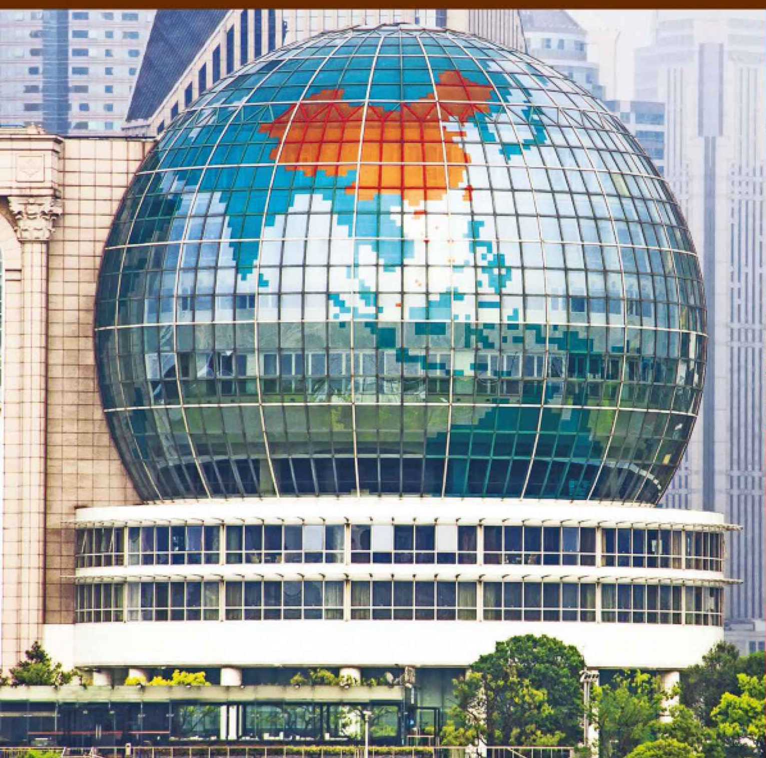
DEVELOPMENT ECONOMICS

GÉRARD ROLAND



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Brief Contents

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Contents

Introduction

The economics of development is one of the most exciting fields in economics. It asks the same questions Adam Smith raised when he founded the study of economics: Why do some countries develop earlier than others? Why do some countries fail to develop while others are successful?

While we have learned a lot about what the wrong answers to those questions are, we have also made progress in recent years in finding the correct answers. Some of the most innovative advances in economics in the past 15 years have been in development economics and they have changed this field tremendously.

Two New Research Directions in Development Economics

Two notable research directions have reshaped the way we think about economic development. The first of these focuses on the fundamental role of institutions in understanding development and growth. Institutions, or the rules of the game in society and the economy, play a big role in determining how costly or inexpensive it is to pursue economic transactions such as buying or selling goods and services, or getting a loan to start a business. In some countries, institutions make economic transactions easier and establish a climate in which property rights are protected and the rule of law prevails. Such institutions have a positive effect on development. In other countries, institutions make economic transactions very difficult: property rights and investments are not protected, corruption is rife, abuse of power by politicians is the norm, and laws are either flawed or not well enforced. These institutions have a negative effect on economic development.

This undergraduate textbook is the first that comprehensively takes stock of the exciting new research that has taken place in recent years to gain an understanding of the role of institutions in economic development. We devote special chapters to particular sets of institutions—legal, political, and fiscal—as well as cultural and social norms. We examine the effect of institutions on growth, property rights, market development, and the delivery of public goods and services. Finally, we explore issues of institutional change such as democratization or property rights reform.

The second research direction that has completely changed the face of development economics is the rapid introduction of randomized evaluation of development projects. Randomized evaluation, now widely used in medical research, initially faced resistance from the medical community: people objected that if a new treatment existed, researchers should not randomly choose who might benefit from it, but give everyone access to the therapy. The disadvantage of this approach was that often only those who were the most health conscious chose to follow the new treatment. As health-conscious people are generally healthier than individuals who are less concerned with their own health, the studies based on that population therefore tended to overestimate the effects of a particular medical treatment. Randomized evaluation is necessary to evaluate medical treatments scientifically.

In recent years, development economists have wholeheartedly adopted the randomization approach to program evaluation in development projects. Entrepreneurial development economists such as Michael Kremer at Harvard, Abhijit Banerjee and Esther Duflo at MIT, Edward Miguel at UC Berkeley, and many others have convinced nongovernmental organizations (NGOs) to use randomized evaluation to assess the effects of various development and aid programs, and answer such questions as: What is the effect of deworming drugs on school participation and learning? What are the best methods for keeping water clean and preventing diarrheal diseases? How effective are bed nets in fighting malaria? What are the most successful tools to enhance the quality of education in poor countries, textbooks, school meals, smaller class sizes, or scholarship programs? Program evaluation enables researchers to figure out which programs are most effective and which policies have the best cost-to-benefit ratio in terms of achieving the goals of health, education, and social welfare, among other measures of development. This book provides a comprehensive study of the recent research in program evaluation in development economics.

The spread of randomized evaluations in development economics has also been associated with great improvements in empirical analysis. For obvious ethical reasons, researchers cannot analyze issues such as assessing the effects of abduction and the horrors of war on child soldiers or understanding the causes of armed conflicts using randomized evaluations, nor can they use these methods to answer the "big" questions about the effects of institutions on development. Nevertheless, researchers in recent years have developed very rigorous and innovative empirical methods for answering these and other questions about the causal effects of economic, social, and political variables.

While different in their focus, research on the role of institutions and on the use of randomized controlled trials to evaluate development policies are quite complementary. Randomized controlled trials are focused on precisely measuring the effect of particular policy interventions in local settings. Research on the role of institutions is more often done in a wider setting and analyzes differences in institutions across countries and, sometimes, across regions in large countries. Knowledge of a particular country's history is often crucial to understanding the origin and evolution of that country's institutions. However, both of these new directions in research share a common dedication to using the highest econometric standards and appropriate empirical methods to measure causal effects.

In this book, we take a broad view of economic development. The field is not confined simply to the study of poverty and underdevelopment, but it also examines how countries become successful in development. In the last decades, parts of East Asia followed by China and India, have been experiencing significant success in economic development. It is crucial that we try to understand the reasons for their success. We pay particular attention to development in

China and we also examine various aspects of economic history to provide a historical perspective on development successes and failures.

Organization of the Book

The comprehensive and flexible nature of the book's contents is designed so that instructors may pick and choose topics according to their specific interests and they can teach chapters in the order that works best for their students.

Part I introduces all the main issues in economic development and covers traditional contributing factors such as poverty and inequality, demographic issues, economic growth, structural change, development strategies, trade, and foreign aid and debt.

Chapter 1 presents data about the development gap, the huge difference in income per capita as well as in other measures of development, between the world's rich and poor countries. It presents the core focus of the book: why some countries grow out of poverty while others do not. It includes a number of maps to present the data so that students can visualize where poverty and underdevelopment are prevalent.

Chapter 2 considers poverty and inequality and how to measure these conditions. In addition, we discuss the evolution of poverty and inequality in the world over time and some of the underlying factors that drive changes in poverty and inequality.

Chapter 3 examines population growth, which has traditionally been an important issue in development. We examine trends in population growth in developing countries and discuss the theory of fertility choices and how it applies to development. We discuss family-planning policies and the reasons why population growth has begun to slow down in developing countries, a phenomenon called the demographic transition.

Chapter 4 covers growth theory. We consider the main theories of growth, both the Solow model and the model of endogenous growth. We also discuss the empirical literature on growth, a subject that many development textbooks do not address. A very important topic in this chapter is the role of institutions in explaining long-term growth. We also discuss alternative explanations for growth such as human capital and geography.

Chapter 5 focuses on issues of structural change. We discuss the traditional Lewis model of structural change as well as the Harris-Todaro model of rural-to-urban migration. We discuss some of the development strategies from the past 50 years such as big-push theories, balanced versus unbalanced growth theories, and import substitution and export promotion strategies.

Chapter 6 discusses globalization and the important international economic issues relevant to development. We offer a simple and thorough explanation of the theory of comparative advantage, and we discuss the political economy of trade and the critical role of multilateral institutions such as the WTO in maintaining free trade agreements. We explain how the WTO's basic rules of reciprocity and nondiscrimination help to sustain and expand multilateral agreements. We also cover exchange-rate issues as well as the topics of foreign debt and aid. In particular, we discuss recent controversies about how useful foreign aid actually is for development.

Part II focuses on institutions and their role in economic development.

Chapter 7 provides precise definitions of various institutions and explains in detail how they help solve a number of important problems that occur in economic transactions. These may be informational problems relative to the quality of goods and services or the reliability of the parties participating in a transaction; commitment problems and incentives to cheat or to renege on promises; collective-action problems and the difficulties faced by communities that attempt to make decisions or take actions that benefit their members as a whole; and coordination problems and the difficulties encountered by economic agents in developing common, efficient norms of behavior. This chapter is critical to understanding, at the microeconomic level, the role that institutions play in solving the various problems that arise in transactions between individuals and within communities.

Chapter 8 examines a topic important for the role of institutions in economic development: the role of markets versus hierarchies in the allocation of resources. In all economies, some goods and services are provided through the market while others are rendered through a hierarchical command system usually run by the government. In the 20th century, some countries even tried to achieve faster development by relying on central planning instead of free markets to allocate most resources in the economy. We discuss the incentive problems in central planning and large bureaucracies, and explain why central planning proved inferior to the capitalist market system.

Chapter 9 compares political institutions in the context of development. We compare the basic political institutions of democracy and dictatorship as well as different forms of both. Political institutions have an important effect on many indicators of economic performance such as growth or the delivery of public goods and services. This chapter also discusses theories and studies of democratization.

Chapter 10 covers legal and fiscal institutions. We present comparative research on legal systems, in particular common- and civil-law systems, and their effect on the development of financial markets. Fiscal institutions are also important because it is more difficult to raise tax revenues in developing countries than in developed countries. This is particularly the case in many countries where a large part of the economy operates in the unofficial sector.

Chapter 11 studies the role of culture in development. Students are introduced to the different methods by which researchers attempt to measure culture, understood as values and beliefs. We also present results from emerging research on the effects of culture on an economy.

Part III covers the core issues that development economists have been working on. The chapters on property rights, corruption, and conflict are unique to this text.

Chapter 12 examines issues of property rights and contracts in rural contexts. It analyzes the types of land contracts that exist on different continents and their economic effects, as well as how a country's institutions can influence these contracts. We also consider the history of land reforms and their economic effects in developing countries.

Chapter 13 discusses issues of property rights in urban contexts and it explores both the effects that result from the absence of legal titles to property in many developing countries and the differences across countries in terms of the protection of property rights. We also provide a detailed analysis of the issue of privatization policies in developing countries.

Chapter 14 considers market development in poor countries and the link between institutions and the development of markets in those countries. An important problem for rural market development is monopsony; farmers often face a single buyer who will only pay a very low price for their goods. This leaves farmers with little incentive to make investments that would increase their agricultural productivity. We also study the experience of transition economies; because free markets did not exist under central planning, the experience of these economies is useful to our understanding of how markets develop. We analyze issues of market integration as well as the obstacles to it in developing economies, and we consider famines and the market problems associated with these devastating events.

Chapter 15 looks at the role of credit markets in development. Here, we build on the issues discussed in Chapter 7. Informational and commitment problems are crucial issues in credit markets. In developing countries, the low levels of collateral and high costs of monitoring loans make these problems more serious. We discuss issues of credit constraints that firms can face and we also study microfinance, an innovative institution that has emerged to deal with some of the specific transaction costs of credit in developing countries.

Chapter 16 presents pertinent facts about health issues in development and how they have evolved over time. We explain the different ways economists measure health and we examine the relationships between health and development, health and income, and health and long-term growth. We also survey the results provided by randomized evaluations of health interventions in poor countries. In addition, this chapter discusses the issue of how to create access to cheap drugs in poor countries as well as the institutional factors relevant to the provision of healthcare services in developing countries.

Chapter 17 discusses the provision of education in developing countries and offers an overview of its progress and failures. We also survey the results of all the different randomized experiments undertaken to improve the quality of education. We discuss the various institutional problems in education such as the allocation of funds between the private and public sector; the allocation of funds to primary, secondary, and tertiary education; the persistent effects of corruption; and the educational gender gap and the programs designed to deal with this problem.

Chapter 18 examines the delivery of infrastructure in developing countries. It is difficult to attract infrastructure investment in poor countries because of their weak protection of property rights. Infrastructure decisions by politicians are not always efficient and scarce funds are often used to finance "white elephant" projects that are economically inefficient, but bring benefits to politicians. We also discuss various other problems developing countries face in relation to infrastructure investment, such as the economic effects of dams or the allocation of responsibility over infrastructure between different levels of government.

Chapter 19 focuses on corruption in the context of development. We explain the pros and cons of the measures of corruption that economists use. There is a direct link between the quality of institutions and the level and persistence of corruption, with cultural aspects playing a significant role. We survey the research on the causes and consequences of corruption and discuss policies to prevent and eradicate it.

Chapter 20 covers the issue of conflict in development. This is an important topic that is often neglected in other textbooks. Because most conflicts since World War II have taken place in developing countries, we present both theoretical and empirical analyses of the causes and consequences of these conflicts.

For those instructors who have a strong preference for traditional development themes, we recommend beginning with Part I, Chapters 1–6, which cover standard development issues. We then recommend Part II, Chapters 7–11 for those who are not very familiar with the economics of institutions. Finally, we recommend concluding with Part III, Chapters 12–20.

For an institutional approach, you may move from Chapter 1 directly to Chapters 7–11. After covering Chapters 12–15, add one chapter from Chapters 16–18, then return to Chapters 4, 2, and 6, and end with Chapters 19 and 20.

For those most interested in microeconomic issues of development, we recommend Chapters 1–4, Chapter 7, one chapter from Chapters 8–11, and then Chapters 12–20.

For those interested in a comparative approach to development, all chapters should be of interest, but if they cannot all be covered, a possible course could be Chapters 1, 2, and 4 followed by Chapters 7–15, and ending with Chapters 19 and 20.

For those instructors who would like to focus on the political economy of development they should also be interested in all chapters, a possible order could be Chapters 1–4, Chapters 6–11, and Chapters 16–20.

There are obviously other ways to structure a course using this textbook and we have made every effort to provide ample material for a variety of approaches.

Other Specific Features

Each chapter contains boxes on numerous topics related to the chapter's content. There are end-of-chapter summaries and review questions, many of which ask students to gather and analyze relevant data using critical thinking skills.

The book contains a wealth of data and figures on all the issues covered in the chapters. It is important for students interested in development economics to become familiar with these types of data in order to develop a quantitative grasp of the main issues in development such as poverty, differences in income per capita across the world, literacy rates, and infant mortality among others.

In order to understand development issues, undergraduate students not only need to be able to read descriptive tables, but they must also be familiar with regression tables. While they need to know the basic econometric methods used in economics, they do not need to know how to perform econometric analysis (this is reserved for graduate school). They must, however, learn to read and understand econometric tables that report results based on the most frequently used econometric techniques. We try to make this reading of econometric tables as easy as possible. In the chapters that include econometric tables, we explain the results in an intuitive way so that students can understand them as such. The book provides a special Econometric Appendix that explains some of the principle econometric concepts and methods. All the methods used in the book's various tables are included in this appendix, which is useful for students who want to know more about the concepts and methods, and a better understanding of them will be both illuminating and rewarding. However, this text was written to present frontier research in development economics in an accessible way to students studying traditional economics or other social sciences, as well as to anyone interested in understanding development.

As far as theory is concerned, our general approach has been to include mathematical models in text boxes and to provide explanations in the main text. The models in the text boxes also help students to achieve a more rigorous understanding of the economic theory and we strongly encourage students to read these boxes. Chapter 4 on economic growth is the only chapter in which models are included in the main text because it is usually difficult to understand growth theory without the use of production functions and basic models such as the Solow model. Even in this chapter, however, we try to focus on the essential components of theory and devote sufficient space to discuss the empirical literature on growth, which has delivered many new insights about economic development in the last 20 years.

Supplements

Please visit the Companion Website at www.routledgetextbooks.com/textbooks/9780321464484.

The Companion Website, by Sandra Trejos, Clarion University, features key concepts, multiple-choice quizzes, and graphing and quantitative exercises for each chapter.

The book's PowerPoint® presentation, by Jeff Werling, University of Maryland, provides instructors with a set of comprehensive lecture slides.

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Gérard Roland
Berkeley, May 2, 2013

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1

The Development Gap

Students who are interested in studying development economics may have various motivations for doing so. They might have idealistic motivations and want to help eradicate poverty and disease in poor countries. They may intend to work for a non-governmental organization (NGO) or an international development aid agency to achieve these goals. Better knowledge of development economics can provide more useful solutions to help the poor in developing economies. Students might also have intellectual motivations and want to understand why poverty can be so persistent and how development economics can contribute to finding solutions to poverty. Why can our planet produce enough food to feed all its inhabitants, yet hundreds of millions of people still suffer from hunger? Which economic policies work best, at the regional, national, urban, and village levels, to help people escape poverty, achieve higher living standards, receive better health care and education, and live longer? How can development economics provide answers to those questions?

There is no better way to introduce the topic of economic development than with some striking pictures. Figures 1.1a, 1.1b, and 1.1c show three different world maps produced by Mark Newman, at the Department of Physics and the Center for the Study of Complex Systems at the University of Michigan. The first map displays the landmass of the world's countries. The second map represents the size of countries as proportional to their population; for example, China and India appear much larger than on standard maps since they have populations, respectively, of 1.3 and 1.2 billion people. Japan and Indonesia also appear larger. Notice how Russia and Canada appear much smaller than on standard maps. On the African continent, South Africa, Nigeria, Egypt, and Ethiopia appear larger, while on the North American continent, Mexico also appears larger.

In the third map, the size of a country appears as proportional to its gross domestic product. Here, the United States, Europe, and Japan appear very large, and Germany appears nearly as large as China. Notice how Central and South America and Africa have become tiny.

These three maps clearly illustrate the challenges of economic development in the world. The overwhelming majority of the world's population lives in developing countries, while most economic activity takes place in a few rich countries such as the United States, Japan, or the nations of Western Europe. Most people on the planet still have very low living standards and roughly one billion people live in conditions of great poverty, surviving on less than a dollar a day. The study of economics should not, therefore, view the issues of economic development as a marginal or exotic subject. It is *the* most important economic problem on our planet and development economics thus has the potential to make a significant positive impact on the lives of people around the world.

FIGURE 1.1a The Actual Land Mass of the World's Countries

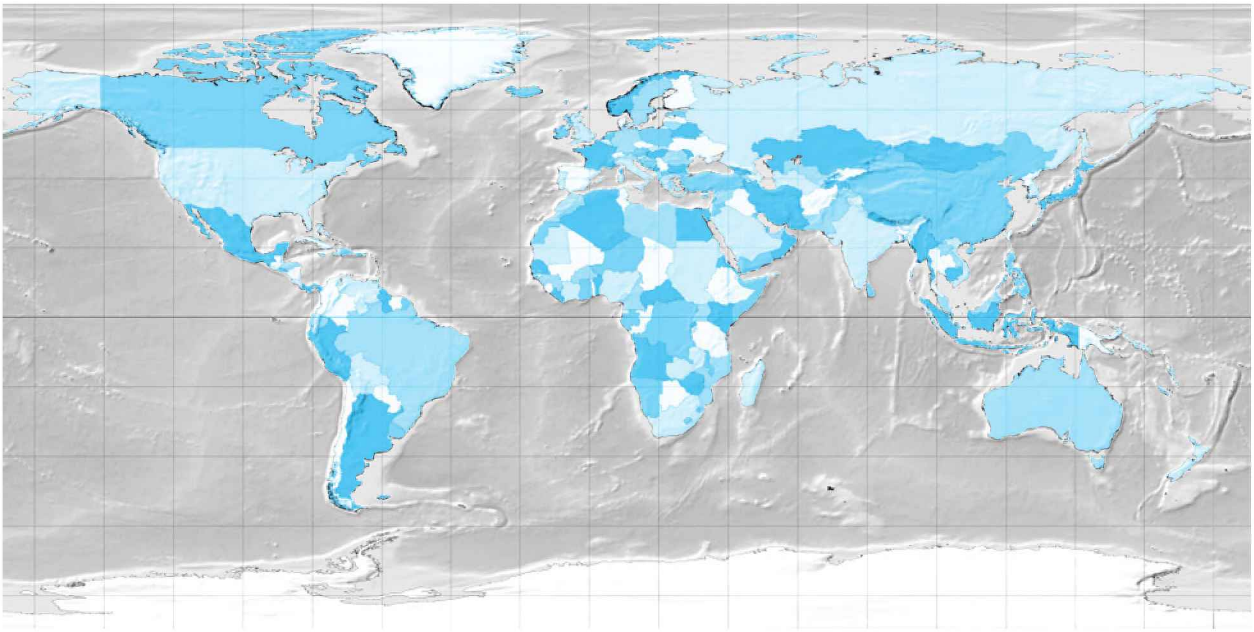


FIGURE 1.1b A World Map Representing a Country's Size as Proportional to Its Population

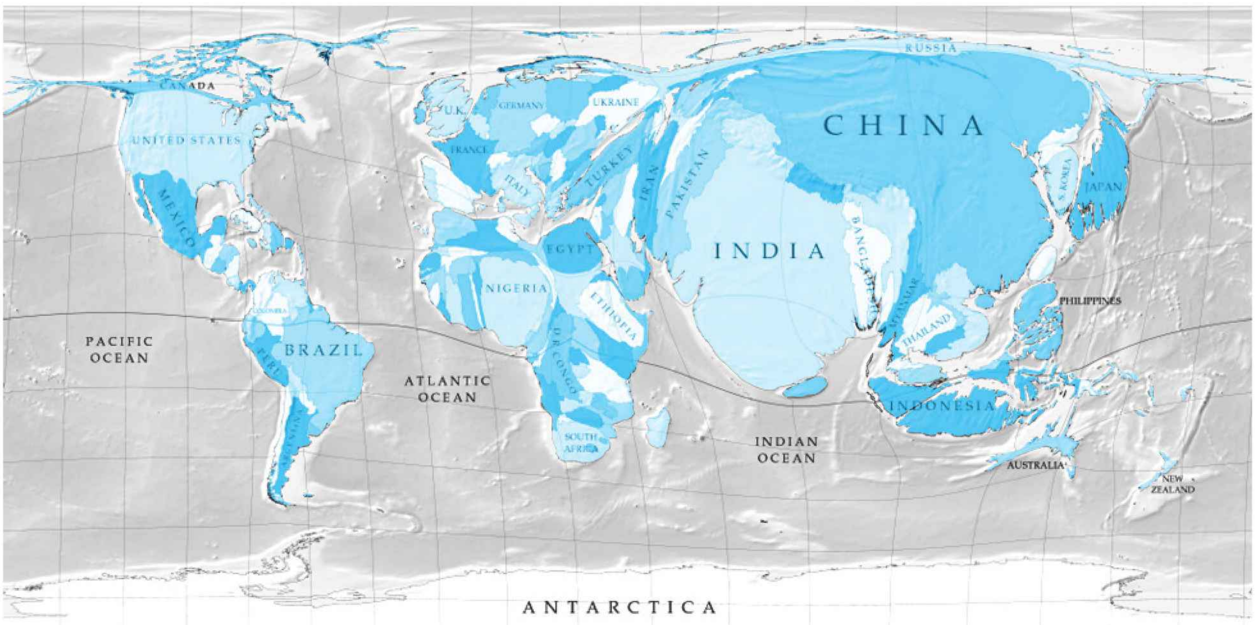
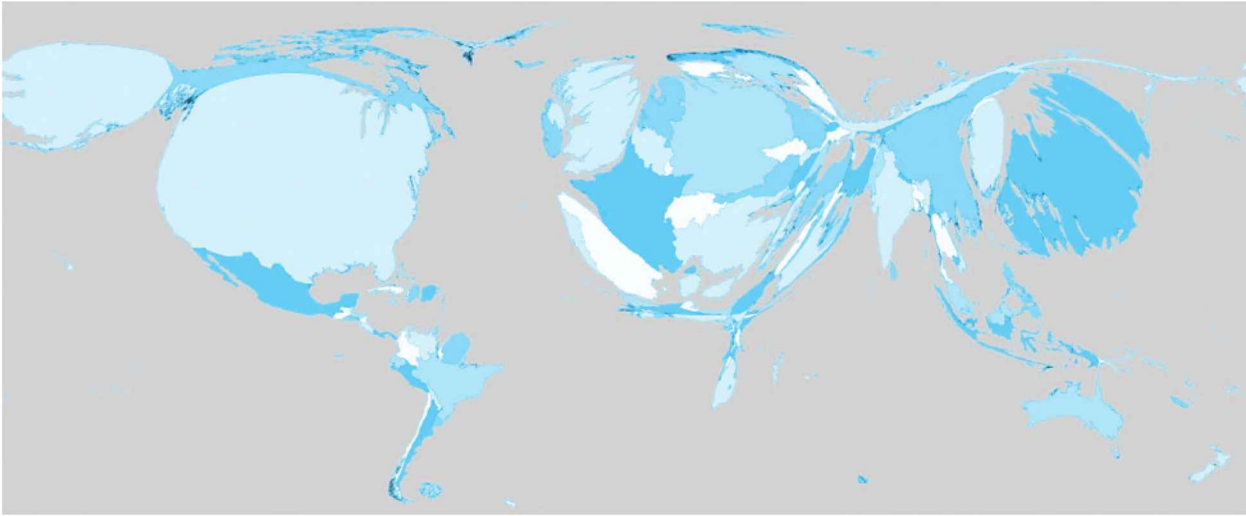


FIGURE 1.1c A World Map Representing a Country's Size as Proportional to Its Gross Domestic Product



In the first map, country sizes are proportional to their landmass; in the second map, they are proportional to their populations; and in the third map, they are proportional to their gross domestic product.

Source: Printed with permission from Mark Newman, University of Michigan. http://www-personal.umich.edu/~mejn/cartograms/.

In this chapter, we examine some of the most important facts about economic development and consider some of the main questions studied in development economics. We first learn about the **development gap**, the differences in economic development between the advanced economies of the United States, Japan, and the Western European nations and the poorer economies of Africa, Asia, Latin America, and Eastern Europe. We review measures of the development gap in terms of income, life expectancy, health, education, and level of urbanization, which will provide a fresh and precise perspective on the scope of the development gap between the richest and poorest countries in the world.

This gap has been evolving over time, decreasing for some countries while increasing for others. For example, in recent decades some Asian countries such as China and India have successfully undertaken a vigorous process of development and have begun to close the gap with the richest countries. Obviously there is still a long way to go, but it is encouraging to see that there are some major success stories in developing nations, and they may help us better understand why the development gap has unfortunately increased in many other poor countries. Another important fact we must consider is that development is not irreversible: rich countries can be engaged in a process of economic decline. Argentina was among the richest countries in the world at the beginning of the 20th century, but over the next 50 years, it experienced a significant downturn in its economy. Development economists have primarily focused on the success or failure of development in poor countries; they have paid less attention to the phenomenon of the decline of countries who had already achieved success in economic development. It is critical to understand economic decline in order to prevent it.

Facts about the Development Gap

There are different ways to measure the gap in economic development between rich and poor countries. We will look at the income gap, the health gap, the education gap, and the differences in rates of urbanization across the world.

The Income Gap

The first and most obvious way to measure the development gap is to measure the income gap between developed economies and poor countries. A common measure of income is **gross domestic product (GDP) per capita**. This is a measure of the value of output produced per inhabitant of a country during a given year. Gross domestic product per capita is a good approximation of average annual per capita income. The only difference is that annual per capita income adjusts for income flowing into or out of the country, as well as for foreign aid and remittances. Of course, these can be significant for poor countries. Nevertheless, GDP is the single most widely used measure of a country's economic size. In order to compare across countries, we need to express GDP per capita in U.S. dollars (or some other common currency). In development economics, it is important to use exchange rates based on **purchasing power parity (PPP)** when converting GDP per capita in the local currency to U.S. dollars. Purchasing power parity exchange rates are based on the prices of all goods and services, and are constructed such that the same basket of goods in one country has the same dollar value in all countries.

Let us look at GDP per capita across countries in 2010 using purchasing power parity. Luxemburg is the richest country in the world with a GDP per capita of $86,000. The world's poorest country is the Democratic Republic of Congo (formerly called Zaire) with a GDP per capita of only $350. This is a very large difference, close to 1:250. Other rich countries include the United States, Norway, Singapore, Qatar, and the United Arab Emirates with a gross domestic product (GDP) per capita around $50,000. Most European countries have a GDP per capita between $20,000 and $40,000. In contrast, 12 countries, including Congo have a GDP per capita lower than $1,000. These include Burundi, Liberia, Eritrea, Niger, the Central African Republic, Sierra Leone, Malawi, Timor-Leste, Mozambique, Madagascar, and Togo. Apart from Timor-Leste in Southeast Asia, all of these countries are in sub-Saharan Africa. Figure 1.2 shows a map of GDP per capita based on purchasing power parity.

Comparing Per Capita Incomes across Countries Using Purchasing Power Parity (PPP) Exchange Rates

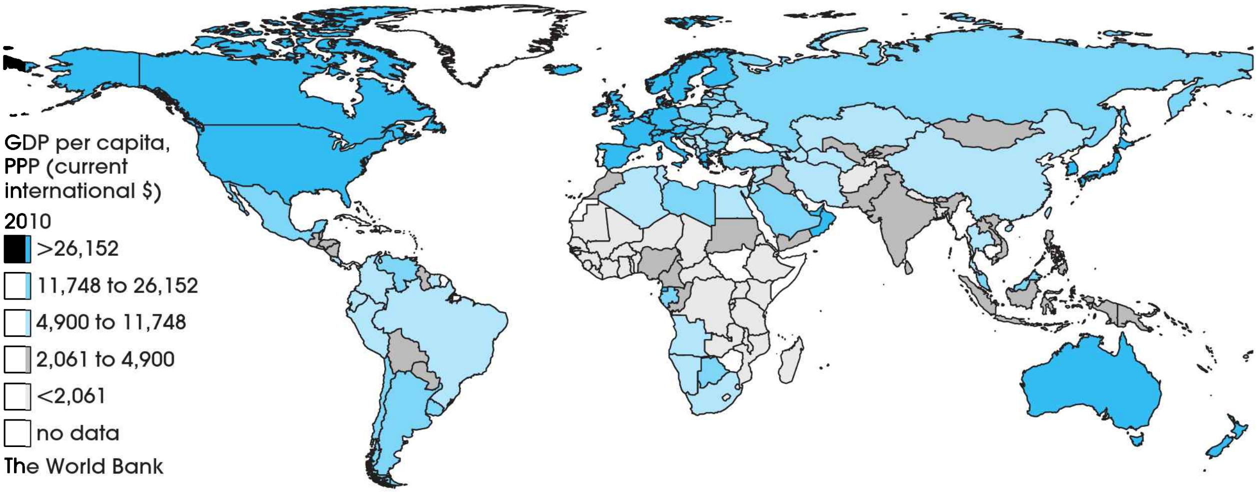
Using PPP to measure a country's GDP (or any other statistical data) means that we must use an exchange rate based on purchasing power parity instead of the market exchange rate to obtain a dollar measure of GDP for that country. The purchasing power parity measure computes exchange rates between currencies of different countries so that *the same basket of goods in any two different countries has the same dollar value*. This is difficult to do but is important for making international income comparisons. One dollar will typically buy less in a rich country than in a poor country if we use existing exchange rates. For example, one U.S. dollar was exchanged internationally in 2012 at roughly 55 Indian rupees. However, 55 Indian rupees will typically buy more things in India than will one U.S. dollar in the United States. The purchasing power parity exchange rate will thus be lower than 55 rupees per dollar, probably closer to 40 rupees or even less. The world's poorest people live on less than one dollar a day. Even though they live under conditions of extreme poverty, they can typically buy more with one dollar in their country than a resident of New York, Tokyo, or London can purchase with that same dollar.

The reason why market exchange rates do not equalize purchasing power parity is that exchange rates are based only on the prices of tradable goods and do not take into account non-tradables, i.e., goods and services that are not traded internationally. Non-tradable goods are usually less expensive in poorer countries. Many of these non-tradable goods are services and their price is related to the cost of labor, which is lower in poorer countries. For example, the price of a haircut is usually lower in poorer countries. The technology for cutting hair is basically the same everywhere and the cost is essentially the wage of the hairdressers. A haircut is a non-tradable service because people do not typically travel across countries to get a cheaper haircut.

As we can see from Figure 1.2, most of the world's poorest countries are in Africa. South Africa is the richest country on the continent with slightly over $10,500 per capita. However, most countries in sub-Saharan Africa are much poorer and have a GDP per capita that is closer to the $1,000 range. Many Asian countries are still very poor; Nepal and Afghanistan have a GDP per capita of roughly $1,200 Bangladesh and Myanmar are below $2,000, and Cambodia, Laos, Pakistan, Vietnam, India, the Philippines, Mongolia, and Indonesia are below $5,000.

Russia and the nations of Latin America and Eastern Europe are among the middle-income countries with a GDP per capita in the range of $5,000 to $15,000. Brazil, for example, has a GDP per capita slightly above $11,000, which is around the Latin American average. Some of the former Soviet republics are quite poor. Tajikistan and Kyrgyzstan have a GDP per capita close to $2,000, roughly the level of Cambodia. Uzbekistan and Moldova have a GDP per capita slightly above $3,000 and are poorer than Vietnam or India. During the Communist period of the 20th century, we would not have classified Soviet republics as developing countries. However, since the fall of Communism, it is clear that many former Soviet republics are actually quite poor. Even

FIGURE 1.2 GDP Per Capita in 2010 (Purchasing Power Parity in Dollars)



The world's poorest countries are concentrated in Africa.

Source: The World Bank, World Development Indicators, http://databank.worldbank.org.

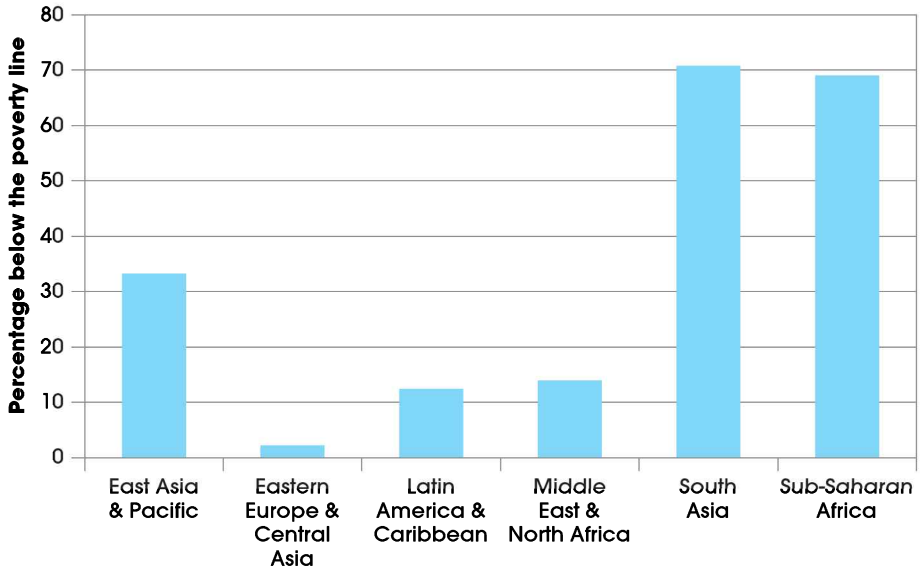
Russia must now be seen as a middle-income country with a GDP per capita of $19,000, which is closer to that of Mexico ($14,500) than to that of the United States ($47,000).

The Poverty Gap

The income gap shows that an overwhelming proportion of the world population lives on less than $10,000 a year. However, this measure does not give an accurate idea of the extreme poverty that exists in the world. Figure 1.3 shows the poverty headcount ratio at $2 a day measured in purchasing power parity. This represents the percentage of the population that lives on less than $2 a day and it is a measure used by the World Bank to gauge extreme poverty. We will talk more about measurement of poverty in Chapter 2. As Figure 1.3 demonstrates, slightly over 70% of the population in South Asia (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka) fits that definition of poverty, while nearly 70% of the population in sub-Saharan Africa lives below that poverty line. As a result, those two regions represent a strong concentration of extreme poverty, with 1.2 billion people in South Asia and 600 million people in sub-Saharan Africa living on less than $2 a day. In East Asia and the Pacific, 33% of the population, or roughly 730 million people, live below that poverty line. Overall, a bit less than half of the human beings on the planet live on less than $2 a day.

Measures of income and poverty are crucial indicators of development, but they are not the only ones. We will next look at other factors that can give us an idea of economic development and living conditions.

FIGURE 1.3 Poverty Headcount Ratio in 2008 at Poverty Line of $2 a Day in 2005 Prices (Purchasing Power Parity)



More than two-thirds of the population in sub-Saharan Africa and in South Asia live on $2 a day.

Source: The World Bank, World Development Indicators, http://databank.worldbank.org/.

The Health Gap

There is an important health gap between rich and poor countries. People in developing countries are more prone to diseases, they do not live as long as people in developed countries, and many of their children die at a young age.

Differences in life expectancy. In 2010, a child born in Japan could expect to live until 83, while a child born the same year in Sierra Leone in Africa could only expect to reach the age of 47. **Life expectancy** is defined as the average number of years a newborn infant would live if health and living conditions at the time of its birth remained the same throughout its life. It reflects the health conditions in a country and the quality of health care its people receive. Life expectancy is closely correlated with income, but it is instructive to look at the numbers on life expectancy in different regions of the world shown in Table 1.1. For each region that includes developing countries, the table identifies the countries with the lowest and the highest life expectancies. Life expectancy in North America is given for comparison.

As the table indicates, life expectancy is the lowest in sub-Saharan Africa by more than 10 years compared to South Asia, and by more than 20 years compared with other regions in the world. All countries outside sub-Saharan Africa have a life expectancy above 50, except for Afghanistan, but 11 African countries have a life expectancy below 50. As we will see in Chapter 16, AIDS is a big factor in reducing life expectancy in many African countries, but it is

TABLE 1.1 2010 Life Expectancy (Years) at Birth in Regions of the World and in Selected Countries

Region, country	Life expectancy	Region, country	Life expectancy
Sub-Saharan Africa	**54.2**	**East Asia and Pacific**	**73.3**
Lesotho	47.3	Timor-Leste	62
Cape Verde	73.77	Japan	83
South Asia	**65.3**	**Latin America and Caribbean**	**74.1**
Afghanistan	48.3	Haiti	61.8
Sri Lanka	74.7	Costa Rica	79.2
Middle East and North Africa	**72.5**	**Europe and Central Asia**	**75.7**
Iraq	68.5	Turkmenistan	64.9
Qatar	78.1	Switzerland	82.2
		North America	**78**

There are marked differences in life expectancy across the world. It is the lowest in sub-Saharan Africa where poverty is the highest.

Source: The World Bank, World Development Indicators, http://databank.worldbank.org/.

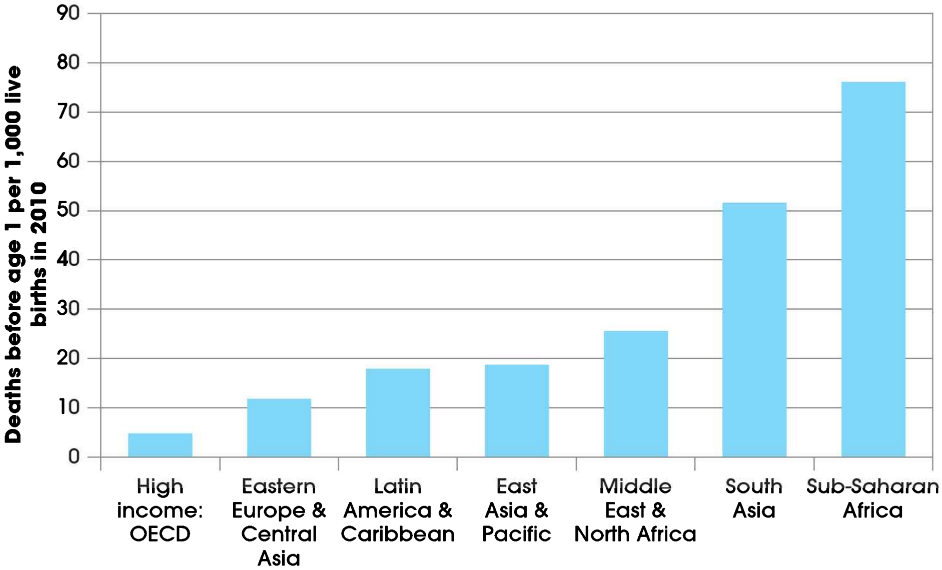
not by any means the only factor contributing to a low life expectancy. Many mothers die giving birth, diseases such as yellow fever and tuberculosis are often fatal, and parasitic diseases and malnutrition make people more vulnerable to illness, leading to an early death.

Outside Africa, other countries with a low life expectancy are Haiti (61.8), Timor-Leste (62), Papua New Guinea (62.4), Cambodia (62.5), Myanmar (64.6), India (65.1), and Pakistan (65.2). Conversely, there are some rather poor countries where life expectancy is quite high. For example, life expectancy in Cuba (79) is higher than in Chile (78.9) and, for that matter, higher than any other country in Central or Latin America. As a comparison, life expectancy in the United States (78.2) is lower than in Cuba or Chile. In China, life expectancy is 73.3 years. Countries from the former Soviet Union have a relatively low life expectancy; Russia's is 68.8, which is lower than Indonesia (68.9). Turkmenistan has a life expectancy of only 64.9, which is below India or Pakistan. Kazakhstan has a life expectancy of 68.3, which is lower than Nepal (68.4) or the Philippines (68.5).

Differences in infant mortality rates. The **infant mortality rate** measures the probability that a child will die before reaching age 1. It is computed as the number of children dying before age 1 per 1,000 live births in the same year. One has to divide this rate by 10 to compute the probability of dying before age 1.

As Figure 1.4 shows, infant mortality rates are the highest in sub-Saharan Africa and South Asia, the regions in the world where there are also the highest poverty rates. For the sake of comparison, the figure shows infant mortality rates for high income countries that are members of the Organization for Economic Co-operation and Development (OECD).

FIGURE 1.4 Infant Mortality Rates in 2010 (Per 1,000 Live Births)



Infant mortality rates are measured as the number of deaths before age 1 per 1,000 live births.

Source: The World Bank, World Development Indicators, http://databank.worldbank.org/.

In Africa, Sierra Leone has an infant mortality rate of 134 per 1,000, Congo has 112, Somalia 108, and the Central African Republic has 106. These are the four countries with the highest infant mortality rates in the world. The 20 countries with the highest infant mortality rates are all in Africa, except for Afghanistan (103). Haiti has a mortality rate of 70.4 per thousand, Pakistan 69.7, Tajikistan 52.2, and Myanmar 50.4. Behind all these numbers are human dramas. Every year, 9 million children die before they have reached the age of 5, leaving grief-stricken families. Most of these unnecessary deaths could be avoided by reducing poverty and improving health care in these developing nations.

Some developing countries have low infant mortality rates demonstrating that health care policies can make a difference. Cuba has an infant mortality rate of only 4.6 per thousand, the same rate as the United Kingdom and a lower rate than the United States (6.5). Korea (4.2), Malaysia (5.6), Montenegro (7.2), Chile (7.7), Russia (9.1), Uruguay (9.2), and Thailand (11.2) are some of the other countries with low infant mortality rates.

Policy interventions can be quite effective in reducing child mortality. Between 2005 and 2010, Kenya reduced its infant mortality rate by 8% each year, perhaps the fastest reduction observed among developing countries. A key factor seems to be a policy that encourages the spread of insecticide-treated bed nets as a way to fight malaria, one of the main causes of infant mortality in tropical and sub-tropical areas. In 2003, only 8% of Kenyan households used such bed nets, but by 2008, treated bed nets were used by more than 60% of households.