

Quibria, M. G.; Ahmed, Shamsun N.; Tschang, Ted; Reyes-Macasaquit, Mari-Len

Working Paper

Digital Divide: Determinants and Policies with Special Reference to Asia

ERD Working Paper Series, No. 27

Provided in Cooperation with:

Asian Development Bank (ADB), Manila

Suggested Citation: Quibria, M. G.; Ahmed, Shamsun N.; Tschang, Ted; Reyes-Macasaquit, Mari-Len (2002) : Digital Divide: Determinants and Policies with Special Reference to Asia, ERD Working Paper Series, No. 27, Asian Development Bank (ADB), Manila, <https://hdl.handle.net/11540/1935>

This Version is available at:

<https://hdl.handle.net/10419/109243>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<http://creativecommons.org/licenses/by/3.0/igo>

Digital Divide: Determinants and Policies with Special Reference to Asia

**M. G. Quibria
Shamsun N. Ahmed
Ted Tschang
Mari-Len Reyes-Macasaquit**

October 2002

ERD Working Paper No. 27

DIGITAL DIVIDE: DETERMINANTS AND POLICIES WITH SPECIAL REFERENCE TO ASIA

M.G. Quibria

Shamsun N. Ahmed

Ted Tschang

Mari-Len Reyes-Macasaquit

October 2002

M. G. Quibria is Advisor, Operations Evaluations Department, Asian Development Bank; Shamsun N. Ahmed is Visiting Scholar, University of East Anglia, and Professor, Department of Economics, University of Dhaka; Ted Tschang is Assistant Professor, Singapore Management University; and Mari-Len Reyes-Macasaquit is Supervising Research Specialist, Philippine Institute of Development Studies. This paper draws partly on an earlier paper that was prepared for and presented in an international conference of the Asian Development Bank Institute. The paper has benefited from the comments of the participants of the conference, in particular Anne Krueger, Kirit Parikh, and Muzzammel Huq; and from the helpful discussions with Ramesh Adhikari, Heather Montgomery, Terry Morrison, Sang Woo Nam, Arvind Panagariya, Steven Parker, and T. N. Srinivasan. M. Arif Al-Mahmood and Thuy Thu Le provided valuable research assistance. The opinions expressed in the paper are those of the authors and not of the institutions they are affiliated with.

Asian Development Bank
P.O. Box 789
0980 Manila
Philippines

©2002 by Asian Development Bank
October 2002
ISSN 1655-5252

The views expressed in this paper
are those of the author(s) and do not
necessarily reflect the views or policies
of the Asian Development Bank.

Foreword

The ERD Working Paper Series is a forum for ongoing and recently completed research and policy studies undertaken in the Asian Development Bank or on its behalf. The Series is a quick-disseminating, informal publication meant to stimulate discussion and elicit feedback. Papers published under this Series could subsequently be revised for publication as articles in professional journals or chapters in books.

Abstract

Access to new information and communication technologies (ICT) remains extremely unequally distributed across and within societies. While there have been a good deal of popular discussions about this “digital divide”, not much is known about the quantitative significance of its various determinants. By undertaking a set of cross-country regressions, the paper finds that income, education, and infrastructure play a critical role in shaping the divide. Based on this analysis, the paper also offers some policy suggestions as to how to promote wider diffusion of ICT in poorer societies.

Contents

Abstract	vii
I. Introduction	1
II. Types of ICT	1
III. Determinants of ICT Adoption	3
IV. Policies to Promote ICT	8
A. Investment in Education	9
B. Investment in Infrastructure	10
C. Creation of Favorable Institutions	11
D. Fostering New Institutional Innovations	12
E. International Cooperation	14
V. Conclusion	14
References	16

I. INTRODUCTION

Much has been written about the digital divide: the division of the world between those who have access to new information and communications technology (ICT) and those who do not. This inequitable access to ICT has implications for productivity and economic growth of rich and poor countries. For example, the United Nations Development Programme (1999, 63) notes: “The network society is creating parallel communications systems: one for those with income, education and literacy connections, giving plentiful information at low cost and high speed: the other are those without connections, blocked by high barriers of time, cost and uncertainty and dependent upon outdated information.” Similar concerns have been expressed by such authors as Dertouzos (1997) and Sachs (2000) with the latter claiming that a new map of the world has been created, this time based on technology. However, there are many others who are much more optimistic. For example, Negroponte (1998) opines that ICT has a “leapfrogging” characteristic that will enable the poor to catch up. As latecomers, developing countries can embrace existing technologies developed elsewhere and skip intermediate stages allowing them to save on considerable costs of development. In light of the contending viewpoints, it is important to learn what the basic economic determinants of the digital divide are and the ways to overcome it.

The organization of this paper is as follows. Section II provides a brief discussion of the various types of ICT, which constitute the backbone of the digital economy. Section III is devoted to a discussion of the determinants of ICT adoption. The quantitative analysis provided in this section suggests that there is a strong association between ICT adoption with the socioeconomic characteristics of the country. In light of this discussion, the paper makes in Section IV some inferences about the policy choices for developing countries that would like to promote ICT adoption. The discussion of this section is primarily focused on Asian countries. However, despite the particular empirical focus of the present analysis, it is hoped that the insights from this analysis would be equally applicable to other parts of the developing world. The paper provides some concluding remarks in Section V.

II. TYPES OF ICT

Depending on the type of use, the new ICT can be roughly divided into three broad categories, that is, ICT for (i) computing, (ii) communication, and (iii) Internet-enabled communication and computing.

With the invention of computers, which represents the most significant technological breakthrough of the last half of the 20th century, the cost of computing has declined exponentially over the years. And the usage of computers has increased by leaps and bounds with the introduction of personal computers. At the most general level, computers augment and improve thinking

capabilities of individuals and organizations and enhance their efficiency. One important example relates to the business management system, known as “enterprise resource planning” (ERP), where new softwares enable firms to efficiently integrate all facets of business, including planning, manufacturing, sales, and marketing. Another example of an important use of computing is computer-aided manufacturing and computer-aided design (CAD/CAM) in the product design for the manufacturing process. This process has radically improved product lifecycles—in particular, it has reduced the time lag between conceptualization of the product and its entry into the market—as well as the quality and complexity of product design.¹

Communication, which is one of the most important aspects of modern human life, has two broad categories: one-way and two-way communication. The most common form of communication is one-way communication, which includes the broadcasting media like radio and television. Two-way communication devices, which include faxes, telephones, telegraphs, and pagers, have improved significantly over the last two decades or so. The Internet’s growth is largely a function of two-way communication links: between telephone lines and personal computers (PCs). However, in most developing countries, mobile telephones are easier to obtain than traditional fixed landline telephones. Therefore, the movement of the Internet and Internet applications into mobile phone systems will have a tremendous technological implication for these countries.

The Internet, including the World Wide Web, is one of the most important technologies to affect both communication and computing. The Internet provides, on one hand, a new communication medium that allows activities like e-mail or chat lists for group communication, and on the other, multiple modes of communication by fostering new interfaces between new and old forms of communication. For example, one can now communicate via voice to others through Internet telephony, or use mobile phones to access the Web. The Internet also provides communities with a whole new means of communication (i.e., many-to-many point communication such as chat lists and discussion forums), and collaborative platforms. The World Wide Web, where people can search for and obtain information on the Internet, enables people to post messages, create home pages, and communicate with many others.

The Internet not only provides individuals with access to more information but also facilitates new ways of representing information (multimedia), structuring information (through hyperlinks), and creating information (through collaborative and distance work). Unlike many other media that treat users as passive, the Internet is an active medium that demands a greater degree of sophisticated thinking and logical skills.

The rapid transformation of the Internet, as it moves beyond PCs into palmtops, mobile phones, and appliances, has radically changed not only communications but also commerce and computing in all fields, including scientific computing and business automation. Already, Bluetooth

¹ An important advantage of CAD/CAM over conventional designs is its ability to transfer information regarding designs readily and accurately across organizational and national boundaries without distortions. In recent years, the use of CAD/CAM has become widespread in multinational enterprises across the world.

technological standards and devices allow any device to electronically “talk” to another device through wireless systems, including the wireless Web, cell phones, and laptops. With the advent of new ICT, e-commerce has increased rapidly along with trade in information products. In business, the simple automation of business processes like accounting and payroll, and the subsequent integration of these functions via ERP software, are being gradually replaced by Web-based inter-enterprise or intra-enterprise ERP, supply chain management, auctions for procuring supplies, and the like.

III. DETERMINANTS OF ICT ADOPTION

The status of ICT adoption of an economy is an indicator of its potential ability to exploit the economic opportunities afforded by the new technologies—or more generally, its prospects for transition to the “new economy.” As expected, the adoption of ICT varies significantly across countries. Like anywhere in the world, Asian countries have experienced a rise in the use of personal computers in recent years, though the degree of expansion has varied between countries.

Table 1 shows the most recent estimates of the numbers of PCs among Asian developing countries. The newly industrialized economies (NIEs) are, quite expectedly, heading the pack and their figures are comparable to those of the advanced countries. For example, Singapore has 527.2 personal computers per thousand people in 1999, which is 1.8 times the figure of Japan in the same year. The rest of the developing countries, including India, which has achieved a large measure of international success in software development, have far fewer numbers of personal computers per capita, compared to the NIEs. The South Asian countries appear to have the lowest per capita computers in the list, ranging from one computer per thousand people in Bangladesh to 4.3 computers in Pakistan.

Along with personal computers other indicators of ICT diffusion in an economy include usage of televisions, main line telephones, mobile phones, fax machines, and Internet. Table 1 provides a picture of ICT diffusion across Asian countries. Whether it is the use of cellular phones, main line telephones, or the Internet, their distributions across countries follow a pattern similar to per capita ownership of PCs. The striking picture that emerges from Table 1 is one of extreme inequality—one of the haves and the have-nots—representing a stark digital divide between countries.²

² It is estimated that more than 75 percent of Internet users live in high-income economies, which contain only 14 percent of the global population. Internet use in countries like Iceland, Norway, Sweden, and United States has already reached more than half the population. This is in stark contrast with the rest of the world. For example, Internet use in South Asia is only 0.4 percent of its population (UNDP 2001).

Table 1. ICT Diffusion in Selected Asian Economies (per thousand people)

Economies	Telephone Main Lines (1999)	Cellular Phones (1999)	Personal computers (1999)	Internet Users (2000)
Developing Asia				
Bangladesh	3.4	1.2	1	0.2
People's Republic of China	85.8	34.2	120	13.4
India	26.6	1.9	3.3	4.5
Indonesia	29.1	10.6	9.1	1.8
Kazakhstan	108.2	3	n.a.	4.2
Kyrgyzstan	76.2	0.6	n.a.	2.1
Malaysia	203	137	68.7	68.8
Nepal	10.6	n.a.	2.6	1.4
Pakistan	22.2	2.1	4.3	8.5
Philippines	39.5	36.6	16.9	6.2
Sri Lanka	36.4	12.2	5.6	3.4
Thailand	85.7	38.4	22.7	16.5
Viet Nam	26.8	4.2	8.9	1.3
Industrial and Newly Industrializing Economies				
Japan	494	449.4	289.6	213.8
Hong Kong, China	577.5	636.1	290.5	260
Singapore	482	418.8	527.2	419.1
Korea	441.4	504.4	189.2	323.1
Taipei, China	545.2	522.4	180.7	288.4
United States*	681.8	311.5	510.5	537.2

*Estimates for the United States were included for comparison.

n.a. means data not available.

Sources: International Telecommunication Union (2000) and Nua Internet Surveys (2000).

Why is there a stark divide? What are the basic economic determinants of ICT diffusion? Are the determinants of adoption and diffusion different in developing Asia from the rest of the world? To address these queries, we undertook a set of elementary regression exercises covering more than 100 countries. These exercises cover a varying number of observations per indicator of ICT diffusion depending on the availability of cross-country data. An Asian dummy was included in each of the regression equations to determine the extent of variation in ICT diffusion in the region from the rest of the world. However, due to lack of disaggregated data, this discussion does not make any distinction between different usages of ICT: whether it is used as a consumption or production item. While the quantitative results are tentative, they are highly suggestive and seem to be in broad sympathy with the results available from advanced countries such as Japan and the United States (US).

How do country characteristics such as income and population size affect the use of ICT? Simple regression analysis suggests the following. First, computer usage is strongly correlated with GDP per capita, with an income elasticity of computer usage exceeding unity (see Table 2). Similarly, Internet use is highly correlated with income, with income elasticity being nearly 2. The usage of other types of ICT (fax machine, telephone main lines, television, cellular phone) is highly income-elastic. Second, as far as population size is concerned, regression analysis does not suggest any additional benefit from a larger size as far as personal computer, telephone main line, and Internet use is concerned. However, when income is controlled, the use of cell phones and televisions appears to increase with the rise of population. This may reflect the simplicity of the technology involved and their easy availability for purchase in most countries. Third, in all cases, the Asian dummy was insignificant, implying that these relationships are not substantially different in Asia from the rest of the world.

Table 2. ICT, Income, and Population

Variables	Population	Income	Asia	R ²	Observations
Cellular Phone	1.065*** (25.617)	1.882*** (25.310)	-0.191 (-0.810)	0.86	145
Fax Machine	-0.152 (-1.783)	1.524*** (11.698)	0.007 (0.017)	0.60	75
Internet Use	0.009 (0.220)	1.897*** (28.904)	-0.335 (-1.536)	0.81	153
Personal Computer	-0.098 *** (-2.999)	1.613*** (27.035)	0.024 (0.222)	0.88	90
Telephone Main Line	-0.056** (-2.319)	1.441 *** (31.807)	0.083 (0.563)	0.86	144
Television	1.061*** (8.664)	2.657 *** (15.132)	0.492 (1.573)	0.86	57

Notes: T-statistics are in parenthesis; ***, ** and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. Standard errors are corrected for heteroscedasticity by using the method proposed by White (1980). All variables are in per capita and in logarithms. For Asia dummy, Asia equals 1 and 0 otherwise. Income is per capita income in purchasing power parity.

Sources: International Telecommunication Union (2000) and Nua Internet Surveys (2000).

How does education affect the adoption of ICT? Simple regression results, as reported in Table 3, suggest the following. The relationship between computer usage and education is statistically significant at the 1 percent level with tertiary education. The same is true as far as Internet use is concerned. Moreover, secondary education is also significant at the 1 percent level for telephone. It may be noted that the firm-level evidence from Japan and the US confirms the

complementarity of tertiary education with ICT use (Bresnahan, Brynjolfsson, and Hitt 1999). For other types of ICT, such as cellular phone, fax machines, and television, education does not play any significant part.

Table 3. **ICT, Income, and Education**

Variables	Income	Primary	Secondary	Tertiary	R ²	Observations
Cellular Phone	1.882*** (9.148)	0.004 (0.812)	-0.008 (-1.174)	0.007 (0.800)	0.85	106
Fax Machine	1.652*** (5.688)	0.014 (1.548)	-0.013 (-1.071)	0.015 (1.560)	0.70	59
Internet Use	1.490*** (6.481)	-0.001 (-0.007)	0.012 (1.252)	0.028*** (2.921)	0.88	56
Personal Computer	1.443*** (15.725)	0.004 (0.661)	0.001 (0.376)	0.008*** (2.804)	0.93	68
Telephone	0.917*** (9.412)	0.001 (0.145)	0.018*** (4.169)	0.001 (0.194)	0.89	107
Television	2.479*** (4.521)	0.018 (1.209)	0.002 (0.210)	-0.007 (-0.534)	0.85	49

Notes: T-statistics are in parenthesis; ***, ** and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. Standard errors are corrected for heteroscedasticity by using the method proposed by White (1980). All variables are in per capita and in logarithms, except percentages. For Asia dummy, Asia equals 1 and 0 otherwise. All regressions include a population control, which is not reported. Income is per capita income in purchasing power parity. All the regressions include an Asia dummy that is statistically insignificant, and a population control, both of which are not reported.

Sources: International Telecommunication Union (2000), World Bank (2000), and UNESCO (2000).

Is there any complementarity between different types of ICT? Table 4, which reports a set of simple regression results, suggests the following. First, telephone use is strongly correlated with PC and Internet use. Internet has high correlation with telephone largely reflecting their complementary nature.

Table 4. **Complementarity between Technologies**

Variables	Income	Telephones	R ²	Observations
Cellular Phone	1.884*** (7.451)	0.030 (0.173)	0.87	133
Internet Use	1.251 *** (6.009)	0.459 *** (3.475)	0.83	138
Personal Computer	1.206*** (6.670)	0.344** (2.219)	0.90	85
Television	1.653** (2.421)	0.680 (1.496)	0.87	56

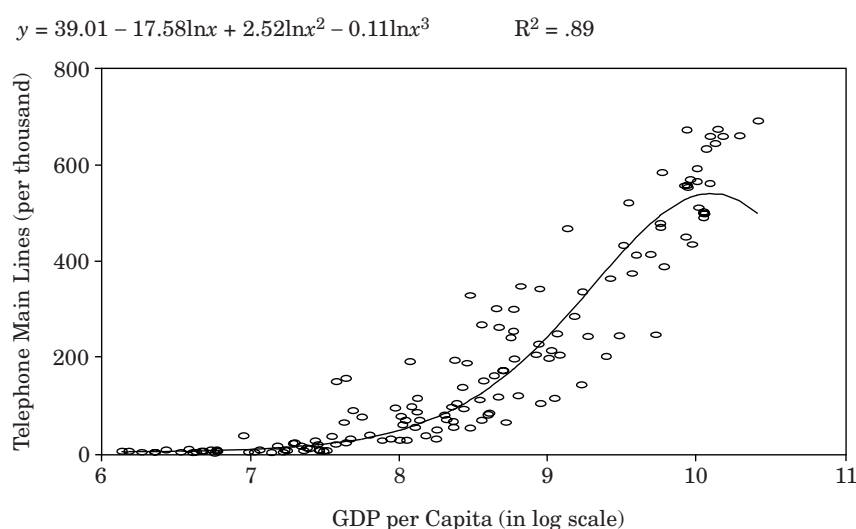
Notes: T-statistics are in parenthesis; ***, ** and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. Standard errors are corrected for heteroscedasticity using the method proposed by White (1980). All variables are in per capita and in logarithms. For Asia dummy, Asia equals 1 and 0 otherwise. Income is per capita income in purchasing power parity. All the regressions include an Asia dummy that was statistically insignificant, and a population control, both of which are not reported.

Sources: World Bank (2000) and International Telecommunication Union (2000).

Second, as expected, there is no complementarity between telephone use and television use and between telephone use and cellular phone use. Third, the correlation between Internet usage and income level increases when controlled for telephones. This suggests that in the presence of a well-developed telephone infrastructure, income level becomes the principal determining variable.

Finally, our cross-country regression analysis suggests the existence of a nonlinear relationship between income and telephone lines. This relationship indicates that there is a serious dearth of telephones at low-income countries, but after a country reaches a threshold income level, telephones become relatively commonplace. Figure 1 represents this relationship, which is a third degree polynomial with statistically significant coefficients. Among the Asian economies, the NIEs have the highest per capita availability of telephones, somewhat comparable to other advanced countries. There may be two different reasons for this distinct separation among countries in terms of telephone use. The first reason relates to supply factors: it simply reflects the fact that higher-income countries may have well-developed infrastructures. The second reason relates to demand factors: it reflects the benefits of the so-called network externality. That is, the benefits of getting a telephone rise as the number of people with telephones in the economy increases.

In short, it appears that the principal determining factors for the diffusion of ICT in developing countries are income and investments in human resource and infrastructure development. However, the degree of influence of these variables is not uniform across the various types of ICT.

Figure 1. **Relationship between Telephones and Income Per Capita**

Sources: World Bank (2000) and International Telecommunication Union (2000).

IV. POLICIES TO PROMOTE ICT

While there is a close interconnection between income and ICT diffusion, this relationship is not a watertight one. The performance of many countries is better than what is warranted by their per capita incomes (whereas that of many others is worse than what is warranted by their per capita incomes). This can be seen from the divergences of individual country performances from the international averages for their respective income levels. In this paper we calculate such divergences for the Internet, the principal component of the new ICT revolution. The international “average” line was derived by regressing Internet adoption against per capita income of the countries expressed in purchasing-power-parity terms. Table 5 shows the estimates of divergences for a number of Asian countries. These divergences from the averages are largely the result of relevant physical and social investments promoted by these countries. Some countries have underinvested compared to their international averages for that income level. These countries need to increase their investment levels in those activities if they do not want to fall behind their “comparator” countries in adoption and diffusion of ICT. That would also require, among others, getting their relevant policies and institutions right.

Table 5. **Internet Access in Selected Economies: Actual versus Predicted**
(per 10,000 people)

Economy	Internet Access, Actual	Internet Access, Predicted	Difference: Actual - Predicted
Developing Asia			
Bangladesh	2	-164.04	166.04
Bhutan	2	-138.84	140.84
People's Republic of China	134	87.10	46.90
India	45	-60.93	105.93
Indonesia	18	21.72	-3.72
Kazakhstan	42	270.41	-228.41
Kyrgyzstan	21	-26.37	47.37
Malaysia	688	811.71	-123.71
Maldives	6	227.93	-221.93
Nepal	14	-193.41	207.41
Pakistan	85	-113.06	198.06
Philippines	62	151.90	-89.90
Sri Lanka	34	68.96	-34.96
Thailand	165	425.64	-260.64
Viet Nam	13	-116.80	129.80
Industrial and Newly Industrializing Economies			
Japan	2138	2988.99	-850.99
Hong Kong, China	2600	2629.85	-29.85
Singapore	4191	3126.22	1064.78
Korea	3231	1580.81	1650.19
United States*	5372	3903.10	1468.90

Notes: The predicted values for Internet use in column three are derived from a cross-country regression analysis for 157 countries between Internet use and GDP per capita in purchasing-power-parity exchange rate. The estimated equation $y = 0.144x - 360.02$, with $R^2 = 0.75$ is statistically significant at conventional levels. Positive numbers in column four in the table indicate that the countries are actually using more Internet services than they are predicted to use at their income levels in relation to international averages for those income levels.

*Estimates for the United States were included for comparison.

Sources: World Bank (2000), International Telecommunication Union (2000), and Nua Internet Surveys (2000).

A. Investment in Education

As our earlier analysis suggests, the relationship between education and ICT is critical. Education is important because it provides the skills required for creating, adapting, and utilizing such technologies. This is not to deny that even the illiterate or near-literate can possibly take advantage of certain technological applications. But to go beyond elementary applications, education becomes increasingly important. Indeed, international evidence suggests that education is a strong complement to Internet use and that the relevant educational levels are secondary and tertiary levels as they are expected to upgrade the national capacity for adaptation and

innovation.³ Therefore, if a country aspires to exploit in significant ways the opportunities offered by new ICT, particularly the creation of new industries, it needs to emphasize secondary and tertiary education. This lesson is in contrast with conventional wisdom that poorer countries should emphasize primary education that yields the higher rate of social returns to these countries (Psacharopoulos 1994). However, in most poor developing countries where illiteracy abounds and the importance of ICT-related industries has not reached a significant level, it may be premature to overturn the conventional wisdom.

Those developing countries that have already reached universal primary education for their citizens should place more emphasis on secondary and tertiary education, particularly focusing on science, mathematics, engineering, and computing if they want to take advantage of new ICT opportunities. Nevertheless, one does not need to rely exclusively on the government for promoting secondary and tertiary education. Many individuals who would like to take advantage of ICT opportunities are economically well off and may not need government financial assistance. For others, improved availability of student loans from the financial system can be a major help in financing their educational expenses.

In addition to formal education, a rapidly changing technology like ICT would require continuous training on the part of the workforce. But the principal responsibility of imparting such training should lie with the concerned firms in line with their requirements. However, the government can also play an important part in inducing the firms to impart such training through various types of tax incentives (UNDP 2001).

B. Investment in Infrastructure

For a country to succeed in ICT, one critical element is physical infrastructure in telecommunications links. The government has an important role in creating such infrastructure, especially in the poorer countries. This role stems from a number of important considerations. First, in very poor countries, the market forces may be shy both because of lack of effective demand and because of lumpiness of investment.

Second, even in countries where the private sector is not shy, the government has to play the role of a catalyst and a regulator. It appears that there are potentially many opportunities for fostering partnerships in the creation of infrastructure. To attract the private sector, the government may have to play the role of a catalyst by instituting various innovative incentive mechanisms such as build-own-operate, build-own-transfer, etc. Even when the private sector is already there, the government has an important function as a regulator. It may be noted that the telecommunications industry, which constitutes the basic infrastructure for ICT, is a natural monopoly.

³ Much of the Internet-based information is textual and in English. In many developing countries, a significant proportion of the rural population is either illiterate or has an education no higher than the elementary level. Therefore, a large segment of the rural population may not be able to access and comprehend the Web-based information.

Third, despite the strong case for a competitive market in ICT, many countries still maintain strong barriers against entry. This entry barrier, along with the heavy government involvement in such ICT-related sectors as telephones, has spawned pervasive corruption in many developing countries and has hiked up costs of communication. Privatization or deregulation would be the most efficient response to such a conundrum. Keeping their markets open to foreign trade and investment augurs well for the development of the ICT industry. Openness speeds up transfer of technology and encourages investments on ICT. It has been suggested that multinational companies as well as local firms take into account the existence of ICT networks as one of the requirements for investments.

Fourth, governments in developing countries should foster an environment that would encourage innovation through research and development. It may be noted that developed countries that have established their lead in the ICT realm have invested heavily in research and development (R&D). In the period 1992-1997, R&D in countries of the Organization for Economic Cooperation and Development accounted for 1.8 percent of GDP while that in East Asia and South Asia averaged 0.8 percent in the same period (Rodriguez and Wilson 2000). With fiscal incentives and proper enforcement of property rights, the private sector would have the impetus to engage in R&D activities. However, in areas where the market fails, particularly in basic research, the government should take the lead. Aside from direct investments in R&D, the government can encourage research linkages between universities and the ICT industry. However, not every country can be in the cutting edge of technology. For most developing countries, which are followers in the technology field, the focus of R&D efforts should be in the area of adaptation of technologies according to local needs and conditions.

Finally, the government can play an important role in ensuring the telecom network standard. In many developed countries in Europe, the fortuitous outcome of a uniform network has come through the dominance of a single company or through the cooperation of several strong companies. But the situation is not so fortuitous in many other countries where a total chaos or near chaos, in terms of standards, prevails. In the US, several incompatible mobile communications standards exist side by side. In developing countries, the government can play a more proactive role in circumventing such chaotic outcomes by imposing socially optimal standards.

C. Creation of Favorable Institutions

For those countries that seek to play an important role in the development and export of ICT items such as software, they need to foster an institutional environment conducive to such development. An important element of such an environment that would foster investment and harness creativity relates to adequate protection of property rights, enforcement of contracts, rule of law, and personal autonomy etc., without which the economic incentives of firms to invest or innovate would be largely eroded. These institutional aspects, which are an important prerequisite for the successful adoption of new ICT but are often weak in poorer countries, need to be improved. But at the same time, the new ICT ideas are often interconnected and draw on each other's concepts,

which makes the task of defining the ownership of the intellectual product as well as appropriating the benefits all the more difficult. The task of defining intellectual property and the appropriate mechanism for protection has been the subject of good deal of discussion. When such “property” can be defined, one well-known method of protecting such property is of course the granting of patent rights, which offers the right incentives to the creators. However, as is well known, such a policy creates at the same time a large element of distortion (because of the monopolistic nature of production) and may sometimes act as stumbling blocks to future innovations. Other methods to encourage innovation include a recent proposal by Kremer (1998) who suggests the introduction of a system of prizes based on what the private firms would pay for the monopoly to produce the item in question. While this is an interesting proposal, it involves substantial public expenditure on rewards for countries that are otherwise financially constrained. In any case, whatever approach the government takes to manage innovation, the wrong approach would be to micromanage it.

If certain types of ICT are considered socially desirable merit goods (for example, those items related to education, etc.), a case can be made for their wide diffusion among the populace. However, diffusion of useful ICT technologies is likely to involve substantial positive externality. In these circumstances, a case may be made for subsidization of ICT use like undertaking efforts to establish communal access to specific types of ICT.

Similarly, research suggests that the use of ICT has been most productive in firms with a flat and less hierarchical organization structure. This type of organization is more common in the US than elsewhere in the world. One way to promote such an organizational structure is by keeping markets open and competitive (Cohen, De Long, and Zysman 2000). The government policy should therefore avoid pursuing policies that foster a closed and monopolistic environment in the name of “nurturing the infant industry.”

D. Fostering New Institutional Innovations

For developing countries, it is difficult to provide first-class infrastructure for the whole country. One way to circumvent the problem is to create special “technology parks” to cater to the specific needs of the ICT industry. These high-tech locations offer superior infrastructure (such as uninterrupted power supply, satellite downlinks, etc.), provide many fiscal incentives (tax holidays etc.), and assure investors of expeditious government approvals and other logistic assistance.⁴

⁴ Some technology parks have achieved considerable success. The Singapore Science Park hosts more than 200 IT-related R&D firms. India has developed a number of such parks in Bangalore, Hyderabad, Mumbai, and Chennai. Another notable example is Taipei, China’s Hsinchu Park, which has an area of 580 hectares and employs more than 70,000 R&D staff. Malaysia’s Multimedia Super Corridor is a more recent high-profile addition. In the Philippines, Metro Manila hosts a number of such technology parks, which are becoming the data center hub for many foreign companies. Meanwhile, the Zhong-Guang village in People’s Republic of China has within its vicinity 68 universities/colleges as well as over 230 state-level research institutes. Its tenants include over 6500 firms (Furuta 2001).

However, these technology parks are not limited to developing countries only. Such technology hubs have also emerged in developed countries, often through private efforts but mostly through a combination of private and government efforts. What are the preconditions for success of these hubs? Based on interviews with the local government officials and representatives of the business and the media, the *Wired Magazine* made an evaluation of the quality of about 50 leading technology hubs of the world. Each hub was rated according to four criteria revealing the factors that influence investors in their site selection: the ability of universities and research facilities in the area to develop new technologies and provide training opportunities; the presence of established firms and multinational companies; the entrepreneurial drive to start new ventures by the population; and the availability of venture capital to bring ideas to the market (Hillner 2000). As expected, those technology hubs in Asia that are rated highly are essentially those that belong to the higher-income countries with the exception of Bangalore in India.⁵

From the experiences of these special technological hubs, a number of important lessons seem to emerge. First and foremost, infrastructure matters and it should be easily available to ICT entrepreneurs if the country aspires to succeed in this area. The government has an important role to play in the provision of the infrastructure. Second, rather than trying to micromanage the private sector, the government should provide strong support to its growth by fostering an appropriate policy environment where entrepreneurship can flourish. Superior flexibility and autonomy are considered critical elements of a successful e-economy environment (Cohen, DeLong, and Zysman 2000). Third, the availability of human capital in the form of skilled workers is tremendously important for the success of such a park or hub. Finally, the ability to attract multinational companies and venture capital is likely to be critical in the successful growth of the location.

In light of the above, it is unlikely that all developing countries would succeed in developing special technology hubs. Nor should every country attempt to do so. Before attempting to undertake such a venture, each country should make a comprehensive evaluation of their true economic costs and benefits. In many cases, these technology hubs in developing countries could turn out to be enclaves of technological excellence and sophistication with little spillovers—technological or human capital—for the rest of the economy.

⁵ This list includes some of the Asian cities: Taipei, Bangalore, Tokyo, Kyoto, Hsinchu, Hong Kong, Inchon, and Kuala Lumpur.

E. International Cooperation

In addition to national efforts, international organizations can play a role in promoting ICT in poorer countries.⁶ A specific set of policy initiatives that international organizations could support to bridge the digital divide may include the creation of uniform standards through technical assistance and policy advice. However, premature standardization can become impediments to technological innovations. Second, in many developing countries, government monopoly predominates in the telecommunications sector. The international organizations can play a role in deregulating this sector as well as ensuring free entry of the private sector, including foreign firms. Also, as we have noted earlier, there are instances where there is an economic case for government subsidization or tax incentives. In poorer countries, where the government is fiscally constrained, international organizations can offer the necessary financial assistance to create the basic infrastructure, as the private sector—both domestic and foreign—may not be forthcoming for obvious economic reasons.

V. CONCLUSION

The advent of new types of ICT, in conjunction with globalization, has opened up fresh opportunities for economic and social transformations from which both developed and developing countries can immensely benefit. In this regard, two important features of new ICT have been emphasized. First, unlike previous technological innovations, access to new technologies—and the benefits they can bestow—can be almost immediate to developing countries. New ICT can be applied selectively and innovatively to directly enhance the welfare of the poor, although the existing data do not afford a full-fledged cost-benefit assessment (Quibria and Tschang 2001). Second, new types of ICT are likely to contribute toward a more efficient integration of the global labor markets than was considered possible before. While the forces of globalization are rapidly breaking down trade and investment barriers, new types of ICT are facilitating relocation of manufacturing and services industries more in line with comparative advantage across the world. The new types of ICT promote more efficient delivery of services, especially where such services can be digitized, and ensure rapid dissemination of market information. This process has the potential of bringing

⁶ The increasing concern for the widening digital divide between the developed and developing countries has led to a flurry of activities in the international development community. The Group of 8 (G-8) countries have adopted the Okinawa Charter on the Global Information Society in its summit in July 2000 to assist developing countries in their efforts to narrow the digital divide. The G-8 created the Digital Opportunity Task Force (Dot Force) that includes stakeholders from G-8 and developing country governments, private and nonprofit sectors, and international organizations (DOT Force 2000). In the area of bilateral cooperation, Japan pledged to provide \$15 billion in development assistance over five years to overcome the digital divide. International organizations like the Asian Development Bank and the World Bank have also placed special emphasis on ICT dissemination in poor countries in their list of priorities.

about a more seamless integration of the global labor markets—including those for unskilled workers—and elimination of absolute poverty.

Notwithstanding the immense potential of new types of ICT, many observers feel that the digital divide will not evaporate immediately or automatically. It is also felt that an aggressive strategy of investment in ICT, neglecting other critical developmental priorities, solely with the objective of eliminating the digital divide, may be counterproductive. Such a strategy will simply detract attention from the more fundamental developmental needs that many countries require to address on an urgent basis. They include such fundamental constraints to economic development as improving the basic infrastructure; opening up markets; breaking telecommunication monopolies; pursuing an effective legal and regulatory system; and providing education for all. For countries that try to skirt these problems, their efforts at computerization and Internet access may turn out to be mere wasteful investments—and indeed a recipe for financial disasters, given the scope for better use of scarce investible resources elsewhere in the economy.⁷

If governments in poor countries channel their scarce financial and political resources to developing social and human capital, building the basic infrastructure and creating a level playing field for the private sector, that will go a long way in creating the prerequisites for the ICT sector to flourish. Beginning modestly with such areas as data processing and teleworking, the poor countries can gradually move to more sophisticated tasks of software development and hardware innovation. Thus, notwithstanding the concerns voiced on the perils of being left behind in this digital age, developing countries should carefully balance between their conflicting needs of adopting modern technology and preparing the basic foundation for economic development.

⁷ A recent study by Pohjola (2000) investigated the relationship between IT investments and growth in 39 countries over the period 1980-1995. It found that, whereas such investments boosted growth in developed economies, they were not beneficial in developing countries that lacked complementary policies.

REFERENCES

- Bresnahan, T., E. Brynjolfsson, and L. Hitt, 1999. Information Technology, Workplace Organization, and the Demand for Skilled Labor: Firm-Level Evidence. NBER Working Paper No. 7136, National Bureau of Economic Research, Cambridge.
- Cohen, S., D. Bradford, and J. Zysman, 2000. "Tool for Thought: What is New and Important about the "E-conomy". Available: http://www.j-bradford-delong.net/OpEd/virtual/technet/Tools_for_Thought.pdf
- Dertouzos, M., 1997. *What Will Be: How the New World of Information Will Change Our Lives*. New York: Harper Edge.
- Digital Opportunity Task Force, 2001. Available: <http://www.dotforce.org>.
- Furuta, Y., 2001. "IT Revolution in Asia." Paper presented in the Third Asia Development Forum, Bangkok, Thailand, 11-14 June. Available: <http://www.worldbank.org/html/extdr/offrep/eap/eapprem/infofuruta.pdf>.
- International Telecommunication Union, 2000. "ITU Telecommunication Indicators." Available: <http://www.itu.int/ti/industryoverview/index.htm>.
- Hillner, J., 2000. "Venture Capitals." *Wired* July.
- Kremer, M., 1998. "Patent Buy-outs: Mechanisms for Encouraging Innovation." *Quarterly Journal of Economics* 113(4):1137-67.
- Negroponte, N., 1998. "The Third Shall be First: The Net Leverages Latecomers in the Developing World." *Wired Magazine* January.
- Nua Internet Surveys, 2000. "How Many Online?" Available: http://www.nua.ie/surveys/how_many_online/index.html.
- Pohjola, M., 2000. Information Technology and Economic Growth: A Cross-Country Analysis. UNU/WIDER Working Paper No.173, The United Nations University and World Institute for Development Economics Research, Helsinki.
- Psacharopoulos, G., 1994. "Returns to Investment in Education: A Global Update." *World Development* 22(9):1325-43.
- Quibria, M. G., and T. Tschang, 2001. Information and Communication Technology and Poverty: An Asian Perspective. ADB Institute Working Paper No. 12, Tokyo.
- Rodriguez, F., and E. Wilson, 2000. Are Poor Countries Losing the Information Revolution? InfoDev Working Paper. Available: <http://www.infodev.org/library/working.htm>.
- Sachs, J., 2000. "A New Map of the World." *The Economist* June 24.
- UNDP, 1999. "New Technologies and the Global Race for Knowledge." In *Human Development Report*. United Nations Development Program, New York.
- _____, 2001. "Making New Technologies Work for Human Development." In *Human Development Report*. United Nations Development Program, New York.
- UNESCO, 2000. "Indicators." Available: <http://unesco.stat.unesco.org/en/stats/stats0.htm>.
- White, H., 1980. "A Heteroscedasticity-Consistent Covariance Matrix and a Direct Test for Heteroscedasticity." *Econometrica* 48(4):817-38.
- World Bank, 2000. *World Development Indicators 2000*. In CD-ROM.

PUBLICATIONS FROM THE ECONOMICS AND RESEARCH DEPARTMENT

ERD WORKING PAPER SERIES (WPS)

(Published in-house; Available through ADB Office of External Relations; Free of Charge)

- | | |
|---|---|
| <p>No. 1 Capitalizing on Globalization
—Barry Eichengreen, <i>January 2002</i></p> <p>No. 2 Policy-based Lending and Poverty Reduction:
An Overview of Processes, Assessment
and Options
—Richard Bolt and Manabu Fujimura
<i>January 2002</i></p> <p>No. 3 The Automotive Supply Chain: Global Trends
and Asian Perspectives
—Francisco Veloso and Rajiv Kumar
<i>January 2002</i></p> <p>No. 4 International Competitiveness of Asian Firms:
An Analytical Framework
—Rajiv Kumar and Doren Chadee
<i>February 2002</i></p> <p>No. 5 The International Competitiveness of Asian
Economies in the Apparel Commodity Chain
—Gary Gereffi
<i>February 2002</i></p> <p>No. 6 Monetary and Financial Cooperation in East
Asia—The Chiang Mai Initiative and Beyond
—Pradumna B. Rana
<i>February 2002</i></p> <p>No. 7 Probing Beneath Cross-national Averages: Poverty,
Inequality, and Growth in the Philippines
—Arsenio M. Balisacan and Ernesto M. Pernia
<i>March 2002</i></p> <p>No. 8 Poverty, Growth, and Inequality in Thailand
—Anil B. Deolalikar
<i>April 2002</i></p> <p>No. 9 Microfinance in Northeast Thailand: Who Benefits
and How Much?
—Brett E. Coleman
<i>April 2002</i></p> <p>No. 10 Poverty Reduction and the Role of Institutions in
Developing Asia
—Anil B. Deolalikar, Alex B. Brillantes, Jr.,
Raghav Gaiha, Ernesto M. Pernia, Mary Racelis
with the assistance of Marita Concepcion Castro-
Guevara, Liza L. Lim, Pilipinas F. Quising
<i>May 2002</i></p> <p>No. 11 The European Social Model: Lessons for
Developing Countries
—Assar Lindbeck
<i>May 2002</i></p> <p>No. 12 Costs and Benefits of a Common Currency for
ASEAN
—Srinivasa Madhur
<i>May 2002</i></p> <p>No. 13 Monetary Cooperation in East Asia: A Survey
—Raul Fabella
<i>May 2002</i></p> <p>No. 14 Toward A Political Economy Approach
to Policy-based Lending
—George Abonyi
<i>May 2002</i></p> <p>No. 15 A Framework for Establishing Priorities in a
Country Poverty Reduction Strategy</p> | <p>—Ron Duncan and Steve Pollard
<i>June 2002</i></p> <p>No. 16 The Role of Infrastructure in Land-use Dynamics
and Rice Production in Viet Nam's Mekong River
Delta
—Christopher Edmonds
<i>July 2002</i></p> <p>No. 17 Effect of Decentralization Strategy on
Macroeconomic Stability in Thailand
—Kanokpan Lao-Araya
<i>August 2002</i></p> <p>No. 18 Poverty and Patterns of Growth
—Rana Hasan and M. G. Quibria
<i>August 2002</i></p> <p>No. 19 Why are Some Countries Richer than Others?
A Reassessment of Mankiw-Romer-Weil's Test of
the Neoclassical Growth Model
—Jesus Felipe and John McCombie
<i>August 2002</i></p> <p>No. 20 Modernization and Son Preference in People's
Republic of China
—Robin Burgess and Juzhong Zhuang
<i>September 2002</i></p> <p>No. 21 The Doha Agenda and Development: A View from
the Uruguay Round
—J. Michael Finger
<i>September 2002</i></p> <p>No. 22 Conceptual Issues in the Role of Education
Decentralization in Promoting Effective Schooling
in Asian Developing Countries
—Jere R. Behrman, Anil B. Deolalikar, and Lee-
Ying Son
<i>September 2002</i></p> <p>No. 23 Promoting Effective Schooling through Education
Decentralization in Bangladesh, Indonesia, and
Philippines
—Jere R. Behrman, Anil B. Deolalikar, and Lee-
Ying Son
<i>September 2002</i></p> <p>No. 24 Financial Opening under the WTO Agreement in
Selected Asian Countries: Progress and Issues
—Yun-Hwan Kim
<i>September 2002</i></p> <p>No. 25 Revisiting Growth and Poverty Reduction in
Indonesia: What Do Subnational Data Show?
—Arsenio M. Balisacan, Ernesto M. Pernia,
and Abuzar Asra
<i>October 2002</i></p> <p>No. 26 Causes of the 1997 Asian Financial Crisis: What
Can an Early Warning System Model Tell Us?
—Juzhong Zhuang and J. Malcolm Dowling
<i>October 2002</i></p> <p>No. 27 Digital Divide: Determinants and Policies with
Special Reference to Asia
—M. G. Quibria, Shamsun N. Ahmed, Ted
Tschang, and Mari-Len Reyes-Macasaquit
<i>October 2002</i></p> |
|---|---|

ERD TECHNICAL NOTE SERIES (TNS)

(Published in-house; Available through ADB Office of External Relations; Free of Charge)

- | | | | |
|-------|---|-------|---|
| No. 1 | Contingency Calculations for Environmental Impacts with Unknown Monetary Values
—David Dole
February 2002 | No. 4 | July 2002
Economic Issues in the Design and Analysis of a Wastewater Treatment Project
—David Dole
July 2002 |
| No. 2 | Integrating Risk into ADB's Economic Analysis of Projects
—Nigel Rayner, Anneli Lagman-Martin, and Keith Ward
June 2002 | No. 5 | An Analysis and Case Study of the Role of Environmental Economics at the Asian Development Bank
—David Dole and Piya Abeygunawardena
September 2002 |
| No. 3 | Measuring Willingness to Pay for Electricity
—Peter Choynowski | | |

ERD POLICY BRIEF SERIES (PBS)

(Published in-house; Available through ADB Office of External Relations; Free of charge)

- | | | | |
|-------|--|-------|--|
| No. 1 | Is Growth Good Enough for the Poor?
—Ernesto M. Pernia, October 2001 | No. 6 | Achieving the Twin Objectives of Efficiency and Equity: Contracting Health Services in Cambodia
—Indu Bhushan, Sheryl Keller, and Brad Schwartz, March 2002 |
| No. 2 | India's Economic Reforms
What Has Been Accomplished?
What Remains to Be Done?
—Arvind Panagariya, November 2001 | No. 7 | Causes of the 1997 Asian Financial Crisis: What Can an Early Warning System Model Tell Us?
—Juzhong Zhuang and Malcolm Dowling, June 2002 |
| No. 3 | Unequal Benefits of Growth in Viet Nam
—Indu Bhushan, Erik Bloom, and Nguyen Minh Thang, January 2002 | No. 8 | The Role of Preferential Trading Arrangements in Asia
—Christopher Edmonds and Jean-Pierre Verbiest, July 2002 |
| No. 4 | Is Volatility Built into Today's World Economy?
—J. Malcolm Dowling and J.P. Verbiest, February 2002 | No. 9 | The Doha Round: A Development Perspective
—Jean-Pierre Verbiest, Jeffrey Liang, and Lea Sumulong, July 2002 |
| No. 5 | What Else Besides Growth Matters to Poverty Reduction? Philippines
—Arsenio M. Balisacan and Ernesto M. Pernia, February 2002 | | |

MONOGRAPH SERIES

(Published in-house; Available through ADB Office of External Relations; Free of charge)

EDRC REPORT SERIES (ER)

- | | | | |
|-------|---|--------|--|
| No. 1 | ASEAN and the Asian Development Bank
—Seiji Naya, April 1982 | | Establishments in ASEAN Countries: Perspectives and Policy Issues
—Mathias Bruch and Ulrich Hiemenz, January 1983 |
| No. 2 | Development Issues for the Developing East and Southeast Asian Countries and International Cooperation
—Seiji Naya and Graham Abbott, April 1982 | No. 10 | A Note on the Third Ministerial Meeting of GATT
—Jungsoo Lee, January 1983 |
| No. 3 | Aid, Savings, and Growth in the Asian Region
—J. Malcolm Dowling and Ulrich Hiemenz, April 1982 | No. 11 | Macroeconomic Forecasts for the Republic of China, Hong Kong, and Republic of Korea
—J.M. Dowling, January 1983 |
| No. 4 | Development-oriented Foreign Investment and the Role of ADB
—Kiyoshi Kojima, April 1982 | No. 12 | ASEAN: Economic Situation and Prospects
—Seiji Naya, March 1983 |
| No. 5 | The Multilateral Development Banks and the International Economy's Missing Public Sector
—John Lewis, June 1982 | No. 13 | The Future Prospects for the Developing Countries of Asia
—Seiji Naya, March 1983 |
| No. 6 | Notes on External Debt of DMCs
—Evelyn Go, July 1982 | No. 14 | Energy and Structural Change in the Asia-Pacific Region, Summary of the Thirteenth Pacific Trade and Development Conference
—Seiji Naya, March 1983 |
| No. 7 | Grant Element in Bank Loans
—Dal Hyun Kim, July 1982 | No. 15 | A Survey of Empirical Studies on Demand for Electricity with Special Emphasis on Price Elasticity of Demand
—Wisarn Pupphavesa, June 1983 |
| No. 8 | Shadow Exchange Rates and Standard Conversion Factors in Project Evaluation
—Peter Warr, September 1982 | No. 16 | Determinants of Paddy Production in Indonesia: 1972-1981—A Simultaneous Equation Model |
| No. 9 | Small and Medium-Scale Manufacturing | | |

- Approach
—*T.K. Jayaraman, June 1983*
- No. 17 The Philippine Economy: Economic Forecasts for 1983 and 1984
—*J.M. Dowling, E. Go, and C.N. Castillo, June 1983*
- No. 18 Economic Forecast for Indonesia
—*J.M. Dowling, H.Y. Kim, Y.K. Wang, and C.N. Castillo, June 1983*
- No. 19 Relative External Debt Situation of Asian Developing Countries: An Application of Ranking Method
—*Jungsoo Lee, June 1983*
- No. 20 New Evidence on Yields, Fertilizer Application, and Prices in Asian Rice Production
—*William James and Teresita Ramirez, July 1983*
- No. 21 Inflationary Effects of Exchange Rate Changes in Nine Asian LDCs
—*Pradumna B. Rana and J. Malcolm Dowling, Jr., December 1983*
- No. 22 Effects of External Shocks on the Balance of Payments, Policy Responses, and Debt Problems of Asian Developing Countries
—*Seiji Naya, December 1983*
- No. 23 Changing Trade Patterns and Policy Issues: The Prospects for East and Southeast Asian Developing Countries
—*Seiji Naya and Ulrich Hiemenz, February 1984*
- No. 24 Small-Scale Industries in Asian Economic Development: Problems and Prospects
—*Seiji Naya, February 1984*
- No. 25 A Study on the External Debt Indicators Applying Logit Analysis
—*Jungsoo Lee and Clarita Barretto, February 1984*
- No. 26 Alternatives to Institutional Credit Programs in the Agricultural Sector of Low-Income Countries
—*Jennifer Sour, March 1984*
- No. 27 Economic Scene in Asia and Its Special Features
—*Kedar N. Kohli, November 1984*
- No. 28 The Effect of Terms of Trade Changes on the Balance of Payments and Real National Income of Asian Developing Countries
—*Jungsoo Lee and Lutgarda Labios, January 1985*
- No. 29 Cause and Effect in the World Sugar Market: Some Empirical Findings 1951-1982
—*Yoshihiro Iwasaki, February 1985*
- No. 30 Sources of Balance of Payments Problem in the 1970s: The Asian Experience
—*Pradumna Rana, February 1985*
- No. 31 India's Manufactured Exports: An Analysis of Supply Sectors
—*Ifzal Ali, February 1985*
- No. 32 Meeting Basic Human Needs in Asian Developing Countries
—*Jungsoo Lee and Emma Banaria, March 1985*
- No. 33 The Impact of Foreign Capital Inflow on Investment and Economic Growth in Developing Asia
—*Evelyn Go, May 1985*
- No. 34 The Climate for Energy Development in the Pacific and Asian Region: Priorities and Perspectives
—*V.V. Desai, April 1986*
- No. 35 Impact of Appreciation of the Yen on Developing Member Countries of the Bank
—*Jungsoo Lee, Pradumna Rana, and Ifzal Ali, May 1986*
- No. 36 Smuggling and Domestic Economic Policies in Developing Countries
—*A.H.M.N. Chowdhury, October 1986*
- No. 37 Public Investment Criteria: Economic Internal Rate of Return and Equalizing Discount Rate
—*Ifzal Ali, November 1986*
- No. 38 Review of the Theory of Neoclassical Political Economy: An Application to Trade Policies
—*M.G. Quibria, December 1986*
- No. 39 Factors Influencing the Choice of Location: Local and Foreign Firms in the Philippines
—*E.M. Pernia and A.N. Herrin, February 1987*
- No. 40 A Demographic Perspective on Developing Asia and Its Relevance to the Bank
—*E.M. Pernia, May 1987*
- No. 41 Emerging Issues in Asia and Social Cost Benefit Analysis
—*I. Ali, September 1988*
- No. 42 Shifting Revealed Comparative Advantage: Experiences of Asian and Pacific Developing Countries
—*P.B. Rana, November 1988*
- No. 43 Agricultural Price Policy in Asia: Issues and Areas of Reforms
—*I. Ali, November 1988*
- No. 44 Service Trade and Asian Developing Economies
—*M.G. Quibria, October 1989*
- No. 45 A Review of the Economic Analysis of Power Projects in Asia and Identification of Areas of Improvement
—*I. Ali, November 1989*
- No. 46 Growth Perspective and Challenges for Asia: Areas for Policy Review and Research
—*I. Ali, November 1989*
- No. 47 An Approach to Estimating the Poverty Alleviation Impact of an Agricultural Project
—*I. Ali, January 1990*
- No. 48 Economic Growth Performance of Indonesia, the Philippines, and Thailand: The Human Resource Dimension
—*E.M. Pernia, January 1990*
- No. 49 Foreign Exchange and Fiscal Impact of a Project: A Methodological Framework for Estimation
—*I. Ali, February 1990*
- No. 50 Public Investment Criteria: Financial and Economic Internal Rates of Return
—*I. Ali, April 1990*
- No. 51 Evaluation of Water Supply Projects: An Economic Framework
—*Arlene M. Tadler, June 1990*
- No. 52 Interrelationship Between Shadow Prices, Project Investment, and Policy Reforms: An Analytical Framework
—*I. Ali, November 1990*
- No. 53 Issues in Assessing the Impact of Project and Sector Adjustment Lending
—*I. Ali, December 1990*
- No. 54 Some Aspects of Urbanization and the Environment in Southeast Asia
—*Ernesto M. Pernia, January 1991*
- No. 55 Financial Sector and Economic Development: A Survey
—*Jungsoo Lee, September 1991*
- No. 56 A Framework for Justifying Bank-Assisted Education Projects in Asia: A Review of the Socioeconomic Analysis and Identification of Areas of Improvement
—*Etienne Van De Walle, February 1992*
- No. 57 Medium-term Growth-Stabilization Relationship in Asian Developing Countries and Some Policy Considerations
—*Yun-Hwan Kim, February 1993*
- No. 58 Urbanization, Population Distribution, and Economic Development in Asia
—*Ernesto M. Pernia, February 1993*
- No. 59 The Need for Fiscal Consolidation in Nepal: The Results of a Simulation
—*Filippo di Mauro and Ronald Antonio Butiong, July 1993*

- No. 60 A Computable General Equilibrium Model of Nepal
—*Timothy Buehrer and Filippo di Mauro, October 1993*
- No. 61 The Role of Government in Export Expansion in the Republic of Korea: A Revisit
—*Yun-Hwan Kim, February 1994*
- No. 62 Rural Reforms, Structural Change, and Agricultural Growth in the People's Republic of China
—*Bo Lin, August 1994*
- No. 63 Incentives and Regulation for Pollution Abatement with an Application to Waste Water Treatment
—*Sudipto Mundle, U. Shankar, and Shekhar Mehta, October 1995*
- No. 64 Saving Transitions in Southeast Asia
—*Frank Harrigan, February 1996*
- No. 65 Total Factor Productivity Growth in East Asia: A Critical Survey
—*Jesus Felipe, September 1997*
- No. 66 Foreign Direct Investment in Pakistan: Policy Issues and Operational Implications
—*Ashfaq H. Khan and Yun-Hwan Kim, July 1999*
- No. 67 Fiscal Policy, Income Distribution and Growth
—*Sailesh K. Jha, November 1999*

ECONOMIC STAFF PAPERS (ES)

- No. 1 International Reserves: Factors Determining Needs and Adequacy
—*Evelyn Go, May 1981*
- No. 2 Domestic Savings in Selected Developing Asian Countries
—*Basil Moore, assisted by A.H.M. Nuruddin Chowdhury, September 1981*
- No. 3 Changes in Consumption, Imports and Exports of Oil Since 1973: A Preliminary Survey of the Developing Member Countries of the Asian Development Bank
—*Dal Hyun Kim and Graham Abbott, September 1981*
- No. 4 By-Passed Areas, Regional Inequalities, and Development Policies in Selected Southeast Asian Countries
—*William James, October 1981*
- No. 5 Asian Agriculture and Economic Development
—*William James, March 1982*
- No. 6 Inflation in Developing Member Countries: An Analysis of Recent Trends
—*A.H.M. Nuruddin Chowdhury and J. Malcolm Dowling, March 1982*
- No. 7 Industrial Growth and Employment in Developing Asian Countries: Issues and Perspectives for the Coming Decade
—*Ulrich Hiemenz, March 1982*
- No. 8 Petrodollar Recycling 1973-1980. Part 1: Regional Adjustments and the World Economy
—*Burnham Campbell, April 1982*
- No. 9 Developing Asia: The Importance of Domestic Policies
—*Economics Office Staff under the direction of Seiji Naya, May 1982*
- No. 10 Financial Development and Household Savings: Issues in Domestic Resource Mobilization in Asian Developing Countries
—*Wan-Soon Kim, July 1982*
- No. 11 Industrial Development: Role of Specialized Financial Institutions
—*Kedar N. Kohli, August 1982*
- No. 12 Petrodollar Recycling 1973-1980. Part II: Debt Problems and an Evaluation of Suggested Remedies
—*Burnham Campbell, September 1982*
- No. 13 Credit Rationing, Rural Savings, and Financial Policy in Developing Countries
—*William James, September 1982*
- No. 14 Small and Medium-Scale Manufacturing Establishments in ASEAN Countries: Perspectives and Policy Issues
—*Mathias Bruch and Ulrich Hiemenz, March 1983*
- No. 15 Income Distribution and Economic Growth in Developing Asian Countries
—*J. Malcolm Dowling and David Soo, March 1983*
- No. 16 Long-Run Debt-Servicing Capacity of Asian Developing Countries: An Application of Critical Interest Rate Approach
—*Jungsoo Lee, June 1983*
- No. 17 External Shocks, Energy Policy, and Macroeconomic Performance of Asian Developing Countries: A Policy Analysis
—*William James, July 1983*
- No. 18 The Impact of the Current Exchange Rate System on Trade and Inflation of Selected Developing Member Countries
—*Pradumna Rana, September 1983*
- No. 19 Asian Agriculture in Transition: Key Policy Issues
—*William James, September 1983*
- No. 20 The Transition to an Industrial Economy in Monsoon Asia
—*Harry T. Oshima, October 1983*
- No. 21 The Significance of Off-Farm Employment and Incomes in Post-War East Asian Growth
—*Harry T. Oshima, January 1984*
- No. 22 Income Distribution and Poverty in Selected Asian Countries
—*John Malcolm Dowling, Jr., November 1984*
- No. 23 ASEAN Economies and ASEAN Economic Cooperation
—*Narongchai Akrasanee, November 1984*
- No. 24 Economic Analysis of Power Projects
—*Nitin Desai, January 1985*
- No. 25 Exports and Economic Growth in the Asian Region
—*Pradumna Rana, February 1985*
- No. 26 Patterns of External Financing of DMCs
—*E. Go, May 1985*
- No. 27 Industrial Technology Development the Republic of Korea
—*S.Y. Lo, July 1985*
- No. 28 Risk Analysis and Project Selection: A Review of Practical Issues
—*J.K. Johnson, August 1985*
- No. 29 Rice in Indonesia: Price Policy and Comparative Advantage
—*I. Ali, January 1986*
- No. 30 Effects of Foreign Capital Inflows on Developing Countries of Asia
—*Jungsoo Lee, Pradumna B. Rana, and Yoshihiro Iwasaki, April 1986*
- No. 31 Economic Analysis of the Environmental Impacts of Development Projects
—*John A. Dixon et al., EAPI, East-West Center, August 1986*
- No. 32 Science and Technology for Development: Role of the Bank
—*Kedar N. Kohli and Ifzal Ali, November 1986*
- No. 33 Satellite Remote Sensing in the Asian and Pacific Region

- Mohan Sundara Rajan, December 1986*
- No. 34 Changes in the Export Patterns of Asian and Pacific Developing Countries: An Empirical Overview
—*Pradumna B. Rana, January 1987*
- No. 35 Agricultural Price Policy in Nepal
—*Gerald C. Nelson, March 1987*
- No. 36 Implications of Falling Primary Commodity Prices for Agricultural Strategy in the Philippines
—*Ifzal Ali, September 1987*
- No. 37 Determining Irrigation Charges: A Framework
—*Prabhakar B. Ghate, October 1987*
- No. 38 The Role of Fertilizer Subsidies in Agricultural Production: A Review of Select Issues
—*M.G. Quibria, October 1987*
- No. 39 Domestic Adjustment to External Shocks in Developing Asia
—*Jungsoo Lee, October 1987*
- No. 40 Improving Domestic Resource Mobilization through Financial Development: Indonesia
—*Philip Erquiaga, November 1987*
- No. 41 Recent Trends and Issues on Foreign Direct Investment in Asian and Pacific Developing Countries
—*P.B. Rana, March 1988*
- No. 42 Manufactured Exports from the Philippines: A Sector Profile and an Agenda for Reform
—*I. Ali, September 1988*
- No. 43 A Framework for Evaluating the Economic Benefits of Power Projects
—*I. Ali, August 1989*
- No. 44 Promotion of Manufactured Exports in Pakistan
—*Jungsoo Lee and Yoshihiro Iwasaki, September 1989*
- No. 45 Education and Labor Markets in Indonesia: A Sector Survey
—*Ernesto M. Pernia and David N. Wilson, September 1989*
- No. 46 Industrial Technology Capabilities and Policies in Selected ADCs
—*Hiroshi Kakazu, June 1990*
- No. 47 Designing Strategies and Policies for Managing Structural Change in Asia
—*Ifzal Ali, June 1990*
- No. 48 The Completion of the Single European Community Market in 1992: A Tentative Assessment of its Impact on Asian Developing Countries
—*J.P. Verbiest and Min Tang, June 1991*
- No. 49 Economic Analysis of Investment in Power Systems
—*Ifzal Ali, June 1991*
- No. 50 External Finance and the Role of Multilateral Financial Institutions in South Asia: Changing Patterns, Prospects, and Challenges
—*Jungsoo Lee, November 1991*
- No. 51 The Gender and Poverty Nexus: Issues and Policies
—*M.G. Quibria, November 1993*
- No. 52 The Role of the State in Economic Development: Theory, the East Asian Experience, and the Malaysian Case
—*Jason Brown, December 1993*
- No. 53 The Economic Benefits of Potable Water Supply Projects to Households in Developing Countries
—*Dale Whittington and Venkateswarlu Swarna, January 1994*
- No. 54 Growth Triangles: Conceptual Issues and Operational Problems
—*Min Tang and Myo Thant, February 1994*
- No. 55 The Emerging Global Trading Environment and Developing Asia
—*Arvind Panagariya, M.G. Quibria, and Narhari Rao, July 1996*
- No. 56 Aspects of Urban Water and Sanitation in the Context of Rapid Urbanization in Developing Asia
—*Ernesto M. Pernia and Stella LF. Alabastro, September 1997*
- No. 57 Challenges for Asia's Trade and Environment
—*Douglas H. Brooks, January 1998*
- No. 58 Economic Analysis of Health Sector Projects: A Review of Issues, Methods, and Approaches
—*Ramesh Adhikari, Paul Gertler, and Anneli Lagman, March 1999*
- No. 59 The Asian Crisis: An Alternate View
—*Rajiv Kumar and Bibek Debroy, July 1999*
- No. 60 Social Consequences of the Financial Crisis in Asia
—*James C. Knowles, Ernesto M. Pernia, and Mary Racelis, November 1999*

OCCASIONAL PAPERS (OP)

- No. 1 Poverty in the People's Republic of China: Recent Developments and Scope for Bank Assistance
—*K.H. Moinuddin, November 1992*
- No. 2 The Eastern Islands of Indonesia: An Overview of Development Needs and Potential
—*Brien K. Parkinson, January 1993*
- No. 3 Rural Institutional Finance in Bangladesh and Nepal: Review and Agenda for Reforms
—*A.H.M.N. Chowdhury and Marcelia C. Garcia, November 1993*
- No. 4 Fiscal Deficits and Current Account Imbalances of the South Pacific Countries: A Case Study of Vanuatu
—*T.K. Jayaraman, December 1993*
- No. 5 Reforms in the Transitional Economies of Asia
—*Pradumna B. Rana, December 1993*
- No. 6 Environmental Challenges in the People's Republic of China and Scope for Bank Assistance
—*Elisabetta Capannelli and Omkar L. Shrestha, December 1993*
- No. 7 Sustainable Development Environment and Poverty Nexus
—*K.F. Jalal, December 1993*
- No. 8 Intermediate Services and Economic Development: The Malaysian Example
—*Sutanu Behuria and Rahul Khullar, May 1994*
- No. 9 Interest Rate Deregulation: A Brief Survey of the Policy Issues and the Asian Experience
—*Carlos J. Glower, July 1994*
- No. 10 Some Aspects of Land Administration in Indonesia: Implications for Bank Operations
—*Sutanu Behuria, July 1994*
- No. 11 Demographic and Socioeconomic Determinants of Contraceptive Use among Urban Women in the Melanesian Countries in the South Pacific: A Case Study of Port Vila Town in Vanuatu
—*T.K. Jayaraman, February 1995*
- No. 12 Managing Development through Institution Building
—*Hilton L. Root, October 1995*
- No. 13 Growth, Structural Change, and Optimal

- Poverty Interventions
—*Shiladitya Chatterjee, November 1995*
- No. 14 Private Investment and Macroeconomic Environment in the South Pacific Island Countries: A Cross-Country Analysis
—*T.K. Jayaraman, October 1996*
- No. 15 The Rural-Urban Transition in Viet Nam: Some Selected Issues
—*Sudipto Mundle and Brian Van Arkadie, October 1997*
- No. 16 A New Approach to Setting the Future Transport Agenda
—*Roger Allport, Geoff Key, and Charles Melhuish, June 1998*
- No. 17 Adjustment and Distribution: The Indian Experience
—*Sudipto Mundle and V.B. Tulasidhar, June 1998*
- No. 18 Tax Reforms in Viet Nam: A Selective Analysis
—*Sudipto Mundle, December 1998*
- No. 19 Surges and Volatility of Private Capital Flows to Asian Developing Countries: Implications for Multilateral Development Banks
—*Pradumna B. Rana, December 1998*
- No. 20 The Millennium Round and the Asian Economies: An Introduction
—*Dilip K. Das, October 1999*
- No. 21 Occupational Segregation and the Gender Earnings Gap
—*Joseph E. Zveglic, Jr. and Yana van der Meulen Rodgers, December 1999*
- No. 22 Information Technology: Next Locomotive of Growth?
—*Dilip K. Das, June 2000*

STATISTICAL REPORT SERIES (SR)

- No. 1 Estimates of the Total External Debt of the Developing Member Countries of ADB: 1981-1983
—*I.P. David, September 1984*
- No. 2 Multivariate Statistical and Graphical Classification Techniques Applied to the Problem of Grouping Countries
—*I.P. David and D.S. Maligalig, March 1985*
- No. 3 Gross National Product (GNP) Measurement Issues in South Pacific Developing Member Countries of ADB
—*S.G. Tiwari, September 1985*
- No. 4 Estimates of Comparable Savings in Selected DMCs
—*Hananto Sigit, December 1985*
- No. 5 Keeping Sample Survey Design and Analysis Simple
—*I.P. David, December 1985*
- No. 6 External Debt Situation in Asian Developing Countries
—*I.P. David and Jungsoo Lee, March 1986*
- No. 7 Study of GNP Measurement Issues in the South Pacific Developing Member Countries. Part I: Existing National Accounts of SPDMCs—Analysis of Methodology and Application of SNA Concepts
—*P. Hodgkinson, October 1986*
- No. 8 Study of GNP Measurement Issues in the South Pacific Developing Member Countries. Part II: Factors Affecting Inter-country Comparability of Per Capita GNP
—*P. Hodgkinson, October 1986*
- No. 9 Survey of the External Debt Situation in Asian Developing Countries, 1985
—*Jungsoo Lee and I.P. David, April 1987*
- No. 10 A Survey of the External Debt Situation in Asian Developing Countries, 1986
—*Jungsoo Lee and I.P. David, April 1988*
- No. 11 Changing Pattern of Financial Flows to Asian and Pacific Developing Countries
—*Jungsoo Lee and I.P. David, March 1989*
- No. 12 The State of Agricultural Statistics in Southeast Asia
—*I.P. David, March 1989*
- No. 13 A Survey of the External Debt Situation in Asian and Pacific Developing Countries: 1987-1988
—*Jungsoo Lee and I.P. David, July 1989*
- No. 14 A Survey of the External Debt Situation in Asian and Pacific Developing Countries: 1988-1989
—*Jungsoo Lee, May 1990*
- No. 15 A Survey of the External Debt Situation in Asian and Pacific Developing Countries: 1989-1992
—*Min Tang, June 1991*
- No. 16 Recent Trends and Prospects of External Debt Situation and Financial Flows to Asian and Pacific Developing Countries
—*Min Tang and Aludia Pardo, June 1992*
- No. 17 Purchasing Power Parity in Asian Developing Countries: A Co-Integration Test
—*Min Tang and Ronald Q. Butiong, April 1994*
- No. 18 Capital Flows to Asian and Pacific Developing Countries: Recent Trends and Future Prospects
—*Min Tang and James Villafuerte, October 1995*

SPECIAL STUDIES, COMPLIMENTARY (SSC)

(Published in-house; Available through ADB Office of External Relations; Free of Charge)

1. Improving Domestic Resource Mobilization Through Financial Development: Overview *September 1985*
2. Improving Domestic Resource Mobilization Through Financial Development: Bangladesh *July 1986*
3. Improving Domestic Resource Mobilization Through Financial Development: Sri Lanka *April 1987*
4. Improving Domestic Resource Mobilization Through Financial Development: India *December 1987*
5. Financing Public Sector Development Expenditure in Selected Countries: Overview *January 1988*
6. Study of Selected Industries: A Brief Report *April 1988*
7. Financing Public Sector Development Expenditure in Selected Countries: Bangladesh *June 1988*
8. Financing Public Sector Development Expenditure in Selected Countries: India *June 1988*
9. Financing Public Sector Development Expenditure in Selected Countries: Indonesia *June 1988*
10. Financing Public Sector Development Expenditure in Selected Countries: Nepal *June 1988*
11. Financing Public Sector Development Expenditure in Selected Countries: Pakistan *June 1988*
12. Financing Public Sector Development Expenditure in Selected Countries: Philippines *June 1988*
13. Financing Public Sector Development Expenditure in Selected Countries: Thailand *June 1988*
14. Towards Regional Cooperation in South Asia: ADB/EWC Symposium on Regional Cooperation in South Asia *February 1988*
15. Evaluating Rice Market Intervention Policies: Some Asian Examples *April 1988*
16. Improving Domestic Resource Mobilization Through Financial Development: Nepal *November 1988*
17. Foreign Trade Barriers and Export Growth *September 1988*
18. The Role of Small and Medium-Scale Industries in the Industrial Development of the Philippines *April 1989*
19. The Role of Small and Medium-Scale Manufacturing Industries in Industrial Development: The Experience of Selected Asian Countries *January 1990*
20. National Accounts of Vanuatu, 1983-1987 *January 1990*
21. National Accounts of Western Samoa, 1984-1986 *February 1990*
22. Human Resource Policy and Economic Development: Selected Country Studies *July 1990*
23. Export Finance: Some Asian Examples *September 1990*
24. National Accounts of the Cook Islands, 1982-1986 *September 1990*
25. Framework for the Economic and Financial Appraisal of Urban Development Sector Projects *January 1994*
26. Framework and Criteria for the Appraisal and Socioeconomic Justification of Education Projects *January 1994*
27. Guidelines for the Economic Analysis of Projects *February 1997*
28. Investing in Asia *1997*
29. Guidelines for the Economic Analysis of Telecommunication Projects *1998*
30. Guidelines for the Economic Analysis of Water Supply Projects *1999*

SPECIAL STUDIES, ADB (SS, ADB)

(Published in-house; Available commercially through ADB Office of External Relations)

1. Rural Poverty in Developing Asia
Edited by M.G. Quibria
Vol. 1: Bangladesh, India, and Sri Lanka, 1994
\$35.00 (paperback)
Vol. 2: Indonesia, Republic of Korea, Philippines, and Thailand, 1996
\$35.00 (paperback)
2. External Shocks and Policy Adjustments: Lessons from the Gulf Crisis
Edited by Naved Hamid and Shahid N. Zahid, 1995
\$15.00 (paperback)
3. Gender Indicators of Developing Asian and Pacific Countries
Asian Development Bank, 1993
\$25.00 (paperback)
4. Urban Poverty in Asia: A Survey of Critical Issues
Edited by Ernesto Pernia, 1994
\$20.00 (paperback)
5. Indonesia-Malaysia-Thailand Growth Triangle: Theory to Practice
Edited by Myo Thant and Min Tang, 1996
\$15.00 (paperback)
6. Emerging Asia: Changes and Challenges
Asian Development Bank, 1997
\$30.00 (paperback)
7. Asian Exports
Edited by Dilip Das, 1999
\$35.00 (paperback)
\$55.00 (hardbound)
8. Mortgage-Backed Securities Markets in Asia
Edited by S.Ghon Rhee & Yutaka Shimomoto, 1999
\$35.00 (paperback)
9. Corporate Governance and Finance in East Asia: A Study of Indonesia, Republic of Korea, Malaysia, Philippines and Thailand
J. Zhuang, David Edwards, D. Webb, & Ma. Virginita Capulong
Vol. 1, 2000 \$10.00 (paperback)
Vol. 2, 2001 \$15.00 (paperback)
10. Financial Management and Governance Issues
Asian Development Bank, 2000
Cambodia \$10.00 (paperback)
People's Republic of China \$10.00 (paperback)
Mongolia \$10.00 (paperback)
Pakistan \$10.00 (paperback)
Papua New Guinea \$10.00 (paperback)
Uzbekistan \$10.00 (paperback)
Viet Nam \$10.00 (paperback)
Selected Developing Member Countries \$10.00 (paperback)
11. Guidelines for the Economic Analysis of Projects
Asian Development Bank, 1997
\$10.00 (paperback)
12. Handbook for the Economic Analysis of Water Supply Projects
Asian Development Bank, 1999
\$15.00 (hardbound)
13. Handbook for the Economic Analysis of Health Sector Projects
Asian Development Bank, 2000
\$10.00 (paperback)

SPECIAL STUDIES, OUP (SS,OUP)

(Co-published with Oxford University Press; Available commercially through Oxford University Press Offices, Associated Companies, and Agents)

1. Informal Finance: Some Findings from Asia
Prabhu Ghate et. al., 1992
\$15.00 (paperback)
2. Mongolia: A Centrally Planned Economy in Transition
Asian Development Bank, 1992
\$15.00 (paperback)
3. Rural Poverty in Asia, Priority Issues and Policy Options
Edited by M.G. Quibria, 1994
\$25.00 (paperback)
4. Growth Triangles in Asia: A New Approach to Regional Economic Cooperation
Edited by Myo Thant, Min Tang, and Hiroshi Kakazu
1st ed., 1994 \$36.00 (hardbound)
Revised ed., 1998 \$55.00 (hardbound)
5. Urban Poverty in Asia: A Survey of Critical Issues
Edited by Ernesto Pernia, 1994
\$18.00 (paperback)
6. Critical Issues in Asian Development: Theories, Experiences, and Policies
Edited by M.G. Quibria, 1995
\$15.00 (paperback)
\$36.00 (hardbound)
7. From Centrally Planned to Market Economies: The Asian Approach
Edited by Pradumna B. Rana and Naved Hamid, 1995
Vol. 1: Overview
\$36.00 (hardbound)
Vol. 2: People's Republic of China and Mongolia
\$50.00 (hardbound)
Vol. 3: Lao PDR, Myanmar, and Viet Nam
\$50.00 (hardbound)
8. Financial Sector Development in Asia
Edited by Shahid N. Zahid, 1995
\$50.00 (hardbound)
9. Financial Sector Development in Asia: Country Studies
Edited by Shahid N. Zahid, 1995
\$55.00 (hardbound)
10. Fiscal Management and Economic Reform in the People's Republic of China
Christine P.W. Wong, Christopher Heady, and Wing T. Woo, 1995
\$15.00 (paperback)
11. Current Issues in Economic Development: An Asian Perspective
Edited by M.G. Quibria and J. Malcolm Dowling, 1996
\$50.00 (hardbound)
12. The Bangladesh Economy in Transition
Edited by M.G. Quibria, 1997
\$20.00 (hardbound)
13. The Global Trading System and Developing Asia
Edited by Arvind Panagariya, M.G. Quibria, and Narhari Rao, 1997
\$55.00 (hardbound)
14. Social Sector Issues in Transitional Economies of Asia
Edited by Douglas H. Brooks and Myo Thant, 1998
\$25.00 (paperback)
\$55.00 (hardbound)
15. Rising to the Challenge in Asia: A Study of Financial Markets
Asian Development Bank, 1999
Vol. 1 \$20.00 (paperback)
Vol. 2 \$15.00 (paperback)
Vol. 3 \$25.00 (paperback)
Vols. 4-12 \$20.00 (paperback)

SERIALS

(Co-published with Oxford University Press; Available commercially through Oxford University Press Offices, Associated Companies, and Agents)

1. Asian Development Outlook (ADO; annual)
\$36.00 (paperback)
2. Key Indicators of Developing Asian and Pacific Countries (KI; annual)
\$35.00 (paperback)

JOURNAL

(Published in-house; Available commercially through ADB Office of External Relations)

1. Asian Development Review (ADR; semiannual)
\$5.00 per issue; \$8.00 per year (2 issues)