15 billion. In the Greater Mekong Subregion (GMS), ten projects are identified, of which five are transport projects and five are energy projects. In the Central Asia Regional Economic Cooperation (CAREC) region, six projects (four transport and two energy) are identified; and of the five projects identified in the South Asia Subregional Economic Cooperation (SASEC) region, three are in the transport sector and two in the energy sector. Finally, to meet this increasing infrastructure investment requirement in Asia, discussion of this chapter proposes developing innovative financing mechanisms and modalities as well as policies, regulations and capacity development, and ensuring strong coordination and cooperation among various stakeholders at the national, subregional and regional levels.

Chapter 3 simulates the impact of an expansion of infrastructure in developing Asian economies using a computable general equilibrium (CGE) model and using version 7 of the Global Trade Analysis Project (GTAP) database, with 2004 as the base year. It provides compelling evidence of the broader gains to developing Asia and the rest of the world from creating Asian infrastructure networks, including transport, telecommunications and energy. If the required investment of \$8 trillion in pan-Asian connectivity is made in the region's infrastructure during 2010–2020, the total net income gains for developing Asia could reach about \$12.98 trillion (in 2008 US dollars) during 2010–2020 and beyond, of which more than \$4.43 trillion would be gained during 2010–2020 and nearly \$8.55 trillion after 2020. These benefits are particularly large for the economies that depend heavily on external trade. The chapter also estimates that the value of income gains for developing Asia as a whole from regional transport infrastructure would be \$7.84 trillion, with \$3.40 trillion from communications and \$1.74 trillion from the investments in energy. Large countries like the PRC and India would gain \$3.54 trillion and \$3.14 trillion in income, respectively. This chapter also shows that the expansion of regional infrastructure in developing Asia would boost both global and regional trade. Global exports would expand by 21.1 percent, while developing Asia's exports and imports would both jump by more than 70 percent. Linking national infrastructure systems across borders in the region has the potential to spread the benefits from current production and business centers, such as those in the PRC and India, to economies previously less involved in the global production cycle, particularly small island countries and landlocked countries. It can also produce economies of scale in public and private service delivery and provide new and larger markets for goods and services in the region.

Chapter 4 briefly outlines the nature of the economies and infrastructure issues in the Greater Mekong Subregion (GMS). A GTAP-based CGE framework has been used for predicting the likely impacts of infrastructure development on GMS countries, with a particular focus on the medium-term results and impacts on poverty. The authors also briefly discuss some potential negative impacts of infrastructure development. Their findings suggest that strong gains in terms of real output, exports and economic welfare (in terms of gross domestic product, GDP) to the GMS countries should result from infrastructure development and trade facilitation. The projected changes in real GDP from the transport improvements for the region should total more than \$5500 million. All of the GMS economies should experience increases in real GDP of between 1.1 percent and 8.3 percent, with the highest percentage increase in Cambodia, followed by the Lao PDR, Myanmar, Viet Nam and Thailand. The total change in economic welfare (as measured using equivalent variation in income) for the region would be \$7915 million; changes in the value of intra-regional export flows would be between almost \$159 million and \$10000 million; and for impacts on poverty for the GMS-4 – Cambodia, Lao People’s Democratic Republic (Lao PDR), Thailand and Viet Nam combined – more than 400000 people are expected to move out of extreme poverty, with another 1.75 million moving above the \$2 per day poverty line. The impact of welfare change will be particularly strong for Thailand, contributing almost 17 percent of the increase in welfare. The largest increases in bilateral exports will also be for Thailand: \$9992.8 million. With regard to the impact on poverty, there will be a large reduction in poverty for the wage labor households in Viet Nam, and a small change in the poverty headcount in households that depend on payment transfers in Cambodia and the Lao PDR. The bulk of the poverty reduction will be in rural areas, which demonstrates that road improvements and improved connectivity will particularly benefit the rural poor in the region. Despite the significant gains from trade facilitation in the GMS, these will not be possible without first improving physical connectivity to enable efficient road links between countries, as well as to mitigate possible negative impacts such as worsening traffic safety, adverse human health impacts, and increased human trafficking and illegal trade in narcotics.

Chapter 5 seeks to quantify the impact of transportation infrastructure developments in the South Asian Subregional Economic Cooperation (SASEC) area through a CGE model to ascertain the economic and socio-economic outcomes of particular regional transportation projects. The authors examine the impacts of these projects on households in the region, on poverty and on income distribution, as well as on general

economic conditions and sectoral impacts. The analysis shows that for all the SASEC economies, transport improvements would boost GDP. The highest rate of increase would be 14.8 percent as a percentage of current GDP in Nepal, followed by 4.10 percent in Bangladesh and 4.6 percent in Sri Lanka. In absolute terms, India would gain the most, by over \$4.3 billion, followed by Pakistan (a non-SASEC economy) at \$2.6 billion. The result is mixed for the impact on household welfare of a reduction in regional transport costs, with clear pro-poor outcomes in some countries, like Nepal, but more ambiguous impacts in others. In Nepal the biggest gainers would be small farm households (\$14.2 million) and landless rural groups (\$11.3 million); in Bangladesh, the largest gains would accrue to the urban highly educated and the richest households (\$17.1 million). In India, the biggest gainers would be the middle-income large farmers (\$92.3 million), followed by non-agricultural labor (\$14.6 million). But the country would experience the distributional consequences, too, as welfare is predicted to fall for some other groups such as rural agricultural labor, the urban self-employed, salaried, urban casual labor and other urban households. Among non-SASEC economies, the household impacts for all are found to be positive in Pakistan and Sri Lanka, suggesting an expected drop in the absolute poverty level. The analysis also shows that trade would rise for all the economies, with Bangladesh and Nepal expected to gain the most as a percentage of total trade.

PART II: POLICIES AND INSTITUTIONS FOR EFFECTIVE INFRASTRUCTURE

This part of the book analyzes the explicit value of infrastructure for the region as a whole, not just a sum of the national benefits. It discusses an appropriate framework for evaluating regional projects and examines how investments in physical infrastructure should be located to increase their efficiency and effectiveness in enhancing regional cooperation and integration. It addresses the impacts of regional infrastructure on the environment and climate change, looking at the institutions, policies and regulatory frameworks needed, and provides examples of best practices. It also examines how negative spillover effects of infrastructure projects can be avoided. Subsequently, issues involving the management of regional infrastructure in the European Union (EU) through an appropriate framework of regional cooperation are discussed.

Chapter 6 covers evaluation practices of regional infrastructure projects and provides a framework and criteria for evaluating such projects. Identified criteria for examining regional infrastructure projects include

the benefits and externalities specific to regional infrastructure projects, including indirect impacts, which are usually not captured in the analysis of national projects. The evaluation framework proposed by the authors contains many quantitative and qualitative criteria to be followed in the preparation, implementation, completion and operation stages of the project. The evaluation criteria include: sources of funding (public and private), analysis of adequate distribution, fair regulatory and pricing arrangements projected economic benefits, economic rationale for public intervention, regional transport agreements and adequate implementation of compensation. This chapter also examines to what extent these criteria are applicable in evaluating past regional infrastructure projects. It reviews the recent literature on emerging impacts and draws lessons for the design and implementation of regional infrastructure projects. The analysis of this chapter shows that for successful preparation, implementation, monitoring and risk management of regional infrastructure projects, it is necessary to consider several factors. Some of the factors include: a clear rationale in articulation of the economic corridor concept; use of distribution analysis as a guide for a win-win design; a clearer account of regional externalities and improved distribution analysis; inter-modal analysis; measurable and quantifiable performance indicators for regional effects; monitoring negative externalities; complementary policy development in regional procedures; and flexibility in the preparation and implementation of regional projects.

Chapter 7 address the issues that arise when formulating, financing, implementing and maintaining transnational infrastructure linkages. The main purpose of this chapter is to analyze various strategies for strengthening Asia's competitive position in global commerce by creating reliable, efficient and secure connections among the main urban gateways in order to permit seamless and rapid movement. This chapter starts with the definition of an optimal economic space. It then discusses how to develop the appropriate criteria to define the emerging spatial economy and identify efficient transnational transport networks. This chapter then examines how investments in physical infrastructure should be located to increase their efficiency and effectiveness in enhancing regional cooperation and integration, with special reference to regional special economic zones. Next, it emphasizes the need for a policy that distinguishes the main flows of goods, people and information from the actual contours and gradients of economic space, and pays attention to door-to-door logistics movements. The chapter suggests a system-based comprehensive approach that will tackle infrastructure, policy, governance and operational issues in an integrated public and private sector strategy.

Chapter 8 first identifies the potential negative environmental impacts of regional infrastructure projects in the energy and transport sectors in Asia, both at the project level and beyond. Next, it discusses how adverse impacts can be minimized during the project planning, design and construction stages. Then, it argues that proper technical specifications and well-functioning regulatory, institutional and legal frameworks (with clearly defined oversight institutions) are crucial for regional infrastructure projects, although many issues need to be addressed at the national level, coupled with regional arrangements wherever necessary. It also examines the roles of multilateral development banks, such as ADB and the World Bank, in the environmental context. This chapter shows that success of regional infrastructure projects and connectivity will depend heavily on how they are managed, and on the ability of national governments and subregional and regional institutions in harmonizing their policies and agendas and establishing effective cooperation mechanisms to mitigate the adverse environmental impacts. The chapter argues that such national efforts, coupled with regional frameworks and arrangements, will promote further development of regional infrastructure projects. Much can be learned from other regional infrastructure programs and institutions, in particular those in the EU and Latin America. Asia can look to these regions to glean best practices and, most importantly, lessons learned. Such policy and institutional cooperation for infrastructure connectivity will be necessary in order to ensure that benefits accrue to all players involved, and that possible negative externalities are mitigated.

Issues involving the management of regional infrastructure in the EU are taken up in Chapter 9. It argues that creating a framework for regional infrastructure cooperation often requires the active role of a third party, an ‘honest broker’, to forge convergence of interests. For a particular regional infrastructural project to succeed, tripartite or multilateral initiatives are required. Alternatively, special-purpose vehicle companies owned by the governments concerned alongside Asian and/or subregional development banks as co-owners may be considered. In Europe, although additional co-financing may be sought from the European Community budget and/or the European Investment Bank (EIB), these resources always complement national budgetary allocations and private funding. In Asia, where the framework for regional cooperation has yet to be further defined, the need for an ‘honest broker’ can be fulfilled by multilateral institutions such as ADB and United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). Most importantly, these initiatives do not require the ‘deep integration’ that characterizes the EU today.

PART III: ADDRESSING INFRASTRUCTURE FINANCING NEEDS

The final part of this volume deals with infrastructure financing. As infrastructure entails large long-term investments, attracting finance, especially in developing countries, is always a challenge. This section details the role of Asian financial markets integration and appropriate financial instruments for financing Asia's regional infrastructure projects. Governments in Asia may choose to tap national savings or to partner with bilateral and/or multilateral institutions such as ADB in undertaking infrastructure investments. They may work with the private sector through public-private partnerships or foreign direct investments (FDIs). This part of the book analyzes the trade-offs involved in choosing each approach, and identifies the challenges in coordinating and incentivizing the partners in infrastructure development. It also provides experiences and best practices from Latin America and Europe in terms of project management of successful regional infrastructure projects. The role of EU member states and regional institutions in promoting PPPs in infrastructure financing is also discussed

Chapter 10 discusses how the financial market integration and various Asian infrastructure financing sources and instruments such as funding from multilateral and bilateral development banks, local currency bond markets, subregional infrastructure funds or companies, guaranteed and linked bonds, Islamic finance and international financing mechanisms can support Asian infrastructure needs in a cost-effective and efficient manner. Asia faces very large demands for funding its infrastructure development: about \$800 billion a year during 2010–2020. Asia has large savings, significant international reserves and rapid accumulations of funds that can be used to meet these infrastructure investment needs, but so far Asian markets have failed to use the available resources to channel funding into high-priority infrastructure projects. The author argues that the development and integration of Asian financial markets could serve the twin goals of Asian infrastructure development and connectivity. It could enhance Asian integration through enhanced regional connectivity – financing the development and implementation of regional infrastructure projects – which would have high pay-offs for all participating countries. At the same time, regional financial and technical resources could be effectively mobilized and utilized to meet the large investment needs in infrastructure. The chapter draws upon the European Union's experience of developing and integrating financial markets and using development banking institutions to support infrastructure investment. Exploring how Asian resources can contribute to infrastructure development, the author

identifies some sources and instruments for financing Asia's regional infrastructure, including: (1) guaranteed and linked bonds; (2) sovereign wealth funds; (3) Islamic financial markets; and (4) public-private partnerships (PPPs). Finally, this chapter provides recommendations on how Asian financial markets could be further developed to mobilize Asian and other regions' savings to finance priority infrastructure projects in the region. The chapter proposes that frameworks for supporting financial market development and integration in Asia should include: (1) harmonization of financial practice and infrastructure; (2) regional mechanisms for macroeconomic oversight; and (3) regional mechanisms for financial stability oversight.

Chapter 11 surveys the literature on successful regional infrastructure projects. It provides information on FDI in Latin America and Eastern Europe, and reviews three sets of analytical framework. The first is the theoretical approach, which can be subdivided into the regional public goods approach, the game-theoretical approach and the incomplete contract approach. The second is the empirical FDI literature, which highlights the determinants of FDI in various countries, which need to be adapted to the regional infrastructure in developing economies. The third is project management, which is the most unconventional from an economic perspective, but is relevant for the successful implementation of regional infrastructure projects and highlights some particular difficulties faced by project managers. Discussion in this chapter points to the importance of government involvement in regional infrastructure projects as there are clear external benefits which will otherwise not be reaped. It points to the importance of coordination of national and subregional policies at the sectoral and institutional levels. This chapter comprises six case studies on regional infrastructure: two in Latin America, two in Eastern Europe and two in Southeast Asia. These illustrate the critical need for smooth coordination of diverse team, top-level backing for the projects, and a thorough understanding of all the political and financial factors involved.

The final chapter (Chapter 12) discusses how member states of the European Union and its institutions have been trying to increase their use of PPPs to accelerate the development of ambitious transnational infrastructure projects. It also discuss the process of risk distribution in PPPs, procurement systems, PPP extensions, preconditions for successful PPP implementation, and the use and financing of PPPs in the European Union. The value for money of a PPP project depends primarily on the distribution of risks between the public and private sectors. The chapter argues that PPPs can potentially allow countries to develop infrastructure faster and at lower cost, but for large infrastructure projects planned for regional operations, PPPs pose a particular challenge as the transfer of

risks to the private sector is hampered by the large scale and long-term horizons involved. Governments thus have to offer important guarantees, such as demand guarantees, or grants. When private non-publicly guaranteed resources are utilized, the distribution of risks between public and private partners remains asymmetric, with the public governmental bodies carrying the lion's share of the financial risks, which may ultimately become a contingent liability for the public exchequer. In Europe, the EU and the EIB public funding is used not simply because the risks are pooled more widely, but because the EU rules and regulations for using such funds lead to better preparation of projects and greater efficiency gains in the project implementation and delivery. The EIB also offers credit guarantees. It provides a useful role model for ADB's operations across Asia for financing regional infrastructure projects.

The overall findings of this book, *Infrastructure for Asian Connectivity*, show that infrastructure connectivity is a basic necessity for the Asian developing economies for sustaining their growth and development. The financing needs for national and regional infrastructure development are huge. Though Asia has made some modest progress in developing a few subregional infrastructure projects, further regionwide connectivity is required by creating effective new projects and institutions as well as by developing and improving the coordination and collaboration of existing institutions at the national, subregional and regional levels to meet diverse challenges that the region is facing now and is likely to face in future. There is an urgent need to develop comprehensive, consistent, multimodal, economical and sustainable infrastructure connectivity plans at the national, subregional and regional levels. In doing so, Asia can learn from the experience of its own subregional programs as well as from experiences in other regions, notably the EU.

Based on these, Asia ultimately needs to develop appropriate policies and institutions nationally, subregionally and regionally for its own specific needs and circumstances. Such institutions will provide the necessary information, commitment, partnership and coordination to support Asia's regional cooperation and integration. Appropriate and effective policies will help institutions to serve their mandated purposes. So far the public sector has been shouldering the major role in infrastructure development. Asia faces very large demands for funding its infrastructure development: about \$800 billion a year during 2010–2020. Since the financing needs are extremely high, attracting the private sector in sharing the costs is becoming increasingly important not only for financing but also for innovative technology and better management. Encouraging private participation will require ways to minimize the associated risks. Asian economies therefore need to develop innovative and effective financing instruments, adopt

appropriate policies, laws and regulations, and create institutions for conducive, enabling business environment with incentives for the private sector. All these cooperative measures at the local, national, subregional, regional and global levels will enhance overall infrastructural connectivity in Asia. Improved connectivity will enhance the region's competitiveness and productivity, facilitate its regional and global integration, and help sustain its growth and poverty reduction and thus help to develop a peaceful, harmonious and prosperous Asia. In view of the prospect of recession in the advanced economies, Asia needs to create national and regional demand and enhance intra-regional trade through developing better hard and soft infrastructure connectivity across borders.

NOTE

1. For details about these key elements of connectivity, see the 'Master Plan on ASEAN Connectivity', available at <http://www.aseansec.org/documents/MPAC.pdf>, accessed 18 August 2011.

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