



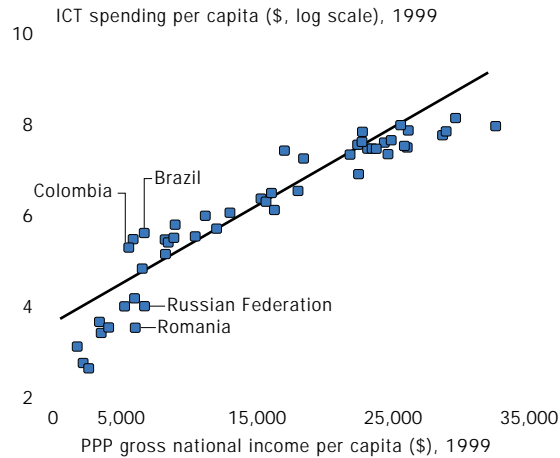
STATES AND MARKETS

Global digital opportunities

Rich countries spend more on information and communications technology (ICT) per capita than poor countries. But for a given income, some countries outpace others by a wide margin.

ICT spending refers to spending on information technology plus telecommunications equipment and services. More broadly, ICT is the set of activities that facilitate the processing, transmission, and display of information by electronic means.

As national income rises, so does ICT spending per person



Colombia spends about seven times as much on ICT per person as Romania—and Brazil about five times as much as Russia—although all four countries have similar per capita incomes (about \$6,000 in purchasing power parity terms).

Do you want bread—or computers? You want both.

The digital and information revolution has changed the way the world learns, communicates, does business, and cures illnesses. New information and communications technologies (ICT) offer vast opportunities for progress in all walks of life in all countries—opportunities for economic growth, improved health, better service delivery, learning through distance education, and social and cultural advances.

None of these benefits will come automatically. Technology may continue to develop at breakneck speed. But it has to be matched with market-oriented reforms that promote competition and entrepreneurial freedom and place a high priority on universal education. And all that requires support from the international community. Otherwise, many countries will be unable to compete and grow in this networked and globalized world.

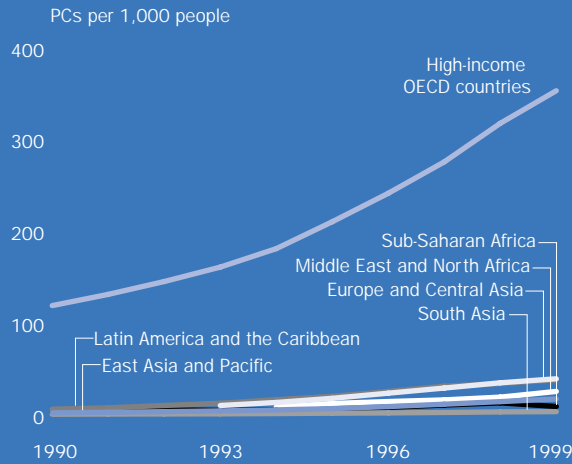
Where do countries stand in the ICT race? What are the opportunities and benefits from a networked society? What are the risks of staying on the sidelines of the ICT revolution? What can developing country governments do to improve their development prospects? What can the international community, including the private sector and nongovernmental organizations, do to help bridge the digital divide and ensure a better world for all? Here are some of the answers.

What is the digital divide?

It's the gap between those with access to ICT and those without.

And the gap is big: rich countries have about 15 percent of the world's population but about 80 percent of the world's personal computers (PCs) and almost 90 percent of its Internet users. On average, a high-income country has 40 times as many computers per capita as a Sub-Saharan African country.

A wide gap in ownership of personal computers



Although the gap in PC ownership between high-income OECD countries and developing regions is wide, PC ownership is growing twice as fast in developing as in rich countries.

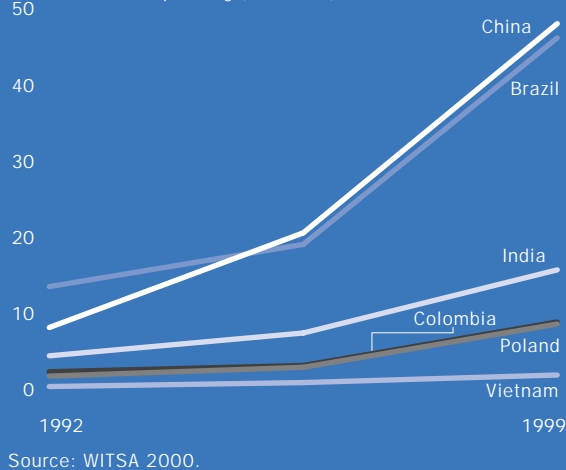
You have to look at ICT in the context of the development framework

Where do countries stand in the ICT race?

Five years ago only five Sub-Saharan African countries had Internet access. This year all the region's countries are connected.

And at 36 percent, its annual growth in Internet hosts is almost twice the world's average.

Some developing countries are spending much more than others on the new technologies



Many countries are bridging the divide. Since 1992 China has increased its ICT spending about 30 percent a year, going from 0.6 percent of worldwide ICT spending to 2.2 percent in 1999. During the same period the number of PCs in China grew more than 40 percent a year.

Only 0.6 percent of the people in developing countries have access to the Internet, compared with 30 percent in the United States. But in 1992-99 such developing countries as China, Brazil, and India had some of the world's fastest growing ICT markets.

Opportunities in the digital society . . .

The advances in ICT can benefit high-income and developing countries through:

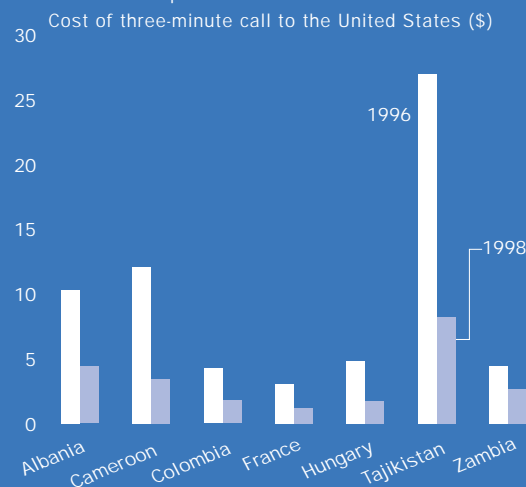
- Lower transaction and distribution costs.
- Broader markets and more effective marketing.
- Greater competition.

• Job creation and social stability.

- Social applications (such as distance education).

• New ways of forming social relationships, fostering human interaction, and bringing the poor and isolated into the global economy.

Costs are falling for computer processing, Internet access, and international phone calls



Source: International Telecommunication Union data.

Consumers everywhere can benefit from the lower costs. And workers with ICT skills in developing countries may have opportunities for employment in firms that export software, accounting services, and insurance claims processing.

You cannot forget about growth, or about legal and financial systems

. . . and the risks of being excluded

There are wide disparities in access to information and telecommunications not only between countries, but also within countries. In Panama the wealthiest fifth of the population are 43 times as likely to have private telephones as the poorest fifth. And in South Africa households in cities are 10 times as likely to have access to private telephones as those in rural areas.

And without access to telephones and a reliable electricity supply, access to the Internet is not possible.

Teledensity differs by income and between rural and urban areas
% with telephones

	Poorest 20%	Richest 20%
Nepal, 1996	0.0	11.0
Panama, 1997	1.7	73.8
South Africa, 1993	0.6	75.0
	Rural households	Urban households
Nepal, 1996	0.1	10.4
Panama, 1997	9.2	57.5
South Africa, 1993	4.7	45.7

Source: World Bank, Living Standards Measurement Study survey data.

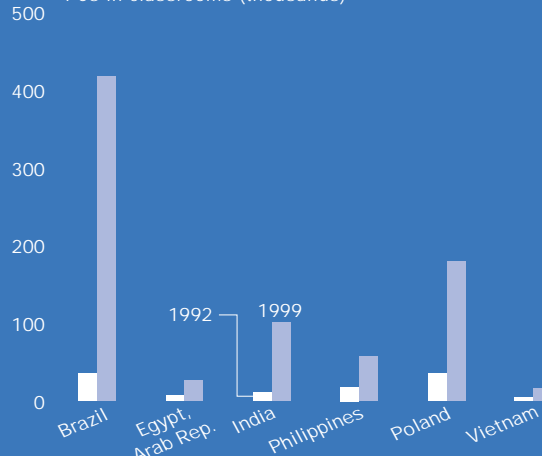
The Kisiizi Hospital in Uganda, far from a paved road and without phone service for many years, finally got wireless phone service through a satellite connection. But at a high cost. Phone calls to the capital cost \$2.50 a minute, equal to five days' work for a wage earner.

The alternatives can be costly in both time and money. A nurse at the hospital found that a five-minute call to Kampala to find out about a training course cost the same as bus fare for the 800-kilometer round-trip to the capital. The rural poor often have little choice but to pay the high costs of phone service. The alternative may be to remain cut off from access to information and basic services.

Computers matter in the digital society . . .

Many developing countries increased the number of PCs in classrooms remarkably between 1992 and 1999. While Brazil had about 35,000 PCs in schools in 1992, it had 400,000 in 1999, about a 12-fold increase. In high-income economies the number of PCs in schools has grown about 3 percent a year on average.

In some developing countries personal computers in classrooms increased almost 60 percent annually in 1992-99
PCs in classrooms (thousands)



Source: WITSA 2000.

Internet capacity is not a simple linear function of economic and political development. Instead, it is driven by complex interactions that could be termed "post-industrialization." That is what Ohio State University researchers Kristopher Robison and Edward Crenshaw (2000) found after analyzing economic, political, and ICT development in 75 high-income and developing countries.

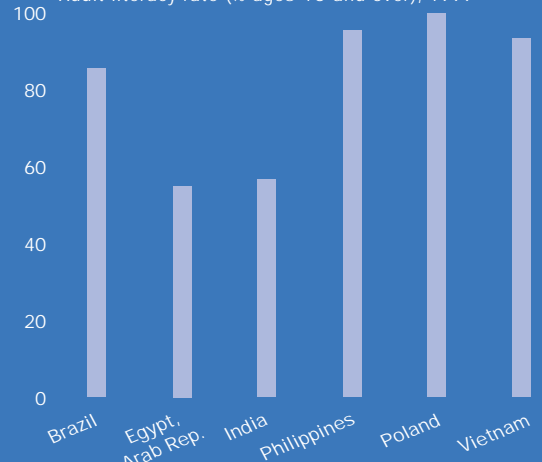
Nor can you forget about health, education, and good government

. . . but literacy is also important

Technology alone is not the answer. It also takes an educated workforce to create opportunities for more equitable development. So it may be just as important for a government to promote universal literacy as it is to promote PC ownership and universal Internet access.

The ability to read is essential in the digital age

Adult literacy rate (% ages 15 and over), 1999

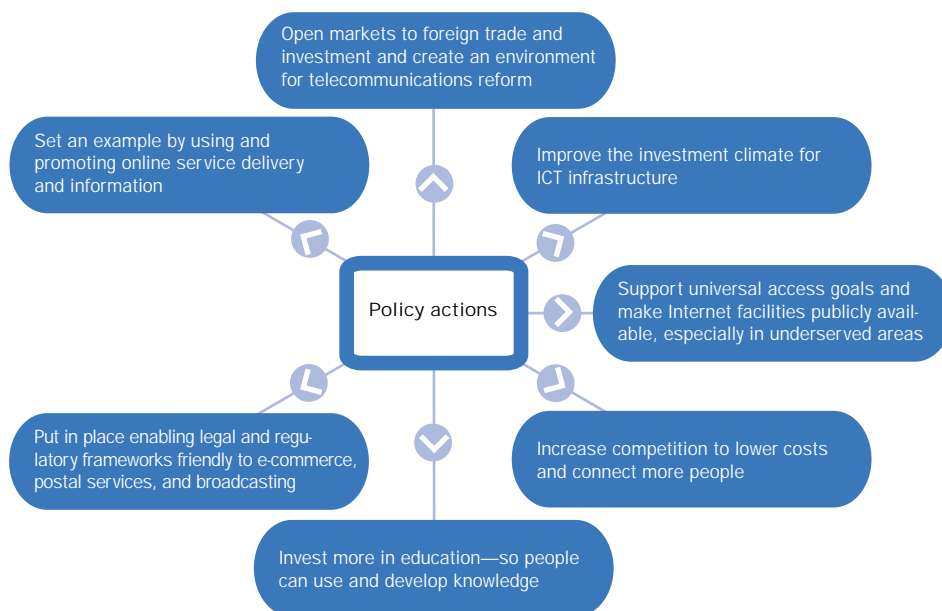


Source: World Bank, *World Development Indicators 2001 CD-ROM*.

Closing the digital divide requires a literate, educated population and open and transparent government and business.

Governments face many challenges in creating an environment for growth in ICT

Connecting computers to the Internet is only the first step toward a fully networked society. Much more is needed.



Indeed, to meet the challenge of poverty . . .

E-government puts government at the service of the public . . .

In 1997 an interagency committee in Chile created a communications and information technology unit to promote e-government. The aim is to improve coordination within and among agencies and thus increase the efficiency and effectiveness of public services. New management tools will improve transparency and probity, reducing opportunities for corruption. They will also support democracy, by empowering people and allowing wider participation.

With the new e-system, companies register in the area in which they want to do business with the public sector. When a government agency wants to purchase goods or services, the e-system automatically emails contract specifications to the registered companies, giving all of them an equal opportunity. The system also provides information on the procurement process, such as the winning bid.

From Chile's e-government procurement program alone, savings of at least \$200 million a year are projected—about 1.4 percent of central government spending in 1997. Every dollar saved is an extra dollar for health care, social security, or public housing.

. . . saving citizens time and improving their satisfaction

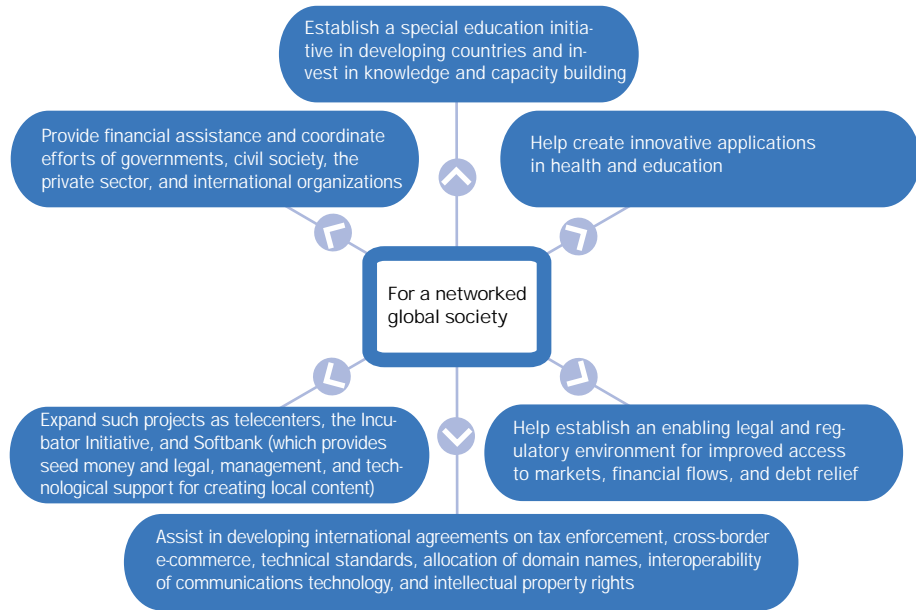
In the Indian state of Andhra Pradesh innovative e-government activities have increased the efficiency of public administration in delivering public services. These innovations include Computer-Aided Registration of Deeds (CARD) and the Twin Cities Network Services (TWINS).

Operating in 214 locations, CARD completes all transactions through a computerized process. It has

reduced the time required for an encumbrance certificate or property valuation from about a week to only 15 minutes. People can now register their property in a day rather than the several days it used to take.

TWINS, operating in the cities of Hyderabad and Secunderabad, provides an interface for issuing citizens certificates, permits, and licenses and for citizens to pay utility bills. A pilot center at Banjara Hills handles about 3,000 transactions a day, serving citizens in minutes. TWINS will expand to 18 other locations in the two cities through a public-private partnership, handling about a million transactions a year.

The international community has a role



... you cannot forget anything in the development paradigm

Incubator Initiative

Efforts to start up ICT-related companies in developing countries face many constraints: no seed capital, too few experienced managers, and more. That is why the Incubator Initiative will provide technical assistance to a network of incubators to help create dynamic, results-oriented ICT enterprises. The initiative is an effort of the Information for Development Program (InfoDev), which is supported by the World Bank and other donors.

www.infodev.org

African Virtual University

The African Virtual University, sponsored by the World Bank Group, offers technology-based distance education to all of Africa. It delivers quality education to students and professionals, mainly in business, engineering, and information technology—areas where Africa lacks the skills needed to participate in the knowledge economy. The university has 25 learning centers in 15 Sub-Saharan countries, reaching more than 12,000 students.

www.avu.org

Bridges.org

Bridges.org's mission is to empower people in developing and emerging economies to use technology for themselves by:

- Providing public education about technology use.
- Promoting policies that remove barriers to the use of technology.
- Creating a body of knowledge about digital divide issues.

www.bridges.org

"DOT Force"— Digital Opportunity Taskforce

The DOT Force, drawn from the Group of Eight (G-8)—Canada, France, Germany, Italy, Japan, the Russian Federation, the United Kingdom, and the United States—held its inaugural meeting in Japan on 27–28 November 2000. In opening the meeting, Japanese Prime Minister Yoshiro Mori expressed hope for broad cooperation and concrete proposals to bridge the digital divide. The DOT Force will investigate promising solutions and report its findings at the G-8 summit in July 2001.

www.dotforce.org

ICT touches every facet of development and poverty reduction

New information and communications technologies can break down some of the physical barriers to participation in society faced by many poor people.

OPPORTUNITY—sustainable growth and employment

Distance education promises to broaden knowledge and information—some of the most important factors in economic growth.

EMPOWERMENT—more transparent governance, better service delivery, greater ability to communicate and participate

“Voice” and participation lead to better accountability and better governance.

SECURITY—reduced vulnerability to ill health and natural disasters

ICT can overcome the “information poverty” that health workers in developing countries face every day.

ICT gives us the opportunity to leverage the transfer of knowledge, empowering people in ways that were previously not possible. It is not just a technical tool; it may be the answer to greater equity in the world, and a greater peace.

James D. Wolfensohn
President
World Bank



5.1 Private sector development

	Private fixed investment		Domestic credit to private sector		Proceeds from privatization ^a	Investment in infrastructure projects with private participation ^a								
	% of gross domestic fixed investment		% of GDP			\$ millions 1990-99	Telecommunications		Energy		Transport		Water and sanitation	
	1990	1998	1990	1999			1990-94	1995-99	1990-94	1995-99	1990-94	1995-99	1990-94	1995-99
Albania	..	..	..	3.6	28.5	..	..	..	..	..	..	..	..
Algeria	..	..	44.5	5.5	55.1	..	..	..	..	..	..	..	..
Angola	..	..	..	2.8	6.2	..	..	..	..	..	..	..	..
Argentina	67.4	91.5	15.6	25.0	44,588.0	9,262.0	10,838.3	9,806.5	10,394.3	5,293.4	8,863.1	4,075.0	3,182.6	
Armenia	..	..	40.4	9.2	219.2	..	442.0	..	..	..	..	..	..
Australia	88.4 ^b	90.4 ^b	64.4	85.0	..	..	..	..	..	..	..	..	..
Austria	..	92.3	91.2	102.9	..	..	..	..	..	..	..	..	..
Azerbaijan	..	..	9.4	3.4	15.8	14.0	82.0	..	..	..	..	..	..
Bangladesh	61.4	68.0	16.7	23.5	59.6	116.0	472.4	..	538.7	..	..	..	..
Belarus	..	..	..	9.7	10.8	10.0	15.0	..	500.0	..	..	..	..
Belgium	92.8 ^b	92.6 ^b	35.5	77.5	..	..	..	..	..	..	..	..	..
Benin	44.8	66.1	20.3	10.9	39.0	..	..	..	..	..	..	..	..
Bolivia	39.3	66.5	24.0	63.9	1,045.4	20.0	729.4	..	1,112.0	..	146.6	..	682.0	
Bosnia and Herzegovina	..	..	..	..	..	..	..	..	..	..	..	..	..
Botswana	..	..	9.4	15.2	..	..	40.0	..	..	..	..	..	..
Brazil	76.7 ^b	82.9 ^b	38.9	34.5	69,607.7	..	44,283.0	303.0	32,135.1	328.1	17,646.8	2.5	1,503.0	
Bulgaria	3.6	55.2	7.2	14.6	3,199.0	21.0	219.0	..	..	..	..	..	..
Burkina Faso	..	..	19.0	11.8	7.5	..	..	..	..	..	..	..	..
Burundi	..	..	13.7	20.9	4.2	0.5	..	..	..	..	..	..	..
Cambodia	86.0	76.3	..	6.4	..	30.1	101.7	..	89.0	..	220.0	..	..
Cameroon	..	..	26.7	8.9	133.1	..	12.7	..	..	30.8	95.0	..	..
Canada	86.3 ^b	89.4 ^b	79.4	87.1	..	..	..	..	..	..	..	..	..
Central African Republic	..	..	7.2	4.3	..	..	1.1	..	..	..	..	..	..
Chad	..	62.5	7.3	3.6	..	..	2.0	..	..	..	..	..	..
Chile	79.5	87.7	47.2	67.5	2,138.4	2,354.9	3,364.4	1,755.8	3,525.3	112.4	3,090.3	127.6	3,162.3	
China	33.8 ^c	45.8 ^c	87.7	122.0	20,593.2	..	5,970.0	5,447.8	12,922.1	5,820.5	9,650.8	42.8	605.4	
Hong Kong, China	..	..	165.1	159.4	..	..	..	..	..	..	..	..	..
Colombia	61.6	59.9	30.8	33.4	5,979.5	1,355.4	1,302.8	540.0	6,831.4	783.0	856.2	..	210.0	
Congo, Dem. Rep.	..	..	1.8	..	..	..	50.0	..	..	..	..	..	..
Congo, Rep.	..	..	15.7	11.6	..	..	47.1	..	325.0	..	..	..	..
Costa Rica	78.9	76.8	12.6	18.5	50.8	..	..	18.3	271.5	..	24.0	..	..
Côte d'Ivoire	57.9	72.0	36.5	16.0	597.4	..	742.3	109.6	260.6	..	178.0	..	..
Croatia	..	..	..	36.9	1,318.3	..	978.0	..	368.5	..	672.2	..	..
Cuba	..	..	..	..	706.0	371.0	..	..	..	..	..	..	..
Czech Republic	86.4	82.0	..	56.8	5,633.1	41.0	6,274.0	356.0	944.1	..	283.7	16.0	48.8	
Denmark	91.8 ^b	91.7 ^b	52.2	34.8	..	..	..	..	..	..	..	..	..
Dominican Republic	73.1	77.8	27.5	32.7	643.4	5.0	163.0	87.5	928.5	..	..	..	..
Ecuador	67.2	70.2	15.1	61.0	169.3	13.8	684.6	..	30.0	12.5	686.8	..	..
Egypt, Arab Rep.	62.3	67.5	30.6	59.7	2,905.4	..	2,045.7	..	700.0	..	197.7	..	..
El Salvador	81.5	76.7	20.1	43.9	1,070.1	..	610.5	..	892.2	..	..	..	..
Eritrea	..	..	..	..	2.0	..	..	..	..	..	..	..	..
Estonia	..	..	20.2	26.4	778.2	136.1	628.2	..	26.5	..	1.0	..	..
Ethiopia	..	..	24.0	30.8	172.0	..	..	..	..	..	..	..	..
Finland	86.9 ^b	84.5 ^b	86.7	52.1	..	..	..	..	..	..	..	..	..
France	..	..	96.1	82.9	..	..	..	..	..	..	..	..	..
Gabon	..	..	13.0	10.7	..	..	..	..	624.8	..	..	..	624.8
Gambia, The	66.8	67.9	11.0	13.7	..	..	..	..	..	..	..	..	..
Georgia	..	..	..	7.7	..	..	31.0	..	25.0	..	..	..	..
Germany	..	..	91.9	118.2	..	..	..	..	..	..	..	..	..
Ghana	..	..	4.9	12.0	888.4	20.0	441.1	..	..	..	..	..	..
Greece	..	83.9 ^b	35.9	46.5	..	..	..	..	..	..	..	..	..
Guatemala	80.0	86.6	14.2	20.7	1,351.2	..	1,366.3	100.0	1,202.9	..	10.0	..	..
Guinea	..	..	3.5	3.5	45.0	..	120.3	..	36.4	..	..	..	..
Guinea-Bissau	28.1	46.0	22.0	7.3	0.5	..	..	23.2	..	..	..	23.2	..
Haiti	..	..	12.1	14.3	16.5	..	1.5	..	..	..	..	..	..
Honduras	..	..	31.1	41.8	74.1	..	38.1	70.0	85.0	..	..	..	..



Private sector development | 5.1

	Private fixed investment		Domestic credit to private sector		Proceeds from privatization ^a	Investment in infrastructure projects with private participation ^a								
	% of gross domestic fixed investment		% of GDP			\$ millions	Telecommunications		Energy		Transport		Water and sanitation	
	1990	1998	1990	1999			1990-99	1990-94	1995-99	1990-94	1995-99	1990-94	1995-99	1990-94	1995-99
Hungary	..	..	46.3	25.4	13,998.9	1,610.2	6,300.2	..	3,812.1	1,086.0	135.0	..	180.3
India	59.1	69.6	25.3	26.1	8,983.4	93.0	9,176.7	2,865.8	7,910.8	126.9	915.3	..	..
Indonesia	67.5	77.0	46.9	20.1	6,134.8	1,119.0	7,245.5	352.5	9,747.1	709.8	2,223.1	3.8	872.2	
Iran, Islamic Rep.	53.6	55.5	32.5	29.4	..	..	28.0	..	..	..	..	..	..
Iraq	..	..	..	..	..	..	..	..	..	..	..	..	..
Ireland	88.8 ^b	87.7 ^b	47.6	89.2	..	..	..	..	..	..	..	..	..
Israel	..	..	57.6	83.2	..	..	..	..	..	..	..	..	..
Italy	..	..	56.5	59.2	..	..	..	..	..	..	..	..	..
Jamaica	..	..	39.0	32.3	385.5	169.0	235.5	246.0	43.0	30.0	..	..	..
Japan	84.2 ^b	78.5 ^b	200.6	115.3	..	..	..	..	..	..	..	..	..
Jordan	..	..	72.3	71.0	63.8	43.0	17.8	..	..	..	182.0	..	55.0
Kazakhstan	..	..	..	9.5	6,375.9	30.0	1,548.0	..	2,084.5	..	..	..	..
Kenya	42.0	58.8	32.8	30.5	318.3	..	55.0	..	154.0	..	53.4	..	..
Korea, Dem. Rep.	..	..	..	..	..	..	..	..	..	..	..	..	..
Korea, Rep.	88.1	79.5	65.5	93.4	..	2,379.0	10,940.5	300.0	3,173.2	..	2,634.0	..	..
Kuwait	..	..	52.1	66.1	..	..	..	..	..	..	..	..	..
Kyrgyz Republic	..	..	..	5.1	139.5	..	94.0	..	..	..	..	..	..
Lao PDR	..	..	1.0	8.6	32.0	..	152.9	..	535.5	..	..	..	..
Latvia	..	..	..	16.7	490.9	180.0	446.7	..	106.0	..	75.0	..	..
Lebanon	..	..	79.4	74.0	..	50.0	323.0	..	..	..	..	..	..
Lesotho	..	..	15.6	15.2	16.2	..	10.0	..	..	..	..	..	..
Libya	..	..	..	..	..	..	..	..	..	..	..	..	..
Lithuania	..	..	..	13.0	1,535.6	30.0	809.5	..	20.0	..	..	..	..
Macedonia, FYR	..	..	..	22.3	679.3	..	..	..	..	..	..	..	..
Madagascar	46.5	47.1	16.9	8.4	9.0	5.0	10.0	..	..	..	..	..	..
Malawi	51.5	21.0	12.8	5.6	18.9	..	18.4	..	..	..	6.0	..	..
Malaysia	64.5	65.4	69.4	144.0	10,159.6	2,010.5	4,380.0	5,663.8	1,610.5	2,769.3	8,196.4	3,976.7	1,056.0	
Mali	..	..	12.8	18.2	21.9	..	..	..	..	..	..	..	..
Mauritania	69.3	36.5	43.5	23.9	1.1	..	..	..	..	..	..	..	..
Mauritius	63.2	69.5	33.2	58.5	..	..	..	..	109.3	..	..	..	..
Mexico	..	92.1	17.5	16.2	28,593.0	15,795.0	11,736.9	..	2,250.3	7,430.9	5,151.9	516.7	199.7	
Moldova	..	..	5.9	12.0	26.6	..	59.6	..	60.0	..	..	..	..
Mongolia	..	..	17.7	8.6	..	..	24.1	..	..	..	..	..	..
Morocco	65.6	70.7	34.0	54.6	3,102.2	..	1,240.0	2,300.0	4,819.9	..	..	..	4,050.9
Mozambique	..	..	17.6	17.0	138.2	..	29.0	..	..	..	..	..	200.0
Myanmar	..	..	4.7	8.6	..	..	4.0	..	..	..	50.0	..	..
Namibia	61.5	48.6	22.7	49.2	..	..	22.0	..	..	..	..	..	..
Nepal	..	..	12.8	29.1	15.1	..	..	125.7	98.2	..	..	..	..
Netherlands	..	..	79.6	107.3	..	..	..	..	..	..	..	..	..
New Zealand	..	..	76.9	118.0	..	..	..	..	..	..	..	..	..
Nicaragua	54.7	67.9	112.6	54.1	130.3	6.6	24.5	..	232.4	..	..	..	..
Niger	..	..	12.3	3.8	..	..	..	..	..	..	..	..	..
Nigeria	..	..	9.4	13.8	730.2	..	63.5	..	..	..	..	..	..
Norway	83.5 ^b	85.1 ^b	82.2	83.6	..	..	..	..	..	..	..	..	..
Oman	..	..	22.9	44.6	60.1	..	..	204.5	..	..	77.5	..	..
Pakistan	51.7	66.2	27.7	28.2	1,992.3	581.5	107.5	1,638.7	5,023.8	..	418.3	..	..
Panama	87.1	82.9	46.7	116.4	1,427.3	..	1,429.2	..	669.2	169.9	994.6	..	25.0	
Papua New Guinea	79.7	76.9	28.6	17.1	223.6	..	..	..	50.0	..	..	..	..
Paraguay	86.7	65.1	15.8	29.3	42.0	33.2	199.3	..	..	..	58.0	..	..
Peru	83.1	84.2	11.8	28.4	8,134.4	1,645.0	4,868.5	431.2	2,671.8	..	86.8	..	..
Philippines	81.8	76.0	22.3	46.6	3,960.0	591.8	5,137.9	4,502.1	6,998.0	..	3,005.6	..	5,820.0	
Poland	84.9	82.1	3.0	23.6	12,171.9	273.0	4,893.0	..	624.8	3.1	2.3	..	..
Portugal	..	..	49.5	98.9	..	..	..	..	..	..	..	..	..
Puerto Rico	..	..	..	..	..	..	..	..	..	..	..	..	..
Romania	9.8	43.3	..	8.4	1,865.7	5.0	1,879.3	..	100.0	..	23.4	..	..
Russian Federation	11.5	2,671.6	223.1	4,695.0	1,100.0	2,281.3	..	400.0	..	108.0	



5.1 Private sector development

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	% of gross domestic fixed investment		% of GDP			\$ millions 1990-99	Telecommunications		Energy		Transport		Water and sanitation	
	1990	1998	1990	1999			1990-94	1995-99	1990-94	1995-99	1990-94	1995-99	1990-94	1995-99
Rwanda	..	..	6.9	9.2	..	..	15.0	..	..	..	..	..	..
Saudi Arabia	..	..	61.0	69.3	..	..	..	..	..	..	..	..	..
Senegal	..	..	26.5	16.4	410.7	..	267.3	..	159.0	..	..	..	..
Sierra Leone	..	..	2.4	2.1	1.6	..	..	..	..	..	..	..	..
Singapore	..	..	97.5	115.3	..	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	37.3	1,979.4	109.2	488.5	..	..	..	..	..	..
Slovenia	..	..	34.9	36.1	521.1	..	..	..	..	..	..	..	..
South Africa	65.6	67.3	81.0	136.3	2,964.2	542.2	4,501.6	..	3.0	..	1,386.4	..	170.0	
Spain	..	..	79.6	87.9	..	..	..	..	..	..	..	..	..
Sri Lanka	..	..	19.6	24.6	804.5	43.6	905.0	..	83.7	..	240.0	..	..
Sudan	..	..	4.8	1.8	..	..	6.0	..	..	..	..	..	..
Sweden	..	..	128.6	106.4	..	..	..	..	..	..	..	..	..
Switzerland	..	..	167.9	174.2	..	..	..	..	..	..	..	..	..
Syrian Arab Republic	..	..	7.5	8.2	..	..	..	..	..	..	..	..	..
Tajikistan	..	..	..	..	..	..	0.2	..	..	..	..	..	..
Tanzania	..	..	13.9	4.6	272.3	1.8	66.9	6.0	150.0	..	16.5	..	..
Thailand	84.8	66.2	83.4	130.1	2,985.8	3,664.0	4,034.9	674.8	4,944.9	695.9	1,700.0	..	239.3	
Togo	..	..	22.6	17.0	38.1	..	..	..	..	..	..	..	..
Trinidad and Tobago	..	..	44.7	45.1	276.2	47.0	146.7	..	207.0	..	..	..	..
Tunisia	50.5	51.2	55.1	65.1	523.0	..	..	627.0	265.0	..	..	..	..
Turkey	..	..	16.7	22.5	4,654.4	74.0	3,269.7	718.0	2,992.2	..	505.0	..	1,202.0
Turkmenistan	..	..	..	1.5	..	..	..	..	..	..	..	..	..
Uganda	..	..	4.0	5.9	174.4	16.0	118.0	..	..	..	..	..	..
Ukraine	..	..	2.6	8.8	31.5	90.0	723.0	..	..	..	..	..	..
United Arab Emirates	..	..	37.4	59.1	..	..	..	..	..	..	..	..	..
United Kingdom	87.3 ^b	92.9 ^b	116.0	123.4	..	..	..	..	..	..	..	..	..
United States	..	..	93.1	145.3	..	..	..	..	..	..	..	..	..
Uruguay	71.5	70.5	32.4	49.6	17.0	13.0	63.7	..	..	96.0	138.0	10.0	..
Uzbekistan	..	..	..	..	212.0	2.5	357.4	..	..	..	..	..	..
Venezuela, RB	34.8	53.8	25.4	13.0	6,072.0	4,185.7	4,850.9	..	63.0	100.0	268.0	..	..
Vietnam	..	..	2.5	21.7	7.6	..	..	..	286.0	10.0	70.0	..	38.2
West Bank and Gaza	..	..	..	..	..	..	155.0	..	..	..	..	..	..
Yemen, Rep.	..	..	6.3	5.9	..	25.0	..	..	..	..	190.0	..	..
Yugoslavia, FR (Serb./Mont.)	..	..	..	..	921.7	..	1,275.0	..	..	..	..	..	..
Zambia	..	..	8.9	7.4	826.0	..	39.2	..	274.0	..	..	..	..
Zimbabwe	..	..	23.0	27.2	217.8	..	46.0	..	1,180.0	18.0	70.0	..	..
World	78.1^w	76.0^w	98.6^w	109.0^w	..^s	..^s	..^s	..^s	..^s	..^s	..^s	..^s	..^s	
Low income	48.1	53.7	26.6	21.7	..	2,121.0	21,270.9	5,121.5	26,560.0	895.5	4,505.6	27.0	1,121.3	
Middle income	72.2	74.8	45.4	58.3	..	47,786.1	160,933.7	35,082.7	113,412.8	24,700.0	67,400.1	8,767.3	23,173.0	
Lower middle income	..	..	55.6	69.0	..	8,673.8	44,182.3	16,687.5	52,873.7	7,331.9	17,858.9	42.8	13,020.5
Upper middle income	73.8	77.9	41.1	48.6	..	39,112.3	116,751.4	18,395.2	60,539.1	17,368.1	49,541.2	8,724.5	10,152.5	
Low & middle income	64.5	66.9	41.7	52.7	..	49,907.1	182,204.6	40,204.2	139,972.8	25,595.5	71,905.7	8,794.3	24,294.3	
East Asia & Pacific	63.3	50.2	71.4	104.1	..	9,826.4	38,129.5	16,733.9	39,728.8	10,005.5	27,749.9	4,023.3	8,631.1	
Europe & Central Asia	..	..	..	18.9	..	2,849.1	35,506.3	2,174.0	13,945.0	1,089.1	2,097.6	16.0	1,539.1
Latin America & Carib.	74.3	79.8	28.5	29.4	..	35,694.0	87,286.0	13,395.8	63,524.0	14,325.2	38,032.1	4,731.8	8,964.6	
Middle East & N. Africa	..	..	41.9	47.2	..	118.0	3,809.5	3,131.5	5,784.9	..	647.2	..	4,105.9
South Asia	55.9	71.8	24.6	26.1	..	834.1	10,693.8	4,630.2	13,655.2	126.9	1,573.6	..	..
Sub-Saharan Africa	..	..	42.7	66.2	..	585.5	6,779.5	138.8	3,334.9	48.8	1,805.3	23.2	1,053.6
High income	81.9	79.2	110.9	129.3	..	..	..	..	..	..	..	..	..
Europe EMU	..	..	75.7	89.2	..	..	..	..	..	..	..	..	..

a. Data refer to total for the period shown. For differences in concepts and definitions between proceeds from privatization and investment in infrastructure projects with private participation see *About the data*. b. Data refer to investment by both private and public corporations. c. Data refer to investment by individuals, shareholding units, jointly owned units, collectively owned units, foreign-funded units, and units in Hong Kong, China; Macao, China; and Taiwan, China.



Private sector development | 5.1

About the data

This new table includes some private sector indicators from previous editions, such as private fixed investment, domestic credit to the private sector, and proceeds from privatization. In addition, it includes data from the World Bank's Private Participation in Infrastructure (PPI) Project Database.

Private fixed investment consists of outlays on additions to fixed assets—improvements to land, construction of infrastructure and buildings, and purchases of plant, machinery, and equipment—by the private sector. When direct estimates of private investment are unavailable, private fixed investment is estimated as the difference between total gross fixed investment and consolidated public investment. Total investment may be estimated directly from surveys of enterprises and administrative records or indirectly using the commodity flow method. Consolidated measures of public investment may omit important subnational units of government and in some cases may include financial as well as physical capital investment. As the difference between two estimated quantities, private fixed investment may be undervalued or overvalued and subject to large errors over time. When private domestic investment accounts for a large share of total investment, it may reflect a highly competitive and efficient private sector—or one that is subsidized and protected.

This concept of private investment is the one used by the International Finance Corporation (IFC) in its *Trends in Private Investment in Developing Countries 2000*, the source for most countries in the table. But for other countries, most notably members of the Organisation for Economic Co-operation and Development (OECD), the concepts and definitions of the 1993 System of National Accounts (SNA) are used. Since IFC data conform to the concepts and definitions of the 1968 SNA, the data are not strictly comparable. While the IFC data on private investment represent only the capital expenditure decisions of the private sector, in the 1993 SNA the term *fixed capital formation by households and corporations* includes capital expenditures by both private and public corporations. Countries reporting on this basis are footnoted in the table. (For further discussion on measuring gross capital formation see *About the data* for table 4.9.)

The data on domestic credit to the private sector are taken from the banking survey of the International Monetary Fund's (IMF) *International Financial Statistics* or, when data are unavailable, from its monetary survey. The monetary survey includes monetary authorities (the central bank) and deposit money banks. In addition to these, the banking survey includes other banking institutions, such as savings and loan institutions,

finance companies, and development banks. In some cases credit to the private sector may include credit to state-owned or partially state-owned enterprises.

Privatization—the transfer of productive assets from the public to the private sector—has been one of the defining economic changes of the past two decades. The data on proceeds from privatization measure the proceeds from the divestiture, or sale (direct or through share issues), of state-owned enterprises.

Direct sales are the most common method of privatization, accounting for more than half of privatization revenues in 1999. Direct sales enable governments to attract strategic investors who can transfer capital, technology, and managerial know-how to newly privatized enterprises. Share issues in domestic and international capital markets are the second most common method, accounting for most of the remaining sales. The estimates of privatization proceeds include data on the largest transactions, but in some cases total privatization revenues may be underreported because of lack of data.

Large sales proceeds do not necessarily imply major changes in the control of stock of state-owned enterprises. For example, selling equity may not change effective control. It may only generate revenue, with no gains in efficiency. A preliminary analysis suggests that the increase in proceeds from privatization in recent years is due to a larger number of countries privatizing a few firms rather than to a radical restructuring of ownership in many countries (Haggarty and Shirley 1997).

Private participation in infrastructure has made important contributions in improving the efficiency of infrastructure services and in extending their delivery to poor people. The privatization trend in infrastructure that began in the 1970s and 1980s took off in the 1990s. Developing countries have been at the head of this wave, pioneering better approaches to providing infrastructure services and reaping the benefits of increased competition and customer focus.

The data on investment in infrastructure projects with private participation refer to all investment (public and private) in projects in which a private company assumes operating risk during the operating period or assumes development and operating risk during the contract period. Foreign state-owned companies are considered private entities for the purposes of this measure. The data are from the World Bank's PPI Project Database, which tracks about 1,700 projects, newly owned or managed by private companies, that reached financial closure in low- and middle-income economies in 1990–99. For more information go to www.worldbank.org/html/fpd/privatesector/PPIDBweb/Intro.htm.

Definitions

- **Private fixed investment** covers gross outlays by the private sector (including private nonprofit agencies) on additions to its fixed domestic assets. Gross domestic fixed investment includes similar outlays by the public sector. No allowance is made for the depreciation of assets.
- **Domestic credit to private sector** refers to financial resources provided to the private sector—such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable—that establish a claim for repayment. For some countries these claims include credit to public enterprises.
- **Proceeds from privatization** cover all sales of public assets to private entities through public offers, direct sales, management and employee buyouts, concessions or licensing agreements, and joint ventures.
- **Investment in infrastructure projects with private participation** covers infrastructure projects in telecommunications, energy (electricity and natural gas transmission and distribution), transport, and water and sanitation that have reached financial closure and directly or indirectly serve the public. Movable assets, incinerators, stand-alone solid waste projects, and small projects such as windmills are excluded. The types of projects included are operations and management contracts, operations and management contracts with major capital expenditure, greenfield projects (in which a private entity or a public-private joint venture builds and operates a new facility), and divestiture.

Data sources

The data on private investment are from the International Finance Corporation's *Trends in Private Investment in Developing Countries 2000*, OECD data files (see OECD, *National Accounts, 1960–97*, volumes 1 and 2), and World Bank estimates. The data on domestic credit are from the IMF's *International Financial Statistics*. The data on privatization proceeds are from various sources, including reports from official privatization agencies and World Bank estimates, supplemented by such publications as the *Financial Times*, *Privatization International*, *Institutional Investor*, *International Financing Review*, *Latin Finance*, *Project Finance*, the *Middle East Economic Digest*, and *Euromoney*. The data on investment in infrastructure projects with private participation are from the World Bank's Private Participation in Infrastructure (PPI) Project Database (www.worldbank.org/html/fpd/privatesector/PPIDBweb/Intro.htm).



5.2 Investment climate

	Foreign direct investment		Entry and exit regulations ^a			Composite ICRG risk rating ^b	Institutional Investor credit rating ^b	Euro-money country credit-worthiness rating ^b	Moody's sovereign long-term debt rating ^b		Standard & Poor's sovereign long-term debt rating ^b	
	% of gross capital formation 1990	1999	Entry 1999	Repatriation of income 1999	Repatriation of capital 1999				December 2000	September 2000	September 2000	Foreign currency January 2001
Albania	0.0	6.6	..	..	..	62.3	15.8	30.4	..	..	..	..
Algeria	0.0	0.1	..	..	..	59.0	33.1	37.7	..	..	..	..
Angola	-27.9	23.2	..	..	..	49.3	11.9	21.0	..	..	..	..
Argentina	9.3	44.2	F	F	F	68.8	45.8	55.0	B1	B1	BB-	BB
Armenia	..	34.0	..	..	..	56.8	..	30.5	..	..	..	..
Australia	10.9	6.7	..	..	..	80.5	82.1	88.0	Aa2	Aaa	AA+	AAA
Austria	1.7	5.6	..	..	..	81.5	87.1	92.3	Aaa	Aaa	AAA	AAA
Azerbaijan	..	32.2	..	..	..	59.5	..	36.9	..	..	..	..
Bangladesh	0.1	1.8	F	F	F	62.5	28.4	35.0	..	..	..	..
Belarus	..	3.5	..	..	..	59.8	14.4	30.7	..	..	..	..
Belgium	..	..	..	..	..	79.3	83.1	89.6	Aa1	Aa1	AA+	AA+
Benin	0.4	7.9	..	..	..	..	17.0	28.5	..	..	..	..
Bolivia	4.4	64.7	..	..	..	69.5	28.6	42.5	B1	B1	B+	BB
Bosnia and Herzegovina	..	0.0	..	..	..	..	..	15.8	..	..	..	..
Botswana	8.0	3.1	F	F	F	79.3	56.1	51.8	..	..	..	..
Brazil	1.1	21.3	F	F	F	64.5	45.0	51.3	B1	B1	BB-	BB+
Bulgaria	0.1	34.1	F	F	F	67.3	37.1	42.5	B2	B1	B+	BB-
Burkina Faso	0.0	0.1	..	..	..	61.8	19.8	32.0	..	..	..	..
Burundi	0.6	0.3	..	..	..	..	15.6	20.8	..	..	..	..
Cambodia	0.0	28.1	..	..	..	..	..	32.9	..	..	..	..
Cameroon	-5.7	3.0	..	..	..	59.0	16.3	29.7	..	..	..	..
Canada	6.4	19.6	..	..	..	84.8	89.6	89.1	Aa1	Aa1	AA+	AAA
Central African Republic	0.5	3.3	..	..	..	..	..	25.1	..	..	..	..
Chad	0.0	9.5	..	..	..	..	13.9	27.8	..	..	..	..
Chile	7.8	62.8	R	F	D	74.8	67.2	65.8	Baa1	A1	A-	AA
China	2.8	10.5	S	F	F	73.8	60.6	59.8	A3	..	BBB	..
Hong Kong, China	..	..	..	..	..	79.3	68.3	77.4	A3	Aa3	A	A+
Colombia	6.7	10.1	A	F	F	60.3	44.0	48.9	Ba2	Baa2	BB	BBB
Congo, Dem. Rep.	-1.4	0.2	..	..	..	45.0	8.8	22.9	..	..	..	..
Congo, Rep.	0.0	0.0	..	..	..	55.3	11.1	22.0	..	..	..	..
Costa Rica	8.3	25.5	..	..	..	75.8	47.5	53.4	Ba1	Ba1	BB	BB+
Côte d'Ivoire	6.6	19.2	F	F	F	54.0	24.1	32.5	..	..	..	..
Croatia	..	29.2	F	F	F	70.3	45.8	49.7	Baa3	Baa1	BBB-	BBB+
Cuba	..	..	..	..	..	62.3	14.1	10.7	Caa1	..	..	..
Czech Republic	2.4	33.7	F	F	F	73.3	60.9	63.1	Ba1	A1	A-	AA-
Denmark	4.2	24.8	..	..	..	86.3	88.9	92.8	Aaa	Aaa	AA+	AAA
Dominican Republic	7.5	30.6	..	..	..	73.8	37.0	43.8	B1	B1	B+	SD
Ecuador	6.7	28.1	F	F	F	52.8	18.3	29.3	Caa2	Caa1	B-	B-
Egypt, Arab Rep.	5.9	5.2	F	F	F	69.3	51.0	56.4	Ba1	Baa1	BBB-	A-
El Salvador	0.3	11.4	..	..	..	75.0	46.3	51.1	Baa3	Baa2	BB+	BB+
Eritrea	..	0.0	..	..	..	..	..	22.2	..	..	..	..
Estonia	7.2	23.8	F	F	F	73.8	55.1	55.7	Baa1	A1	BBB+	A-
Ethiopia	1.5	0.2	..	..	..	61.3	15.9	31.0	..	..	..	..
Finland	2.0	18.7	..	..	..	87.0	89.1	91.4	Aaa	Aaa	AA+	AA+
France	4.6	14.3	..	..	..	78.5	93.6	92.3	Aaa	Aaa	AAA	AAA
Gabon	5.7	-2.8	..	..	..	64.5	23.8	33.0	..	..	..	..
Gambia, The	0.0	20.0	..	..	..	66.3	..	37.6	..	..	..	..
Georgia	0.0	17.8	..	..	..	..	21.0	30.4	..	..	..	..
Germany	1.0	11.2	..	..	..	84.3	94.6	92.8	Aaa	Aaa	AAA	AAA
Ghana	1.8	0.9	F	F	F	53.8	29.5	37.6	..	..	..	..
Greece	5.2	3.9	F	F	F	73.3	70.0	78.7	A2	A2	A-	A-
Guatemala	4.6	4.9	..	..	..	69.8	37.1	47.3	Ba2	Ba1	..	..
Guinea	3.6	10.0	..	..	..	57.0	15.1	26.8	..	..	..	..
Guinea-Bissau	2.7	1.1	..	..	..	45.0	..	20.0	..	..	..	..
Haiti	2.2	1.9	..	..	..	55.5	12.5	24.3	..	..	..	..
Honduras	6.3	13.0	..	..	..	63.0	26.6	38.8	B2	B2	..	..



Investment climate 5.2

	Foreign direct investment		Entry and exit regulations ^a			Composite ICRG risk rating ^b	Institutional Investor credit rating ^b	Euro-money country credit-worthiness rating ^b	Moody's sovereign long-term debt rating ^b		Standard & Poor's sovereign long-term debt rating ^b	
	% of gross capital formation		Entry	Repatriation of income	Repatriation of capital				Foreign currency	Domestic currency	Foreign currency	Domestic currency
	1990	1999	1999	1999	1999	December 2000	September 2000	September 2000	January 2001	January 2001	January 2001	January 2001
Hungary	0.0	14.0	F	F	F	72.0	64.9	65.2	A3	A1	A-	A+
India	0.2	2.1	A	F	F	61.8	51.5	53.8	Ba2	Ba2	BB	BBB
Indonesia	3.1	-9.2	R	RS	RS	54.8	27.4	38.5	B3	B3	B-	B
Iran, Islamic Rep.	-1.1	0.3	..	..	..	68.5	27.0	40.6	B2	Ba2	..	..
Iraq	..	..	..	..	..	47.0	12.6	9.0	..	..	..	..
Ireland	6.3	87.6	..	..	..	84.3	88.5	89.7	Aaa	Aaa	AA+	AA+
Israel	1.1	11.1	F	F	F	68.0	64.4	72.7	A2	A2	A-	AA-
Italy	2.6	2.8	..	..	..	78.8	84.2	87.1	Aa3	Aa3	AA	AA
Jamaica	11.7	28.9	R	F	F	67.8	33.8	42.7	Ba3	Baa3	B	B+
Japan	0.2	1.1	..	..	..	83.8	87.7	90.7	Aa1	Aa2	AAA	AAA
Jordan	3.0	9.4	F	F	F	70.8	41.9	46.3	Ba3	Ba3	BB-	BBB-
Kazakhstan	1.2	56.8	..	..	..	66.0	34.4	42.5	B1	B1	BB-	BB
Kenya	3.4	1.0	R	F	F	60.3	25.0	37.6	..	..	..	..
Korea, Dem. Rep.	..	..	..	..	..	48.5	6.2	4.7	..	..	..	..
Korea, Rep.	0.8	8.5	R	F	F	78.0	63.3	66.3	Baa2	Baa1	BBB	A
Kuwait	..	2.0	..	..	..	80.3	64.4	73.3	Baa1	..	A	A+
Kyrgyz Republic	..	15.7	..	..	..	..	23.8	35.8	..	..	..	..
Lao PDR	..	14.7	..	..	..	..	..	24.0	..	..	..	..
Latvia	1.1	21.1	F	F	F	71.0	47.9	53.1	Baa2	A2	BBB	A-
Lebanon	1.2	4.2	F	F	F	61.0	36.8	46.8	B1	B1	B+	BB-
Lesotho	5.1	64.1	..	..	..	..	25.0	36.4	..	..	..	..
Libya	..	..	..	..	..	66.8	31.5	19.3	..	..	..	..
Lithuania	0.0	20.0	F	F	F	71.8	43.7	50.8	Ba1	Baa1	BBB-	BBB+
Macedonia, FYR	..	4.1	..	..	..	..	..	37.4	..	..	..	..
Madagascar	4.2	2.9	..	..	..	63.0	..	29.5	..	..	..	..
Malawi	0.0	22.4	..	..	..	56.8	19.6	31.7	..	..	..	..
Malaysia	16.4	8.8	R	F	F	75.8	59.5	61.1	Baa2	A3	BBB	A
Mali	-1.3	3.4	..	..	..	61.8	14.0	28.1	..	..	..	..
Mauritania	3.4	3.5	..	..	..	..	..	27.2	..	..	..	..
Mauritius	5.0	4.2	R	F	F	..	54.6	59.1	Baa2	A2	..	..
Mexico	4.3	10.5	F	F	F	73.0	56.7	59.7	Baa3	Baa1	BB+	BBB+
Moldova	0.0	13.1	..	..	..	49.5	15.8	29.2	B3	Caa1	..	..
Mongolia	..	12.7	..	..	..	67.0	..	30.6	..	..	B	B
Morocco	2.5	0.0	F	F	F	67.8	47.3	55.1	Ba1	..	BB	BBB
Mozambique	2.3	29.6	..	..	..	55.3	19.8	28.6	..	..	..	..
Myanmar	..	..	..	..	..	58.3	17.4	26.4	..	..	..	..
Namibia	..	..	F	F	F	75.8	37.4	23.6	..	..	..	..
Nepal	0.9	0.4	..	..	..	..	26.9	32.7	..	..	..	..
Netherlands	14.8	39.4	..	..	..	88.0	94.5	92.9	Aaa	Aaa	AAA	AAA
New Zealand	21.3	7.4	..	..	..	77.5	78.7	85.3	Aa2	Aaa	AA+	AAA
Nicaragua	0.0	30.7	..	..	..	52.3	21.8	26.3	B2	B2	..	..
Niger	-0.5	7.3	..	..	..	61.8	10.9	25.4	..	..	..	..
Nigeria	14.0	11.8	R	F	F	59.3	18.1	32.1	..	..	..	..
Norway	3.7	8.6	..	..	..	90.5	90.1	94.2	Aaa	Aaa	AAA	AAA
Oman	10.2	..	F	F	F	78.3	54.9	66.2	Baa2	Baa2	BBB-	BBB
Pakistan	3.2	4.3	F	F	F	53.8	19.2	32.0	Caa1	Caa1	B-	B+
Panama	14.8	0.7	..	..	..	72.8	46.7	52.2	Ba1	..	BB+	BB+
Papua New Guinea	19.7	46.3	..	..	..	66.5	30.2	37.2	B1	B1	B+	BB
Paraguay	6.3	5.3	..	..	..	65.8	32.5	41.3	B2	B1	B	BB-
Peru	0.9	17.3	F	F	F	69.5	42.3	39.1	Ba3	Baa3	BB-	BB+
Philippines	5.0	4.0	S	F	F	65.0	49.4	52.8	Ba1	Baa3	BB+	BBB+
Poland	0.6	17.8	F	F	F	73.8	62.2	63.6	Baa1	A2	BBB+	A+
Portugal	13.6	10.8	..	..	..	78.8	83.6	83.3	Aa2	Aa2	AA	AA
Puerto Rico	..	..	..	..	..	..	..	..	..	..	..	..
Romania	0.0	15.4	F	F	F	58.5	30.3	36.6	B3	Caa1	B-	B
Russian Federation	0.0	5.3	F	F	F	66.3	26.7	37.9	B3	B3	B-	B-



5.2 Investment climate

	Foreign direct investment		Entry and exit regulations ^a			Composite ICRG risk rating ^b	Institutional Investor credit rating ^b	Euro-money country credit-worthiness rating ^b	Moody's sovereign long-term debt rating ^b		Standard & Poor's sovereign long-term debt rating ^b	
	% of gross capital formation 1990	1999	Entry 1999	Repatriation of income 1999	Repatriation of capital 1999				December 2000	September 2000	September 2000	Foreign currency January 2001
Rwanda	2.1	0.6	..	..	..	..	..	21.1	..	..	..	..
Saudi Arabia ^c	..	..	C	RS	RS	76.0	57.0	68.3	Baa3	Ba1	..	..
Senegal	7.2	4.0	..	..	..	62.5	23.5	34.3	..	..	B+	B+
Sierra Leone	37.9	51.0	..	..	..	37.8	6.4	23.1	..	..	..	..
Singapore	41.5	25.1	..	..	..	90.5	87.8	90.0	Aa1	Aaa	AAA	AAA
Slovak Republic	0.0	5.6	F	F	F	71.5	49.1	53.0	Ba1	Baa2	BB+	BBB+
Slovenia	5.0	3.2	C	RS	RS	75.8	67.0	68.9	A2	Aa3	A	AA
South Africa	..	6.7	F	F	F	68.0	55.1	57.7	Baa3	Baa1	BBB-	A-
Spain	10.1	6.5	..	..	..	79.0	86.1	87.3	Aa2	Aa2	AA+	AA+
Sri Lanka	2.4	4.1	R	RS	RS	59.0	33.3	39.8	..	..	..	..
Sudan	..	..	..	..	..	49.5	8.7	25.5	..	..	..	..
Sweden	3.5	147.2	..	..	..	84.0	87.2	91.1	Aa1	Aaa	AA+	AAA
Switzerland	9.3	14.2	..	..	..	89.5	95.6	96.9	Aaa	Aaa	AAA	AAA
Syrian Arab Republic	3.7	1.6	..	..	..	69.3	23.1	39.0	..	..	..	..
Tajikistan	..	14.9	..	..	..	..	14.2	17.8	..	..	..	..
Tanzania	0.0	12.1	..	..	..	59.5	20.3	28.9	..	..	..	..
Thailand	6.9	23.8	R	F	F	75.3	53.2	59.5	Baa3	Baa1	BBB-	A-
Togo	0.0	15.9	..	..	..	58.5	17.6	28.6	..	..	..	..
Trinidad and Tobago	17.1	44.0	R	F	F	72.8	52.0	54.2	Baa3	Baa1	BBB-	BBB+
Tunisia	1.9	6.3	F	F	F	72.5	54.5	57.5	..	Baa2	BBB	A
Turkey	1.9	1.8	F	F	F	55.5	46.8	52.7	B1	..	B+	B+
Turkmenistan	..	5.4	..	..	..	..	21.9	31.8	B2	..	..	..
Uganda	0.0	21.1	..	..	..	64.3	22.7	33.7	..	..	..	..
Ukraine	0.0	6.5	F	F	F	61.8	17.7	33.1	Caa1	Caa3	..	..
United Arab Emirates	..	..	..	..	..	80.0	66.3	75.6	..	..	..	..
United Kingdom	16.3	33.4	..	..	..	83.5	89.1	91.5	Aaa	Aaa	AAA	AAA
United States	4.8	10.6	..	..	..	82.0	91.6	94.3	Aaa	Aaa	AAA	AAA
Uruguay	0.0	7.2	..	..	..	73.3	53.5	56.8	Baa3	Baa3	BBB-	BBB+
Uzbekistan	1.5	7.1	..	..	..	..	20.2	34.2	..	..	..	..
Venezuela, RB	9.1	20.0	F	F	F	70.0	37.9	43.8	B2	B3	B	..
Vietnam	1.9	22.1	..	..	..	70.0	28.0	38.4	B1	..	..	..
West Bank and Gaza	..	..	..	..	..	..	..	..	..	..	..	..
Yemen, Rep.	-19.2	-11.8	..	..	..	63.5	..	34.0	..	..	..	..
Yugoslavia, FR (Serb./Mont.)	..	..	..	..	..	45.5	12.7	14.8	..	..	..	..
Zambia	35.7	29.6	..	..	..	57.3	15.5	27.0	..	..	..	..
Zimbabwe	-0.8	9.2	R	F	F	40.3	17.1	33.4	..	..	..	..
World	4.2w	10.2w				67.8m	37.0m	38.8m				
Low income	1.1	3.0				57.3	17.6	29.4				
Middle income	2.3	14.0				69.5	44.0	48.9				
Lower middle income	1.8	9.7				67.6	34.4	41.3				
Upper middle income	3.0	17.8				72.8	54.8	56.2				
Low & middle income	2.1	12.4				63.3	28.0	35.0				
East Asia & Pacific	3.5	9.6				67.0	39.8	38.4				
Europe & Central Asia	0.3	11.6				66.2	30.3	36.9				
Latin America & Carib.	3.8	22.3				69.5	40.1	45.6				
Middle East & N. Africa	2.3	0.8				68.5	39.3	46.3				
South Asia	0.5	2.4				60.4	27.6	33.8				
Sub-Saharan Africa	2.0	9.3				58.8	17.9	28.6				
High income	4.8	9.6				81.8	87.2	89.7				
Europe EMU	5.8	12.9				80.4	87.8	90.5				

a. Entry and exit regulations are classified as free (F), relatively free (R), delayed (D), special classes of shares (S), authorized investors only (A), restricted (RS), and closed (C). For explanations of these terms see *About the data*. b. This copyrighted material is reprinted with permission from the following data providers: PRS Group, 6320 Fly Road, Suite 102, PO Box 248, East Syracuse, NY 13057; Institutional Investor Inc., 488 Madison Avenue, New York, NY 10022; Euromoney Publications PLC, Nestor House, Playhouse Yard, London EC4V 5EX, UK; Moody's Investor Service, 99 Church Street, New York, NY 10007; and Standard & Poor's Rating Services, The McGraw-Hill Companies, Inc., 1221 Avenue of the Americas, New York, NY 10020. Prior written consent from the original data providers cited must be obtained for third-party use of these data. c. Foreigners are barred from investing directly in the Saudi stock market, but they may invest indirectly through mutual funds.



Investment climate 5.2

About the data

As investment portfolios become increasingly global, investors as well as governments seeking to attract investment must have a good understanding of trends in foreign direct investment and country risk. This table presents information on foreign direct investment, country risk and creditworthiness ratings from several major international rating services, and information on the regulation of entry to and exit from emerging stock markets reported by Standard & Poor's.

The statistics on foreign direct investment are based on balance of payments data reported by the International Monetary Fund (IMF), supplemented by data on net foreign direct investment reported by the Organisation for Economic Co-operation and Development and official national sources. (For a detailed discussion of data on foreign direct investment see *About the data* for table 6.7.)

Entry and exit restrictions on investments are among the mechanisms by which countries attempt to reduce the risk to their economies associated with foreign investment. Yet such restrictions may increase the risk or uncertainty perceived by investors. Many countries close industries considered strategic to foreign or non-resident investors. And national law or corporate policy may limit foreign investment in a company or in certain classes of stocks.

The entry and exit regulations summarized in the table refer to "new money" investment by foreign institutions; other regulations may apply to capital invested through debt conversion schemes or to capital from other sources. The regulations reflected here are formal ones. But even formal regulations may have very different effects in different countries because of differences in the bureaucratic culture, the speed with which applications are processed, and the extent of red tape. The regulations on entry are evaluated using the terms *free* (no significant restrictions), *relatively free* (some registration procedures required to ensure repatriation rights), *special classes* (foreigners restricted to certain classes of stocks designated for foreign investors), *authorized investors only* (only approved foreign investors may buy stocks), and *closed* (closed or access severely restricted, as for nonresident nationals only). Regulations on repatriation of income and capital are evaluated as *free* (repatriation done routinely) or *restricted* (repatriation requires registration with or permission of a government agency that may restrict the timing of exchange release).

Most risk ratings are numerical or alphabetical indexes, with a higher number or a letter closer to the beginning of the alphabet meaning lower risk (a good prospect). (For more on the rating processes of the rat-

ing agencies see the data sources.) Risk ratings may be highly subjective, reflecting external perceptions that do not always capture the actual situation in a country. But these subjective perceptions are the reality that policymakers face. Countries not rated by credit risk rating agencies typically do not attract registered flows of private capital. The risk ratings presented here are included for their analytical usefulness and are not endorsed by the World Bank.

The PRS Group's *International Country Risk Guide* (ICRG) collects information on 22 components of risk, groups it into three major categories (political, financial, and economic), and converts it into a single numerical risk assessment ranging from 0 to 100. Ratings below 50 indicate very high risk, and those above 80 very low risk. Ratings are updated monthly.

Institutional Investor country credit ratings are based on information provided by leading international banks. Responses are weighted using a formula that gives more importance to responses from banks with greater worldwide exposure and more sophisticated country analysis systems. Countries are rated on a scale of 0 to 100 (highest risk to lowest), and ratings are updated every six months.

Euromoney country creditworthiness ratings are based on nine weighted categories (covering debt, economic performance, political risk, and access to financial and capital markets) that assess country risk. The ratings, also on a scale of 0 to 100 (highest risk to lowest), are based on polls of economists and political analysts supplemented by quantitative data such as debt ratios and access to capital markets.

Moody's sovereign long-term debt ratings are opinions of the ability of entities to honor senior unsecured financial obligations and contracts denominated in foreign currency (foreign currency issuer ratings) or in their domestic currency (domestic currency issuer ratings).

Standard & Poor's ratings of sovereign long-term foreign and domestic currency debt are based on current information furnished by obligors or obtained by Standard & Poor's from other sources it considers reliable. A Standard & Poor's issuer credit rating (one form of which is a sovereign credit rating) is a current opinion of an obligor's capacity and willingness to pay its financial obligations as they come due (its creditworthiness). This opinion does not apply to any specific financial obligation, as it does not take into account the nature and provisions of obligations, their standing in bankruptcy or liquidation, statutory preferences, or the legality and enforceability of obligations.

Definitions

- **Foreign direct investment** is net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. Gross capital formation (gross domestic investment in previous editions) is the sum of gross fixed capital formation, changes in inventories, and acquisitions less disposals of valuables.
- **Regulations on entry to emerging stock markets** are assessed on a scale from free to closed (see *About the data*).
- **Regulations on repatriation of income** (dividends, interest, and realized capital gains) and **repatriation of capital from emerging stock markets** are evaluated as free or restricted (see *About the data*).
- **Composite International Country Risk Guide (ICRG) risk rating** is an overall index, ranging from 0 to 100, based on 22 components of risk.
- **Institutional Investor credit rating** ranks, from 0 to 100, the chances of a country's default.
- **Euromoney country creditworthiness rating** ranks, from 0 to 100, the risk of investing in an economy.
- **Moody's sovereign foreign and domestic currency long-term debt ratings** assess the risk of lending to governments. An entity's ability to meet its senior financial obligations is rated from Aaa (offering exceptional financial security) to C (usually in default, with potential recovery values low). Modifiers 1-3 are applied to ratings from Aa to B, with 1 indicating a high ranking in the rating category.
- **Standard & Poor's sovereign foreign and domestic currency long-term debt ratings** range from AAA (extremely strong capacity to meet financial commitments) through CC (currently highly vulnerable). Ratings from AA to CCC may be modified by a plus or minus sign to show relative standing in the category. An obligor rated SD (selective default) has failed to pay one or more financial obligations when due.

Data sources

The data on foreign direct investment are based on estimates compiled by the IMF in its *Balance of Payments Statistics Yearbook*, supplemented by World Bank staff estimates. The data on entry and exit regulations are from Standard & Poor's *Emerging Stock Markets Factbook 2000*. The country risk and creditworthiness ratings are from the PRS Group's monthly *International Country Risk Guide*, the monthly *Institutional Investor*, the monthly *Euromoney*, Moody's Investors Service's *Sovereign, Subnational and Sovereign-Guaranteed Issuers*, and Standard & Poor's Sovereign List in *Credit Week*.



5.3 Stock markets

	Market capitalization				Value traded		Turnover ratio		Listed domestic companies		S&P/IFC investable index	
	\$ millions		% of GDP		% of GDP		value of shares traded as % of capitalization		1990	2000	% change in price index	
	1990	2000	1990	1999	1990	1999	1990	2000			1999	2000
Albania	..	..	..	..	..	..	..	..	..	..	..	..
Algeria	..	..	..	..	..	..	..	..	..	..	..	..
Angola	..	..	..	..	..	..	..	..	..	..	..	..
Argentina	3,268	166,068	2.3	29.6	0.6	2.7	33.6	4.8	179	127	33.4	-25.1
Armenia	..	25	..	1.4	..	0.1	..	4.6	..	95	..	..
Australia	108,879	427,683	35.1	105.9	12.9	26.2	31.6	28.0	1,089	1,217	..	..
Austria	11,476	33,025	7.1	15.9	11.5	6.1	110.3	37.9	97	97	..	..
Azerbaijan	..	4	..	0.1	..	..	..	..	..	2	..	..
Bangladesh	321	1,186	1.1	1.9	0.0	1.7	1.5	74.4	134	221	-17.5 ^a	28.5 ^a
Belarus	..	..	..	..	..	..	..	..	..	..	..	..
Belgium	65,449	184,942	33.1	74.5	3.2	23.8	..	27.5	182	172	..	..
Benin	..	..	..	..	..	..	..	..	..	..	..	..
Bolivia	..	116	..	1.4	..	0.0	..	1.0	..	18	..	..
Bosnia and Herzegovina	..	..	..	..	..	..	..	..	..	..	..	..
Botswana	261	978	6.7	17.5	0.2	0.6	6.1	4.8	9	16	45.6 ^a	-6.9 ^a
Brazil	16,354	226,152	3.5	30.3	1.2	11.6	23.6	43.5	581	459	66.9	-10.3
Bulgaria	..	617	..	5.7	..	0.4	..	9.2	..	503	-23.7 ^a	-30.0 ^a
Burkina Faso	..	..	..	..	..	..	..	..	..	..	..	..
Burundi	..	..	..	..	..	..	..	..	..	..	..	..
Cambodia	..	..	..	..	..	..	..	..	..	..	..	..
Cameroon	..	..	..	..	..	..	..	..	..	..	..	..
Canada	241,920	800,914	42.2	126.1	12.4	57.4	26.7	54.2	1,144	3,767	..	..
Central African Republic	..	..	..	..	..	..	..	..	..	..	..	..
Chad	..	..	..	..	..	..	..	..	..	..	..	..
Chile	13,645	60,401	45.0	101.1	2.6	10.2	6.3	9.4	215	258	35.8	-15.2
China	2,028	580,991	0.5	33.4	0.2	38.1	158.9	158.3	14	1,086	102.2	-9.8
Hong Kong, China	83,397	609,090	111.5	383.2	46.3	154.1	43.1	51.4	284	695	..	..
Colombia	1,416	9,560	3.5	13.4	0.2	0.8	5.6	3.8	80	126	-19.7	-43.8
Congo, Dem. Rep.	..	..	..	..	..	..	..	..	..	..	..	..
Congo, Rep.	..	..	..	..	..	..	..	..	..	..	..	..
Costa Rica	475	2,303	5.6	15.2	0.1	1.4	5.8	12.0	82	22	..	..
Côte d'Ivoire	549	1,185	5.1	13.5	0.2	0.8	3.4	2.6	23	41	-12.1 ^a	-25.6 ^a
Croatia	..	2,742	..	12.7	..	0.4	..	7.4	2	64	-18.1 ^a	10.9 ^a
Cuba	..	..	..	..	..	..	..	..	..	..	..	..
Czech Republic	..	11,002	..	22.2	..	7.8	..	60.3	..	131	4.2	-0.6
Denmark	39,063	105,293	29.3	60.4	8.3	35.2	28.0	60.0	258	233	..	..
Dominican Republic	..	141	..	0.8	..	..	..	..	..	6	..	..
Ecuador	69	704	0.5	2.2	..	0.1	0.0	5.5	65	30	-77.1 ^a	33.0 ^a
Egypt, Arab Rep.	1,765	28,741	4.1	36.8	0.3	10.1	..	34.7	573	1,076	24.2	-45.6
El Salvador	..	2,141	..	17.2	..	0.4	..	2.7	..	40	..	..
Eritrea	..	..	..	..	..	..	..	..	..	..	..	..
Estonia	..	1,846	..	34.2	..	5.4	..	18.9	..	23	42.3 ^a	4.5 ^a
Ethiopia	..	..	..	..	..	..	..	..	..	..	..	..
Finland	22,721	349,409	16.6	269.5	2.9	86.1	..	44.3	73	147	..	..
France	314,384	1,475,457	25.9	103.0	9.6	53.8	..	62.4	578	968	..	..
Gabon	..	..	..	..	..	..	..	..	..	..	..	..
Gambia, The	..	..	..	..	..	..	..	..	..	..	..	..
Georgia	..	..	..	..	..	..	..	..	..	..	..	..
Germany	355,073	1,432,190	22.2	67.8	21.4	64.3	139.3	107.5	413	933	..	..
Ghana	76	502	1.2	11.8	..	0.3	0.0	1.5	13	22	-33.5 ^a	-50.9 ^a
Greece	15,228	110,839	17.9	163.3	4.6	150.9	36.3	63.7	145	329	64.4	-44.6
Guatemala	..	215	..	1.2	..	0.0	..	2.9	..	5	..	..
Guinea	..	..	..	..	..	..	..	..	..	..	..	..
Guinea-Bissau	..	..	..	..	..	..	..	..	..	..	..	..
Haiti	..	..	..	..	..	..	..	..	..	..	..	..
Honduras	40	458	1.3	8.7	0.0	..	0.0	..	26	71	..	..



Stock markets 5.3

	Market capitalization				Value traded		Turnover ratio		Listed domestic companies		S&P/IFC investable index	
	\$ millions		% of GDP		% of GDP		value of shares traded as % of capitalization		1990	2000	% change in price index	
	1990	2000	1990	1999	1990	1999	1990	2000			1999	2000
Hungary	505	12,021	7.5	33.7	0.3	29.7	6.3	90.7	21	60	15.2	-28.2
India	38,567	148,064	12.2	41.3	6.9	27.3	65.9	133.6	2,435	5,937	81.0	-31.1
Indonesia	8,081	26,834	7.1	45.0	3.5	14.0	75.8	32.9	125	290	95.1	-61.0
Iran, Islamic Rep.	34,282	21,830	..	19.7	..	2.0	30.4	12.4	97	295	..	..
Iraq	..	..	..	..	..	..	..	..	..	..	..	..
Ireland	..	42,458	..	45.5	..	54.1	..	90.9	..	84	..	..
Israel	3,324	64,081	6.3	63.3	10.5	15.3	95.8	36.3	216	654	54.9	14.7
Italy	148,766	728,273	13.5	62.2	3.9	45.8	26.8	82.7	220	241	..	..
Jamaica	911	3,582	21.5	36.7	0.8	0.6	3.4	2.5	44	46	1.9 ^a	45.6 ^a
Japan	2,917,679	4,546,937	98.2	104.6	54.0	42.5	43.8	52.5	2,071	2,470	36.8 ^b	-27.2 ^b
Jordan	2,001	4,943	49.8	72.2	10.1	6.8	20.0	7.7	105	163	-3.6	-24.5
Kazakhstan	..	2,260	..	14.3	..	0.2	..	1.2	..	17	..	..
Kenya	453	1,283	5.3	13.2	0.1	0.7	2.2	3.6	54	57	-27.5 ^a	-8.1 ^a
Korea, Dem. Rep.	..	..	..	..	..	..	..	..	..	..	..	..
Korea, Rep.	110,594	148,649	43.8	75.8	30.1	180.3	61.3	233.2	669	704	106.5	-57.1
Kuwait	..	18,814	..	63.6	..	20.5	..	32.8	..	76	..	..
Kyrgyz Republic	..	..	..	..	..	0.0	..	..	..	..	..	..
Lao PDR	..	..	..	..	..	..	..	..	..	..	..	..
Latvia	..	563	..	6.2	..	0.7	..	48.6	..	64	-9.5 ^a	41.2 ^a
Lebanon	..	1,583	..	13.8	..	1.9	..	6.7	..	12	-18.0	-18.6 ^a
Lesotho	..	..	..	..	..	..	..	..	..	..	..	..
Libya	..	..	..	..	..	..	..	..	..	..	..	..
Lithuania	..	1,588	..	10.7	..	2.7	..	14.8	..	54	9.5 ^a	4.9 ^a
Macedonia, FYR	..	8	..	0.2	..	0.8	..	348.3	..	2	..	..
Madagascar	..	..	..	..	..	..	..	..	..	..	..	..
Malawi	..	..	..	..	..	..	..	..	..	..	..	..
Malaysia	48,611	116,935	110.4	184.0	24.7	61.4	24.6	44.6	282	795	44.5	-23.3
Mali	..	..	..	..	..	..	..	..	..	..	..	..
Mauritania	..	..	..	..	..	..	..	..	..	..	..	..
Mauritius	268	1,331	10.1	38.7	0.2	1.8	1.9	5.0	13	40	-6.7 ^a	-19.4 ^a
Mexico	32,725	125,204	12.5	31.8	4.6	7.5	44.0	32.3	199	179	78.5	-21.5
Moldova	..	38	..	3.3	..	0.3	..	97.9	..	58	..	..
Mongolia	..	32	..	3.5	..	3.8	..	7.3	..	418	..	..
Morocco	966	10,899	3.7	39.1	0.2	7.2	..	9.2	71	53	-7.8	-19.1
Mozambique	..	..	..	..	..	..	..	..	..	..	..	..
Myanmar	..	..	..	..	..	..	..	..	..	..	..	..
Namibia	21	311	0.7	22.5	..	0.7	0.0	4.5	3	13	5.3	-37.8 ^a
Nepal	..	418	..	8.4	..	0.5	..	6.9	..	108	..	..
Netherlands	119,825	695,209	40.5	176.6	13.6	239.2	29.0	145.1	260	344	..	..
New Zealand	8,835	28,352	20.5	51.9	4.5	21.9	17.3	45.0	171	114	..	..
Nicaragua	..	..	..	..	..	..	..	..	..	..	..	..
Niger	..	..	..	..	..	..	..	..	..	..	..	..
Nigeria	1,372	4,237	4.8	8.4	0.0	0.4	0.9	7.3	131	195	-10.3 ^a	-10.3 ^a
Norway	26,130	63,696	22.6	41.6	12.1	35.4	54.4	90.2	112	195	..	..
Oman	1,061	3,463	9.4	29.4	0.9	13.0	12.3	14.2	55	131	7.2	7.2 ^a
Pakistan	2,850	6,581	7.1	12.0	0.6	36.2	8.7	475.5	487	762	37.5	-16.7
Panama	226	3,584	3.4	37.5	0.0	0.5	0.9	1.5	13	31	..	..
Papua New Guinea	..	..	..	..	..	..	..	..	..	..	..	..
Paraguay	..	423	..	5.5	..	0.2	..	3.5	..	55	..	..
Peru	812	10,562	3.1	25.8	0.4	4.4	19.3	12.6	294	230	19.7	-28.1
Philippines	5,927	51,554	13.4	62.8	2.7	25.7	13.6	15.8	153	230	0.9	-43.6
Poland	144	31,279	0.2	19.1	0.0	7.2	89.7	49.9	9	225	22.3	-3.5
Portugal	9,201	66,488	13.0	58.5	2.4	35.9	16.9	63.0	181	125	38.4	38.4
Puerto Rico	..	..	..	..	..	..	..	..	..	..	..	..
Romania	..	1,069	..	2.6	..	0.9	..	23.1	..	5,555	-36.5 ^a	-25.3 ^a
Russian Federation	244	38,922	0.0	18.0	..	0.7	..	36.9	13	249	284.0	-32.2



5.3 Stock markets

	Market capitalization				Value traded		Turnover ratio		Listed domestic companies		S&P/IFC investable index	
	\$ millions		% of GDP		% of GDP		value of shares traded as % of capitalization		1990	2000	% change in price index	
	1990	2000	1990	1999	1990	1999	1990	2000			1999	2000
Rwanda	..	..	..	..	..	..	..	..	..	..	..	..
Saudi Arabia	48,213	67,171	40.8	43.4	1.9	10.6	..	27.1	59	75	42.3 ^a	42.3 ^a
Senegal	..	..	..	..	..	..	..	..	..	..	..	..
Sierra Leone	..	..	..	..	..	..	..	..	..	..	..	..
Singapore	34,308	198,407	93.6	233.6	55.4	115.4	..	66.9	150	355	..	..
Slovak Republic	..	742	..	3.7	..	2.4	..	129.8	..	838	-24.2	0.4
Slovenia	..	2,547	..	10.9	..	3.7	..	20.7	24	38	-3.7 ^a	-9.5 ^a
South Africa	137,540	204,952	122.8	200.2	7.3	55.6	..	33.9	732	616	56.1	-17.3
Spain	111,404	431,668	21.7	72.4	8.0	124.9	..	178.5	427	718	..	..
Sri Lanka	917	1,074	11.4	9.9	0.5	1.3	5.8	11.0	175	239	-6.0	-41.7
Sudan	..	..	..	..	..	..	..	..	..	..	..	..
Sweden	97,929	373,278	41.2	156.4	7.4	99.8	14.9	73.1	258	277	..	..
Switzerland	160,044	693,127	70.1	268.1	29.6	208.5	..	78.0	182	239	..	..
Syrian Arab Republic	..	..	..	..	..	..	..	..	..	..	..	..
Tajikistan	..	..	..	..	..	..	..	..	..	..	..	..
Tanzania	..	181	..	2.1	..	0.1	..	3.4	..	4	..	..
Thailand	23,896	29,489	28.0	46.9	26.8	33.5	92.6	53.2	214	381	42.3	-54.1
Togo	..	..	..	..	..	..	..	..	..	..	..	..
Trinidad and Tobago	696	4,330	13.7	63.6	1.1	1.4	10.0	3.1	30	27	-3.3 ^a	8.5 ^a
Tunisia	533	2,828	4.3	12.9	0.2	2.0	3.3	23.3	13	44	16.8 ^a	9.0 ^a
Turkey	19,065	69,659	12.6	60.7	3.9	43.8	42.5	206.2	110	315	254.5	-51.2
Turkmenistan	..	..	..	..	..	..	..	..	..	..	..	..
Uganda	..	..	..	..	..	..	..	..	..	..	..	..
Ukraine	..	1,881	..	2.9	..	0.3	..	19.6	..	139	20.2 ^a	75.2 ^a
United Arab Emirates	..	28,211	..	70.5	..	..	..	..	..	53	..	..
United Kingdom	848,866	2,933,280	85.9	203.4	28.2	95.6	33.4	51.9	1,701	1,945	14.5 ^c	-10.2 ^c
United States	3,059,434	16,635,114	53.2	181.8	30.5	202.9	53.4	123.5	6,599	7,651	19.5 ^d	-10.1 ^d
Uruguay	..	168	..	0.8	..	0.0	..	0.9	36	17	..	..
Uzbekistan	..	119	..	0.7	..	0.2	..	..	..	4	..	..
Venezuela, RB	8,361	8,128	17.2	7.3	4.6	0.8	43.0	8.9	76	85	-12.4	18.7
Vietnam	..	..	..	..	..	..	..	..	..	..	..	..
West Bank and Gaza	..	848	..	20.1	..	3.6	..	20.9	..	22	..	..
Yemen, Rep.	..	..	..	..	..	..	..	..	..	..	..	..
Yugoslavia, FR (Serb./Mont.)	..	10,817	..	..	..	..	..	0.0	..	16	..	..
Zambia	..	291	..	9.2	..	0.4	..	4.7	..	8	..	..
Zimbabwe	2,395	2,432	27.3	44.8	0.6	4.0	2.9	10.8	57	69	140.6	-24.6
World	9,399,659 s	36,030,812 s	50.7 w	119.0 w	28.5 w	102.6 w	48.3 w	87.6 w	25,424 s	49,612 s		
Low income	54,588	268,082	9.8	31.7	4.7	19.6	53.8	114.4	3,446	8,332		
Middle income	430,570	2,159,585	21.2	41.1	8.0	30.6	78.3	81.6	4,914	16,539		
Lower middle income	58,226	751,776	5.9	31.0	..	22.8	..	130.8	1,833	11,420		
Upper middle income	372,344	1,407,809	27.3	49.8	8.5	37.2	36.5	28.3	3,081	5,119		
Low & middle income	485,158	2,427,667	19.9	39.8	7.6	29.0	70.8	87.6	8,360	24,871		
East Asia & Pacific	197,109	955,379	21.3	52.4	13.2	68.1	117.2	139.4	1,443	3,754		
Europe & Central Asia	19,065	265,209	2.1	24.6	..	11.2	..	46.6	110	8,968		
Latin America & Carib.	78,470	584,986	7.7	29.7	2.1	7.3	29.7	20.8	1,748	1,938		
Middle East & N. Africa	5,265	151,895	27.8	33.9	1.5	7.3	..	32.5	817	1,874		
South Asia	42,655	194,475	10.8	34.0	5.6	25.2	53.9	128.3	3,231	7,199		
Sub-Saharan Africa	142,594	275,724	52.0	121.0	..	32.3	..	23.0	1,011	1,138		
High income	8,914,501	33,603,143	55.3	138.7	31.8	120.9	49.3	94.0	17,064	24,741		
Europe EMU	1,168,755	5,475,059	22.0	84.0	7.3	71.0	..	94.0	2,485	3,880		

Note: Because aggregates for market capitalization are unavailable for 2000, those shown refer to 1999.

a. Data refer to the S&P/IFC Global index. b. Data refer to the Nikkei 225 index. c. Data refer to the FT 100 index. d. Data refer to the S&P 500 index.



Stock markets 5.3

About the data

Financial market development is closely related to an economy's overall development. At low levels of economic development, commercial banks tend to dominate the financial system. As economies grow, specialized financial intermediaries and equity markets develop.

The stock market indicators presented in the table include measures of size (market capitalization and number of listed domestic companies) and liquidity (value traded as a percentage of GDP, and turnover ratio). The comparability of such indicators between countries may be limited by conceptual and statistical weaknesses, such as inaccurate reporting and differences in accounting standards. The percentage change in stock market prices in U.S. dollars, from the Standard & Poor's Investable (S&P/IFCI) and Global (S&P/IFCG) country indexes, is an important measure of overall performance. Regulatory and institutional factors that can affect investor confidence, such as the existence of a securities and exchange commission and the quality of investor protection laws, may influence the functioning of stock markets but are not included in this table.

Stock market size can be measured in a number of ways, each of which may produce a different ranking among countries. Market capitalization shows the overall size of the stock market in U.S. dollars and as a percentage of GDP. The number of listed domestic companies is another measure of market size. Market size is positively correlated with the ability to mobilize capital and diversify risk.

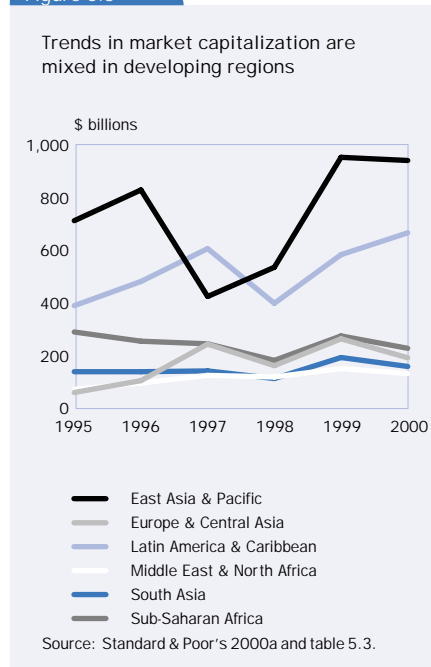
Market liquidity, the ability to easily buy and sell securities, is measured by dividing the total value traded by GDP. This indicator complements the market capitalization ratio by showing whether market size is matched by trading. The turnover ratio—the value of shares traded as a percentage of market capitalization—is also a measure of liquidity, as well as of transactions costs. (High turnover indicates low transactions costs.) The turnover ratio complements the ratio of value traded to GDP, because the turnover ratio is related to the size of the market and the value traded ratio to the size of the economy. A small, liquid market will have a high turnover ratio but a low value traded ratio. Liquidity is an important attribute of stock markets because, in theory, liquid markets improve the allocation of capital and enhance prospects for long-term economic growth. A more comprehensive measure of liquidity would include trading costs and the time and uncertainty in finding a counterpart in settling trades.

Standard & Poor's maintains a series of indexes for investors interested in investing in stock markets

in developing countries. (Standard & Poor's acquired these indexes of emerging market performance from the International Finance Corporation on 30 December 1999, as well as rights to publish the *Emerging Stock Markets Factbook*.) At the core of the Standard & Poor's family of emerging market indexes, the S&P/IFCG indexes are intended to represent the most active stocks in the markets they cover and to be the broadest possible indicator of market movements. The S&P/IFCI indexes apply the same calculation methodology as the S&P/IFCG indexes but include only the subset of S&P/IFCG markets that Standard & Poor's has determined to be "investable." The indexes are designed to measure returns on emerging market stocks that are legally and practically open to foreign portfolio investment. The S&P/IFCG indexes cover 54 markets, providing regular updates on 2,228 stocks; the S&P/IFCI indexes cover 30 markets and 1,197 stocks. They are widely used benchmarks for international portfolio management. See Standard & Poor's (2000b) for further information on the indexes.

Because markets included in Standard & Poor's emerging markets category vary widely in level of development, it is best to look at the entire category to identify the most significant market trends. And it is useful to remember that stock market trends may be distorted by currency conversions, especially when a currency has registered a significant devaluation.

Figure 5.3



Definitions

- **Market capitalization** (also known as market value) is the share price times the number of shares outstanding.
- **Value traded** refers to the total value of shares traded during the period.
- **Turnover ratio** is the total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end-of-period values for the current period and the previous period.
- **Listed domestic companies** are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. This indicator does not include investment companies, mutual funds, or other collective investment vehicles.
- **S&P/IFC Investable index price change** is the U.S. dollar price change in the stock markets covered by the S&P/IFCI country index, supplemented by the S&P/IFCG country index.

Data sources

The data on stock markets are from Standard & Poor's *Emerging Stock Markets Factbook 2000*, supplemented by other data from Standard & Poor's. The firm collects data through an annual survey of the world's stock exchanges, supplemented by information provided by its network of correspondents and by Reuters. Standard & Poor's acquired the International Finance Corporation's Emerging Market Database on 30 December 1999. The GDP data are from the World Bank's national accounts data files. *About the data* is based on Demirgüç-Kunt and Levine (1996a).



5.4 Financial depth and efficiency

	Domestic credit provided by banking sector		Liquid liabilities		Quasi-liquid liabilities		Ratio of bank liquid reserves to bank assets		Interest rate spread		Spread over LIBOR	
	% of GDP		% of GDP		% of GDP		%		Lending minus deposit rate percentage points		Lending rate minus LIBOR percentage points	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
Albania	..	46.5	..	57.9	..	37.5	..	11.0	2.1	8.7	16.7	16.2
Algeria	74.7	50.0	73.6	46.1	24.9	18.2	1.3	2.5	..	2.5	..	5.6
Angola	..	7.9	..	25.0	..	17.4	..	14.9	..	43.7	..	74.9
Argentina	32.4	35.6	11.5	31.6	7.1	23.9	7.4	2.6	..	3.0	..	5.6
Armenia	58.7	10.7	79.9	11.1	42.9	5.8	13.6	10.5	..	11.5	..	33.4
Australia	71.6	90.4	55.1	68.8	43.3	48.7	1.5	1.7	4.5	4.0	9.9	2.1
Austria	120.9	131.7	..	..	..	..	2.1	2.3	..	3.4	..	0.2
Azerbaijan	57.2	11.8	33.5	13.2	11.6	5.0	4.5	7.9	..	..	..	..
Bangladesh	23.9	33.5	23.4	31.4	16.8	23.0	12.8	9.7	4.0	5.4	7.7	8.7
Belarus	..	20.8	..	17.5	..	9.4	..	12.4	..	27.2	..	45.6
Belgium	70.3	147.3	..	..	..	..	0.2	1.0	6.9	4.3	4.7	1.3
Benin	22.4	6.7	26.7	25.6	5.9	7.4	29.3	10.7	9.0	..	7.7	..
Bolivia	30.7	67.7	24.5	56.1	18.0	48.5	18.8	4.8	18.0	23.1	33.5	30.0
Bosnia and Herzegovina	..	..	..	..	..	..	..	..	..	..	..	..
Botswana	-46.4	-69.7	22.1	31.2	13.7	23.6	11.0	7.5	1.8	5.2	-0.4	9.2
Brazil	89.8	51.8	26.4	31.8	18.5	25.3	6.7	8.4	..	..	..	..
Bulgaria	118.5	18.6	71.9	30.4	53.6	17.2	10.2	7.9	8.9	9.6	42.4	7.4
Burkina Faso	13.7	13.5	21.3	23.0	7.5	6.8	12.7	4.7	9.0	..	7.7	..
Burundi	23.2	34.0	18.2	23.6	6.5	6.4	2.8	4.1	..	..	4.0	9.8
Cambodia	..	7.4	..	12.2	..	7.7	..	29.1	..	10.2	..	12.1
Cameroon	31.2	17.7	22.6	15.6	10.1	5.7	3.4	4.7	11.0	17.0	10.2	16.6
Canada	85.8	96.5	74.5	76.0	59.9	54.8	1.6	0.6	1.3	1.5	5.7	1.0
Central African Republic	12.9	11.7	15.3	16.7	1.8	1.5	2.8	2.0	11.0	17.0	10.2	16.6
Chad	11.5	10.6	14.6	10.9	0.6	0.6	3.6	2.7	11.0	17.0	10.2	16.6
Chile	73.0	72.5	40.7	52.2	32.8	41.4	3.8	4.0	8.6	4.1	40.5	7.2
China	90.0	130.6	79.2	147.8	41.4	90.4	15.7	15.0	0.7	3.6	1.0	0.4
Hong Kong, China	156.3	140.8	181.7	222.6	166.8	207.7	0.1	0.2	3.3	4.0	1.7	3.1
Colombia	35.9	41.4	29.8	35.1	19.3	26.3	26.3	29.6	8.8	9.1	36.9	25.0
Congo, Dem. Rep.	25.3	..	12.9	..	2.1	..	..	..	..	..	..	119.2
Congo, Rep.	29.1	20.2	22.0	15.4	6.1	2.0	2.0	3.7	11.0	17.0	10.2	16.6
Costa Rica	23.8	28.0	33.9	33.1	23.8	21.3	68.5	17.8	11.4	11.4	24.2	20.3
Côte d'Ivoire	44.5	25.9	28.8	24.3	10.9	6.9	2.1	5.3	9.0	..	7.7	..
Croatia	..	45.9	..	39.2	..	29.5	..	6.8	..	10.6	..	9.5
Cuba	..	..	..	..	..	..	..	..	..	..	..	..
Czech Republic	..	62.7	..	67.9	..	43.5	..	18.0	..	4.2	..	3.3
Denmark	63.0	57.4	59.0	55.9	29.4	24.5	1.1	6.2	6.2	4.7	5.8	1.7
Dominican Republic	31.5	36.6	28.4	34.4	13.1	21.6	31.1	54.9	15.2	9.0	29.3	19.6
Ecuador	17.2	80.9	23.3	46.1	12.9	34.2	23.1	7.7	-6.0	15.1	29.2	58.6
Egypt, Arab Rep.	106.8	99.8	87.9	83.3	60.7	63.8	17.1	13.3	7.0	3.7	10.7	7.6
El Salvador	32.0	43.5	30.6	48.4	19.6	38.5	33.4	26.4	3.2	4.7	12.9	10.1
Eritrea	..	..	..	..	..	..	..	..	..	..	..	..
Estonia	65.0	34.6	136.2	34.4	93.5	12.0	43.1	19.4	..	4.5	26.6	3.3
Ethiopia	67.6	58.5	42.2	40.7	12.6	19.0	23.3	12.6	3.6	4.3	-2.3	5.2
Finland	83.1	55.8	54.4	48.0	..	..	4.1	4.1	4.1	3.5	3.3	-0.7
France	104.4	102.2	..	..	..	..	1.0	0.4	6.1	3.7	2.3	0.9
Gabon	20.0	22.5	17.8	16.6	6.6	6.6	2.0	5.7	11.0	17.0	10.2	16.6
Gambia, The	3.4	14.2	20.7	32.8	8.8	16.8	8.8	16.5	15.2	11.5	18.2	18.6
Georgia	..	20.2	..	8.2	..	3.1	..	14.1	..	18.8	..	28.0
Germany	105.4	145.2	67.9	78.1	..	..	3.2	6.6	4.5	6.4	3.3	3.4
Ghana	13.2	36.2	14.1	19.0	3.4	8.6	20.2	8.0	..	..	..	..
Greece	101.3	94.8	70.6	63.8	56.9	45.0	22.4	31.4	8.1	6.3	19.3	9.6
Guatemala	17.4	16.9	21.2	23.0	11.8	11.6	31.8	10.7	5.1	11.6	15.0	14.1
Guinea	6.0	6.1	0.8	2.0	0.8	2.0	6.2	14.7	0.2	..	12.9	..
Guinea-Bissau	77.5	14.1	68.9	30.3	4.4	1.0	10.8	13.2	13.1	..	37.4	..
Haiti	32.9	25.7	31.4	33.6	15.9	22.0	74.9	30.4	..	15.5	..	17.5
Honduras	40.9	28.3	33.6	49.3	18.8	34.9	6.6	22.0	8.3	10.2	8.7	24.7



Financial depth and efficiency 5.4

	Domestic credit provided by banking sector		Liquid liabilities		Quasi-liquid liabilities		Ratio of bank liquid reserves to bank assets		Interest rate spread		Spread over LIBOR	
	% of GDP		% of GDP		% of GDP		%		Lending minus deposit rate percentage points		Lending rate minus LIBOR percentage points	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
Hungary	105.5	52.1	43.8	46.2	19.0	27.7	28.5	..	4.1	3.1	20.5	10.9
India	51.6	49.6	43.2	52.4	28.2	36.1	14.8	12.2	..	..	8.2	7.1
Indonesia	45.5	60.5	40.4	57.2	29.1	46.9	4.5	5.3	3.3	1.9	12.5	22.3
Iran, Islamic Rep.	70.8	54.1	57.6	45.0	31.1	25.3	66.0	54.8	..	..	..	..
Iraq	..	..	..	..	..	..	..	..	..	..	..	..
Ireland	55.2	93.8	44.5	..	..	..	4.8	1.8	5.0	3.2	3.0	-2.1
Israel	106.2	87.5	70.2	97.3	63.6	90.1	11.9	13.0	12.0	5.0	18.1	11.0
Italy	89.4	92.0	70.5	..	..	..	12.0	1.2	7.3	4.0	5.8	0.2
Jamaica	34.8	45.4	51.0	48.9	37.8	32.6	37.4	8.3	6.6	13.5	22.2	21.6
Japan	266.8	144.0	187.5	125.8	159.6	77.4	1.5	1.8	3.4	2.0	-1.4	-3.3
Jordan	117.9	86.1	131.2	109.6	77.8	78.7	20.5	28.0	2.2	3.2	2.0	6.5
Kazakhstan	..	11.3	..	14.5	..	3.6	..	7.7	..	..	..	..
Kenya	52.9	49.8	43.3	46.6	29.3	31.9	9.9	22.7	5.1	12.8	10.4	17.0
Korea, Dem. Rep.	..	..	..	..	..	..	..	..	..	..	..	..
Korea, Rep.	65.7	96.6	54.6	93.8	45.7	84.6	6.3	17.2	0.0	1.4	1.7	4.0
Kuwait	243.0	110.7	192.2	85.3	153.9	70.1	1.2	1.1	0.4	2.8	4.1	3.1
Kyrgyz Republic	..	14.6	..	13.6	..	5.0	..	16.7	..	25.3	..	55.4
Lao PDR	5.1	10.3	7.2	15.2	3.1	13.0	3.4	20.0	2.5	18.6	20.0	26.6
Latvia	..	20.0	..	28.3	..	10.9	..	8.9	..	9.2	..	8.8
Lebanon	132.6	134.9	193.7	153.7	170.9	145.8	3.9	8.1	23.1	7.0	31.6	14.1
Lesotho	30.1	-0.2	38.8	31.1	22.4	13.4	24.1	38.3	7.4	11.6	12.1	13.7
Libya	..	..	..	..	..	..	40.8	26.3	1.5	3.8	-1.3	1.6
Lithuania	..	15.5	..	21.1	..	8.7	..	17.2	..	8.1	..	7.7
Macedonia, FYR	..	21.0	..	19.3	..	9.1	..	4.4	..	9.1	..	15.0
Madagascar	26.2	15.2	17.8	26.0	5.3	10.8	8.5	22.5	5.3	12.7	17.5	22.6
Malawi	20.5	8.9	22.0	16.4	12.2	8.1	32.8	10.3	8.9	20.4	12.7	48.2
Malaysia	75.7	151.6	64.4	136.0	43.0	110.8	5.9	8.3	1.3	3.2	-1.1	1.9
Mali	13.7	16.8	20.5	22.6	5.5	6.0	50.8	4.9	9.0	..	7.7	..
Mauritania	54.7	0.3	28.5	14.1	7.0	4.3	6.1	2.1	5.0	..	1.7	..
Mauritius	45.1	76.7	63.3	81.8	49.1	70.6	8.8	15.0	5.4	10.7	9.7	16.2
Mexico	36.6	28.8	22.8	28.9	16.4	20.4	4.2	6.4	..	16.3	..	20.5
Moldova	62.8	28.9	70.3	20.6	35.4	8.5	8.3	14.3	..	8.0	..	30.1
Mongolia	68.5	11.4	52.4	23.5	13.8	11.3	2.0	11.8	..	17.9	..	32.2
Morocco	60.1	85.5	61.0	78.7	18.4	20.2	11.3	5.1	0.5	7.1	0.7	8.1
Mozambique	15.6	6.6	26.5	25.5	5.2	11.7	61.5	14.3	..	11.8	..	14.2
Myanmar	32.8	26.8	27.9	25.7	7.8	9.9	271.8	25.1	2.1	5.1	-0.3	10.7
Namibia	20.4	53.7	24.4	51.1	14.3	27.2	4.4	3.1	10.6	7.7	17.4	13.1
Nepal	28.9	41.3	32.2	48.5	18.5	32.3	12.7	20.2	2.5	4.0	6.1	5.9
Netherlands	103.0	126.8	..	..	..	..	0.3	0.8	8.4	0.7	3.4	-2.0
New Zealand	81.6	119.0	77.9	92.7	64.8	78.5	0.8	10.3	4.4	3.9	7.7	3.1
Nicaragua	206.6	147.0	56.9	66.6	23.1	54.8	20.2	15.4	12.5	11.9	13.7	16.7
Niger	16.2	9.4	19.8	7.4	8.3	1.9	42.9	1.6	9.0	..	7.7	..
Nigeria	23.7	19.5	23.6	21.6	10.3	9.2	11.6	5.4	5.5	7.5	17.0	14.9
Norway	89.5	74.1	59.9	55.9	27.0	11.8	0.5	3.4	4.6	2.8	5.9	2.7
Oman	16.6	44.7	28.9	37.0	19.3	28.3	6.9	4.1	1.4	2.2	1.4	4.9
Pakistan	50.9	48.4	39.8	46.2	10.0	18.9	8.9	7.2	..	..	..	..
Panama	52.7	106.6	41.1	81.8	33.0	69.8	..	..	3.6	3.1	3.7	4.6
Papua New Guinea	35.8	31.2	35.2	32.8	24.0	18.0	3.2	3.6	6.9	3.4	7.2	13.5
Paraguay	14.9	28.2	21.4	33.3	12.8	24.1	31.0	51.2	8.1	10.5	22.7	24.8
Peru	20.2	27.6	24.8	34.2	11.8	21.5	22.0	16.4	2,335.0	14.5	4,766.2	25.4
Philippines	26.9	68.8	36.8	67.5	28.2	54.3	11.7	8.3	4.6	3.6	15.8	6.4
Poland	18.8	39.3	32.8	42.8	16.6	28.5	20.6	10.7	462.5	5.8	495.9	11.6
Portugal	69.9	103.9	..	..	..	..	29.0	11.4	7.8	2.8	13.5	-0.2
Puerto Rico	..	..	..	..	..	..	..	..	..	..	..	..
Romania	79.7	18.7	60.4	25.7	32.7	20.3	1.2	14.3	..	..	..	..
Russian Federation	..	32.7	..	21.7	..	10.1	..	7.8	..	26.0	..	34.3



5.4 Financial depth and efficiency

	Domestic credit provided by banking sector		Liquid liabilities		Quasi-liquid liabilities		Ratio of bank liquid reserves to bank assets		Interest rate spread		Spread over LIBOR	
	% of GDP		% of GDP		% of GDP		%		Lending minus deposit rate percentage points		Lending rate minus LIBOR percentage points	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
Rwanda	17.1	13.7	14.9	15.1	7.0	6.1	4.3	26.0	6.3	..	4.9	..
Saudi Arabia	58.7	38.2	47.9	57.8	21.9	27.7	5.6	10.0	..	..	..	..
Senegal	33.8	22.8	22.9	24.1	9.7	9.2	14.1	1.8	9.0	..	7.7	..
Sierra Leone	26.3	50.1	13.1	16.1	2.6	5.0	64.1	13.7	12.0	17.3	44.2	21.4
Singapore	75.7	94.7	123.6	121.2	100.6	99.6	3.7	4.2	2.7	4.1	-1.0	0.4
Slovak Republic	..	60.2	..	64.1	..	45.3	..	6.5	..	6.7	..	15.7
Slovenia	..	43.4	..	46.7	..	36.7	..	4.1	..	5.1	..	7.0
South Africa	97.8	155.0	44.6	45.1	27.2	12.7	3.3	7.0	2.1	5.8	12.7	12.6
Spain	106.1	108.9	..	..	..	..	8.7	2.6	5.4	2.1	7.7	-1.5
Sri Lanka	43.1	34.5	35.2	40.4	22.9	30.6	9.9	11.5	-6.4	-4.8	4.7	1.6
Sudan	20.4	7.3	20.1	10.3	2.9	3.6	79.5	5.3	..	..	..	..
Sweden	140.5	115.8	52.4	45.3	..	..	1.9	1.3	6.8	3.9	8.4	0.1
Switzerland	179.0	185.4	145.2	164.3	118.6	122.2	1.1	0.9	-0.9	2.7	-0.9	-1.5
Syrian Arab Republic	56.6	27.5	54.7	51.2	10.5	17.3	46.0	28.4	..	..	..	..
Tajikistan	..	..	..	..	..	..	..	..	..	..	..	..
Tanzania	34.6	12.8	19.9	19.0	6.3	9.3	5.3	3.9	..	14.1	..	16.5
Thailand	91.1	141.9	74.9	114.4	66.0	98.7	3.1	6.5	2.2	4.3	6.1	3.6
Togo	21.3	23.8	36.1	24.7	19.1	8.0	59.0	1.6	9.0	..	7.7	..
Trinidad and Tobago	58.5	52.8	54.6	59.0	42.7	46.6	13.5	8.8	6.9	8.5	4.6	11.6
Tunisia	62.5	69.6	51.5	55.2	26.7	31.9	1.6	3.7	..	..	..	..
Turkey	19.4	49.8	24.1	51.8	16.4	46.2	16.3	19.9	..	..	..	..
Turkmenistan	..	30.5	..	14.9	..	5.1	..	35.7	..	..	..	..
Uganda	17.8	7.5	7.6	14.6	1.4	6.7	17.9	8.3	7.4	12.8	30.4	16.1
Ukraine	83.2	25.9	50.1	17.0	9.0	6.0	49.0	10.4	..	34.3	..	49.5
United Arab Emirates	34.7	58.9	46.3	56.9	37.7	40.9	4.4	6.1	..	..	..	..
United Kingdom	121.4	127.0	..	..	..	..	0.5	0.4	2.2	2.7	6.4	-0.1
United States	110.9	164.2	65.5	62.4	49.4	46.4	2.3	6.6	1.9	2.7	1.7	2.6
Uruguay	46.7	54.4	58.1	48.7	51.5	42.4	31.1	18.4	76.6	39.0	166.1	47.9
Uzbekistan	..	..	..	..	..	..	..	..	..	..	..	..
Venezuela, RB	37.4	16.7	41.1	21.3	29.4	10.8	21.9	18.8	7.7	10.8	27.2	26.7
Vietnam	15.9	22.4	22.7	32.5	9.3	15.9	13.3	12.1	..	5.3	..	9.4
West Bank and Gaza	..	..	..	..	..	..	..	..	..	..	..	..
Yemen, Rep.	62.8	21.8	57.1	35.3	10.8	15.8	121.2	24.2	..	3.8	..	16.6
Yugoslavia, FR (Serb./Mont.)	..	..	..	..	..	..	..	..	..	..	..	..
Zambia	67.8	59.7	21.8	18.6	10.6	11.8	33.7	12.9	9.5	20.3	26.8	35.1
Zimbabwe	41.7	45.4	41.8	32.8	30.3	16.3	12.2	11.5	2.9	16.9	3.4	50.0
World	123.5 w	126.2 w	85.7 w	78.0 w	69.1 w	54.0 w	9.9 m	9.2 m				
Low income	44.7	43.3	37.2	43.7	22.3	29.1	12.8	12.1				
Middle income	65.0	70.5	44.8	66.1	28.1	45.2	12.6	8.5				
Lower middle income	65.5	84.1	63.7	86.9	37.9	55.6	17.9	10.6				
Upper middle income	64.4	58.4	34.9	47.6	24.2	35.9	7.1	7.2				
Low & middle income	61.0	66.4	43.3	62.7	26.9	42.7	12.8	10.8				
East Asia & Pacific	73.4	114.5	63.9	120.4	42.7	84.1	5.9	8.7				
Europe & Central Asia	..	38.0	..	34.7	..	22.9	..	10.4				
Latin America & Carib.	59.2	41.6	25.5	32.5	17.8	24.4	22.5	18.1				
Middle East & N. Africa	69.5	59.6	62.1	60.1	30.7	32.8	14.2	10.0				
South Asia	49.0	47.6	41.1	49.7	25.3	33.1	12.7	11.5				
Sub-Saharan Africa	56.8	77.9	32.5	33.4	17.3	12.7	11.6	5.3				
High income	137.2	147.8	97.8	79.8	82.8	..	1.9	1.4				
Europe EMU	97.0	115.9	..	..	..	..	3.7	2.2				



Financial depth and efficiency 5.4

About the data

Households and institutions save and invest independently. The financial system's role is to intermediate between them and to cycle available funds to where they are needed. Savers accumulate claims on financial institutions, which pass these funds to their final users. As an economy develops, this indirect lending by savers to investors becomes more efficient and gradually increases financial assets relative to GDP. This wealth allows increased saving and investment, facilitating and enhancing economic growth. As more specialized savings and financial institutions emerge, more financing instruments become available, spreading risks and reducing costs to liability holders. As securities markets mature, savers can invest their resources directly in financial assets issued by firms.

The ratio of domestic credit provided by the banking sector to GDP is used to measure the growth of the banking system because it reflects the extent to which savings are financial. In a few countries governments may hold international reserves as deposits in the banking system rather than in the central bank. Since the claims on the central government are a net item (claims of central government minus central government deposits), this net figure may be negative, resulting in a negative figure for domestic credit provided by the banking sector.

Liquid liabilities include bank deposits of generally less than one year plus currency. Their ratio to GDP indicates the relative size of these readily available forms of money—money that the owners can use to buy goods and services without incurring any cost. Quasi-liquid liabilities are long-term deposits and assets—such as certificates of deposit, commercial paper, and bonds—that can be converted into currency or demand deposits, but at a cost. The ratio of bank liquid reserves to bank assets captures the banking system's liquidity. In countries whose banking system is liquid, adverse macroeconomic conditions should be less likely to lead to banking and financial crises. Data on domestic credit and liquid and quasi-liquid liabilities are cited on an end-of-year basis.

No less important than the size and structure of the financial sector is its efficiency, as indicated by the margin between the cost of mobilizing liabilities and the earnings on assets—or the interest rate spread. A narrowing of the interest rate spread reduces transactions costs, which lowers the overall cost of investment and is therefore crucial to economic growth. Interest rates reflect the responsiveness of financial institutions to competition and price incentives. The interest rate spread, also known as the intermediation margin, is a summary measure of a banking sys-

tem's efficiency. To the extent that information about interest rates is inaccurate, banks do not monitor all bank managers, or the government sets deposit and lending rates, the interest rate spread may not be a reliable measure of efficiency. The spread over LIBOR reflects the differential between a country's lending rate and the London interbank offered rate (ignoring expected changes in the exchange rate). Interest rates are expressed as annual averages.

In some countries financial markets are distorted by restrictions on foreign investment, selective credit controls, and controls on deposit and lending rates. Interest rates may reflect the diversion of resources to finance the public sector deficit through statutory reserve requirements and direct borrowing from the banking system. And where state-owned banks dominate the financial sector, noncommercial considerations may unduly influence credit allocation. The indicators in the table provide quantitative assessments of each country's financial sector, but qualitative assessments of policies, laws, and regulations are needed to analyze overall financial conditions. Recent events in East Asia highlight the risks of weak financial intermediation, poor corporate governance, and deficient government policies, including procyclical macroeconomic policy responses to large capital inflows.

The accuracy of financial data depends on the quality of accounting systems, which are weak in some developing economies. Some of the indicators in the table are highly correlated, particularly the ratios of domestic credit, liquid liabilities, and quasi-liquid liabilities to GDP, because changes in liquid and quasi-liquid liabilities flow directly from changes in domestic credit. Moreover, the precise definition of the financial aggregates presented varies by country.

The indicators reported here do not capture the activities of the informal sector, which remains an important source of finance in developing economies. Personal credit or credit extended through community-based pooling of assets may be the only source of credit available to small farmers, small businesses, or home-based producers. And in financially repressed economies the rationing of formal credit forces many borrowers and lenders to turn to the informal market, which is very expensive, or to self-financing and family savings.

Definitions

- **Domestic credit provided by banking sector** includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The banking sector includes monetary authorities, deposit money banks, and other banking institutions for which data are available (including institutions that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other banking institutions include savings and mortgage loan institutions and building and loan associations.
- **Liquid liabilities** are also known as broad money, or M3. They are the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travelers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.
- **Quasi-liquid liabilities** are the M3 money supply less M1.
- **Ratio of bank liquid reserves to bank assets** is the ratio of domestic currency holdings and deposits with the monetary authorities to claims on other governments, nonfinancial public enterprises, the private sector, and other banking institutions.
- **Interest rate spread** is the interest rate charged by banks on loans to prime customers minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits.
- **Spread over LIBOR** (London interbank offered rate) is the interest rate charged by banks on short-term loans in local currency to prime customers minus LIBOR. LIBOR is the most commonly recognized international interest rate and is quoted in several currencies. The average three-month LIBOR on U.S. dollar deposits is used here.

Data sources

The data on credit, liabilities, bank reserves, and interest rates are collected from central banks and finance ministries and reported in the print and electronic editions of the International Monetary Fund's *International Financial Statistics*.



5.5 Tax policies

	Tax revenue	Taxes on income, profits, and capital gains		Domestic taxes on goods and services		Export duties		Import duties		Highest marginal tax rate ^a		
	% of GDP	% of total taxes		% of value added in industry and services		% of tax revenue		% of tax revenue		Individual rate %	on income over \$	Corporate rate %
	1999	1990	1999	1990	1999	1990	1999	1990	1999	1999	1999	1999
Albania	14.8	..	9.4	..	16.9	..	0.0	..	19.3	..	..	..
Algeria	27.5	..	72.3	..	3.7	..	0.0	..	15.3	..	..	..
Angola	..	..	..	..	..	..	..	..	..	..	..	..
Argentina	12.6	2.7	17.3	2.2	6.5	9.3	0.1	2.6	6.9	35	200,000	35
Armenia	..	..	..	..	..	..	..	..	..	..	..	..
Australia	22.1	70.9	72.8	5.4	5.0	0.1	0.0	4.4	2.8	47	30,579	36
Austria	35.3	20.8	27.0	9.0	9.5	0.0	..	1.6	..	50	59,590	34
Azerbaijan	19.0	..	23.1	..	11.3	..	0.0	..	9.0	40	3,704	30
Bangladesh	..	..	..	..	..	..	..	..	..	..	..	..
Belarus	27.8	12.1	11.6	17.3	15.2	3.6	0.0	0.4	8.0	..	..	..
Belgium	43.0	36.1	37.5	10.4	11.2	0.0	0.0	0.0	0.0	55	69,993	39
Benin	..	..	..	..	..	..	..	..	..	..	..	..
Bolivia	13.9	7.9	10.5	5.8	9.0	0.0	0.0	11.1	7.1	13	..	25
Bosnia and Herzegovina	..	..	..	..	..	..	..	..	..	..	..	..
Botswana	..	71.7	..	1.0	..	0.0	..	24.7	..	30	17,960	15
Brazil	19.9	24.5	19.9	7.1	6.9	0.0	0.0	2.5	3.0	28	17,881	15
Bulgaria	26.8	40.6	16.9	10.4	13.6	0.0	0.0	2.5	4.2	40	9,403	27
Burkina Faso	..	24.7	..	4.9	..	1.1	..	33.1	..	..	..	..
Burundi	16.7	23.4	22.5	16.6	17.0	3.1	0.0	23.2	16.4	..	..	..
Cambodia	..	..	..	..	..	..	..	..	..	20	39,915	20
Cameroon	12.8	25.1	26.0	4.3	6.9	1.7	3.9	18.9	31.6	60	13,321	39
Canada	19.8	59.3	59.3	3.7	..	0.0	0.0	3.2	1.6	29	38,604	38
Central African Republic	..	..	..	..	..	..	..	..	..	..	..	..
Chad	..	20.3	..	3.9	..	..	..	..	..	..	..	..
Chile	18.4	15.8	20.7	10.4	13.3	..	..	..	..	45	6,526	15
China	6.1	49.8	7.8	1.5	6.1	0.0	0.0	22.1	6.6	45	12,079	30
Hong Kong, China	..	..	..	..	..	..	..	..	..	17	13,583	16
Colombia	10.6	36.4	39.9	4.8	6.0	2.0	0.0	22.5	8.5	35	32,221	35
Congo, Dem. Rep.	4.3	28.5	31.0	2.6	2.3	4.1	1.9	45.1	32.5	50	13,167	..
Congo, Rep.	8.7	..	..	4.1	6.7	0.0	0.0	32.3	30.6	50	14,210	45
Costa Rica	18.4	11.5	16.5	6.9	9.8	8.0	0.7	18.2	4.9	25	14,185	30
Côte d'Ivoire	19.9	18.1	22.7	8.9	5.1	3.7	13.1	28.4	34.7	10	4,263	35
Croatia	40.4	..	12.0	..	24.6	..	0.0	..	7.6	35	5,556	..
Cuba	..	..	..	..	..	..	..	..	..	..	..	..
Czech Republic	33.0	..	14.3	..	14.4	..	0.0	..	2.0	40	36,979	35
Denmark	33.3	43.5	43.1	16.1	16.4	0.0	0.0	0.1	0.0	59	..	32
Dominican Republic	15.7	23.8	17.6	3.1	6.7	0.1	0.0	41.4	36.8	25	14,309	25
Ecuador	..	62.9	..	4.5	..	0.3	..	12.1	..	0	66,226	0
Egypt, Arab Rep.	16.6	26.4	34.4	4.1	5.9	0.0	0.0	18.9	19.9	32	14,706	40
El Salvador	12.6	..	26.1	..	6.5	..	0.0	..	9.5	30	22,857	25
Eritrea	..	..	..	..	..	..	..	..	..	..	..	..
Estonia	28.5	27.5	21.0	14.8	14.5	0.0	0.0	0.8	0.0	26	..	26
Ethiopia	..	40.9	..	9.1	..	2.8	..	18.0	..	..	..	..
Finland	27.7	34.5	33.6	15.2	14.5	0.0	0.0	1.0	0.0	38	61,164	28
France	38.9	18.7	20.9	11.7	12.2	0.0	0.0	0.0	0.0	..	..	33
Gabon	..	35.9	..	5.0	..	2.8	..	23.4	..	55	2,290	40
Gambia, The	..	13.7	..	12.2	..	0.2	..	45.6	..	..	..	..
Georgia	10.2	..	11.6	..	11.0	..	0.0	..	4.7	..	..	..
Germany	26.3	17.5	17.3	7.4	6.4	0.0	0.0	0.0	0.0	53	66,690	30
Ghana	..	25.1	..	6.8	..	12.4	..	28.7	..	35	7,102	35
Greece	21.9	23.3	41.6	13.0	14.0	0.0	0.0	0.1	0.1	45	56,271	35
Guatemala	..	..	..	..	..	..	..	..	..	25	26,740	28
Guinea	10.7	12.6	10.1	3.2	0.8	51.7	0.2	11.2	42.9	..	..	..
Guinea-Bissau	..	..	..	..	..	..	..	..	..	..	..	..
Haiti	..	..	..	..	..	..	..	..	..	..	..	..
Honduras	..	..	..	..	..	..	..	..	..	30	75,758	15



Tax policies 5.5

	Tax revenue	Taxes on income, profits, and capital gains		Domestic taxes on goods and services		Export duties		Import duties		Highest marginal tax rate ^a		
	% of GDP	% of total taxes		% of value added in industry and services		% of tax revenue		% of tax revenue		Individual rate %	Corporate rate %	Corporate rate %
	1999	1990	1999	1990	1999	1990	1999	1990	1999	1999	1999	1999
Hungary	33.6	21.2	21.8	22.6	15.3	1.3	0.0	5.6	3.7	40	4,566	18
India	9.1	18.6	33.2	7.4	5.2	0.1	0.1	35.8	28.4	30	3,538	35
Indonesia	15.7	65.4	67.4	5.5	5.2	0.1	0.5	6.6	2.4	30	6,623	30
Iran, Islamic Rep.	16.0	24.7	25.2	1.0	5.4	0.0	0.0	18.6	11.5	54	174,171	54
Iraq	..	..	..	..	..	..	..	..	..	..	..	..
Ireland	30.6	39.7	43.5	13.4	12.5	0.0	0.0	0.0	0.0	46	14,799	32
Israel	35.5	42.4	41.9	..	..	0.0	0.0	1.4	0.8	50	57,789	36
Italy	38.8	37.7	38.8	11.5	10.4	0.0	0.0	0.0	0.0	46	81,665	37
Jamaica	..	..	..	..	..	..	..	..	..	25	2,712	33
Japan	..	73.0	..	2.5	..	0.0	..	1.4	..	50	259,291	35
Jordan	18.3	22.9	14.6	6.8	9.8	0.0	0.0	34.7	27.8	..	..	..
Kazakhstan	8.3	..	18.0	..	6.8	..	0.0	..	4.4	30	..	30
Kenya	..	32.9	..	15.9	..	0.0	..	17.8	..	33	382	33
Korea, Dem. Rep.	..	..	..	..	..	..	..	..	..	..	..	..
Korea, Rep.	17.3	37.5	31.0	6.7	7.1	0.0	0.0	13.0	7.4	40	66,236	28
Kuwait	3.4	19.5	8.2	0.0	..	0.0	0.0	76.8	0.0	0	..	0
Kyrgyz Republic	10.1	..	14.5	..	11.7	..	0.0	..	6.3	..	..	30
Lao PDR	..	..	..	..	..	..	..	..	..	40	1,064	..
Latvia	29.3	..	15.0	..	15.6	..	0.0	..	1.5	25	..	25
Lebanon	12.6	..	15.1	..	1.9	..	..	..	39.0	..	..	..
Lesotho	34.9	12.7	23.2	12.8	7.5	0.2	..	63.6	..	..	..	..
Libya	..	..	..	..	..	..	..	..	..	..	..	..
Lithuania	24.6	22.2	13.4	16.4	16.0	..	0.0	..	1.8	33	..	29
Macedonia, FYR	..	..	..	..	..	..	..	..	..	..	..	..
Madagascar	..	15.7	..	3.6	..	8.5	..	50.1	..	..	..	..
Malawi	..	42.5	..	13.9	..	0.0	..	18.7	..	38	948	38
Malaysia	18.9	42.5	44.4	6.3	6.9	9.7	2.2	15.1	13.3	30	39,474	28
Mali	..	..	..	..	..	..	..	..	..	..	..	..
Mauritania	..	..	..	..	..	..	..	..	..	..	..	..
Mauritius	18.2	15.2	13.9	6.4	9.6	4.6	0.0	45.7	30.7	30	2,220	15
Mexico	11.7	34.2	40.4	10.2	8.8	0.1	0.0	6.9	4.8	40	200,000	35
Moldova	21.6	..	5.1	..	18.3	..	0.0	..	3.8	..	..	..
Mongolia	15.3	28.2	9.6	8.1	12.6	0.0	2.2	19.6	4.1	..	..	..
Morocco	24.6	27.3	24.1	12.1	..	0.3	0.0	20.3	19.5	44	6,445	35
Mozambique	..	..	..	..	..	..	..	..	..	20	792	35
Myanmar	3.5	29.8	36.2	6.8	4.7	0.0	0.0	23.3	9.5	30	..	30
Namibia	..	39.4	..	10.0	..	3.6	..	26.9	..	40	16,129	40
Nepal	8.5	13.0	20.0	6.6	6.5	0.4	1.3	37.0	31.7	..	..	..
Netherlands	41.1	33.6	26.6	10.5	10.3	0.0	0.0	0.0	0.0	60	56,075	35
New Zealand	29.8	62.2	65.5	12.4	..	0.0	0.0	2.5	1.7	33	18,134	33
Nicaragua	..	20.0	..	16.9	..	0.0	..	21.3	..	30	18,083	30
Niger	..	..	..	..	..	..	..	..	..	..	..	..
Nigeria	..	..	..	..	..	..	..	..	..	25	1,395	28
Norway	34.7	21.7	25.6	14.9	16.1	0.1	0.0	0.6	0.7	28	6,835	28
Oman	6.4	87.6	63.6	0.3	..	0.0	0.0	7.8	19.9	0	..	12
Pakistan	13.1	12.8	27.8	8.6	6.8	0.0	0.0	44.4	16.1	..	..	..
Panama	17.2	24.4	24.8	4.8	..	1.3	0.2	15.8	..	30	200,000	30
Papua New Guinea	18.4	47.0	51.3	5.0	2.9	2.1	5.1	29.3	27.8	47	48,251	25
Paraguay	..	12.4	..	3.6	..	0.0	..	18.8	..	0	..	30
Peru	13.8	5.7	25.0	6.8	8.9	7.7	0.0	9.9	11.6	30	47,985	30
Philippines	14.4	32.5	42.6	6.4	5.6	0.0	0.0	28.4	20.0	33	12,773	33
Poland	29.0	..	21.6	..	12.6	..	0.0	..	3.1	40	15,192	34
Portugal	31.3	25.7	29.6	11.5	13.0	0.0	0.0	2.6	0.0	40	36,478	34
Puerto Rico	..	..	..	..	..	..	..	..	..	33	50,000	20
Romania	24.4	21.0	32.8	15.3	9.6	0.0	0.0	0.6	6.3	45	4,080	38
Russian Federation	19.0	..	11.9	..	8.9	..	4.5	..	5.5	35	6,036	35



5.5 Tax policies

	Tax revenue	Taxes on income, profits, and capital gains		Domestic taxes on goods and services		Export duties		Import duties		Highest marginal tax rate ^a		
	% of GDP	% of total taxes		% of value added in industry and services		% of tax revenue		% of tax revenue		Individual rate %	on income over \$	Corporate rate %
	1999	1990	1999	1990	1999	1990	1999	1990	1999	1999	1999	1999
Rwanda	..	20.0	..	5.6	..	7.4	..	20.7	..	..	..	..
Saudi Arabia	..	..	..	..	..	..	..	..	..	0	..	45
Senegal	..	..	..	..	..	..	..	..	..	50	22,469	35
Sierra Leone	9.9	33.0	17.6	1.9	6.8	0.4	0.0	41.3	47.4	..	..	..
Singapore	14.5	44.6	47.3	4.3	4.2	0.0	0.0	3.5	2.2	28	240,964	26
Slovak Republic	30.7	..	24.8	..	10.9	..	0.0	..	4.9	42	29,258	40
Slovenia	38.3	..	13.8	..	19.9	..	0.0	..	3.3	..	..	..
South Africa	25.6	55.0	58.0	10.3	10.7	0.0	0.0	3.9	3.0	45	20,391	30
Spain	26.9	34.0	31.8	..	7.4	0.0	0.0	1.7	0.0	40	77,139	35
Sri Lanka	14.9	12.0	17.0	14.7	13.0	4.2	0.0	27.4	16.7	35	4,405	35
Sudan	..	..	..	..	..	..	..	..	..	..	..	..
Sweden	35.5	20.6	15.5	12.6	..	0.0	0.0	0.6	0.0	31	27,198	28
Switzerland	23.1	17.0	16.6	..	..	0.0	0.0	6.9	1.0	..	..	45
Syrian Arab Republic	15.0	40.2	48.9	9.6	..	1.3	3.1	8.2	13.6	..	..	..
Tajikistan	9.0	..	6.3	..	8.5	..	0.0	..	12.6	..	..	..
Tanzania	..	..	..	..	..	..	..	..	..	35	12,335	30
Thailand	13.7	26.2	33.3	8.8	8.0	0.2	0.3	23.7	10.3	37	108,430	30
Togo	..	..	..	..	..	..	..	..	..	..	..	..
Trinidad and Tobago	..	..	..	..	..	..	..	..	..	35	7,937	35
Tunisia	25.9	16.0	21.5	7.1	12.2	0.4	0.1	35.1	13.4	..	..	..
Turkey	21.3	51.2	45.2	5.9	12.9	0.0	0.0	7.3	1.7	40	159,898	30
Turkmenistan	..	..	..	..	..	..	..	..	..	..	..	..
Uganda	..	..	..	..	..	..	..	..	..	30	3,578	30
Ukraine	..	..	..	..	..	..	..	..	..	40	5,953	30
United Arab Emirates	1.8	0.0	0.0	0.6	..	..	..	..	..	0	..	20
United Kingdom	34.6	43.2	41.8	10.2	11.4	0.0	0.0	0.0	0.0	40	46,589	31
United States	19.5	56.1	59.5	..	..	0.0	0.0	1.7	1.0	40	283,150	35
Uruguay	24.7	7.1	16.8	9.4	12.4	0.6	0.1	8.1	3.5	..	..	30
Uzbekistan	..	..	..	..	..	..	..	..	..	45	2,400	33
Venezuela, RB	12.8	82.2	29.2	0.8	5.9	0.0	0.0	7.1	13.2	34	78,500	34
Vietnam	14.7	..	23.5	..	7.6	..	0.0	..	26.4	50	5,695	32
West Bank and Gaza	..	..	..	..	..	..	..	..	..	..	..	..
Yemen, Rep.	10.3	44.9	45.9	2.7	2.9	0.0	0.0	29.2	25.9	..	..	..
Yugoslavia, FR (Serb./Mont.)	..	..	..	..	..	..	..	..	..	..	..	..
Zambia	..	..	..	..	..	..	..	..	..	30	742	35
Zimbabwe	26.1	49.7	48.2	8.4	9.7	0.0	0.0	18.8	19.0	50	20,455	35

a. These data are from PricewaterhouseCoopers's *Individual Taxes: Worldwide Summaries 1999–2000* and *Corporate Taxes: Worldwide Summaries 1999–2000*, copyright 1999 by PricewaterhouseCoopers by permission of John Wiley and Sons, Inc.



Tax policies | 5.5

About the data

Taxes are compulsory, unrequited payments made to governments by individuals, businesses, or institutions. They are considered unrequited because governments provide nothing specifically in return for them, although taxes typically are used to provide goods or services to individuals or communities on a collective basis. The sources of the revenue received by governments and the relative contributions of these sources are determined by policy choices about where and how to impose taxes and by changes in the structure of the economy. Tax policy may reflect concerns about distributional effects, economic efficiency (including corrections for externalities), and the practical problems of administering a tax system. There is no ideal level of taxation. But taxes influence incentives and thus the behavior of economic actors and the country's competitiveness.

The level of taxation is typically measured by tax revenue as a share of GDP. Comparing levels of taxation across countries provides a quick overview of the fiscal obligations and incentives facing the private sector. In this table tax data measured in local currencies are normalized by scaling variables in the same units to ease cross-country comparisons. The table refers only to central government data, which may significantly understate the total tax burden, particularly in countries where provincial and municipal governments are large or have considerable tax authority.

Low ratios of tax collections to GDP may reflect weak administration and large-scale tax avoidance or evasion. They may also reflect the presence of a sizable parallel economy with unrecorded and undisclosed incomes. Tax collection ratios tend to rise with income, with higher-income countries relying on taxes to finance a much broader range of social services and social security than lower-income countries are able to provide.

As countries develop, their capacity to tax residents directly typically expands and indirect taxes become less important as a source of revenue. Thus the share of taxes on income, profits, and capital gains is one measure of an economy's (and tax system's) level of development. In the early stages of development governments tend to rely on indirect taxes because the administrative costs of collecting them are relatively low. The two main indirect taxes are international trade taxes (including customs revenues) and domestic taxes on goods and services. The table shows these domestic taxes as a percentage of value added in industry and services. Agriculture and mining are excluded from the denominator because indirect taxes on goods originating from these sectors are usually negligible. What is missing here is a measure

of the uniformity of these taxes across industries and along the value added chain of production. Without such data no clear inferences can be drawn about how neutral a tax system is between subsectors. "Surplus" revenues raised by some governments by charging higher prices for goods produced under monopoly by state-owned enterprises are not counted as tax revenues. Similarly, losses from charging below-market prices for products are rarely identified as subsidies.

Export and import duties are shown separately because the burden they impose on the economy (and thus growth) is likely to be large. Export duties, typically levied on primary (particularly agricultural) products, often take the place of direct taxes on income and profits, but they reduce the incentive to export and encourage a shift to other products. High import duties penalize consumers, create protective barriers—which promote higher-priced output and inefficient production—and implicitly tax exports. By contrast, lower trade taxes enhance openness—to foreign competition, knowledge, technologies, and resources—energizing development in many ways. The economies growing fastest over the past 15 years have not relied on tax revenues from imports. Seeing this pattern, many developing countries have lowered tariffs over the past decade, a trend that is expected to continue. In some countries, such as members of the European Union, most customs duties are collected by a supranational authority; these revenues are not reported in the individual countries' accounts.

The tax revenues collected by governments are the outcomes of systems that are often complex, containing many exceptions, exemptions, penalties, and other inducements that affect the incidence of taxes and thus influence the decisions of workers, managers, and entrepreneurs. A potentially important influence on both domestic and international investors is a tax system's progressivity, as reflected in the highest marginal tax rate on individual and corporate income. Figures for individual marginal tax rates generally refer to employment income. For some countries the highest marginal tax rate is also the basic or flat rate, and other surtaxes, deductions, and the like may apply.

Definitions

- **Tax revenue** comprises compulsory, unrequited, nonrepayable receipts collected by central governments for public purposes. It includes interest collected on tax arrears and penalties collected on nonpayment or late payment of taxes and is shown net of refunds and other corrective transactions.
- **Taxes on income, profits, and capital gains** include taxes levied by central governments on the actual or presumptive net income of individuals and profits of enterprises. Also included are taxes on capital gains, whether realized or not, on the sale of land, securities, and other assets. Social security contributions based on gross pay, payroll, or number of employees are not included, but those based on personal income after deductions and personal exemptions are included.
- **Domestic taxes on goods and services** include all taxes and duties levied by central governments on the production, extraction, sale, transfer, leasing, or delivery of goods and rendering of services, or on the use of goods or permission to use goods or perform activities. These include general sales taxes, turnover or value added taxes, excise taxes, and motor vehicle taxes.
- **Export duties** include all levies collected on goods at the point of export. Rebates on exported goods—that is, repayments of previously paid general consumption taxes, excise taxes, or import duties—should be deducted from the gross receipts of the appropriate taxes, not from export duty receipts.
- **Import duties** comprise all levies collected on goods at the point of entry into the country. They include levies for revenue purposes or import protection, whether on a specific or ad valorem basis, as long as they are restricted to imported products.
- **Highest marginal tax rate** is the highest rate shown on the schedule of tax rates applied to the taxable income of individuals and corporations. Also presented are the income levels above which the highest marginal tax rates for individuals apply.

Data sources

The definitions used here are from the International Monetary Fund's (IMF) *Manual on Government Finance Statistics* (1986). The data on tax revenues are from print and electronic editions of the IMF's *Government Finance Statistics Yearbook*. The data on individual and corporate tax rates are from PricewaterhouseCoopers's *Individual Taxes: Worldwide Summaries 1999–2000* and *Corporate Taxes: Worldwide Summaries 1999–2000*.



5.6 Relative prices and exchange rates

	Exchange rate arrangements ^a		Official exchange rate	Ratio of official to parallel exchange rate	Real effective exchange rate	Purchasing power parity conversion factor		Interest rate			Key agricultural producer prices	
	Classification 1999	Structure 1999	local currency units to \$	1999	1995 = 100 1999	local currency units to international \$		Deposit % 1999	Lending % 1999	Real % 1999	Wheat \$ per metric ton 1998	Maize \$ per metric ton 1998
			1999			1990	1999					
Albania	IF	U	137.7	1.0	..	1.9	47.0	12.9	21.6	18.7	..	..
Algeria	MF	U	66.6	0.9	110.2	4.9	21.0	8.5	11.0	0.1	337	..
Angola	IF	U	2.8	..	..	0.0	0.4	36.6	80.3	-70.0	..	..
Argentina	CB	U	1.0	1.0	..	0.3	0.6	8.0	11.0	13.3	85	56
Armenia	IF	U	535.1	1.0	115.3	..	..	27.3	38.8	38.8	..	..
Australia	IF	U	1.5	1.0	98.6	1.4	1.3	3.5	7.5	6.3	127	128
Austria	Euro	U	12.9 ^b	1.0	92.8	12.6	13.2	2.2	5.6	4.7	117	117
Azerbaijan	MF	U	4,120.2	1.0	..	..	724.8	..	..	..	204	132
Bangladesh	P	U	49.1	1.0	..	9.1	11.6	8.7	14.1	9.1	172	173
Belarus	MF	M	..	..	..	..	41.9	23.8	51.0	-64.2	..	..
Belgium	Euro	U	37.9 ^b	1.0	91.8	33.5	36.2	2.4	6.7	5.7	..	..
Benin	FF	U	615.7	1.0	..	150.7	260.5	3.5	..	..	..	285
Bolivia	P	U	5.8	1.0	118.4	1.3	2.5	12.3	35.4	31.7	195	119
Bosnia and Herzegovina	CB	U	..	..	..	..	..	..	..	..	..	..
Botswana	P	D	4.6	1.0	..	1.1	2.1	9.5	14.6	6.6	90	110
Brazil	IF	U	1.8	..	..	0.0	0.8	26.0	..	..	164	125
Bulgaria	CB	U	1.8	1.0	118.7	0.0	0.6	3.2	12.8	9.4	..	..
Burkina Faso	FF	U	615.7	1.0	..	119.8	149.8	3.5	..	..	..	148
Burundi	MF	D	563.6	1.0	90.0	49.0	104.3	..	15.2	11.4	156	357
Cambodia	MF	D	3,807.8	1.0	..	66.5	741.9	7.3	17.6	11.3	..	158
Cameroon	FF	U	615.7	1.0	109.7	184.8	233.9	5.0	22.0	23.5	79	120
Canada	IF	U	1.5	1.0	97.6	1.2	1.2	4.9	6.4	4.7	87	78
Central African Republic	FF	U	615.7	1.0	91.3	129.9	157.1	5.0	22.0	20.4	..	469
Chad	FF	U	615.7	1.0	..	107.2	148.0	5.0	22.0	27.6	258	271
Chile	IF	U	508.8	1.0	105.4	141.6	264.2	8.5	12.6	8.8	201	148
China	P	U	8.3	0.9	106.9	1.2	1.8	2.3	5.8	8.4	134	109
Hong Kong, China	CB	U	7.8	1.0	..	6.1	8.3	4.5	8.5	14.3	..	..
Colombia	IF	U	1,756.2	..	102.7	120.4	637.2	21.3	30.4	15.9	261	156
Congo, Dem. Rep.	IF	U	4.0	0.7	340.7	0.0	..	..	124.6	..	..	..
Congo, Rep.	FF	U	615.7	1.0	..	456.5	657.4	5.0	22.0	-0.3	..	238
Costa Rica	P	U	285.7	1.0	103.5	41.3	136.6	14.3	25.7	11.6	..	179
Côte d'Ivoire	FF	U	615.7	1.0	103.5	160.4	268.3	3.5	..	..	..	133
Croatia	MF	U	7.1	1.0	97.1	..	4.3	4.3	14.9	10.5	..	..
Cuba	..	..	..	..	..	..	..	..	..	..	..	..
Czech Republic	MF	U	34.6	1.0	114.8	..	13.7	4.5	8.7	6.2	..	..
Denmark	P	U	7.0	1.0	97.5	8.2	8.8	2.4	7.1	4.3	127	..
Dominican Republic	MF	D	16.0	1.0	105.6	2.5	6.0	16.1	25.0	17.5	..	226
Ecuador	Other	U	11,786.8	1.0	80.3	286.2	4,341.3	48.9	64.0	1.3	185	203
Egypt, Arab Rep.	P	M	3.4	..	..	0.7	1.4	9.2	13.0	11.0	189	158
El Salvador	P	U	8.8	1.0	..	2.4	4.1	10.7	15.5	14.9	..	220
Eritrea	IF	U	..	..	..	..	1.6	..	..	..	..	..
Estonia	CB	U	14.7	..	..	0.1	6.3	4.2	8.7	4.6	..	..
Ethiopia	MF	U	7.9	1.0	..	0.7	1.2	6.3	10.6	9.1	205	128
Finland	Euro	U	5.6 ^b	1.0	90.7	5.9	6.1	1.2	4.7	4.0	159	..
France	Euro	U	6.2 ^b	1.0	93.2	6.5	6.6	2.7	6.4	6.0	126	119
Gabon	FF	U	615.7	1.0	96.2	324.2	368.1	5.0	22.0	16.4	..	163
Gambia, The	IF	U	11.4	1.0	99.8	1.8	2.3	12.5	24.0	30.6	..	241
Georgia	IF	U	2.0	1.0	..	..	0.4	14.6	33.4	21.9	796	724
Germany	Euro	U	1.8 ^b	1.0	89.5	..	2.0	2.4	8.8	7.8	124	139
Ghana	IF	U	2,647.3	1.0	125.7	91.7	582.5	23.6	..	..	..	242
Greece	P	U	305.6	1.0	102.5	117.8	235.4	8.7	15.0	11.6	220	171
Guatemala	MF	U	7.4	1.0	..	1.4	3.3	8.0	19.5	13.6	234	156
Guinea	IF	U	1,387.4	1.0	..	211.8	357.6	..	..	..	..	226
Guinea-Bissau	FF	U	615.7	1.0	..	12.0	167.3	3.5	..	..	..	..
Haiti	IF	U	16.9	1.0	..	1.3	6.4	7.4	22.9	12.1	..	271
Honduras	P	U	14.2	1.0	..	1.2	5.2	20.0	30.2	17.1	51	264



Relative prices and exchange rates 5.6

	Exchange rate arrangements ^a		Official exchange rate	Ratio of official to parallel exchange rate	Real effective exchange rate	Purchasing power parity conversion factor		Interest rate			Key agricultural producer prices	
	Classification 1999	Structure 1999				local currency units to \$	1995 = 100	local currency units to international \$		Deposit % 1999	Lending % 1999	Real % 1999	Wheat $ per metric ton	Maize $ per metric ton
			1999	1999	1990	1999	1998	1998				
Hungary	P	U	237.1	1.0	109.0	21.3	99.8	13.3	16.3	6.8	113	92
India	IF	U	43.1	1.0	..	4.7	8.6	..	12.5	9.0	142	95
Indonesia	IF	U	7,855.1	1.0	..	603.8	1,892.4	25.7	27.7	13.2	..	87
Iran, Islamic Rep.	P	D	1,752.9	0.2	245.4	172.9	1,192.8	..	..	..	289	297
Iraq	P	U	0.3	..	..	..	..	..	..	..	..	..
Ireland	Euro	U	0.7 ^b	1.0	94.2	0.6	0.7	0.1	3.3	-0.4	114	..
Israel	P	U	4.1	1.0	105.7	1.7	3.7	11.3	16.4	9.1	149	1,330
Italy	Euro	U	1,817.4 ^b	1.0	110.9	1,330.1	1,665.1	1.6	5.6	4.0	181	161
Jamaica	MF	U	39.0	1.0	..	3.7	29.9	13.5	27.0	17.7	..	1,182
Japan	IF	U	113.9	1.0	89.3	174.8	157.1	0.1	2.2	3.1	1,295	1,082
Jordan	P	U	0.7	1.0	..	0.3	0.3	..	..	..	379	223
Kazakhstan	IF	U	119.5	0.5	..	..	25.6	..	..	..	72	85
Kenya	MF	U	70.3	1.0	..	8.5	24.9	9.6	22.4	14.6	262	151
Korea, Dem. Rep.	..	..	..	..	..	..	..	..	..	..	..	..
Korea, Rep.	IF	U	1,188.8	1.0	..	467.4	657.1	7.9	9.4	11.2	494	398
Kuwait	P	U	0.3	1.0	..	..	..	5.8	8.6	..	..	..
Kyrgyz Republic	MF	U	39.0	1.0	..	..	3.9	35.6	60.9	16.9	18	34
Lao PDR	MF	D	7,102.0	1.0	..	168.0	1,357.3	13.4	32.0	-42.1	..	96
Latvia	P	U	0.6	1.0	..	..	0.2	5.0	14.2	12.0	..	..
Lebanon	P	U	1,507.8	1.0	..	294.5	..	12.5	19.5	..	283	304
Lesotho	P	U	6.1	1.0	83.3	0.9	1.4	7.5	19.1	11.0	195	137
Libya	P	D	0.5	0.2	..	..	..	3.2	7.0	..	897	889
Lithuania	CB	U	4.0	1.0	..	..	1.7	4.9	13.1	9.5	..	..
Macedonia, FYR	P	U	56.9	1.0	73.7	0.1	20.8	11.4	20.4	20.8	..	..
Madagascar	IF	U	6,283.8	1.0	..	482.2	1,945.3	15.3	28.0	16.6	102	192
Malawi	MF	U	44.1	1.0	111.7	1.2	12.6	33.2	53.6	8.0	64	35
Malaysia	P	U	3.8	..	83.3	1.4	1.6	4.1	7.3	7.5	..	98
Mali	FF	U	615.7	1.0	..	133.2	201.4	3.5	..	..	124	128
Mauritania	MF	U	209.5	1.0	..	34.8	48.0	..	..	..	197	223
Mauritius	IF	U	25.2	1.0	..	6.6	10.0	10.9	21.6	15.0	..	208
Mexico	IF	U	9.6	1.0	..	1.4	5.8	9.6	25.9	8.4	141	146
Moldova	IF	U	10.5	1.0	100.1	..	1.4	27.5	35.5	-3.1	..	..
Mongolia	IF	U	1,021.9	1.0	..	2.7	230.0	19.8	37.7	32.7	..	..
Morocco	P	U	9.8	1.0	106.1	3.0	3.5	6.4	13.5	12.5	255	205
Mozambique	IF	U	12,775.1	1.0	..	303.4	3,410.9	7.9	19.6	17.3	21	13
Myanmar	P	D	6.3	..	..	..	..	11.0	16.1	..	..	..
Namibia	P	U	6.1	1.0	..	1.0	2.0	10.8	18.5	9.4	183	154
Nepal	P	U	68.2	1.0	..	6.2	11.7	7.3	11.3	2.6	119	106
Netherlands	Euro	U	2.1 ^b	1.0	93.7	2.1	2.1	2.7	3.5	2.1	118	232
New Zealand	IF	U	1.9	1.0	90.9	1.5	1.4	4.6	8.5	8.5	153	131
Nicaragua	P	U	11.8	1.0	104.3	0.0	2.4	10.3	22.1	9.8	..	189
Niger	FF	U	615.7	1.0	..	117.8	157.3	3.5	..	..	372	582
Nigeria	MF	U	92.3	0.9	78.9	3.5	30.6	12.8	20.3	6.5	1,555	1,201
Norway	MF	U	7.8	1.0	97.8	8.7	9.4	5.4	8.2	1.5	528	..
Oman	..	U	0.4	1.0	..	..	..	8.1	10.3	..	..	..
Pakistan	P	U	49.1	0.8	92.4	5.8	11.8	..	..	..	125	19
Panama	Other	U	1.0	1.0	..	0.6	0.6	6.9	10.1	10.8	..	265
Papua New Guinea	IF	U	2.6	1.0	84.2	0.5	0.8	15.5	18.9	5.9	..	84
Paraguay	MF	U	3,119.1	1.0	97.7	389.4	1,027.7	19.7	30.2	25.4	109	121
Peru	IF	U	3.4	1.0	..	0.1	1.5	16.3	30.8	25.9	242	246
Philippines	IF	U	39.1	1.0	96.4	5.3	10.6	8.2	11.8	3.3	..	138
Poland	IF	U	4.0	1.0	112.3	0.3	1.9	11.2	17.0	9.5	164	146
Portugal	Euro	U	188.2 ^b	1.0	98.9	90.9	133.4	2.4	5.2	1.1	147	144
Puerto Rico	..	..	..	..	..	..	..	..	..	..	..	..
Romania	MF	U	15,332.8	1.0	97.8	5.9	3,845.4	..	..	..	93	73
Russian Federation	IF	M	24.6	1.0	80.9	..	4.2	13.7	39.7	-14.5	..	..



5.6 Relative prices and exchange rates

	Exchange rate arrangements ^a		Official exchange rate local currency units to \$ 1999	Ratio of official to parallel exchange rate 1999	Real effective exchange rate 1995 = 100 1999	Purchasing power parity conversion factor local currency units to international \$		Interest rate			Key agricultural producer prices	
	Classification 1999	Structure 1999				1990	1999	Deposit % 1999	Lending % 1999	Real % 1999	Wheat \$ per metric ton 1998	Maize \$ per metric ton 1998
Rwanda	IF	U	333.9	1.0	..	32.1	88.9	7.9	..	..	226	145
Saudi Arabia	P	U	3.7	1.0	106.4	2.6	2.4	6.1	..	..	387	478
Senegal	FF	U	615.7	1.0	..	175.3	224.4	3.5	..	..	..	135
Sierra Leone	IF	D	1,804.2	..	116.2	38.0	544.4	9.5	26.8	1.5	..	33
Singapore	MF	U	1.7	1.0	95.4	1.7	1.8	1.7	5.8	7.2	..	..
Slovak Republic	MF	U	41.4	1.0	100.0	5.8	14.3	14.4	21.1	13.6	101	89
Slovenia	MF	U	181.8	1.0	..	..	114.7	7.2	12.4	5.4	198	160
South Africa	IF	U	6.1	1.0	84.6	1.0	2.1	12.2	18.0	10.4	146	103
Spain	Euro	U	156.2 ^b	1.0	96.7	104.4	130.6	1.8	3.9	0.8	157	154
Sri Lanka	P	U	70.4	1.0	..	9.3	17.8	11.8	7.0	2.3	..	218
Sudan	IF	U	252.6	1.0	..	..	..	..	..	..	248	117
Sweden	IF	U	8.3	1.0	97.0	9.0	9.8	1.6	5.5	5.0	126	..
Switzerland	IF	U	1.5	1.0	89.4	2.0	2.0	1.2	3.9	3.2	525	368
Syrian Arab Republic	P	M	11.2	1.0	..	8.9	13.2	..	..	..	884	823
Tajikistan	MF	U	..	..	..	..	..	..	..	..	..	..
Tanzania	IF	U	744.8	1.0	..	71.6	395.8	7.8	21.9	11.7	348	348
Thailand	IF	U	37.8	1.0	..	10.2	12.7	4.7	9.0	11.9	..	87
Togo	FF	U	615.7	1.0	105.3	90.5	134.4	3.5	..	..	..	216
Trinidad and Tobago	P	U	6.3	1.0	110.2	2.9	4.1	8.5	17.0	11.3	..	349
Tunisia	P	U	1.2	1.0	101.5	0.3	0.4	..	..	..	284	..
Turkey	P	U	418,782.9	1.0	..	1,445.1	188,358.0	78.4	..	..	133	126
Turkmenistan	P	D	5,200.0	0.7	..	..	1,074.3	..	..	..	..	..
Uganda	IF	U	1,454.8	1.0	88.0	112.8	348.4	8.7	21.5	16.5	681	358
Ukraine	MF	U	4.1	0.9	126.6	..	0.7	20.7	55.0	24.5	..	..
United Arab Emirates	P	U	3.7	1.0	..	3.3	..	..	..	..	..	..
United Kingdom	IF	U	0.6	1.0	127.6	0.6	0.7	..	5.3	2.8	118	176
United States	IF	U	1.0	1.0	119.4	1.0	1.0	..	8.0	6.3	99	61
Uruguay	P	U	11.3	1.0	112.5	0.6	8.1	14.2	53.3	46.2	119	125
Uzbekistan	MF	U	..	..	..	..	37.3	..	..	..	..	..
Venezuela, RB	P	U	605.7	1.0	152.3	23.0	475.3	21.3	32.1	3.5	123	445
Vietnam	P	U	13,916.2	1.0	..	..	2,773.9	..	..	..	..	..
West Bank and Gaza	..	..	..	..	..	..	..	..	..	..	..	..
Yemen, Rep.	IF	U	155.7	1.0	..	14.0	77.4	18.3	22.0	1.9	191	221
Yugoslavia, FR (Serb./Mont.)	..	..	..	..	..	..	..	..	..	..	..	..
Zambia	IF	U	2,388.0	1.0	111.9	17.3	1,006.7	20.3	40.5	15.4	211	79
Zimbabwe	P	U	38.3	1.0	..	0.9	6.3	38.5	55.4	4.9	211	122

a. Exchange rate arrangements are given for the end of the year in 1999. Exchange rate classifications include independent floating (IF), managed floating (MF), pegged (P), currency board (CB), and several exchange arrangements (euro means that the euro is used, FF that the currency is pegged to the French franc, and other that the currency of another country is used as legal tender). Exchange rate structures include dual exchange rates (D), multiple exchange rates (M), and unitary rate (U). b. Data refer to the exchange rate for the national currency relative to the U.S. dollar. On 1 January 1999 irrevocably fixed factors for converting national currencies of European Monetary Union members to the euro were established. The average annual euro-U.S. dollar exchange rate in 1999 was 0.94.



Relative prices and exchange rates | 5.6

About the data

In a market-based economy the choices households, producers, and governments make about the allocation of resources are influenced by relative prices, including the real exchange rate, real wages, real interest rates, and commodity prices. Relative prices also reflect, to a large extent, the choices of these agents. Thus relative prices convey vital information about the interaction of economic agents in an economy and with the rest of the world.

The exchange rate is the price of one currency in terms of another. Official exchange rates and exchange rate arrangements are established by governments (other exchange rates fully recognized by governments include market rates, which are determined largely by legal market forces, and, for countries maintaining multiple exchange arrangements, principal rates, secondary rates, and tertiary rates). Parallel, or black market, exchange rates reflect unofficial rates negotiated by traders and are by nature difficult to measure. Parallel exchange rate markets often account for only a small share of transactions and so may be both thin and volatile. But in countries with weak policies and financial systems they often represent the “going” rate. The parallel rates used here are collected by the Monetary Research Institute and published in its *MRI Bankers' Guide to Foreign Currency*.

Real effective exchange rates are derived by deflating a trade-weighted average of the nominal exchange rates that apply between trading partners. For most high-income countries the weights are based on trade in manufactured goods with other high-income countries during 1989–91, and an index of relative, normalized unit labor costs is used as the deflator. (Normalization smooths a time series by removing short-term fluctuations while retaining changes of a large amplitude over the longer economic cycle.) For other countries the weights prior to 1990 take into account trade in manufactured and primary products during 1980–82, and the weights from January 1990 onward this trade during 1988–90, and an index of relative changes in consumer prices is used as the deflator. An increase in the real effective exchange rate represents an appreciation of the local currency. Because of conceptual and data limitations, changes in real effective exchange rates should be interpreted with caution.

The official or market exchange rate is often used to compare prices in different currencies. But because market imperfections are extensive and exchange rates reflect at best the relative prices of tradable goods, the volume of goods and services that a U.S. dollar buys in the United States may not correspond to what a U.S. dollar converted to another country's

currency at the official exchange rate would buy in that country. The alternative approach is to convert national currency estimates of gross national income to a common currency by using conversion factors that reflect equivalent purchasing power. Purchasing power parity (PPP) conversion factors are based on price and expenditure surveys conducted by the International Comparison Programme (ICP) and represent the conversion factors applied to equalize price levels across countries. See *About the data* for table 1.1 for further discussion of the PPP conversion factor.

Many interest rates coexist in an economy, reflecting competitive conditions, the terms governing loans and deposits, and differences in the position and status of creditors and debtors. In some economies interest rates are set by regulation or administrative fiat. In economies with imperfect markets or where reported nominal rates are not indicative of effective rates, it may be difficult to obtain data on interest rates that reflect actual market transactions. Deposit and lending rates are collected by the International Monetary Fund (IMF) as representative interest rates offered by banks to resident customers. The terms and conditions attached to these rates differ by country, however, limiting their comparability. Real interest rates are calculated by adjusting nominal rates by an estimate of the inflation rate in the economy. A negative real interest rate indicates a loss in the purchasing power of the principal. The real interest rates in the table are calculated as $(i - P)/(1 + P)$, where i is the nominal interest rate and P is the inflation rate (as measured by the GDP deflator).

The table also shows prices for two key agricultural commodities, wheat and maize. The prices received by farmers, used here, are important determinants of the type and volume of agricultural production. In theory these prices should refer to national average farmgate, or first-point-of-sale, transactions. But depending on the country's institutional arrangements—whether it relies on market wholesale prices, government fixed prices, or support prices—the data may not always refer to the same selling points. These data come from the Food and Agriculture Organization (FAO), with most originating from official national publications or FAO questionnaires. As the data show, the prices received by farmers are often not equalized across international markets (even after adjusting for freight, transport, and insurance costs and for differences in quality). Market imperfections such as taxes, subsidies, and trade barriers drive a wedge between domestic and international prices.

Definitions

- **Exchange rate arrangement** describes the arrangement that an IMF member country has furnished to the IMF under article IV, section 2(a) of the IMF's Articles of Agreement. *Exchange rate classification* indicates how the exchange rate is determined in the main market when there is more than one market: floating (managed or independent), pegged (conventional, within horizontal bands, crawling peg, or crawling band), currency board (implicit legislative commitment to exchange domestic currency for a specified foreign currency at a fixed exchange rate), and exchange arrangement (country uses the euro, currency is pegged to the French franc, or another country's currency is used as legal tender). *Exchange rate structure* shows whether countries have a unitary exchange rate or dual or multiple rates.
- **Official exchange rate** refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar).
- **Ratio of official to parallel exchange rate** measures the premium people must pay, relative to the official exchange rate, to exchange the domestic currency for U.S. dollars in the black market.
- **Real effective exchange rate** is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs.
- **Purchasing power parity conversion factor** is the number of units of a country's currency required to buy the same amount of goods and services in the domestic market as a U.S. dollar would buy in the United States.
- **Deposit interest rate** is the rate paid by commercial or similar banks for demand, time, or savings deposits.
- **Lending interest rate** is the rate charged by banks on loans to prime customers.
- **Real interest rate** is the lending interest rate adjusted for inflation as measured by the GDP deflator.
- **Key agricultural producer prices** are domestic producer prices converted to U.S. dollars using the official exchange rate.

Data sources

The information on exchange rate arrangements is from the IMF's *Exchange Arrangements and Exchange Restrictions Annual Report, 1999*. The official and real effective exchange rates and deposit and lending rates are from the IMF's *International Financial Statistics*. The estimates of parallel market exchange rates are from the Monetary Research Institute's *MRI Bankers' Guide to Foreign Currency*. PPP conversion factors are from the World Bank. The agricultural price data are from the FAO's *Production Yearbook*. The real interest rates are calculated using World Bank data on the GDP deflator.



5.7 Defense expenditures and trade in arms

	Military expenditures				Armed forces personnel				Arms trade			
	% of GNI		% of central government expenditure		Total thousands		% of labor force		Exports % of total exports		Imports % of total imports	
	1992	1997	1992	1997	1992	1997	1992	1997	1992	1997	1992	1997
Albania	4.7	1.4	10.1	4.9	65	52	4.2	3.2	0.0	0.0	0.0	1.3
Algeria	1.8	3.9	5.9	12.0	126	124	1.7	1.3	0.0	0.0	0.1	5.6
Angola	24.2	20.5	24.6	36.3	128	95	2.8	1.8	0.0	0.0	1.5	3.5
Argentina	1.9	1.2	16.0	6.3	65	65	0.5	0.5	0.0	0.0	0.3	0.2
Armenia	3.5	3.5	..	..	20	60	1.1	3.2	0.0	2.1	0.0	0.0
Australia	2.5	2.2	9.2	8.6	68	65	0.8	0.7	0.1	0.0	2.1	1.4
Austria	1.0	0.9	2.4	1.9	52	48	1.4	1.3	0.2	0.0	0.1	0.3
Azerbaijan	2.9	1.9	9.0	10.8	43	75	1.4	2.2	0.0	1.3	0.0	0.0
Bangladesh	1.3	1.4	11.2	10.7	107	110	0.2	0.2	0.0	0.0	1.0	0.7
Belarus	1.9	1.7	4.9	4.8	102	65	1.9	1.2	0.0	6.7	0.0	0.0
Belgium	1.8	1.5	3.7	3.2	79	46	1.9	1.1	0.3	0.1	0.2	0.2
Benin	1.3	1.3	6.3	6.8	7	8	0.3	0.3	0.0	0.0	0.0	0.0
Bolivia	2.2	1.9	10.4	6.7	32	33	1.2	1.1	0.0	0.0	0.9	1.6
Bosnia and Herzegovina	16.5	5.9	..	14.1	60	40	3.2	2.4	0.0	0.0	0.0	6.5
Botswana	4.4	5.1	10.3	13.4	7	8	1.2	1.2	0.0	0.0	1.1	0.9
Brazil	1.1	1.8	3.5	3.9	296	296	0.4	0.4	0.5	0.1	0.9	0.7
Bulgaria	3.3	3.0	7.9	9.2	99	80	2.3	1.9	3.1	2.4	0.0	0.2
Burkina Faso	2.4	2.8	11.5	12.3	9	9	0.2	0.2	0.0	0.0	1.1	0.0
Burundi	2.7	6.1	7.8	25.8	13	35	0.4	1.0	0.0	0.0	0.0	16.5
Cambodia	4.9	4.1	..	25.8	135	60	2.7	1.0	0.0	0.0	0.0	0.9
Cameroon	1.6	3.0	8.2	17.7	12	13	0.2	0.2	0.0	0.0	0.0	0.7
Canada	2.0	1.3	7.5	..	82	61	0.5	0.4	0.7	0.3	0.6	0.2
Central African Republic	2.0	3.9	8.3	27.7	4	5	..	..	0.0	0.0	0.0	0.0
Chad	4.0	2.7	17.3	12.6	38	35	1.3	1.0	0.0	0.0	4.1	2.1
Chile	2.5	3.9	11.7	17.8	92	102	1.7	1.7	0.0	0.0	1.0	0.3
China	2.8	2.2	19.8	17.6	3,160	2,600	0.5	0.4	1.3	0.6	1.6	0.4
Hong Kong, China	..	..	..	..	..	..	..	..	..	..	..	..
Colombia	2.4	3.7	14.7	19.9	139	149	0.9	0.9	0.0	0.0	1.7	0.8
Congo, Dem. Rep.	3.0	5.0	16.1	41.4	45	50	0.3	0.3	0.0	0.0	0.0	2.4
Congo, Rep.	5.7	4.1	13.5	12.3	10	10	1.0	0.9	0.0	0.0	0.0	1.1
Costa Rica	1.4	0.6	7.5	3.1	8	10	0.7	0.7	0.0	0.0	0.2	0.1
Côte d'Ivoire	1.5	1.1	4.3	4.0	15	15	0.3	0.3	0.0	0.0	0.0	0.0
Croatia	7.7	6.3	19.2	20.1	103	58	4.6	2.7	0.0	0.0	0.0	0.1
Cuba	2.4	2.3	..	..	175	55	3.5	1.0	0.0	0.0	4.5	0.0
Czech Republic	2.7	1.9	6.9	5.8	107	55	1.9	1.0	1.6	0.4	0.0	0.5
Denmark	2.0	1.7	4.8	3.9	28	29	1.0	1.0	0.0	0.0	0.5	0.5
Dominican Republic	0.9	1.1	6.8	7.3	22	22	0.7	0.6	0.0	0.0	0.2	0.1
Ecuador	3.5	4.0	25.4	20.3	57	58	1.5	1.3	0.0	0.0	1.2	3.2
Egypt, Arab Rep.	3.7	2.8	8.5	11.0	424	430	2.2	1.9	0.7	0.1	19.4	12.1
El Salvador	2.1	0.9	13.4	6.7	49	15	2.4	0.6	0.0	0.0	4.1	0.3
Eritrea	..	7.8	..	18.1	55	55	3.2	2.9	0.0	0.0	0.0	0.0
Estonia	0.5	1.5	2.2	4.5	3	7	0.4	0.9	0.0	0.0	1.2	0.2
Ethiopia	3.7	1.9	17.9	7.9	120	100	0.5	0.4	0.0	0.0	0.0	0.0
Finland	2.2	1.7	4.3	4.3	33	35	1.3	1.3	0.0	0.1	2.1	1.2
France	3.4	3.0	7.6	6.4	522	475	2.1	1.8	0.9	2.0	0.2	0.1
Gabon	3.1	2.0	10.1	7.0	7	10	1.4	1.8	0.0	0.0	0.0	0.0
Gambia, The	3.6	3.7	19.7	15.0	1	1	0.2	0.2	0.0	0.0	2.1	11.9
Georgia	2.4	1.4	..	9.6	25	11	0.9	0.4	0.0	0.0	0.0	1.1
Germany	2.1	1.6	6.3	4.7	442	335	1.1	0.8	0.3	0.1	0.6	0.2
Ghana	0.8	0.7	4.6	2.4	7	7	0.1	0.1	0.0	0.0	0.0	0.0
Greece	4.4	4.6	13.5	13.8	208	206	4.8	4.6	0.2	0.3	3.9	3.1
Guatemala	1.5	1.4	14.0	15.0	44	30	1.4	0.8	0.0	0.0	0.2	0.1
Guinea	1.4	1.5	7.0	8.0	15	12	0.5	0.4	0.0	0.0	0.0	3.7
Guinea-Bissau	3.2	3.2	7.6	13.0	11	7	2.3	1.3	0.0	0.0	0.0	0.0
Haiti	1.5	..	14.7	..	8	0	0.3	0.0	0.0	0.0	0.0	0.8
Honduras	1.4	1.3	5.5	5.6	17	10	0.9	0.5	0.0	0.0	2.9	0.5



Defense expenditures and trade in arms 5.7

	Military expenditures				Armed forces personnel				Arms trade			
	% of GNI		% of central government expenditure		Total thousands		% of labor force		Exports % of total exports		Imports % of total imports	
	1992	1997	1992	1997	1992	1997	1992	1997	1992	1997	1992	1997
Hungary	2.1	1.9	3.8	4.3	78	50	1.6	1.0	0.4	0.0	0.0	0.5
India	2.5	2.8	12.4	14.3	1,260	1,260	0.3	0.3	0.0	0.3	2.9	1.0
Indonesia	1.4	2.3	7.2	13.1	283	280	0.3	0.3	0.1	0.0	0.4	1.0
Iran, Islamic Rep.	3.0	3.0	14.9	11.6	528	575	3.2	3.1	0.1	0.1	3.3	5.8
Iraq	9.7	4.9	..	..	407	400	8.2	6.8	0.0	0.0	0.0	0.0
Ireland	1.4	1.2	3.8	3.3	13	17	1.0	1.1	0.0	0.0	0.1	0.1
Israel	11.7	9.7	23.3	20.9	181	185	8.8	7.5	4.8	1.6	7.9	3.6
Italy	2.1	2.0	3.9	4.1	471	419	1.9	1.7	0.3	0.3	0.2	0.2
Jamaica	1.0	0.9	3.0	2.4	3	3	0.2	0.2	0.0	0.0	0.6	0.2
Japan	1.0	1.0	6.3	6.6	242	250	0.4	0.4	0.0	0.0	0.9	0.8
Jordan	8.8	9.0	27.3	25.0	100	102	9.9	7.9	0.0	0.0	1.2	3.2
Kazakhstan	2.9	1.3	14.2	4.4	15	34	0.2	0.4	0.0	0.0	0.0	3.3
Kenya	3.0	2.1	9.9	7.2	24	24	0.2	0.2	0.0	0.0	1.2	1.2
Korea, Dem. Rep.	25.0	27.5	28.5	..	1,200	1,100	10.9	9.1	13.1	8.1	7.9	2.1
Korea, Rep.	3.7	3.4	19.8	14.6	750	670	3.7	2.9	0.1	0.0	1.5	0.8
Kuwait	77.0	7.5	96.3	26.8	12	28	2.1	4.1	0.2	0.0	13.8	24.3
Kyrgyz Republic	0.7	1.6	7.1	..	12	14	0.6	0.7	0.0	0.0	0.0	0.0
Lao PDR	9.8	3.4	23.6	17.5	37	50	..	..	0.0	0.0	2.3	1.4
Latvia	1.6	0.9	2.5	..	5	5	0.4	0.4	0.0	0.0	0.0	0.0
Lebanon	4.0	3.0	18.5	8.4	37	57	3.1	4.0	0.0	0.0	0.0	0.5
Lesotho	3.6	2.5	10.5	6.1	2	2	0.3	0.2	0.0	0.0	0.0	0.0
Libya	7.6	6.1	16.4	19.7	85	70	6.3	4.7	0.1	0.0	1.7	0.1
Lithuania	0.7	0.8	2.5	2.8	10	12	0.5	0.6	0.0	0.0	0.0	0.1
Macedonia, FYR	2.2	2.5	..	10.2	10	15	1.2	1.6	0.0	0.0	0.0	0.0
Madagascar	1.1	1.5	5.4	8.5	21	21	0.4	0.3	0.0	0.0	0.0	0.0
Malawi	1.1	1.0	3.9	2.9	10	8	0.2	0.2	0.0	0.0	0.0	0.0
Malaysia	3.2	2.2	10.3	9.9	128	110	1.7	1.3	0.0	0.0	0.6	0.9
Mali	2.3	1.7	9.4	7.2	12	10	0.3	0.2	0.0	0.0	0.0	1.5
Mauritania	3.5	2.3	13.3	9.8	16	11	1.6	1.0	0.0	0.0	0.0	0.0
Mauritius	0.4	0.3	1.5	1.2	1	1	0.2	0.2	0.0	0.0	0.3	0.4
Mexico	0.5	1.1	3.7	6.2	175	250	0.5	0.7	0.0	0.0	0.5	0.1
Moldova	0.5	1.0	1.5	1.9	9	11	0.4	0.5	0.0	7.9	0.8	0.0
Mongolia	2.6	1.9	9.3	5.1	21	20	1.9	1.6	0.0	0.0	0.0	0.0
Morocco	4.5	4.3	14.3	12.9	195	195	2.1	1.8	0.0	0.0	1.4	1.9
Mozambique	7.6	2.8	17.0	9.2	50	14	0.6	0.2	0.0	0.0	0.6	0.0
Myanmar	8.3	7.6	74.3	75.5	286	322	1.3	1.4	0.0	0.0	23.0	13.6
Namibia	2.2	2.7	5.6	7.3	8	8	1.4	1.2	0.0	0.0	0.0	0.3
Nepal	1.0	0.8	6.0	5.1	35	35	0.4	0.3	0.0	0.0	0.0	0.0
Netherlands	2.5	1.9	6.9	6.4	90	57	1.3	0.8	0.1	0.3	0.4	0.3
New Zealand	1.6	1.3	4.0	3.9	11	10	0.6	0.5	0.0	0.0	1.2	0.7
Nicaragua	3.1	1.5	8.1	4.5	15	14	1.0	0.8	13.5	0.0	0.6	0.0
Niger	1.3	1.1	7.9	6.9	5	5	0.1	0.1	0.0	0.0	0.0	1.4
Nigeria	2.6	1.4	15.6	12.3	76	76	0.2	0.2	0.0	0.0	2.0	0.7
Norway	3.1	2.1	6.4	4.8	36	33	1.6	1.4	0.1	0.0	1.7	0.7
Oman	20.5	26.1	40.2	36.4	35	38	6.6	6.2	0.0	0.0	0.3	3.2
Pakistan	7.4	5.7	27.9	24.2	580	610	1.4	1.3	0.4	0.0	6.7	5.2
Panama	1.3	1.4	5.7	4.8	11	12	1.1	1.1	2.0	0.0	0.5	0.3
Papua New Guinea	1.5	1.3	4.2	4.1	4	5	0.2	0.2	0.0	0.0	4.0	0.0
Paraguay	1.8	1.3	13.2	10.5	16	16	1.0	0.9	0.0	0.0	0.7	0.1
Peru	1.8	2.1	11.1	13.4	112	115	1.4	1.3	0.0	0.0	1.4	3.0
Philippines	1.9	1.5	10.2	7.9	107	105	0.4	0.3	0.0	0.0	1.6	0.3
Poland	2.3	2.3	8.8	5.6	270	230	1.4	1.2	0.2	0.2	0.0	0.4
Portugal	2.7	2.4	6.4	5.9	80	72	1.7	1.4	0.1	0.0	0.6	0.3
Puerto Rico	..	..	..	..	..	..	..	..	..	..	..	..
Romania	3.3	2.4	7.9	6.9	172	200	1.6	1.9	0.5	0.1	0.6	2.2
Russian Federation	8.0	5.8	28.0	30.9	1,900	1,300	2.5	1.7	5.9	2.6	0.0	0.0



5.7 Defense expenditures and trade in arms

	Military expenditures				Armed forces personnel				Arms trade			
	% of GNI		% of central government expenditure		Total thousands		% of labor force		Exports % of total exports		Imports % of total imports	
	1992	1997	1992	1997	1992	1997	1992	1997	1992	1997	1992	1997
Rwanda	4.4	4.4	21.7	22.2	30	40	0.8	1.0	0.0	0.0	0.0	6.7
Saudi Arabia	26.8	14.5	72.5	35.8	172	180	3.1	2.7	0.0	0.0	25.2	40.4
Senegal	2.8	1.6	13.5	8.5	18	14	0.5	0.4	0.0	0.0	1.0	0.0
Sierra Leone	3.2	5.9	17.7	33.0	8	5	0.5	0.3	0.0	0.0	6.8	0.0
Singapore	5.2	5.7	27.2	19.4	56	55	3.9	3.5	0.0	0.1	0.4	0.3
Slovak Republic	2.2	2.1	5.1	8.0	33	44	1.2	1.5	0.7	0.5	3.5	0.1
Slovenia	2.1 ^a	1.7 ^a	..	..	15	10	1.5	1.0	0.0	0.0	0.0	0.2
South Africa	3.2	1.8	9.8	5.6	75	75	0.5	0.5	0.4	1.2	1.3	0.1
Spain	1.6	1.5	6.4	6.0	198	107	1.2	0.6	0.3	0.5	0.4	0.4
Sri Lanka	3.8	5.1	13.6	21.2	110	110	1.5	1.4	0.0	0.0	0.3	1.5
Sudan	7.8	4.6	60.0	53.8	82	105	0.9	1.0	0.0	0.0	13.4	1.3
Sweden	2.6	2.5	5.3	5.4	70	60	1.5	1.3	1.5	1.1	0.3	0.5
Switzerland	1.8	1.4	7.2	5.8	31	39	0.9	1.0	1.2	0.1	0.7	0.4
Syrian Arab Republic	9.7	5.6	39.0	26.2	408	320	10.9	6.9	0.6	0.0	11.2	1.7
Tajikistan	0.3	1.7	0.7	10.6	3	10	0.1	0.4	0.0	0.0	0.0	0.0
Tanzania	2.2	1.3	10.0	10.7	46	35	0.3	0.2	0.0	0.0	0.3	1.5
Thailand	2.6	2.3	16.6	12.1	283	288	0.9	0.8	0.0	0.0	1.2	1.5
Togo	2.9	2.0	13.2	11.6	8	12	0.5	0.7	0.0	0.0	0.0	1.3
Trinidad and Tobago	1.5	1.5	4.8	5.4	2	2	0.4	0.4	0.0	0.0	0.0	0.2
Tunisia	2.4	2.0	7.1	5.3	35	35	1.1	1.0	0.0	0.0	0.3	0.3
Turkey	3.8	4.0	18.8	14.7	704	820	2.8	2.8	0.1	0.0	6.6	3.3
Turkmenistan	..	4.6	..	15.6	28	21	1.7	1.1	1.4	0.0	0.0	0.0
Uganda	2.4	4.2	11.7	23.9	70	50	0.8	0.5	0.0	0.0	2.3	2.3
Ukraine	1.9	3.7	..	8.4	438	450	1.7	1.8	0.0	3.5	0.0	0.0
United Arab Emirates	5.7	6.9	49.5	46.5	55	60	5.3	4.7	0.0	0.1	4.2	4.7
United Kingdom	3.8	2.7	9.3	7.1	293	218	1.0	0.7	3.3	2.3	1.3	0.7
United States	4.8	3.3	21.1	16.3	1,920	1,530	1.5	1.1	5.6	4.6	0.3	0.2
Uruguay	2.3	1.4	8.0	4.4	25	25	1.8	1.7	0.0	0.0	0.5	0.3
Uzbekistan	2.7	2.5	6.0	6.1	40	65	0.5	0.7	0.0	1.7	0.0	0.1
Venezuela, RB	2.6	2.2	11.9	9.8	75	75	1.0	0.8	0.0	0.0	0.9	1.8
Vietnam	3.4	2.8	14.5	11.1	857	650	2.4	1.7	0.4	0.0	0.4	1.1
West Bank and Gaza	..	..	..	..	..	..	..	..	..	..	..	..
Yemen, Rep.	9.4	8.1	29.8	17.4	64	69	1.5	1.3	0.0	0.0	0.2	5.5
Yugoslavia, FR (Serb./Mont.)	..	4.9	..	..	137	115	2.8	2.3	0.0	1.6	0.0	0.4
Zambia	3.3	1.1	9.3	3.9	16	21	0.5	0.5	0.0	0.0	0.0	0.0
Zimbabwe	3.8	3.8	10.1	11.9	48	40	1.0	0.8	0.3	0.0	4.1	0.5
World	3.2 w	2.5 w	12.7 w	10.8 w	24,539 t	22,157 t	1.0 w	0.8 w	1.2 w	1.0 w	1.1 w	1.0 w
Low income	2.7	2.9	12.5	13.3	6,511	6,206	0.7	0.6	0.1	0.4	2.0	1.2
Middle income	4.0	2.9	19.0	15.3	12,357	11,074	1.0	0.8	0.8	0.4	2.7	1.8
Lower middle income	4.3	3.2	19.4	17.6	9,856	8,573	1.0	0.8	1.6	0.8	2.4	1.5
Upper middle income	3.8	2.7	18.6	12.7	2,501	2,501	1.2	1.0	0.1	0.1	3.0	2.1
Low & middle income	3.8	2.9	18.0	15.0	18,868	17,280	0.9	0.7	0.7	0.4	2.6	1.8
East Asia & Pacific	2.9	2.5	17.2	15.1	7,256	6,264	0.8	0.6	0.4	0.2	1.3	0.8
Europe & Central Asia	5.2	4.0	19.3	16.6	4,311	3,899	2.1	1.7	2.9	1.4	1.4	0.8
Latin America & Carib.	1.3	1.8	5.8	6.6	1,443	1,362	0.8	0.7	0.2	0.0	0.7	0.5
Middle East & N. Africa	14.2	6.9	48.2	22.9	2,633	2,614	3.3	2.9	0.1	0.0	10.5	13.1
South Asia	3.1	3.1	14.9	15.6	2,142	2,133	0.4	0.4	0.1	0.2	3.3	1.6
Sub-Saharan Africa	3.1	2.3	10.5	7.8	1,083	1,008	0.5	0.4	0.2	0.5	1.3	0.5
High income	3.1	2.4	11.8	9.9	5,671	4,877	1.3	1.1	1.4	1.2	0.7	0.7
Europe EMU	2.3	2.0	5.9	5.1	1,981	1,612	1.5	1.2	0.4	0.5	0.4	0.2

Note: Data for some countries are based on partial or uncertain data or rough estimates; see U.S. Department of State (1999).

a. Data provided by national authorities.



Defense expenditures and trade in arms 5.7

About the data

Although national defense is an important function of government and security from external threats contributes to economic development, high levels of defense spending burden the economy and may impede growth. Comparisons of defense spending between countries should take into account the many factors that influence perceptions of vulnerability and risk, including historical and cultural traditions, the length of borders that need defending, the quality of relations with neighbors, and the role of the armed forces in the body politic.

Data on defense spending from governments are often incomplete and unreliable. Even in countries where parliaments vigilantly review government budgets and spending, defense spending and trade in arms often do not receive close scrutiny. For a detailed critique of the quality of such data see Ball (1984) and Happe and Wakeman-Linn (1994).

The International Monetary Fund's (IMF) *Government Finance Statistics Yearbook* is the primary source of data on defense spending. It uses a consistent definition of defense spending based on the United Nations' classification of the functions of government and the North Atlantic Treaty Organization (NATO) definition. The IMF checks data on defense spending for broad consistency with other macroeconomic data reported to it but is not always able to verify the accuracy and completeness of the data. Moreover, country coverage is affected by delays or failure to report data. Thus most researchers supplement the IMF's data with assessments by other organizations. However, these organizations rely heavily on reporting by governments, on confidential intelligence estimates of varying quality, on sources that they do not or cannot reveal, and on one another's publications. The data in this table are the latest available from the U.S. Department of State's Bureau of Verification and Compliance (formerly the Bureau of Arms Control).

Definitions of military spending differ depending on whether they cover civil defense, reserves and auxiliary forces, police and paramilitary forces, dual-purpose forces such as military and civilian police, military grants in kind, pensions for military personnel, and social security contributions paid by one part of government to another. Official government data may omit parts of military spending, disguise financing through extrabudgetary accounts or unrecorded use of foreign exchange receipts, or fail to include military assistance or secret military equipment imports. Current spending is more likely to be reported than capital spending. In some cases a more accurate estimate of military spending can be obtained by adding the value of estimated arms imports and nominal military expenditures. This method may understate or overstate spending

in a particular year, however, because payments for arms may not coincide with deliveries.

The data on armed forces refer to military personnel on active duty, including paramilitary forces. These data exclude civilians in the defense establishment and so are not consistent with the data on military spending on personnel. Moreover, because they exclude payments to personnel not on active duty, they underestimate the share of the labor force working for the defense establishment. Because governments rarely report the size of their armed forces, such data typically come from intelligence sources. The Bureau of Verification and Compliance attributes its data to unspecified U.S. government sources.

The Standard International Trade Classification does not clearly distinguish trade in military goods. For this and other reasons, customs-based data on trade in arms are of little use, so most compilers rely on trade publications, confidential government information on third-country trade, and other sources. The construction of defense production facilities and the licensing fees paid for the production of arms are included in trade data when they are specified in military transfer agreements. Grants in kind are usually included as well. Definitional issues include treatment of dual-use equipment such as aircraft, use of military establishments such as schools and hospitals by civilians, and purchases by nongovernment buyers. Bureau of Verification and Compliance data do not include arms supplied to subnational groups. Valuation problems arise when data are reported in volume terms and the purchase price must be estimated. Differences between sources may reflect reporting lags or differences in the period covered. Most compilers revise their time-series data regularly, so estimates for the same year may not be consistent between publication dates.

The data on U.S. arms exports were substantially revised upward in last year's edition of the *World Development Indicators*, based on data from the most recent edition of the Bureau of Verification and Compliance's *World Military Expenditures and Arms Transfers* (U.S. Department of State 1999). Revisions were made in commercial arms sales made directly by U.S. firms to foreign importers under authorization of the U.S. Department of State in accordance with U.S. regulations on international traffic in arms. Under the previous methodology the commercial arms component was represented by preliminary data on the deliveries made under approved export licenses. But because of weaknesses in data reporting, the extent to which authorized exports matched actual exports was uncertain. The new methodology assumes that deliveries constitute 50 percent of total authorizations by country. These deliveries are then distributed in a fixed pattern over the years of the license.

Definitions

- **Military expenditures** for NATO countries are based on the NATO definition, which covers military-related expenditures of the defense ministry (including recruiting, training, construction, and the purchase of military supplies and equipment) and other ministries. Civilian-type expenditures of the defense ministry are excluded. Military assistance is included in the expenditures of the donor country, and purchases of military equipment on credit are included at the time the debt is incurred, not at the time of payment. Data for other countries generally cover expenditures of the ministry of defense (excluded are expenditures on public order and safety, which are classified separately).
- **Armed forces personnel** refer to active duty military personnel, including paramilitary forces if those forces resemble regular units in their organization, equipment, training, or mission.
- **Arms trade** comprises exports and imports of military equipment usually referred to as "conventional," including weapons of war, parts thereof, ammunition, support equipment, and other commodities designed for military use. See *About the data* for more details.

Data sources

The data on military expenditures, armed forces, and arms trade are from the Bureau of Verification and Compliance's *World Military Expenditures and Arms Transfers 1998* (U.S. Department of State 1999).



5.8 Transport infrastructure

	Roads			Railways			Air		
	Total road network km	Paved roads %	Goods hauled million ton-km	Passenger-km per \$ million of PPP GDP	Goods transported ton-km per \$ million of PPP GDP	Diesel locomotives available %	Aircraft departures thousands	Passengers carried thousands	Air freight million ton-km
	1995-99 ^a	1995-99 ^a	1995-99 ^a	1995-99 ^a	1995-99 ^a	1995-99 ^a	1999	1999	1999
Albania	18,000	39.0	1,830	9,196	1,941	..	1	20	0
Algeria	104,000	68.9	..	11,146	..	..	36	2,937	15
Angola	51,429	10.4	..	..	..	..	6	531	37
Argentina	215,471	29.4	..	28,665	..	..	184	9,192	241
Armenia	16,718	96.2	69	6,232	49,717	30	4	343	12
Australia	913,000	38.7	..	..	..	..	338	30,007	1,794
Austria	200,000	100.0	16,100	41,307	75,075	89	127	6,057	341
Azerbaijan	27,327	92.3	2,968	..	..	..	9	572	58
Bangladesh	201,182	9.5	..	22,570	4,706	81	6	1,215	143
Belarus	65,994	94.8	9,232	202,576	463,691	93	6	212	2
Belgium	145,850	80.7	35,000	32,012	30,522	86	233	9,965	535
Benin	6,787	20.0	..	..	..	..	2	84	14
Bolivia	49,400	5.5	..	6,460	..	..	24	1,873	20
Bosnia and Herzegovina	21,846	52.3	..	..	..	..	4	60	1
Botswana	10,217	55.0	..	..	..	..	6	144	0
Brazil	1,724,924	9.5	..	865	31,150	..	678	28,273	1,450
Bulgaria	37,284	92.0	168	96,104	122,533	37	15	735	12
Burkina Faso	12,100	16.0	..	..	..	..	3	147	14
Burundi	..	..	..	..	..	..	0	0	0
Cambodia	35,769	7.5	1,200	..	77,235	..	..	..	..
Cameroon	34,300	12.5	..	14,371	40,811	68	5	293	47
Canada	901,903	35.3	76,694	1,945	429,555	..	310	24,039	1,861
Central African Republic	24,307	2.7	60	..	..	..	2	84	14
Chad	33,400	0.8	..	..	..	..	2	84	14
Chile	79,353	18.9	..	4,907	7,802	65	93	5,188	1,139
China	1,526,389	..	572,430	82,693	260,427	82	548	55,853	3,295
Hong Kong, China	1,760	100.0	..	..	..	..	72	12,593	4,546
Colombia	112,988	14.4	31	62	1,948	..	209	8,665	635
Congo, Dem. Rep.	..	..	..	700	..	15	..	..	..
Congo, Rep.	12,800	9.7	..	36,264	..	35	6	132	14
Costa Rica	35,876	22.0	3,070	..	..	50	32	1,055	85
Côte d'Ivoire	50,400	9.7	..	6,512	21,081	53	6	260	14
Croatia	..	..	..	34,782	58,859	63	16	833	2
Cuba	60,858	49.0	..	..	..	53	16	1,259	63
Czech Republic	128,854	100.0	36,694	53,029	138,506	86	35	1,853	26
Denmark	71,462	100.0	15,300	40,275	11,786	..	110	5,971	198
Dominican Republic	4,969	78.7	..	..	..	..	0	10	0
Ecuador	43,197	18.9	3,959	..	..	..	20	1,387	33
Egypt, Arab Rep.	64,000	78.1	31,500	317,220	16,164	..	44	4,620	270
El Salvador	10,029	19.8	..	..	..	..	32	1,624	44
Eritrea	4,010	21.8	..	..	..	..	..	..	..
Estonia	50,436	21.3	3,929	19,842	486,631	80	11	302	1
Ethiopia	28,652	13.3	..	..	..	..	25	861	102
Finland	77,900	64.5	26,500	29,933	87,619	88	108	6,050	252
France	893,500	100.0	245,400	50,392	42,145	93	747	49,691	4,962
Gabon	7,670	8.2	..	11,254	65,276	89	7	423	54
Gambia, The	2,700	35.4	..	..	..	..	..	..	..
Georgia	20,215	93.5	420	44,361	200,857	34	3	159	3
Germany	656,140	99.1	315,900	31,471	38,962	92	710	54,550	6,620
Ghana	37,800	24.1	..	6,221	..	..	5	304	31
Greece	117,000	91.8	17,000	11,850	2,101	..	91	6,267	103
Guatemala	14,118	34.5	..	..	..	..	7	506	3
Guinea	30,500	16.5	..	..	..	..	1	59	1
Guinea-Bissau	4,400	10.3	..	..	..	..	0	0	0
Haiti	4,160	24.3	..	..	..	..	..	..	..
Honduras	13,603	20.4	..	..	..	..	..	..	..



Transport infrastructure 5.8

	Roads			Railways			Air		
	Total road network km	Paved roads %	Goods hauled million ton-km	Passenger-km per \$ million of PPP GDP	Goods transported ton-km per \$ million of PPP GDP	Diesel locomotives available %	Aircraft departures thousands	Passengers carried thousands	Air freight million ton-km
	1995-99 ^a	1995-99 ^a	1995-99 ^a	1995-99 ^a	1995-99 ^a	1995-99 ^a	1999	1999	1999
Hungary	188,203	43.4	14	94,085	72,243	64	30	1,944	40
India	2,465,877	56.5	958	195,355	136,165	90	181	16,005	531
Indonesia	346,863	46.3	..	28,490	8,725	83	135	8,047	362
Iran, Islamic Rep.	167,157	56.3	..	18,506	43,629	47	76	8,277	107
Iraq	47,400	86.0	..	..	..	..	0	0	0
Ireland	92,500	94.1	5,900	18,714	4,599	82	133	11,949	138
Israel	16,115	100.0	..	3,243	9,132	92	52	4,033	1,034
Italy	654,676	100.0	219,800	38,135	18,054	79	357	28,049	1,614
Jamaica	19,000	70.7	..	..	..	..	21	1,670	30
Japan	1,156,371	76.0	300,670	77,409	7,608	88	662	105,960	8,226
Jordan	6,640	100.0	..	..	35,549	90	16	1,252	194
Kazakhstan	109,445	89.7	4,506	177,393	1,474,814	..	18	667	23
Kenya	63,800	13.9	..	13,457	44,821	..	25	1,358	66
Korea, Dem. Rep.	31,200	6.4	..	..	..	..	1	59	2
Korea, Rep.	86,990	74.5	74,504	46,461	19,459	88	206	31,319	8,359
Kuwait	4,450	80.6	..	..	..	..	17	2,130	268
Kyrgyz Republic	18,500	91.1	1,220	..	..	..	8	312	6
Lao PDR	22,321	13.8	..	..	..	..	6	197	2
Latvia	73,227	38.6	4,161	108,396	770,302	88	9	199	0
Lebanon	6,350	95.0	..	..	..	..	10	719	103
Lesotho	5,940	18.3	..	..	..	..	0	1	0
Libya	24,484	57.1	..	..	..	..	6	571	0
Lithuania	73,650	91.3	7,740	28,379	328,042	88	11	250	2
Macedonia, FYR	8,684	63.8	1,210	15,959	40,430	40	6	488	2
Madagascar	30,623	11.6	..	..	..	..	19	635	32
Malawi	16,451	19.0	..	0	11,535	..	4	112	1
Malaysia	65,877	75.8	..	8,221	7,203	65	165	14,985	1,425
Mali	15,100	12.1	..	30,578	35,377	..	2	84	14
Mauritania	7,660	11.3	..	..	..	..	4	187	14
Mauritius	1,910	96.0	..	..	..	..	11	831	169
Mexico	318,952	34.3	179,085	2,578	61,435	68	310	19,263	309
Moldova	12,657	87.0	952	..	..	..	1	43	1
Mongolia	49,250	3.5	123	253,483	684,165	..	2	225	8
Morocco	57,646	56.3	2,557	18,176	52,224	75	44	3,392	58
Mozambique	30,400	18.7	110	..	..	..	6	235	7
Myanmar	28,200	12.2	..	..	..	..	11	537	6
Namibia	63,258	8.3	..	5,607	133,970	89	8	201	4
Nepal	7,700	41.5	..	..	..	..	12	583	16
Netherlands	116,500	90.0	46,500	41,134	9,712	88	224	19,741	4,053
New Zealand	92,075	61.9	..	..	51,030	..	228	8,892	842
Nicaragua	18,000	10.1	..	..	..	..	1	59	1
Niger	10,100	7.9	..	..	..	..	2	84	14
Nigeria	194,394	30.9	..	512	4,915	18	8	668	30
Norway	90,880	75.5	12,796	..	..	..	335	15,020	201
Oman	32,800	30.0	..	..	..	..	22	1,933	126
Pakistan	254,410	43.0	96,802	81,899	17,118	..	65	4,972	330
Panama	11,400	34.6	..	..	..	..	21	933	15
Papua New Guinea	19,600	3.5	..	..	..	..	24	1,102	18
Paraguay	29,500	9.5	..	..	..	..	8	232	0
Peru	77,999	12.9	..	1,397	4,640	..	37	1,900	6
Philippines	199,950	19.8	..	915	4	..	36	5,004	241
Poland	381,046	65.6	70,452	77,593	171,756	55	44	2,141	80
Portugal	68,732	..	14,200	30,125	13,406	88	104	7,325	223
Puerto Rico	14,400	100.0	..	..	..	..	..	..	..
Romania	198,589	69.3	13,457	97,692	135,241	78	18	980	12
Russian Federation	570,719	..	138	129,048	1,102,493	..	321	18,600	872



5.8 Transport infrastructure

	Roads			Railways			Air		
	Total road network km	Paved roads %	Goods hauled million ton-km	Passenger-km per \$ million of PPP GDP	Goods transported ton-km per \$ million of PPP GDP	Diesel locomotives available %	Aircraft departures thousands	Passengers carried thousands	Air freight million ton-km
	1995-99 ^a	1995-99 ^a	1995-99 ^a	1995-99 ^a	1995-99 ^a	1995-99 ^a	1999	1999	1999
Rwanda	14,900	9.1	..	..	..	..	..	..	..
Saudi Arabia	151,470	30.1	..	998	3,811	80	107	12,329	1,000
Senegal	14,576	29.3	..	6,609	37,365	79	2	103	14
Sierra Leone	11,300	8.0	..	..	..	..	0	19	0
Singapore	3,066	100.0	..	..	..	..	68	15,283	5,451
Slovak Republic	42,713	86.7	8,474	57,115	215,427	87	6	111	0
Slovenia	20,126	90.6	3,440	21,848	89,048	..	11	556	4
South Africa	534,131	11.8	..	25,701	283,106	96	101	7,374	686
Spain	663,795	99.0	103,000	26,047	16,714	87	414	33,559	816
Sri Lanka	11,285	95.0	30	59,310	1,865	..	10	1,422	179
Sudan	11,900	36.3	..	..	..	42	7	390	34
Sweden	210,907	77.5	32,700	36,988	96,543	..	237	12,933	290
Switzerland	71,115	..	14,500	..	..	..	276	16,209	1,879
Syrian Arab Republic	41,792	23.1	..	5,688	28,030	100	11	668	18
Tajikistan	13,700	82.7	..	..	..	..	4	156	2
Tanzania	88,200	4.2	..	73,054	73,054	66	5	190	2
Thailand	64,600	97.5	..	26,781	7,923	72	95	15,951	1,671
Togo	7,520	31.6	..	..	..	..	2	84	14
Trinidad and Tobago	8,320	51.1	..	..	..	..	21	1,112	55
Tunisia	23,100	78.9	..	21,247	41,961	71	20	1,923	19
Turkey	385,960	34.0	150,974	14,726	20,238	74	111	10,097	313
Turkmenistan	13,597	..	..	..	..	..	3	220	17
Uganda	..	..	..	1,366	4,924	..	3	179	22
Ukraine	168,674	96.6	18,206	296,128	941,037	87	28	891	13
United Arab Emirates	1,088	100.0	..	..	..	..	44	5,848	1,114
United Kingdom	371,603	100.0	159,500	..	..	..	906	68,235	4,926
United States	6,348,227	58.8	1,534,430	1,020	350,942	..	8,512 ^b	634,365 ^b	27,317 ^b
Uruguay	8,983	90.0	..	6,931	6,126	..	11	728	18
Uzbekistan	43,463	87.3	..	42,559	304,816	..	31	1,658	69
Venezuela, RB	96,155	33.6	..	0	342	65	130	4,690	68
Vietnam	93,300	25.1	..	18,843	9,807	95	29	2,600	99
West Bank and Gaza	..	..	..	..	..	..	..	..	..
Yemen, Rep.	64,725	8.1	..	..	..	..	8	731	21
Yugoslavia, FR (Serb./Mont.)	48,603	59.3	1,244	..	..	..	..	..	..
Zambia	66,781	..	..	24,892	74,141	62	1	42	0
Zimbabwe	18,338	47.4	..	18,082	151,076	70	13	567	35
World	55.3 m						20,645 s	1,558,788 s	
Low income		18.7					730	47,663	
Middle income		47.8					4,345	308,412	
Lower middle income		45.7					2,001	156,778	
Upper middle income		49.7					2,344	151,634	
Low & middle income		29.9					5,074	356,075	
East Asia & Pacific		17.4					1,350	136,788	
Europe & Central Asia		87.0					754	43,845	
Latin America & Carib.		20.1					1,930	91,253	
Middle East & N. Africa		52.1					428	42,080	
South Asia		43.0					282	24,711	
Sub-Saharan Africa		15.3					331	17,397	
High income		90.3					15,571	1,202,713	
Europe EMU		99.0					3,186	227,778	

a. Data are for the latest year available in the period shown. b. Data cover only the carriers designated by the U.S. Department of Transportation as major and national air carriers.



Transport infrastructure 5.8

About the data

Transport infrastructure—highways, railways, ports and waterways, and airports and air traffic control systems—and the services that flow from it are crucial to the activities of households, producers, and governments. Because performance indicators vary significantly by transport mode and by focus (whether physical infrastructure or the services flowing from that infrastructure), highly specialized and carefully specified indicators are required. The table provides selected indicators of the size and extent of roads, railways, and air transport systems and the volume of freight and passengers carried.

Data for most transport sectors are not internationally comparable. Unlike for demographic statistics, national income accounts, and international trade data, the collection of infrastructure data has not been “internationalized.” Data on roads are collected by the International Road Federation (IRF), and data on air transport by the International Civil Aviation Organization (ICAO). National road associations are the primary source of IRF data; in countries where such an association is lacking or does not respond, other agencies are contacted, such as road directorates, ministries of transport or public works, or central statistical offices. As a result, the compiled data are of uneven quality.

Even when data are available, they are often of limited value because of incompatible definitions, inappropriate geographical units of observation, lack of timeliness, and variations in the nature of the terrain. Data on passengers carried, for example, may be distorted because of “ticketless” travel or breaks in journeys; in such cases the statistics may report the number of passenger-kilometers for two passengers rather than one. Measurement problems are compounded because the mix of transported commodities changes over time, and in some cases shorter-haul traffic has been excluded from intercity traffic. Finally, the quality of transport service (reliability, transit time, and condition of goods delivered) is rarely measured but may be as important as quantity in assessing an economy’s transport system. Serious efforts are needed to create international databases whose comparability and accuracy can be gradually improved.

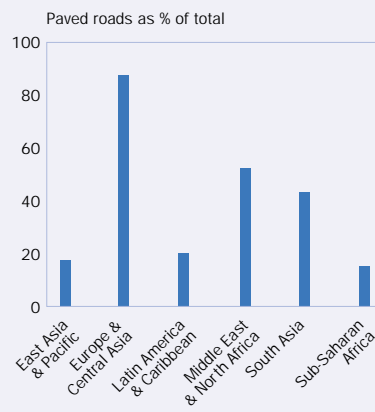
The air transport data represent the total (international and domestic) scheduled traffic carried by the air carriers registered in a country. Countries submit air transport data to ICAO on the basis of standard instructions and definitions issued by ICAO. In many cases, however, the data include estimates by ICAO for nonreporting carriers. Where possible, these estimates are based on previous submissions supple-

mented by information published by the air carriers, such as flight schedules.

The data represent the air traffic carried on scheduled services, but changes in air transport regulations in Europe have made it more difficult to classify traffic as scheduled or nonscheduled. Thus recent increases shown for some European countries may be due to changes in the classification of air traffic rather than actual growth. For countries with few air carriers or only one, the addition or discontinuation of a home-based air carrier may cause significant changes in air traffic.

Figure 5.8

More roads are paved in Europe and Central Asia



Note: Data are for the latest year available in 1995–99. Source: Table 5.8.

In Europe and Central Asia almost 90 percent of the road network is paved, but in Sub-Saharan Africa only about 15 percent is. Roads carry 80–90 percent of Sub-Saharan Africa’s freight and passengers and provide the only access to most rural communities. But about 50 percent of its rural road network and 30 percent of its urban network are in poor condition.

Definitions

- **Total road network** includes motorways, highways, and main or national roads, secondary or regional roads, and all other roads in a country.
- **Paved roads** are those surfaced with crushed stone (macadam) and hydrocarbon binder or bituminized agents, with concrete, or with cobblestones, as a percentage of all the country’s roads, measured in length.
- **Goods hauled by road** are the volume of goods transported by road vehicles, measured in millions of metric tons times kilometers traveled.
- **Railway passengers** refer to the total number of passengers transported times kilometers traveled per million dollars of GDP measured in purchasing power parity (PPP) terms (for a discussion of PPP see *About the data* for table 1.1).
- **Goods transported by rail** are the tonnage of goods transported times kilometers traveled per million dollars of GDP measured in purchasing power parity (PPP) terms.
- **Diesel locomotives available** are those in service as a percentage of all diesel locomotives.
- **Aircraft departures** are the number of domestic and international takeoffs of air carriers registered in the country.
- **Air passengers carried** include both domestic and international aircraft passengers of air carriers registered in the country.
- **Air freight** is the sum of the metric tons of freight, express, and diplomatic bags carried on each flight stage (the operation of an aircraft from takeoff to its next landing) multiplied by the stage distance of air carriers registered in the country.

Data sources

The data on roads are from the International Road Federation’s *World Road Statistics* and from Eurostat (europa.eu.int/eurostat.html). The railway data are from a database maintained by the World Bank’s Transportation, Water, and Urban Development Department, Transport Division. The air transport data are from the International Civil Aviation Organization’s *Civil Aviation Statistics of the World* and ICAO staff estimates.



5.9 Power and communications

	Electric power		Telephone mainlines ^a							Mobile phones ^a	International telecommunications ^a	
	Consumption per capita kwh 1998	Transmission and losses % of output 1998	per 1,000 people 1999	In largest city per 1,000 people 1999	Waiting list thousands 1999	Waiting time years 1999	per employee 1999	Revenue per line \$ 1999	Cost of local call \$ per 3 minutes 1999	per 1,000 people 1999	Outgoing traffic minutes per subscriber 1999	Cost of call to U.S. \$ per 3 minutes 1999
Albania	678	47	36	93	98.5	3.9	32	596	0.02	3	525	4.37
Algeria	563	19	52	55	640.0	6.0	90	166	0.02	2	90	4.70
Angola	60	28	8	21	21.1	1.5	46	1,195	0.06	2	363	5.13
Argentina	1,891	15	201	247	58.2	0.1	373	1,319	0.09	121	62	2.80
Armenia	930	28	155	206	71.0	..	61	153	0.11	2	62	..
Australia	8,717	6	520	516	0.0	0.0	116	1,422	0.16	343	112	0.60
Austria	6,175	6	472	519	0.0	0.0	160	1,249	0.17	514	305	1.60
Azerbaijan	1,584	16	95	184	88.4	3.1	65	84	0.12	23	44	9.80
Bangladesh	81	16	3	24	172.0	4.4	23	591	0.03	1	104	6.00
Belarus	2,761	7	257	341	440.0	2.6	99	61	0.01	2	60	6.10
Belgium	7,249	5	502	501	..	0.0	218	1,009	0.16	314	312	2.00
Benin	46	71	7	36	13.7	4.0	30	1,182	0.11	1	297	6.90
Bolivia	409	12	62	107	7.5	0.1	103	826	0.09	52	65	3.70
Bosnia and Herzegovina	539	22	96	447	70.0	2.2	201	431	0.03	14	264	3.70
Botswana	..	..	77	179	11.8	0.7	71	974	0.02	74	323	3.60
Brazil	1,793	17	149	165	2,400.0	0.7	176	728	0.03	89	24	1.80
Bulgaria	3,166	13	354	564	330.0	3.5	111	131	0.00	42	34	..
Burkina Faso	..	..	4	36	..	..	38	1,137	0.10	0	206	11.00
Burundi	..	..	3	54	10.0	7.9	33	480	0.03	0	129	7.30
Cambodia	..	..	3	16	..	..	38	771	0.03	8	263	..
Cameroon	185	20	6	38	50.0	6.2	43	725	0.06	0	291	3.39
Canada	15,071	7	655	..	0.0	0.0	238	969	..	226	266	1.20
Central African Republic	..	..	3	15	1.8	>10.0	25	1,181	0.49	1	439	8.00
Chad	..	..	1	7	0.6	0.5	23	2,199	0.16	0	292	14.07
Chile	2,082	8	207	282	58.3	0.1	223	766	0.12	151	80	2.90
China	746	7	86	294	812.0	0.0	159	259	0.01	34	18	6.70
Hong Kong, China	5,244	12	576	576	0.0	0.0	106	1,760	0.00	636	703	2.60
Colombia	866	21	160	322	1,155.0	1.7	151	413	0.04	75	33	2.20
Congo, Dem. Rep.	110	3	0	..	..	..	..	..	..	0	..	..
Congo, Rep.	83	38	..	..	..	..	..	..	..	1	..	..
Costa Rica	1,450	5	204	478	34.7	0.4	178	333	0.02	35	122	2.00
Côte d'Ivoire	..	..	15	57	33.1	1.1	59	1,911	0.07	18	325	7.86
Croatia	2,463	21	365	324	72.0	0.9	151	473	0.03	66	198	5.66
Cuba	954	18	39	86	..	..	29	1,396	0.09	0	75	7.30
Czech Republic	4,747	8	371	965	74.0	0.2	161	585	0.15	189	96	2.00
Denmark	6,033	6	685	..	0.0	0.0	193	1,140	0.12	495	180	1.77
Dominican Republic	627	28	98	129	..	..	200	..	..	50	234	3.90
Ecuador	625	21	91	339	..	..	164	400	0.01	31	91	4.90
Egypt, Arab Rep.	861	12	75	151	1,290.0	2.3	84	395	0.03	8	32	5.84
El Salvador	559	13	76	198	..	..	50	752	0.06	62	151	2.40
Eritrea	..	..	7	40	19.3	6.8	59	726	0.02	0	92	8.24
Estonia	3,531	18	357	381	39.3	1.5	191	514	0.07	268	143	3.41
Ethiopia	22	10	3	42	225.0	>10.0	30	404	0.03	0	64	7.37
Finland	14,129	4	557	677	0.0	0.0	132	1,417	0.13	651	151	1.75
France	6,287	6	582	..	0.0	0.0	200	836	0.12	366	129	1.00
Gabon	749	10	32	89	10.0	>10.0	36	2,064	0.15	7	491	..
Gambia, The	..	..	23	77	16.9	6.4	31	1,028	0.30	4	219	6.18
Georgia	1,257	14	123	289	105.0	3.0	69	47	..	19	70	..
Germany	5,681	4	590	591	0.0	0.0	215	1,070	0.11	286	152	0.80
Ghana	289	1	8	54	..	..	44	1,078	0.08	4	190	..
Greece	3,739	7	528	727	21.6	0.2	260	891	0.07	367	130	2.59
Guatemala	322	21	55	..	..	..	130	403	0.09	30	140	0.80
Guinea	..	..	6	19	1.3	0.2	56	373	0.10	3	266	9.04
Guinea-Bissau	..	..	7	109	3.0	>10.0	34	1,902	0.15	0	384	..
Haiti	33	54	9	..	100.0	>10.0	20	1,443	0.00	3	203	7.10
Honduras	446	21	44	99	170.0	5.7	72	697	0.06	12	54	4.20



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	Electric power		Telephone mainlines ^a							Mobile phones ^a	International telecommunications ^a	
	Consumption per capita kwh 1998	Transmission and distribution losses % of output 1998	per 1,000 people 1999	In largest city per 1,000 people 1999	Waiting list thousands 1999	Waiting time years 1999	per employee 1999	Revenue per line \$ 1999	Cost of local call \$ per 3 minutes 1999	per 1,000 people 1999	Outgoing traffic minutes per subscriber 1999	Cost of call to U.S. \$ per 3 minutes 1999
Hungary	2,888	13	371	557	77.2	0.2	215	616	0.13	162	61	1.68
India	384	18	27	131	3,680.0	0.9	63	138	0.01	2	18	4.20
Indonesia	320	12	29	163	..	..	135	275	0.02	11	41	4.20
Iran, Islamic Rep.	1,343	15	125	286	1,200.0	1.4	177	218	0.01	7	24	7.71
Iraq	1,359	0	30	75	..	..	..	..	..	0	..	..
Ireland	4,760	9	478	..	..	..	118	1,637	0.17	447	573	1.54
Israel	5,475	6	471	..	22.0	0.2	422	1,089	0.05	472	279	3.30
Italy	4,431	7	462	..	0.0	0.0	335	1,129	0.13	528	117	1.40
Jamaica	2,252	10	199	..	183.0	3.5	160	908	0.06	56	137	5.20
Japan	7,322	3	558	814	0.0	0.0	392	1,613	0.09	449	28	2.10
Jordan	1,205	10	87	232	29.7	0.4	97	708	0.03	18	258	..
Kazakhstan	2,399	17	108	224	172.0	..	53	148	..	3	60	2.68
Kenya	129	25	10	71	121.0	9.6	20	1,044	0.05	1	85	11.17
Korea, Dem. Rep.	..	..	46	..	..	..	..	..	..	0	..	..
Korea, Rep.	4,497	7	438	521	0.0	0.0	298	768	0.04	500	43	1.80
Kuwait	13,800	..	240	47	0.0	0.0	60	841	0.00	158	394	5.41
Kyrgyz Republic	1,430	32	76	197	66.9	>10.0	50	64	..	1	65	15.48
Lao PDR	..	..	7	..	8.3	1.7	30	662	..	2	230	4.00
Latvia	1,879	20	300	403	19.7	..	161	452	0.12	112	77	3.00
Lebanon	1,820	16	201	96	..	..	124	580	0.07	194	124	4.45
Lesotho	..	..	10	58	20.0	>10.0	33	655	0.02	5	1,707	..
Libya	3,677	..	101	94	80.0	1.4	32	619	0.03	4	78	..
Lithuania	1,909	9	312	400	74.9	1.4	166	188	0.06	90	44	5.49
Macedonia, FYR	..	..	234	235	40.0	1.2	128	342	0.01	24	188	4.13
Madagascar	..	..	3	7	7.3	2.0	17	1,084	0.08	1	192	11.16
Malawi	..	..	4	37	31.6	>10.0	8	877	0.03	2	236	12.45
Malaysia	2,554	7	203	282	160.0	0.7	174	559	0.02	137	156	2.80
Mali	..	..	3	18	..	..	20	2,196	0.14	0	444	17.59
Mauritania	..	..	6	17	47.8	>10.0	34	1,730	0.09	0	489	..
Mauritius	..	..	224	306	29.1	1.2	145	473	0.04	89	122	4.60
Mexico	1,513	15	112	135	137.0	0.2	130	1,000	0.14	79	143	3.00
Moldova	688	26	127	304	118.0	..	73	71	0.02	4	70	3.53
Mongolia	..	..	39	101	39.6	6.0	22	329	0.02	13	40	5.65
Morocco	443	4	53	115	17.9	0.2	104	592	0.08	13	150	4.50
Mozambique	54	10	4	24	39.7	7.0	35	988	0.09	1	222	..
Myanmar	64	33	6	29	84.4	3.6	32	2,726	0.48	0	70	26.86
Namibia	..	..	64	317	5.4	0.7	63	840	0.05	18	572	..
Nepal	47	23	11	..	275.0	5.9	54	268	0.01	0	99	..
Netherlands	5,908	4	607	..	0.0	0.0	279	1,130	0.14	436	224	0.30
New Zealand	8,215	13	496	..	0.0	0.0	239	968	0.00	366	397	0.90
Nicaragua	281	29	30	74	108.0	8.4	65	635	0.09	9	339	3.20
Niger	..	..	2	18	..	..	19	1,243	..	0	340	..
Nigeria	85	32	4	11	42.0	..	35	3,738	..	0	141	..
Norway	24,607	8	709	823	0.0	0.0	133	1,546	0.08	613	178	1.05
Oman	2,828	16	90	165	3.9	0.5	106	1,552	0.07	49	463	..
Pakistan	337	25	22	62	298.0	1.5	51	349	0.02	2	29	..
Panama	1,211	23	164	250	..	..	106	764	..	86	116	4.40
Papua New Guinea	..	..	13	..	..	..	23	2,428	..	2	422	..
Paraguay	756	3	55	129	20.1	0.5	51	782	0.05	196	116	6.10
Peru	642	13	67	132	29.6	0.4	294	819	0.07	40	66	2.40
Philippines	451	16	39	146	..	..	219	690	0.00	38	45	4.80
Poland	2,458	11	263	199	1,800.0	1.5	121	578	0.07	102	61	3.65
Portugal	3,395	8	423	711	25.6	0.2	215	1,123	0.10	467	129	1.88
Puerto Rico	..	..	333	..	..	..	168	1,163	..	209	723	0.87
Romania	1,626	12	167	357	740.0	3.9	83	203	0.09	61	41	4.29
Russian Federation	3,937	11	210	448	6,530.0	3.9	71	133	0.02	9	33	6.12



5.9 Power and communications

	Electric power		Telephone mainlines ^a						Cost of local call \$ per 3 minutes	Mobile phones ^a per 1,000 people	International telecommunications ^a	
	Consumption per capita kwh 1998	Transmission and distribution losses % of output 1998	per 1,000 people 1999	In largest city per 1,000 people 1999	Waiting list thousands 1999	Waiting time years 1999	per employee 1999	Revenue per line \$ 1999			Outgoing traffic minutes per subscriber 1999	Cost of call to U.S. \$ per 3 minutes 1999
Rwanda	..	..	2	40	8.0	>10.0	45	1,424	0.04	2	376	..
Saudi Arabia	4,692	8	129	253	927.0	3.1	117	1,445	0.02	40	305	6.41
Senegal	111	11	18	48	24.0	1.0	118	1,099	0.12	9	220	4.48
Sierra Leone	..	..	4	18	25.0	>10.0	18	129	0.03	0	236	..
Singapore	6,771	4	482	482	0.0	0.0	222	1,313	0.02	419	719	1.70
Slovak Republic	3,899	8	307	670	69.3	0.5	116	269	0.12	170	98	2.10
Slovenia	5,096	6	378	661	5.7	0.2	225	481	0.03	309	197	5.56
South Africa	3,832	8	125	415	116.0	0.3	112	717	0.08	120	84	..
Spain	4,195	10	410	485	4.3	0.0	354	980	0.09	306	117	1.88
Sri Lanka	244	19	36	245	225.0	1.6	61	461	0.05	12	67	4.49
Sudan	47	31	9	45	355.0	7.0	95	403	0.02	0	99	7.79
Sweden	13,955	7	665	..	0.0	0.0	205	1,260	0.13	583	257	0.90
Switzerland	6,980	6	699	966	0.0	0.0	203	1,670	0.13	411	481	1.00
Syrian Arab Republic	838	..	99	140	2,820.0	>10.0	78	219	0.01	0	76	26.71
Tajikistan	2,045	14	35	150	49.1	..	52	48	0.00	0	42	8.16
Tanzania	53	22	5	28	29.6	1.6	40	840	0.08	2	77	13.30
Thailand	1,345	9	86	371	420.0	1.2	154	351	0.08	38	57	2.50
Togo	..	..	8	33	17.0	3.6	44	1,209	0.10	4	222	11.44
Trinidad and Tobago	3,478	8	216	200	10.0	0.5	100	814	0.04	30	243	3.30
Tunisia	824	11	90	90	83.7	0.9	129	445	0.03	6	165	6.47
Turkey	1,353	19	278	405	500.0	0.4	249	267	0.10	125	39	3.31
Turkmenistan	859	10	82	155	58.6	8.5	48	104	..	1	46	..
Uganda	..	..	3	37	9.2	3.0	34	1,522	0.15	3	179	8.60
Ukraine	2,350	17	199	418	2,650.0	9.6	80	82	0.00	4	38	..
United Arab Emirates	9,892	9	332	373	0.6	0.0	119	1,730	0.00	283	988	3.77
United Kingdom	5,327	8	567	..	0.0	0.0	167	1,505	0.19	457	180	1.10
United States	11,832	7	664	..	0.0	0.0	172	1,463	0.09	312	155	..
Uruguay	1,788	15	271	336	0.0	0.0	154	970	0.18	95	96	5.00
Uzbekistan	1,618	9	66	231	38.8	1.7	56	153	..	2	44	..
Venezuela, RB	2,566	23	109	329	392.0	..	218	1,461	0.09	143	63	5.20
Vietnam	232	16	27	133	..	..	17	304	0.08	4	22	..
West Bank and Gaza	..	..	72	..	38.8	0.8	..	302	0.05	14	165	0.61
Yemen, Rep.	96	26	17	77	131.0	4.5	61	273	0.02	2	109	..
Yugoslavia, FR (Serb./Mont.)	..	..	214	455	119.0	1.8	155	147	0.01	57	89	12.08
Zambia	539	11	9	24	12.3	7.2	24	1,346	0.05	3	170	2.60
Zimbabwe	896	17	21	75	109.0	5.1	33	640	0.03	15	275	2.81
World	2,085 w	9 w	158 w	231 w	38,167.9 s	1.4 m	198 m	935 w	0.06 m	86 w	129 m	4.00 m
Low income	362	17	26	125	7,727.8	5.9	72	212	0.06	3	141	..
Middle income	1,367	11	121	293	28,593.8	1.0	166	447	0.05	55	94	4.36
Lower middle income	1,064	10	102	293	21,600.7	1.5	148	267	0.05	33	77	4.50
Upper middle income	2,482	12	190	..	7,402.7	0.5	207	809	0.07	136	116	3.73
Low & middle income	913	12	79	211	37,980.2	2.0	152	412	0.05	32	105	4.70
East Asia & Pacific	787	8	82	265	1,901.9	1.2	178	355	0.03	42	51	5.30
Europe & Central Asia	2,652	13	213	378	12,480.6	2.0	126	256	0.07	47	61	3.97
Latin America & Carib.	1,452	16	130	..	4,139.2	0.5	189	847	0.09	82	116	3.20
Middle East & N. Africa	1,263	12	87	..	6,314.0	1.4	126	467	0.03	12	124	..
South Asia	341	19	23	118	4,352.5	1.6	61	174	0.02	2	67	5.45
Sub-Saharan Africa	454	10	14	29	1,158.2	6.0	99	793	0.07	5	222	..
High income	8,353	6	583	..	63.7	0.0	230	1,312	0.10	377	189	1.78
Europe EMU	5,504	6	526	..	29.9	0.0	248	1,037	0.13	383	152	1.67

a. Data are from the International Telecommunication Union's (ITU) *World Telecommunication Development Report 2000*. Please cite the ITU for third-party use of these data.



Power and communications 5.9

About the data

An economy's production and consumption of electricity is a basic indicator of its size and level of development. Although a few countries export electric power, most production is for domestic consumption. Expanding the supply of electricity to meet the growing demand of increasingly urbanized and industrialized economies without incurring unacceptable social, economic, and environmental costs is one of the great challenges facing developing countries.

Data on electric power production and consumption are collected from national energy agencies by the International Energy Agency (IEA) and adjusted by the IEA to meet international definitions (for data on electricity production see table 3.9). Electricity consumption is equivalent to production less power plants' own use and transmission, distribution, and transformation losses. It includes consumption by auxiliary stations, losses in transformers that are considered integral parts of those stations, and electricity produced by pumping installations. It covers electricity generated by primary sources of energy—coal, oil, gas, nuclear, hydro, geothermal, wind, tide and wave, and combustible renewables—where data are available. Neither production nor consumption data capture the reliability of supplies, including break-downs, load factors, and frequency of outages.

Over the past decade privatization and liberalization have spurred dramatic growth in telecommunications in many countries. The table presents some common performance indicators for telecommunications, including measures of supply and demand, service quality, productivity, economic and financial performance, and tariffs. The quality of data varies among reporting countries as a result of differences in regulatory obligations for the provision of data.

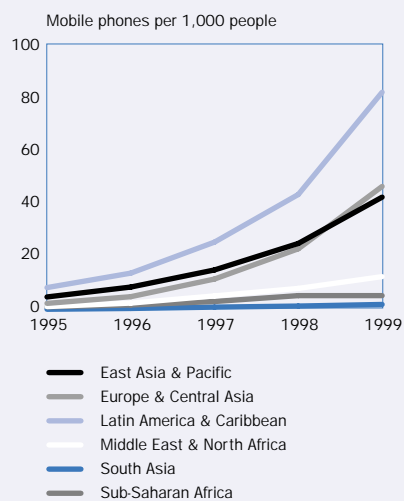
Demand for telecommunications is often measured by the sum of telephone mainlines and registered applicants for new connections. (A mainline is normally identified by a unique number that is the one billed.) In some countries the list of registered applicants does not reflect real current pending demand, which is often hidden or suppressed, reflecting an extremely short supply that has discouraged potential applicants from applying for telephone service. And in some cases waiting lists may overstate demand because applicants have placed their names on the list several times to improve their chances. Waiting time is calculated by dividing the number of applicants on the waiting list by the average number of mainlines added each year over the past three years. The number of mainlines no longer reflects a telephone system's full capacity because mobile telephones—whose

use has been expanding rapidly in most countries, rich and poor—provide an alternative point of access.

The table includes four measures of efficiency in telecommunications: waiting list, waiting time, mainlines per employee, and revenue per mainline. Caution should be used in interpreting the estimates of mainlines per employee because firms often subcontract part of their work. The cross-country comparability of revenue per mainline may also be limited because, for example, some countries do not require telecommunications providers to submit financial information; the data usually do not include revenues from cellular and mobile phones or radio, paging, and data services; and there are definitional and accounting differences between countries.

Figure 5.9

Latin America leads developing regions in mobile phones



Source: Table 5.9 based on International Telecommunication Union data.

Mobile phone use is growing rapidly in all developing regions, but especially in Latin America, where there are about 60 percent as many mobile phones as there are fixed telephone lines. Mobile phones are even beginning to reach the poor and isolated, helping them participate in the global economy.

Definitions

- **Electric power consumption** measures the production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants.
- **Electric power transmission and distribution losses** are losses in transmission between sources of supply and points of distribution and in distribution to consumers, including pilferage.
- **Telephone mainlines** are telephone lines connecting a customer's equipment to the public switched telephone network. Data are presented for the entire country and for the largest city.
- **Waiting list** shows the number of applications for a connection to a mainline that have been held up by a lack of technical capacity.
- **Waiting time** is the approximate number of years applicants must wait for a telephone line.
- **Mainlines per employee** are calculated by dividing the number of mainlines by the number of telecommunications staff (with part-time staff converted to full-time equivalents) employed by telecommunications enterprises providing public telecommunications services.
- **Revenue per line** is the revenue received by firms per mainline for providing telecommunications services.
- **Cost of local call** is the cost of a three-minute call within the same exchange area using the subscriber's equipment (that is, not from a public phone).
- **Mobile phones** refer to users of portable telephones subscribing to an automatic public mobile telephone service using cellular technology that provides access to the public switched telephone network, per 1,000 people.
- **Outgoing traffic** is the telephone traffic, measured in minutes per subscriber, that originates in the country and has a destination outside the country.
- **Cost of call to U.S.** is the cost of a three-minute peak rate call from the country to the United States.

Data sources

The data on electricity consumption and losses are from the IEA's *Energy Statistics and Balances of Non-OECD Countries 1997–98*, the IEA's *Energy Statistics of OECD Countries 1997–98*, and the United Nations Statistics Division's *Energy Statistics Yearbook*. The telecommunications data are from the International Telecommunication Union's (ITU) *World Telecommunication Development Report 2000*, except for the data on telephone traffic, which are from *Direction of Traffic 1999*, published by TeleGeography and the ITU.



5.10 The information age

	Daily newspapers	Radios	Television ^a		Fax machines ^a	Personal computers ^a	Internet			Information and communications technology expenditures % of GDP 1999		
	per 1,000 people 1996	per 1,000 people 1999	Sets per 1,000 people 1999	Cable subscribers per 1,000 people 1999	per 1,000 people 1999	per 1,000 people 1999	Hosts per 10,000 people ^b July 2000	Users thousands ^a 1999	Monthly access charges ^a Service provider charge \$ 1998		Telephone call charge \$ 1998	Secure servers 2000
Albania	36	217	113	..	4.8	5.2	0.35	3	..	..	1	..
Algeria	38	241	107	..	0.2	5.8	0.01	20	..	..	..	..
Angola	11	62	15	..	..	1.0	0.01	10	..	..	..	..
Argentina	123	681	293	163.2	2.4	49.2	47.34	900	30	11	219	3.41
Armenia	23	224	238	0.4	0.3	5.7	3.13	30	..	..	2	..
Australia	293	1,378	706	30.3	48.6	469.2	683.26	6,000	22	6	3,207	8.85
Austria	296	753	516	138.8	..	256.8	431.74	1,840	23	29	554	4.82
Azerbaijan	27	23	254	0.1	..	..	0.23	8	..	..	1	..
Bangladesh	9	50	7	..	..	1.0	0.00	50	..	..	1	..
Belarus	174	296	322	..	2.3	..	1.06	50	..	..	3	..
Belgium	160	792	523	369.6	..	315.2	352.15	1,400	23	20	310	5.88
Benin	2	110	11	..	..	1.5	0.04	10	..	..	1	..
Bolivia	55	676	118	5.1	..	12.3	1.73	78	..	..	5	..
Bosnia and Herzegovina	152	245	112	..	..	..	1.84	4	..	..	..	..
Botswana	27	156	20	..	2.3	31.0	14.63	12	..	..	..	..
Brazil	40	444	333	15.5	3.1	36.3	38.97	3,500	33	3	923	5.82
Bulgaria	257	543	408	28.8	..	26.6	18.80	235	..	..	19	1.76
Burkina Faso	1	33	11	..	..	1.0	0.19	4	..	..	..	..
Burundi	3	152	15	..	..	..	0.00	2	..	..	..	..
Cambodia	2	128	9	..	0.3	1.2	0.18	4	..	..	1	..
Cameroon	7	163	34	..	..	2.7	0.01	20	..	..	..	..
Canada	159	1,047	715	273.2	35.8	360.8	590.37	11,000	12	0	4,530	8.52
Central African Republic	2	83	6	..	0.1	1.4	0.02	1	..	..	..	..
Chad	0	242	1	..	0.0	1.3	0.01	1	..	..	..	..
Chile	98	355	240	44.9	2.7	66.6	33.78	700	32	7	112	5.74
China	..	334	292	47.2	1.6	12.2	0.69	8,900	39	26	171	4.86
Hong Kong, China	792	678	434	68.0	58.0	297.6	182.92	2,430	18	5	475	8.31
Colombia	46	560	199	15.5	4.6	33.7	10.15	664	..	..	54	8.85
Congo, Dem. Rep.	3	375	2	..	..	..	0.00	1	..	..	..	..
Congo, Rep.	8	124	13	..	..	3.5	0.01	1	..	..	..	..
Costa Rica	94	776	229	19.1	2.3	101.7	24.33	150	..	..	48	..
Côte d'Ivoire	17	164	70	0.0	..	5.5	0.37	20	..	..	1	..
Croatia	115	336	279	42.4	11.2	67.0	42.61	200	..	..	44	..
Cuba	118	355	246	..	..	9.9	0.33	35	..	..	2	..
Czech Republic	254	803	487	89.7	9.9	107.2	134.39	700	25	15	232	8.49
Denmark	309	1,318	621	250.5	..	414.0	692.29	1,500	23	27	332	6.94
Dominican Republic	52	178	96	..	..	..	9.16	25	..	..	8	..
Ecuador	70	420	205	16.4	..	20.1	1.67	35	..	..	9	..
Egypt, Arab Rep.	40	324	183	..	0.5	12.0	0.85	200	..	..	12	3.32
El Salvador	48	478	191	45.0	..	16.2	1.62	40	..	..	9	..
Eritrea	..	484	16	..	0.4	..	0.02	1	..	..	..	..
Estonia	174	966	555	75.9	..	135.2	249.29	200	..	..	70	..
Ethiopia	1	196	6	..	0.1	0.7	0.01	8	..	..	1	..
Finland	455	1,563	643	180.5	38.4	360.1	1,358.99	2,143	9	18	414	5.88
France	218	937	623	43.4	47.5	221.8	167.11	5,370	17	26	1,446	5.96
Gabon	29	500	251	8.3	0.4	8.4	0.21	3	..	..	..	..
Gambia, The	2	394	3	..	1.0	7.9	0.12	3	..	..	..	..
Georgia	..	555	474	2.8	..	..	2.06	20	..	..	13	..
Germany	311	948	580	226.3	79.1	297.0	233.29	14,400	23	28	4,441	5.27
Ghana	14	680	115	..	..	2.5	0.06	20	..	..	1	..
Greece	153	478	480	1.2	..	60.2	100.38	750	21	7	106	5.51
Guatemala	33	80	61	28.5	..	9.9	2.54	65	..	..	10	..
Guinea	..	49	44	0.0	0.4	3.4	0.00	5	..	..	..	..
Guinea-Bissau	5	44	0.4	..	0.11	2
Haiti	3	55	5	0.00	6	1	..
Honduras	55	395	95	8.1	..	9.5	0.19	20	4	..



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	Daily newspapers	Radios	Television ^a		Fax machines ^a	Personal computers ^a	Internet			Information and communications technology expenditures % of GDP 1999		
			Sets per 1,000 people 1999	Cable subscribers per 1,000 people 1999			Hosts per 10,000 people ^b July 2000	Users thousands ^a 1999	Monthly access charges ^a		Secure servers 2000	
	per 1,000 people 1996	per 1,000 people 1999	per 1,000 people 1999	per 1,000 people 1999	per 1,000 people 1999	per 1,000 people 1999	per 10,000 people ^b July 2000	Users thousands ^a 1999	Service provider charge \$ 1998	Telephone call charge \$ 1998	Secure servers 2000	% of GDP 1999
Hungary	186	687	448	159.0	17.6	74.7	129.30	600	24	20	100	6.42
India	..	121	75	37.1	0.2	3.3	0.32	2,800	13	0	85	3.46
Indonesia	24	157	143	..	0.9	9.1	1.15	900	9	6	54	1.39
Iran, Islamic Rep.	28	264	157	..	..	52.4	0.11	100	..	..	..	..
Iraq	19	229	83	..	..	..	0.00	..	..	..	..	..
Ireland	150	699	406	171.2	27.4	404.9	227.43	679	21	14	290	6.48
Israel	290	519	328	188.5	..	245.7	260.58	800	25	3	..	7.36
Italy	104	880	488	2.8	31.4	191.8	272.96	7,000	23	14	940	4.72
Jamaica	62	795	189	98.8	..	43.0	2.26	60	..	..	5	..
Japan	578	960	719	125.4	127.0	286.9	269.25	27,060	41	14	4,139	7.06
Jordan	58	288	83	0.1	8.4	13.9	1.45	120	..	..	2	..
Kazakhstan	..	395	238	..	0.1	..	2.82	70	..	..	17	..
Kenya	9	104	22	..	..	4.2	0.32	35	..	..	..	..
Korea, Dem. Rep.	199	147	55	..	..	..	..	..	..	..	..	..
Korea, Rep.	393	1,033	361	150.1	..	181.8	100.65	10,860	12	14	313	4.42
Kuwait	374	632	480	..	31.6	121.3	23.15	100	..	..	3	..
Kyrgyz Republic	15	112	47	..	..	..	6.18	10	..	..	1	..
Lao PDR	4	143	10	..	..	2.3	0.00	2	..	..	..	..
Latvia	247	684	741	66.8	..	82.0	65.26	105	..	..	33	..
Lebanon	107	908	351	1.4	..	46.4	11.89	200	..	..	16	..
Lesotho	8	49	16	..	..	..	0.39	1	..	..	..	..
Libya	14	243	136	..	..	..	0.01	7	..	..	..	..
Lithuania	93	500	420	62.2	1.7	59.5	38.66	103	..	..	39	..
Macedonia, FYR	21	206	250	..	1.5	..	11.53	30	..	..	..	..
Madagascar	5	198	22	..	..	1.9	0.36	8	..	..	..	..
Malawi	3	250	3	..	0.1	0.9	0.00	10	..	..	..	..
Malaysia	158	419	174	5.2	8.1	68.7	27.55	1,500	1	8	128	5.20
Mali	1	54	12	0.0	..	1.0	0.05	10	..	..	1	..
Mauritania	0	151	96	..	1.3	27.2	0.20	13	..	..	..	..
Mauritius	75	368	230	..	26.1	95.7	27.70	55	..	..	11	..
Mexico	97	325	267	15.7	3.0	44.2	50.60	1,822	24	3	218	4.20
Moldova	60	742	297	17.8	0.2	8.0	4.02	25	..	..	3	..
Mongolia	27	151	61	10.8	3.0	9.2	0.70	6	..	..	1	..
Morocco	26	241	165	..	0.7	10.8	0.33	50	..	..	4	..
Mozambique	3	40	5	..	..	2.6	0.10	15	..	..	..	..
Myanmar	10	70	7	..	0.1	1.1	0.00	1	..	..	..	..
Namibia	19	144	38	..	..	29.5	19.76	6	..	..	2	..
Nepal	11	39	7	2.9	0.4	2.7	0.35	35	..	..	..	..
Netherlands	306	981	600	387.3	38.5	359.9	679.75	3,000	23	19	695	7.13
New Zealand	216	989	518	76.5	..	328.0	807.94	700	19	0	539	10.54
Nicaragua	30	277	69	40.5	..	8.1	2.18	20	..	..	4	..
Niger	0	66	27	..	..	0.4	0.12	3	..	..	..	..
Nigeria	24	224	68	..	..	6.4	0.01	100	..	..	1	..
Norway	588	916	648	184.3	50.0	446.6	1,121.12	2,000	13	22	318	6.93
Oman	29	598	575	..	2.7	26.4	3.00	50	..	..	1	..
Pakistan	23	104	119	0.1	2.0	4.3	0.40	80	..	..	6	..
Panama	62	300	192	..	..	32.0	10.21	45	..	..	25	..
Papua New Guinea	15	95	13	..	..	..	0.70	2	..	..	..	..
Paraguay	43	182	205	15.4	..	11.2	2.66	20	..	..	5	..
Peru	0	273	147	14.1	..	35.7	3.88	400	..	..	26	..
Philippines	79	159	110	9.4	..	16.9	2.21	500	31	0	59	2.71
Poland	113	522	387	122.0	..	62.0	67.14	2,100	14	20	251	4.90
Portugal	75	304	560	59.8	7.0	93.0	117.25	700	19	10	131	5.31
Puerto Rico	126	742	324	72.0	..	..	3.10	200	..	..	52	..
Romania	300	335	312	129.5	..	26.8	13.23	600	40	1.78
Russian Federation	105	418	421	23.1	0.4	37.4	19.50	2,700	20	0	242	1.55



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	Daily newspapers	Radios	Television ^a		Fax machines ^a	Personal computers ^a	Internet			Information and communications technology expenditures % of GDP 1999		
	per 1,000 people 1996	per 1,000 people 1999	Sets per 1,000 people 1999	Cable subscribers per 1,000 people 1999	per 1,000 people 1999	per 1,000 people 1999	Hosts per 10,000 people ^b July 2000	Users thousands ^a 1999	Monthly access charges ^a Service provider charge \$ 1998 Telephone call charge \$ 1998 Secure servers 2000			
Rwanda	0	102	0	..	0.1	..	0.42	5	..	..	1	..
Saudi Arabia	57	321	263	..	..	57.4	1.53	300	..	..	9	..
Senegal	5	142	41	..	..	15.1	0.51	30	..	..	..	..
Sierra Leone	4	274	13	0.0	0.5	..	0.16	2	..	..	1	..
Singapore	360	682	308	53.2	25.8	436.6	385.73	950	15	5	483	7.67
Slovak Republic	185	967	417	122.3	10.0	109.7	58.78	600	..	..	59	5.98
Slovenia	199	407	356	150.8	10.5	251.4	99.12	250	..	..	98	4.31
South Africa	32	333	129	..	3.6	54.7	43.12	1,820	17	8	470	7.17
Spain	100	333	547	13.3	..	119.4	136.51	4,652	23	16	857	4.03
Sri Lanka	29	209	102	0.0	..	5.6	0.91	65	..	..	5	..
Sudan	27	271	173	0.0	0.9	2.9	0.00	5	..	..	..	..
Sweden	445	932	531	221.5	..	451.4	703.91	3,666	22	17	934	9.28
Switzerland	337	1,000	518	357.1	..	461.9	582.23	1,427	18	14	..	7.48
Syrian Arab Republic	20	277	66	..	1.4	14.3	0.00	20	..	..	1	..
Tajikistan	20	142	328	..	0.3	..	0.36	2	..	..	..	..
Tanzania	4	279	21	..	..	2.4	0.16	25	..	..	..	..
Thailand	63	233	289	2.4	2.5	22.7	8.84	800	25	33	103	2.13
Togo	4	227	22	..	4.1	17.7	0.34	15	..	..	..	..
Trinidad and Tobago	123	535	337	..	3.9	54.2	41.88	30	..	..	8	..
Tunisia	31	158	190	..	3.4	15.3	0.10	30	..	..	4	..
Turkey	111	180	332	11.0	1.7	33.8	16.60	1,500	25	9	171	2.47
Turkmenistan	..	277	201	..	..	..	1.03	2	..	..	..	..
Uganda	2	127	28	..	..	2.5	0.07	25	..	..	1	..
Ukraine	54	884	413	15.7	0.0	15.8	6.57	200	..	..	37	..
United Arab Emirates	156	345	252	..	21.0	102.1	92.13	400	..	..	24	..
United Kingdom	329	1,435	652	52.6	..	302.5	348.34	12,500	20	29	5,374	9.35
United States	215	2,146	844	246.3	78.4	510.5	2,419.86	74,100	20	0	73,386	8.87
Uruguay	293	606	531	104.6	..	99.6	107.27	300	..	..	32	..
Uzbekistan	3	458	276	..	0.1	..	0.09	8	..	..	1	..
Venezuela, RB	206	470	185	25.9	3.0	42.2	6.48	525	28	39	86	3.44
Vietnam	4	107	184	..	0.4	8.9	0.01	100	..	..	4	7.40
West Bank and Gaza	..	..	..	..	..	..	..	..	..	..	..	..
Yemen, Rep.	15	64	286	..	..	1.7	0.06	10	..	..	..	..
Yugoslavia, FR (Serb./Mont.)	107	297	273	..	1.9	20.7	13.38	80	..	..	8	..
Zambia	12	160	145	..	0.1	7.2	0.86	15	..	..	..	..
Zimbabwe	19	390	180	..	..	13.0	2.61	20	..	..	..	..
World	.. w	420w	268 w	58.5 w	12.3 w	68.4 w	152.47 w	241,864 s			110,498 s	
Low income	..	157	85	..	0.4	4.4	0.48	4,766			224	
Middle income	..	360	279	44.5	2.0	27.1	13.20	45,241			4,622	
Lower middle income	..	322	273	41.4	1.5	17.7	3.55	17,942			1,141	
Upper middle income	89	498	304	50.2	3.8	60.9	48.45	27,299			3,481	
Low & middle income	..	264	193	32.8	1.3	16.6	7.15	50,006			4,846	
East Asia & Pacific	..	302	252	46.8	1.5	17.0	3.98	23,593			844	
Europe & Central Asia	102	446	370	49.9	1.5	39.3	24.10	10,184			1,392	
Latin America & Carib.	71	419	272	29.6	3.1	37.7	29.62	9,687			1,946	
Middle East & N. Africa	33	272	175	..	..	25.4	0.67	1,153			72	
South Asia	..	113	71	36.3	0.3	3.2	0.31	3,034			97	
Sub-Saharan Africa	12	201	43	..	..	8.4	3.10	2,357			495	
High income	286	1,289	693	160.4	73.0	345.9	981.74	191,857			105,652	
Europe EMU	208	821	582	101.6	47.9	234.9	263.37	41,280			10,131	

a. Data are from the International Telecommunication Union's (ITU) *World Telecommunication Development Report 2000* and *Challenges to the Network: Internet for Development* (1999). Please cite the ITU for third-party use of these data. b. Data are from the Internet Software Consortium (www.isc.org).



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About the data

The table includes indicators of the penetration of the information economy—newspapers, radios, television sets, fax machines, personal computers, and Internet hosts and users—as well as some of the economics of the information age—Internet access charges, the number of secure servers, and spending on information and communications technology. Other important indicators of information and communications technology—such as the use of teleconferencing or the use of the Internet in organizing conferences, distance education, and commercial transactions—are not collected systematically and so are not reported here. Important as all these indicators are, they fail to capture characteristics of the information disseminated, such as its quality.

The data on the number of daily newspapers in circulation and radio receivers in use are from statistical surveys carried out by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). In some countries definitions, classifications, and methods of enumeration do not entirely conform to UNESCO standards. For example, newspaper circulation data should refer to the number of copies distributed, but in some cases the figures reported are the number of copies printed. In addition, many countries impose radio and television license fees to help pay for public broadcasting, discouraging radio and television owners from declaring ownership. Because of these and other data collection problems, estimates of the number of newspapers and radios vary widely in reliability and should be interpreted with caution.

The data for other electronic communications and information technology are from the International Telecommunication Union (ITU), the Internet Software Consortium, Netcraft, and the World Information Technology and Services Alliance. The ITU collects data on television sets and cable television subscribers through annual questionnaires sent to national broadcasting authorities and industry associations. Some countries require that television sets be registered. To the extent that households do not register their televisions or do not register all of their televisions, the data on licensed sets may understate the true number.

Because of different regulatory requirements for the provision of data, complete measurement of the telecommunications sector is not possible. Telecommunications data are compiled through annual questionnaires sent to telecommunications authorities and operating companies. The data are supplemented by annual reports and statistical yearbooks of telecommunications ministries, regulators, operators, and industry associations. In some cases estimates are derived from ITU documents or other references.

The data on fax machines exclude fax modems attached to computers. Some operators report only the equipment they sell, lease, or register, so the actual number is almost certainly much higher.

The estimates of personal computers are derived from an annual questionnaire, supplemented by other sources. In many countries mainframe computers are used extensively, and thousands of users can be connected to a single mainframe computer; thus the number of personal computers understates the total use of computers.

Internet hosts are computers connected directly to the worldwide network, each allowing many computer users to access the Internet. Hosts are assigned to countries on the basis of the host's country code, though this does not necessarily indicate that the host is physically located in that country. All hosts lacking a country code identification are assigned to the United States. The Internet Software Consortium changed the methods used in its Internet domain survey beginning in July 1998. The new survey is believed to be more reliable and to avoid the undercounting that occurs when organizations restrict download access to their domain data. Nevertheless, some measurement problems remain, so the number of Internet hosts shown for each country should be considered an approximation. In particular, most hosts are now under generic top-level domains (for example, .com, .net, and .org), which, unlike country code top-level domains (.de, .uk), have never had a geographic designation (see Zook 2000). For detailed analysis of Internet trends by country, it is best to use the original source data.

Data on Internet users are based on reported estimates, derived from reported counts of Internet service provider (ISP) subscribers, or calculated by multiplying the number of hosts by an estimated multiplier. The price of Internet access in many countries is a major constraint on universal access. The table shows both the ISP charge and the telephone call charge. ISP charges are similar across countries, but telephone call charges vary much more and are extremely high in some countries because of the monopolistic power of the telecommunications operator. As a result, the price of Internet access is much higher in developing than in high-income countries, especially relative to per capita income.

The number of secure servers, from the Netcraft Secure Server Survey, gives an indication of how many companies are conducting encrypted transactions over the Internet. The data on information and communications technology expenditures cover the world's 55 largest buyers of such technology among countries and regions, accounting for 98 percent of global spending.

Definitions

- **Daily newspapers** refer to those published at least four times a week.
- **Radios** refer to radio receivers in use for broadcasts to the general public.
- **Television sets** refer to those in use.
- **Cable television subscribers** are households that subscribe to a multichannel television service delivered by a fixed line connection. Some countries also report subscribers to pay television using wireless technology or those cabled to community antenna systems.
- **Fax machines** are facsimile machines connected to the public switched telephone network.
- **Personal computers** are self-contained computers designed to be used by a single individual.
- **Internet hosts** are computers with active Internet Protocol (IP) addresses connected to the Internet. All hosts without a country code identification are assumed to be located in the United States.
- **Internet users** are people with access to the worldwide network.
- **Internet service provider charge** is the monthly dial-up access charge for 20 hours of use. It includes local telephone call charges and taxes but excludes the initial ISP connection charge.
- **Internet telephone call charge** is the off-peak telephone call charge for 20 hours of Internet access. If a special Internet tariff exists, it is used instead.
- **Secure servers** are servers using encryption technology in Internet transactions.
- **Information and communications technology expenditures** include external spending on information technology ("tangible" spending on information technology products purchased by businesses, households, governments, and education institutions from vendors or organizations outside the purchasing entity), internal spending on information technology ("intangible" spending on internally customized software, capital depreciation, and the like), and spending on telecommunications and other office equipment.

Data sources

The data on newspapers and radios are compiled by UNESCO. The data on television sets, cable television subscribers, fax machines, personal computers, Internet users, and Internet access charges are from the ITU. They are reported in the ITU's *World Telecommunication Development Report 2000, Challenges to the Network: Internet for Development* (1999), and the *World Telecommunications Indicators Database* (2000b). The data on Internet hosts are from the Internet Software Consortium (www.isc.org), and the data on secure servers from Netcraft (www.netcraft.com/). The data on information and communications technology expenditures are from *Digital Planet 2000: The Global Information Economy* by the World Information Technology and Services Alliance (WITSA), which uses data from the International Data Corporation.



5.11 Science and technology

	Scientists and engineers in R&D	Technicians in R&D	Science and engineering students	Scientific and technical journal articles	Expenditures for R&D	High-technology exports		Royalty and license fees		Patent applications filed ^a	
	per million people 1987-97 ^b	per million people 1987-97 ^b	% of total tertiary students 1987-97 ^b	1997	% of GNI 1987-97 ^b	\$ millions 1999	% of manufactured exports 1999	Receipts \$ millions 1999	Payments \$ millions 1999	Residents 1998	Non-residents 1998
Albania	..	..	19	10	..	7	7	..	..	0	35,159
Algeria	..	..	58	139	..	16	4	..	..	42	264
Angola	..	..	24	2	..	..	..	..	..	..	..
Argentina	660	147	28	2,119	0.38	557	8	19	442	861	5,459
Armenia	1,485	177	29	178	..	3	2	..	..	77	33,822
Australia	3,357	797	24	11,793	1.80	1,624	11	344	1,124	9,097	48,609
Austria	1,627	812	33	3,432	1.53	6,384	13	120	623	3,023	144,017
Azerbaijan	2,791	188	37	71	0.21	..	..	..	..	0	33,507
Bangladesh	52	33	47	130	0.03	3	0	0	6	32	184
Belarus	2,248	266	48	548	1.07	157	4	1	1	919	34,350
Belgium	2,272	2,201	41	4,717	1.60	11,115	8	757	1,138	1,899	110,753
Benin	176	54	18	19	..	0	0	..	2	..	..
Bolivia	172	154	30	27	0.50	296	..	2	5	..	..
Bosnia and Herzegovina	..	..	..	8	..	..	..	..	..	0	34,441
Botswana	..	..	37	33	..	..	..	0	6	7	85
Brazil	168	59	27	3,908	0.81	3,453	13	133	1,283	2,535	48,331
Bulgaria	1,747	967	27	896	0.57	113	4	..	..	281	36,294
Burkina Faso	17	16	18	20	0.19	..	..	..	..	..	..
Burundi	33	32	20	11	0.31	..	..	0	0	1	4
Cambodia	..	..	13	3	..	..	..	..	..	..	..
Cameroon	..	..	45	73	..	..	..	..	..	..	..
Canada	2,719	1,070	16	19,910	1.66	23,935	15	1,178	2,602	4,841	60,841
Central African Republic	56	32	30	5	..	..	..	..	..	..	..
Chad	..	..	14	2	..	..	..	..	..	..	..
Chile	445	233	42	850	0.68	93	4	99	51	189	1,771
China	454	200	43	9,081	0.66	29,614	17	75	792	14,004	68,285
Hong Kong, China	..	..	36	2,080	..	4,398	21	..	..	128	14,539
Colombia	..	..	28	208	..	289	8	7	68	74	1,662
Congo, Dem. Rep.	..	..	..	15	..	..	..	..	..	2	27
Congo, Rep.	..	..	48	8	..	..	..	0	0	..	..
Costa Rica	532	..	20	73	0.21	2,707	..	1	31	..	..
Côte d'Ivoire	..	..	31	31	..	..	..	..	..	..	..
Croatia	1,916	714	30	544	1.03	270	8	..	..	273	12,633
Cuba	1,612	1,121	16	148	0.84	..	..	..	..	109	33,997
Czech Republic	1,222	693	28	2,024	1.20	2,141	9	43	137	641	38,555
Denmark	3,190	2,644	25	3,950	1.95	6,493	20	..	..	2,897	143,460
Dominican Republic	..	..	35	6	..	7	0	..	30	..	..
Ecuador	146	42	27	39	0.02	25	6	..	70	8	302
Egypt, Arab Rep.	459	341	12	1,108	0.22	3	0	47	329	494	1,139
El Salvador	20	356	59	3	..	38	7	1	20	..	..
Eritrea	..	..	30	0	..	..	..	..	..	..	..
Estonia	2,017	391	27	222	0.57	271	13	2	6	22	35,479
Ethiopia	..	..	26	103	..	..	..	..	0	4	0
Finland	2,799	1,966	39	3,897	2.78	8,547	24	648	375	4,796	142,088
France	2,659	2,873	37	26,509	2.25	55,834	23	1,983	2,297	20,298	109,717
Gabon	234	22	29	16	..	..	..	..	..	..	..
Gambia, The	..	..	..	25	..	0	19	..	..	5	60,267
Georgia	..	..	39	128	..	..	..	..	..	280	35,448
Germany	2,831	1,472	47	36,233	2.41	75,176	17	3,017	4,405	67,790	134,981
Ghana	..	..	32	78	..	32	14	..	0	6	66,167
Greece	773	314	26	2,123	0.47	484	10	0	58	68	111,271
Guatemala	104	112	..	15	0.16	71	9	..	..	11	196
Guinea	..	..	34	3	..	0	0	..	0	..	..
Guinea-Bissau	..	..	0	3	..	..	..	..	..	0	15,568
Haiti	..	..	..	2	..	2	4	..	..	3	6
Honduras	..	..	24	10	..	6	3	0	0	11	140

Science and technology 5.11



	Scientists and engineers in R&D	Technicians in R&D	Science and engineering students	Scientific and technical journal articles	Expenditures for R&D	High-technology exports		Royalty and license fees		Patent applications filed ^a	
	per million people 1987-97 ^b	per million people 1987-97 ^b	% of total tertiary students 1987-97 ^b	1997	% of GNI 1987-97 ^b	\$ millions 1999	% of manufactured exports 1999	Receipts \$ millions 1999	Payments \$ millions 1999	Residents 1998	Non-residents 1998
Hungary	1,099	510	32	1,717	0.68	4,839	23	62	307	751	37,956
India	149	108	25	8,439	0.73	1,415	6	23	315	2,111	7,997
Indonesia	182	..	39	123	0.07	2,731	10	..	..	0	32,910
Iran, Islamic Rep.	560	166	39	332	0.48	9	1	0	0	337	159
Iraq	..	..	41	35	..	..	..	..	..	68	18
Ireland	2,319	506	31	1,118	1.61	27,929	47	415	6,943	1,199	111,145
Israel	..	..	49	5,321	2.35	4,644	19	258	263	2,529	39,742
Italy	1,318	798	30	16,405	2.21	17,240	8	563	1,382	3,167	109,341
Jamaica	..	..	64	49	..	1	0	6	41	..	..
Japan	4,909	827	21	43,891	2.80	104,794	27	8,190	9,855	360,338	77,037
Jordan	94	10	26	177	0.26	15	2	..	..	0	0
Kazakhstan	..	..	20	119	0.32	130	8	..	..	1,245	34,093
Kenya	..	..	19	235	..	16	4	1	44	33	67,797
Korea, Dem. Rep.	..	..	..	0	..	..	..	..	..	0	33,918
Korea, Rep.	2,193	318	32	4,619	2.82	41,452	32	455	2,661	50,714	71,036
Kuwait	230	71	29	173	0.16	35	1	..	..	..	..
Kyrgyz Republic	584	50	14	9	0.20	5	6	..	..	111	33,794
Lao PDR	..	..	20	2	..	..	..	..	..	..	..
Latvia	1,049	351	23	141	0.43	40	4	10	10	195	35,768
Lebanon	..	..	30	81	..	..	..	..	..	..	..
Lesotho	..	..	19	2	..	..	..	13	0	6	67,485
Libya	..	..	..	12	..	..	..	..	..	12	23
Lithuania	2,028	631	31	198	0.70	377	12	0	14	135	35,703
Macedonia, FYR	1,335	546	47	49	..	18	2	2	3	84	35,049
Madagascar	12	37	25	..	0.18	4	3	1	10	0	34,941
Malawi	..	..	27	38	..	..	..	..	..	7	67,753
Malaysia	93	32	27	304	0.24	39,996	59	0	0	179	6,272
Mali	..	..	12	12	..	0	7	..	..	..	..
Mauritania	..	..	41	2	..	..	..	0	0	..	..
Mauritius	361	158	14	2	0.40	13	1	0	0	3	12
Mexico	214	74	32	1,915	0.33	24,070	21	42	554	472	44,249
Moldova	330	1,641	52	111	0.90	5	4	0	0	257	33,854
Mongolia	910	176	24	13	..	..	..	1	..	148	35,006
Morocco	..	..	41	271	..	10	0	6	201	90	237
Mozambique	..	..	42	9	..	..	..	..	..	..	..
Myanmar	..	..	56	3	..	..	..	2	0	..	..
Namibia	..	..	4	7	..	..	..	6	3	..	..
Nepal	..	..	13	35	..	..	..	0	0	..	..
Netherlands	2,219	1,358	39	11,008	2.08	39,917	33	2,388	3,426	5,751	109,325
New Zealand	1,663	809	20	2,308	1.04	611	15	49	317	1,353	38,381
Nicaragua	204	85	33	11	..	2	6	..	..	12	142
Niger	..	..	32	25	..	0	5	..	..	..	..
Nigeria	15	76	42	405	0.09	17	13	..	..	..	..
Norway	3,664	1,842	26	2,501	1.58	2,012	17	90	341	1,642	42,616
Oman	..	..	13	53	..	118	10	..	..	..	..
Pakistan	72	13	32	232	0.92	22	0	2	19	16	782
Panama	..	..	29	37	..	2	1	0	18	31	142
Papua New Guinea	..	..	10	31	..	34	..	..	..	..	..
Paraguay	..	..	20	4	..	3	3	189	3	..	..
Peru	233	10	34	63	..	46	5	4	60	48	756
Philippines	157	22	14	159	0.22	8,479	59	6	110	163	3,280
Poland	1,358	1,377	28	4,019	0.77	580	3	25	491	2,410	38,942
Portugal	1,182	167	36	1,085	0.62	1,062	5	27	292	119	145,023
Puerto Rico	..	..	..	..	..	..	..	..	..	..	..
Romania	1,387	581	21	751	0.72	237	4	4	38	1,308	36,518
Russian Federation	3,587	600	50	17,147	0.88	2,899	16	43	8	16,630	41,902



5.11 Science and technology

	Scientists and engineers in R&D	Technicians in R&D	Science and engineering students	Scientific and technical journal articles	Expenditures for R&D	High-technology exports		Royalty and license fees		Patent applications filed ^a	
	per million people 1987-97 ^b	per million people 1987-97 ^b	% of total tertiary students 1987-97 ^b	1997	% of GNI 1987-97 ^b	\$ millions 1999	% of manufactured exports 1999	Receipts \$ millions 1999	Payments \$ millions 1999	Residents 1998	Non-residents 1998
Rwanda	35	8	28	5	0.04	..	..	0	1	..	..
Saudi Arabia	..	..	17	613	..	18	0	0	0	45	1,286
Senegal	3	4	21	58	0.01	34	13	0	2	..	..
Sierra Leone	..	..	17	8	..	..	..	..	..	0	33,154
Singapore	2,318	301	..	1,164	1.13	60,032	61	..	..	311	44,637
Slovak Republic	1,866	792	40	950	1.05	377	5	15	54	224	36,628
Slovenia	2,251	1,027	26	517	1.46	318	4	8	47	296	36,001
South Africa	1,031	315	29	1,927	0.70	1,055	8	71	162	..	8
Spain	1,305	343	31	11,210	0.90	6,945	8	344	1,831	3,119	144,770
Sri Lanka	191	47	34	61	..	109	3	..	..	81	34,974
Sudan	..	..	16	43	..	0	0	0	0	6	67,713
Sweden	3,826	3,166	38	8,219	3.76	15,100	22	1,386	1,147	8,599	140,894
Switzerland	3,006	1,374	34	6,935	2.60	16,283	22	..	..	6,026	141,553
Syrian Arab Republic	30	25	23	57	0.20	..	..	..	..	..	..
Tajikistan	666	..	17	29	..	..	..	..	..	37	33,742
Tanzania	..	..	37	89	..	6	6	0	4	..	..
Thailand	103	39	18	356	0.13	13,999	32	19	583	477	4,594
Togo	98	63	35	7	0.48	0	1	..	0	..	..
Trinidad and Tobago	..	..	58	41	..	21	2	0	0	17	34,969
Tunisia	125	57	33	188	0.30	125	3	10	3	46	128
Turkey	291	..	45	2,116	0.45	892	4	..	..	231	37,155
Turkmenistan	..	..	..	7	..	..	..	..	..	41	33,664
Uganda	21	14	17	46	0.57	2	11	0	0	7	67,603
Ukraine	2,171	575	42	2,163	..	..	..	..	..	5,327	36,623
United Arab Emirates	..	..	24	127	..	..	..	..	..	..	8
United Kingdom	2,448	1,017	34	38,530	1.95	66,942	30	7,942	6,301	28,889	147,298
United States	3,676	..	19	166,829	2.63	184,239	35	36,467	13,275	141,342	121,445
Uruguay	..	..	32	110	..	21	2	0	10	27	469
Uzbekistan	1,763	314	..	261	..	..	..	..	..	723	35,148
Venezuela, RB	209	32	26	429	0.49	71	3	0	0	201	2,323
Vietnam	..	..	..	106	..	..	..	..	..	30	35,748
West Bank and Gaza	..	..	..	..	..	..	..	..	..	..	..
Yemen, Rep.	..	..	5	10	..	..	..	..	..	..	..
Yugoslavia, FR (Serb./Mont.)	1,099	515	47	492	..	..	..	..	..	526	34,015
Zambia	..	..	16	23	..	..	..	..	..	7	86
Zimbabwe	..	..	24	100	..	10	2	..	..	8	66,264
World	.. w	.. w	35 w	512,637 s	2.18 w	959,990 s	21 w	67,641 s	66,837 s	785,229 s	5,034,563 s
Low income	..	..	28	13,572	0.47	2,890	6	41	370	9,241	1,105,167
Middle income	668	233	39	61,762	0.90	180,967	21	1,400	8,682	96,166	1,092,164
Lower middle income	763	255	41	35,148	0.58	60,566	18	434	2,461	37,173	613,666
Upper middle income	660	..	32	26,614	1.17	120,400	24	966	6,221	58,993	478,498
Low & middle income	..	..	35	75,334	0.85	183,857	20	1,440	9,052	105,407	2,197,331
East Asia & Pacific	492	193	43	14,817	1.32	136,271	31	558	4,147	65,506	284,777
Europe & Central Asia	2,533	..	44	34,905	0.77	13,222	11	207	1,068	32,728	940,242
Latin America & Carib.	..	..	30	10,093	0.62	31,706	16	503	2,710	4,003	241,989
Middle East & N. Africa	..	..	29	3,123	..	1,336	2	63	548	926	2,874
South Asia	137	98	24	8,896	0.66	131	4	23	321	2,143	43,155
Sub-Saharan Africa	..	..	29	3,499	..	1,190	9	86	258	101	684,294
High income	3,166	..	25	437,303	2.36	776,133	22	66,201	57,786	679,822	2,837,232
Europe EMU	2,127	1,510	38	115,641	2.15	239,033	19	10,379	22,820	111,399	1,405,323

a. Other patent applications filed in 1998 include those filed under the auspices of the African Intellectual Property Organization (25 by residents, 34,970 by nonresidents), African Regional Industrial Property Organization (24 by residents, 34,591 by nonresidents), European Patent Office (51,073 by residents, 62,335 by nonresidents), and Eurasian Patent Organization (293 by residents, 35,418 by nonresidents). The original information was provided by the World Intellectual Property Organization (WIPO). The International Bureau of WIPO assumes no liability or responsibility with respect to the transformation of these data. b. Data are for the latest year available; see *Primary data documentation* for the year.



Science and technology 5.11

About the data

Science is advancing rapidly in virtually all fields, particularly biotechnology, and playing a growing economic role: countries unable to access, generate, and apply relevant scientific knowledge will fall even further behind. And there is greater appreciation of the need for high-quality scientific input into public policy issues such as regional and global environmental concerns.

Science and technology cover a range of issues too complex and too broad to be quantified by any single set of indicators, but those in the table shed light on countries' "technological base"—the availability of skilled human resources (students enrolled in science and engineering, and scientists, engineers, and technicians employed in research and development, or R&D), the number of scientific and technical articles published, the competitive edge countries enjoy in high-technology exports, sales and purchases of technology through royalties and licenses, and the number of patent applications filed.

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) collects data on scientific and technical workers and R&D expenditures from member states, mainly through questionnaires and special surveys as well as from official reports and publications, supplemented by information from other national and international sources. UNESCO reports either the stock of scientists, engineers, and technicians or the number of economically active persons (people engaged in or actively seeking work in any branch of the economy on a given date) qualified to be scientists, engineers, or technicians. Stock data generally come from censuses and are less timely than measures of the economically active population. UNESCO supplements these data with estimates of the number of qualified scientists and engineers by counting the number of people who have completed education at ISCED (International Standard Classification of Education) levels 6 and 7; qualified technicians are estimated using the number of people who have completed education at ISCED level 5. The data on scientists, engineers, and technicians, normally calculated in terms of full-time-equivalent staff, cannot take into account the considerable variations in quality of training and education. Similarly, R&D expenditures are no guarantee of progress; governments need to pay close attention to the practices that make them effective.

The data on science and engineering students refer to those enrolled at the tertiary level, which normally requires as a minimum condition of admission the successful completion of education at the secondary level. These data are reported to UNESCO by national education authorities. (For further details on UNESCO education surveys see *About the data* for table 2.12.)

The methodology used for determining a country's high-technology exports was developed by the Organisation for Economic Co-operation and Development in collaboration with Eurostat. Termed the "product approach" to distinguish it from a "sectoral approach," the method is based on the calculation of R&D intensity (R&D expenditure divided by total sales) for groups of products from six countries (Germany, Italy, Japan, the Netherlands, Sweden, and the United States). Because industrial sectors characterized by a few high-technology products may also produce many low-technology products, the product approach is more appropriate for analyzing international trade than is the sectoral approach. To construct a list of high-technology manufactured products (services are excluded), the R&D intensity was calculated for products classified at the three-digit level of the Standard International Trade Classification revision 3. The final list was determined at the four- and five-digit level. At this level, since no R&D data were available, final selection was based on patent data and expert opinion. This methodology takes only R&D intensity into account. Other characteristics of high technology are also important, such as know-how, scientific and technical personnel, and technology embodied in patents; considering these characteristics would result in a different list. (See Hatzichronoglou 1997 for further details.)

The counts of scientific and technical journal articles include those published in a stable set of about 5,000 of the world's most influential scientific and technical journals, tracked since 1985 by the Institute of Scientific Information's Science Citation Index (SCI) and Social Science Citation Index (SSCI). (See *Definitions* for the fields covered.) The SCI and SSCI database covers the core set of scientific journals but may exclude some of regional or local importance. It may also reflect some bias toward English-language journals.

Most countries have adopted systems that protect patentable inventions. Under most patent legislation, to be protected by law (patentable), an idea must be new in the sense that it has not already been published or publicly used; it must be nonobvious (involve an inventive step) in the sense that it would not have occurred to any specialist in the industrial field, had such a specialist been asked to find a solution to the problem; and it must be capable of industrial application in the sense that it can be industrially manufactured or used. Information on patent applications filed is shown separately for residents and nonresidents of the country. The World Intellectual Property Organization estimates that at the end of 1998 about 4 million patents were in force in the world.

Definitions

- **Scientists and engineers in R&D** are people trained at the tertiary level to work in any field of science who are engaged in professional R&D activity.
- **Technicians in R&D** are people engaged in professional R&D activity who have received vocational or technical training in any branch of knowledge or technology. Most such jobs require three years beyond the first stage of secondary education.
- **Science and engineering students** include students at the tertiary level in the following fields: engineering, natural science, mathematics and computers, and social and behavioral sciences.
- **Scientific and technical journal articles** refer to scientific and engineering articles published in the following fields: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences.
- **Expenditures for R&D** are current and capital expenditures on creative, systematic activity that increases the stock of knowledge. Included are fundamental and applied research and experimental development work leading to new devices, products, or processes.
- **High-technology exports** are products with high R&D intensity. They include high-technology products such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery.
- **Royalty and license fees** are payments and receipts between residents and nonresidents for the authorized use of intangible, nonproduced, non-financial assets and proprietary rights (such as patents, copyrights, trademarks, industrial processes, and franchises) and for the use, through licensing agreements, of produced originals of prototypes (such as manuscripts and films).
- **Patent applications filed** are applications filed with a national patent office for exclusive rights for an invention—a product or process that provides a new way of doing something or offers a new technical solution to a problem. A patent provides protection for the invention to the owner of the patent for a limited period, generally 20 years.

Data sources

The data on technical personnel, science and engineering students, and R&D expenditures are from UNESCO's *Statistical Yearbook*. The data on scientific and technical journal articles are from the National Science Foundation's *Science and Engineering Indicators 2000*. The information on high-technology exports is from the United Nations' Commodity Trade (COMTRADE) database. The data on royalty and license fees are from the International Monetary Fund's *Balance of Payments Statistics Yearbook*, and the data on patents from the World Intellectual Property Organization's *Industrial Property Statistics*.