

Growth, productivity and the wealth of nations

SUMMARY

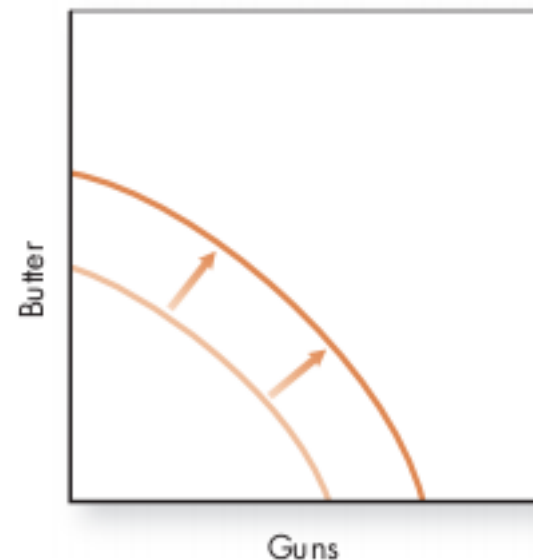
After reading this chapter you should be able to...

- Define growth and relate it to living standards.
- List five sources of growth.
- Distinguish diminishing marginal productivity from decreasing returns to scale.
- Explain the convergence hypothesis and list four reasons why it has not taken place.
- Distinguish Classical growth theory from new growth theory.

GENERAL OBSERVATIONS ABOUT GROWTH

General observations about growth

- Growth and the economy's potential output
- Potential output: *the highest amount of output an economy can produce from existing production processes and resources.*
- The analysis of growth focuses on forces that shift out the production possibility curve.



- **Say's law:** supply creates its own demand

General observations about growth

- The importance of growth for living standards
- For many economists, growth, not distribution or business cycles, is the most important macroeconomic issue.
- Growth in income improves lives by fulfilling basic needs and making more goods available to more people.
- **The Rule of 72** states: the number of years it takes for a certain amount to double in value is equal to 72 divided by its annual rate of increase.

General observations about growth

- Market, specialization, and growth
- **Specialization:** the concentration of individuals on certain aspects of production.
- **Division of labor:** the splitting up of a task to allow for specialization of production.
- Specialization and the division of labor that accompany markets increase productivity and growth.

General observations about growth

- Economic growth, distribution and markets
- Even though growth isn't evenly distributed, it generally raises the incomes of the poor.

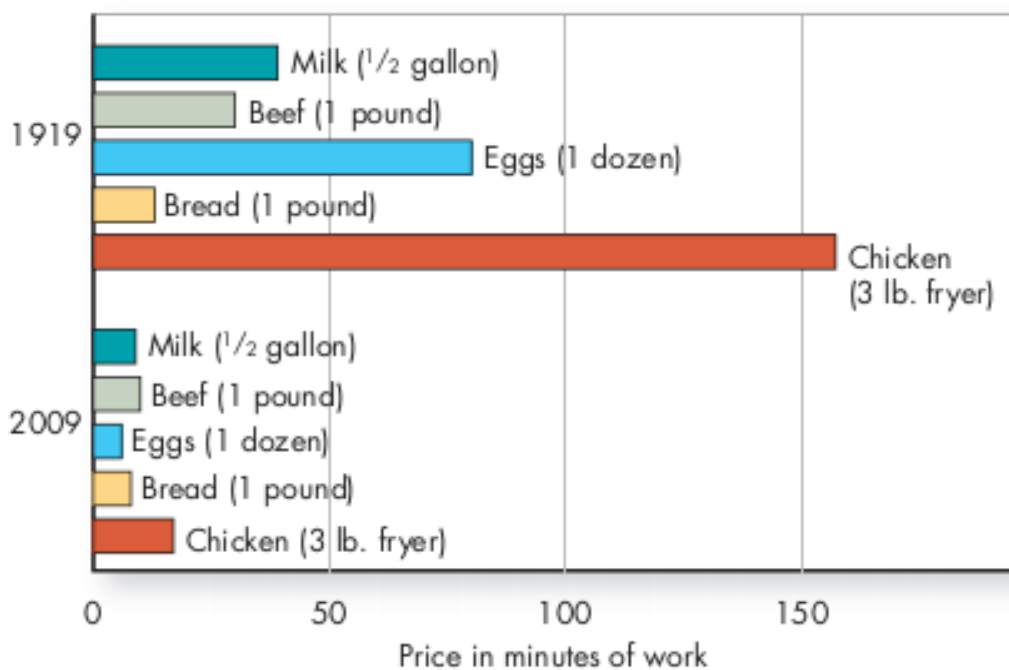


FIGURE 9-1 Cost of Goods in Hours of Work

Growth in the U.S. economy in the past century has reduced the number of hours the average person needs to work to buy consumer goods.

Source: Federal Reserve Bank of Dallas, *Time Well Spent* (1997 annual report). Updated by author.

General observations about growth

- Per capita growth
- If there is per capita growth, the country is producing more goods and services per person.
- Per capita growth = % change in output - % change in population

Country	Per Capita GDP Growth	=	Real GDP Growth	-	Population Growth
Canada	-0.1		0.7		0.8
Denmark	0.0		0.3		0.3
Russia	6.5		6.0		-0.5
Sudan	3.2		5.3		2.1
Thailand	3.2		3.6		0.4
Venezuela	4.2		5.7		1.5

Source: CIA World Factbook, 2009.

THE SOURCES OF GROWTH

The sources of growth

- 5 important sources of growth:
 - Growth-compatible institutions.
 - Capital accumulation – investment in productive capacity.
 - Available resources.
 - Technological development.
 - Entrepreneurship.

General observations about growth

- Growth-compatible institutions
- Growth-compatible institutions (institutions that foster growth) must have incentives built into them that lead people to put forth effort and discourage people from spending a lot of their time in leisure pursuits or creating impediments for others to gain income for themselves.
- Many regulations, even reasonable ones, also tend to inhibit economic growth because they inhibit entrepreneurship.
- Informal property rights limit borrowing by the poor, and hence limit growth.

The sources of growth

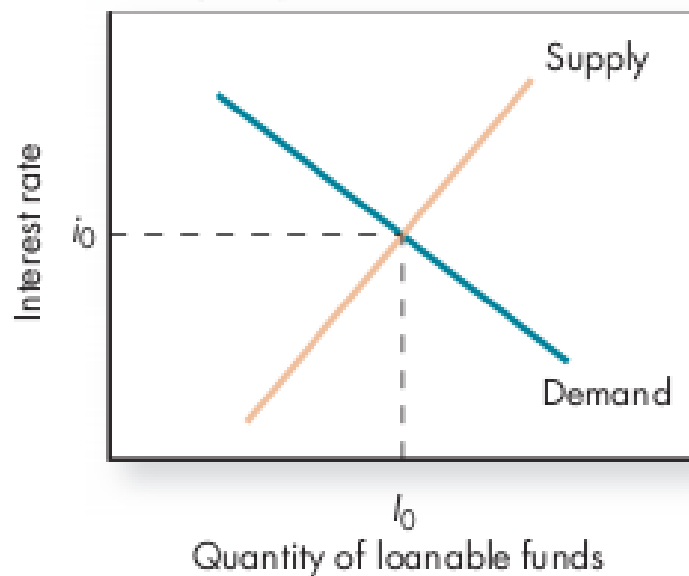
- Investment and accumulated capital
- Societies that can't afford to save (forgo consumption) will not grow.
- However, it's not exactly savings that matters but rather investment. And for saving to be helpful, it has to be translated into investment.

The sources of growth

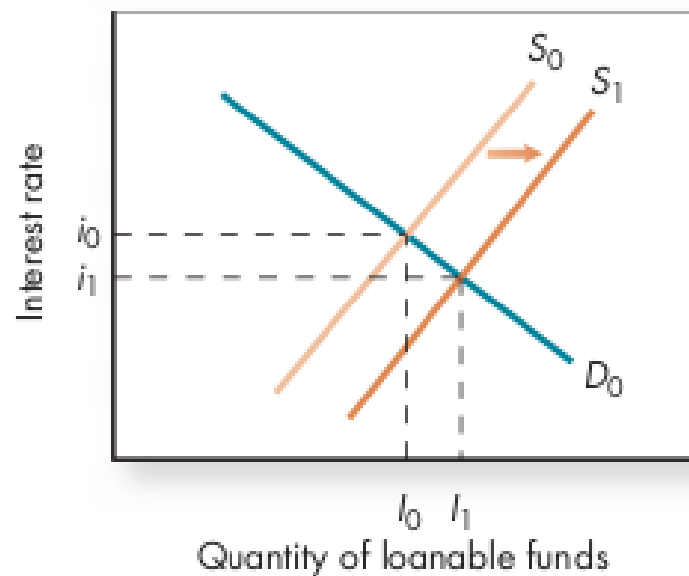
- Investment and accumulated capital

FIGURE 9-2 (A AND B) The Loanable Funds Market

Savings is the supply of loanable funds; it is an upward-sloping curve. Investment is the demand for loanable funds; it is a downward-sloping curve. The interest rate equilibrates the supply and demand for loanable funds. When the supply of loanable funds (savings) increases as shown in (b), the interest rate falls from i_0 to i_1 , and the quantity of loanable funds demanded (investment) increases from I_0 to I_1 .



(a)



(b)

The sources of growth

- Investment and accumulated capital
- There are 3 types of capital:
 - **Physical capital:** *it includes both private capital (buildings and machines available for production) and public capital (infrastructure such as highways and water supply).*
 - **Social capital:** *the habitual way of doing things that guides people in how they approach production.*
 - **Human capital:** *the skills that are embodied in workers through experience, education, and on-the-job training, or, more simply, people's knowledge.*

The sources of growth

- Available resources
- What is a resource depends on the production processes of an economy and technology.
- Exemple: there was a time where oil was not of a big use, until the day men learned it could be burned as fuel, oil became a resource.
- Exemple: if solar energy technology is ever perfected, oil will go back at being not of a big use.

The sources of growth

- Technological development
- Growth is not just getting more of the same thing. It's also getting some things that are different.
- **Technology:** *the way we make goods and supply services.*

The sources of growth

- Entrepreneurship
- It is the ability to get things done.
- It involves creativity, vision, willingness to accept risk, and a talent for translating that vision into reality.
- When a country's population demonstrates entrepreneurship, it can overcome deficiencies in other ingredients that contribute to growth.

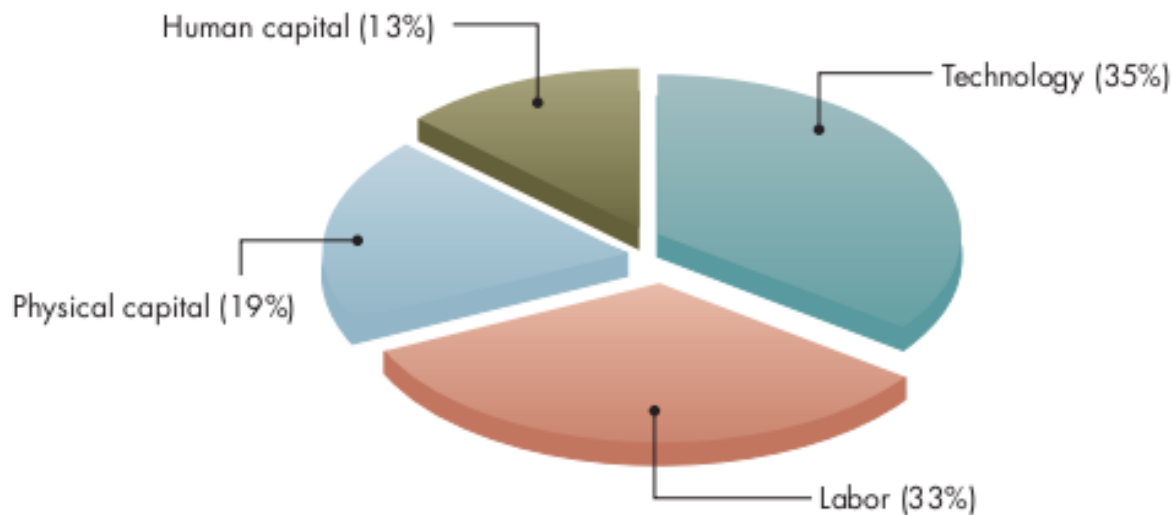
The sources of growth

- Empirical estimates of factor contribution to growth

FIGURE 9-3 Sources of Real U.S. GDP Growth

Technology accounts for the majority of growth in the United States, followed closely by increases in labor.

Source: Edward E. Denison, *Trends in Economic Growth, 1928–82* (Washington, DC: The Brookings Institution, 1985), and author estimates.



THE PRODUCTION FUNCTION AND THEORIES OF GROWTH

The production function and theories of growth

- The production function shows the relationship between the quantity of inputs used in production and the quantity of output resulting from production.
- $\text{Output} = A * f(\text{Labor, Capital, Land})\dots$
- ...where A is an adjustment factor to capture the effect changes in technology.

The production function and theories of growth

- Describing production functions
- **Constant returns to scale:** output will rise by the same proportionate increase as all inputs.
- **Increasing returns to scale:** output rises by a greater proportionate increase than all inputs.
- **Decreasing returns to scale:** output rises by a smaller proportionate increase than all inputs.
- **Law of diminishing marginal productivity:** increasing one input, keeping all others constant, will lead to smaller and smaller gains in output.

The production function and theories of growth

- The standard theory of growth- the Classical growth model
- **The Classical growth model:** it's a model of growth that focuses on the role of capital accumulation in the growth process.
- The Classical economists' major policy conclusion was: the more capital an economy has, the faster it will grow.

Saving → Investment → Increase in capital → Growth

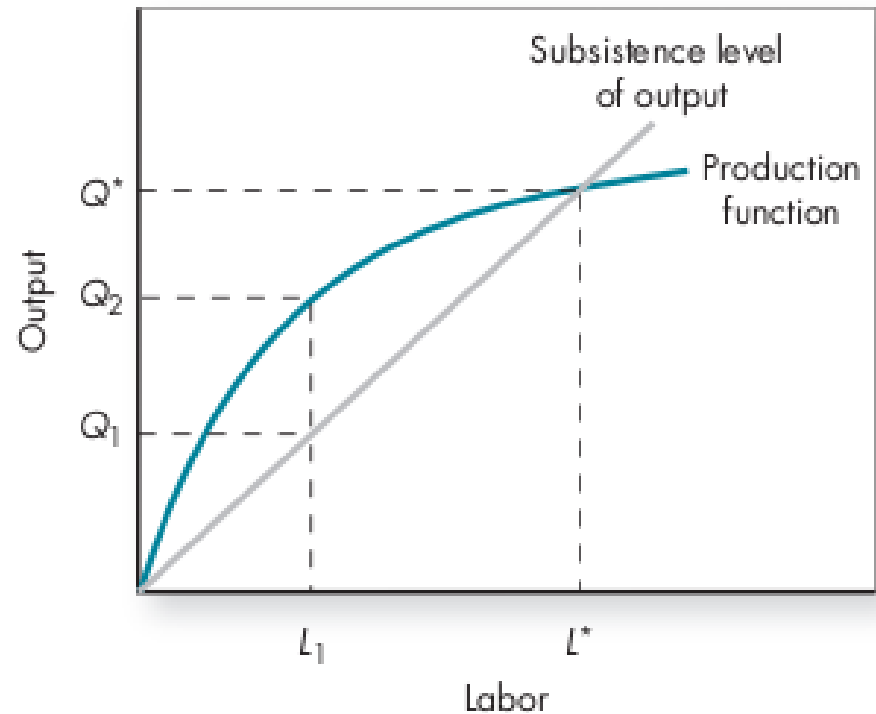
The production function and theories of growth

- Focus on diminishing marginal productivity of labor

FIGURE 9-4

Classical Growth Theory

The classical theory of growth focused on diminishing marginal productivity of labor. Because of diminishing marginal productivity, per capita income declines as the labor supply increases, other inputs held constant. As output per person declines, at some point output available per person is no longer sufficient to feed the population.



The production function and theories of growth

- The convergence debate
- The convergence hypothesis states that per capita income in countries with similar institutional structures will gravitate toward the same level of income per person.

The production function and theories of growth

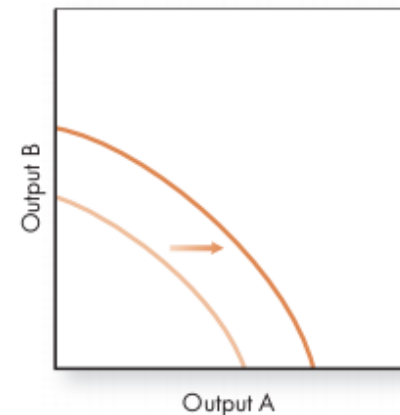
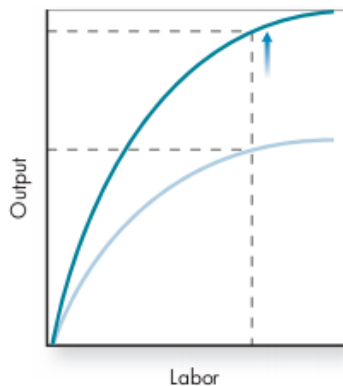
- The convergence debate
- Lack of factor of mobility:
 - The speed of convergence depends on factor and technological mobility. It is the transfer of capital and technology that causes convergence.
- Differing institutional structure:
 - The more similar the institutional structures, the more likely it is that convergence will take place because firms are likely to move production to countries whose institutions are well-suited for the businesses' practices and culture.

The production function and theories of growth

- The convergence debate
- Incomparable factors of production
 - The measure of labor needs to be adjusted to capture the skills, education, experience and effort that laborers bring to production.
 - These adjustments make it difficult to compare the measurements among different countries
 - Increases in human capital have allowed labor to keep pace with capital, allowing economies to avoid the diminishing productivity of capital.

The production function and theories of growth

- The convergence debate
- Technological agglomeration effects:
 - Technological agglomeration is the geographic concentration of technological advances caused by the tendency of innovations to lead to further innovations in that industry and other countries.
 - Technological growth shifts the production function up and the production possibility curve out.



The production function and theories of growth

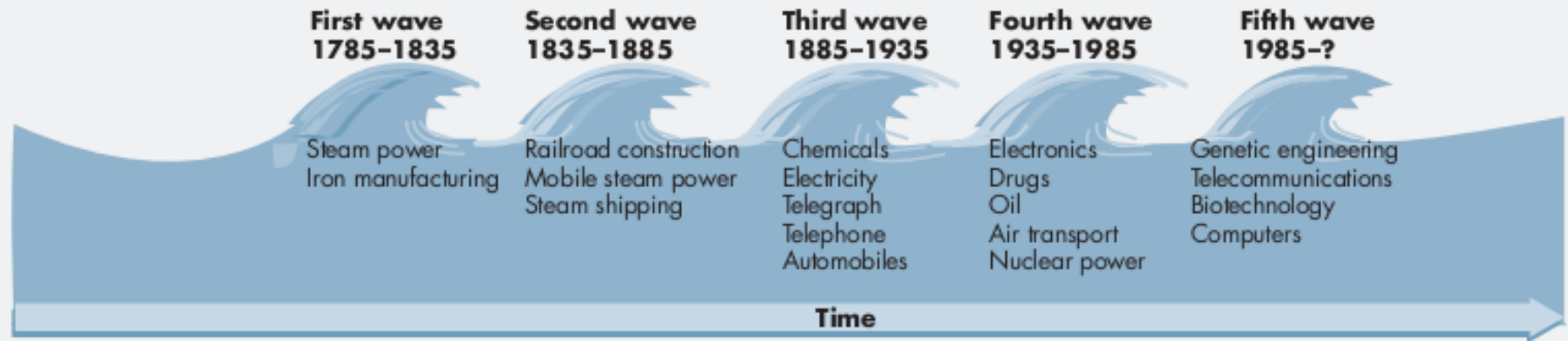
Is the 21st Century the Age of Technology or One of Many Ages of Technology?

Sometimes newspapers write as if the importance of technology to the economy in the 21st century is a new phenomenon. It is not. Technology has been changing our society for the last two centuries, and it is not at all clear that the technological changes we are currently experiencing are any more revolutionary than those experienced by other generations in the last 200 years. For example, in terms of its impact on people's lives and communications in general, the Internet is small potatoes compared to the phone system.

One economist who recognized the importance of technology was Joseph Schumpeter. Schumpeter emphasized the role of the entrepreneur. He argued that entrepreneurs

create major technological changes that drive the economy forward.

According to Schumpeter, the economy's growth depends on these entrepreneurs, and the industries they are in will be the leading industries, pulling the rest of the economy along after them. The accompanying figure lists five waves of technological innovation that have driven our economy. As you can see, in the late 1700s, steam power and iron manufacturing were the driving forces. In the 1860s, railroads were the dynamic industry. Later, electronics, automobiles, and chemicals drove our economy. In the 1980s through the early 21st century, computers and biotechnology have been the leading industries.



The production function and theories of growth

- New growth theory
- New growth emphasizes technology as the primary source of growth.

Technological advance → Investment → Further technological advance → Growth

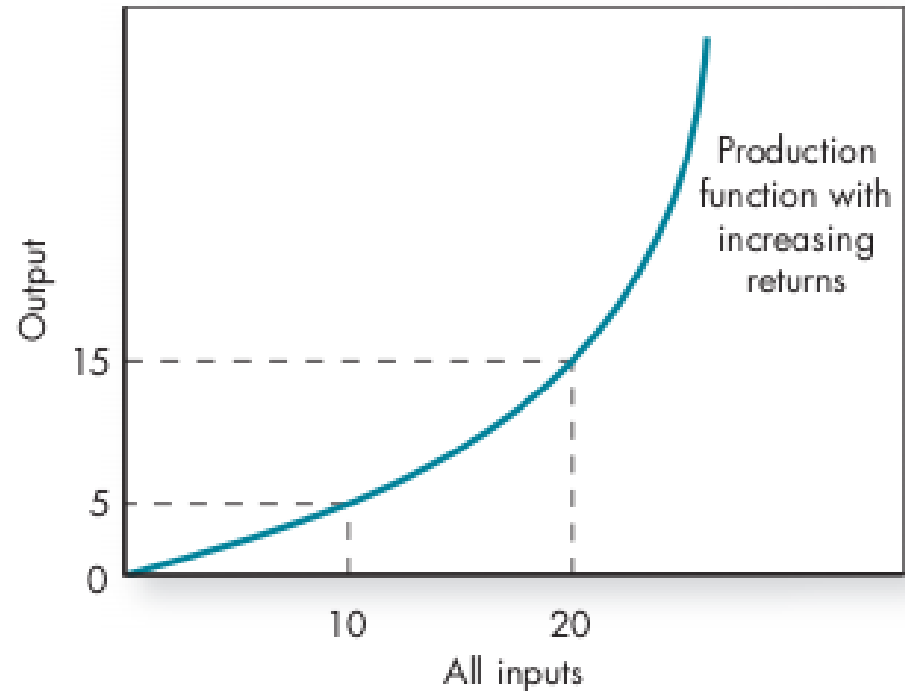
- The common knowledge aspect of technology creates positive externalities, which new growth theory sees as the key to growth.
- Patents turn innovations into private property.

The production function and theories of growth

- New growth theory
- **Learning by doing** overcomes the law of diminishing marginal productivity because learning by doing increases the productivity of workers.

FIGURE 9-5 New Growth Theory

New growth theory focuses on increasing returns to scale. With increasing returns, increases in inputs lead to proportionately greater increases in output. For example, the initial increase of inputs from 0 to 10 results in a 5-unit increase in output. An increase in inputs from 10 to 20 results in a higher 10-unit increase in output. With increasing returns, output per person can rise forever.



The production function and theories of growth

- New growth theory
- Does the economy always use the “best” technology available? – **technology lock-in**.
- Exemple: QWERTY/ AZERTY keyboards; VHS & Betamax record video.

The production function and theories of growth

- Growth policies
- General policies that are good for growth:
 - Encouraging saving and investment.
 - Formalizing property rights and reducing bureaucracy and corruption.
 - Providing more of the right kind of education.
 - Promoting policies that encourage technological innovation.
 - Promoting policies that allow taking advantage of specialization.

The production function and theories of growth

Micro Credit

In 2006 the Nobel Peace Prize went to Mohammed Yunus, a U.S.-trained economist. He won the prize for developing a financial institution in one of the poorest countries of the world—Bangladesh—called the Grameen Bank that makes loans to poor village women at market interest rates. Even though the bank loaned to individuals with little or no collateral, the bank has had excellent payback ratios, far exceeding what most people thought possible.¹

How did he do it? Most banks in developing countries tend to focus on loans to well-off people with resources to serve as collateral. This leaves the traditional part of many developing countries' economies without an effective way to translate saving into investment, stranding many entrepreneurial individuals without ways to develop their ideas. Yunus reconsidered the fundamental role of banking in an economy: to make it possible for people with good ideas to develop those ideas by providing them with funds—and to devise a structure that allowed such lending to take place.

He saw that Western banking institutions did not fulfill that role for Bangladesh. By basing their lending decisions on the amount of collateral a borrower had, they essentially made it impossible for most people in Bangladesh to get loans. But Yunus also recognized that collateral served a useful purpose: It forced people to make the difficult decision about whether they really needed the loans, and to work hard to see that they could pay the loans back, even



With a loan from the Grameen Bank (www.grameen-info.org), these women purchased the raw materials to weave baskets whose sale will provide a source of income.

if the going got tough. If you eliminate collateral, something else must replace it.

Yunus's ingenious solution was the *borrowing circle*—a credit system that replaces traditional collateral with guarantees by friends of the borrower. Recognizing that social pressures were extremely strong in Bangladesh, Yunus offered to make loans to any woman who could find four friends who would agree to help her pay the loan back if necessary. If the borrower defaulted, the others could not borrow until the loan was repaid.

This simple concept worked. Today the Grameen Bank has more than 6.6 million borrowers and lends \$60 million every month. The loans are taken out to buy such things as a cow or material to make a fishing net—not large items, but items to use in activities that generate bottom-up growth. Other microcredit banks—banks that make small loans to poor people using alternative forms of collateral—have developed similar plans.

Other countries have also replicated the microcredit approach pioneered by Grameen Bank and today there are more than 90 Grameen replicas across Asia, Africa, Latin America, Europe, and the United States. In the United States, microcredit banks focus on helping low-income people who are generally excluded from formal credit markets develop home-based businesses. Today, the idea of microfinance has spread to the Internet, making it possible for you to make a loan to, say, a baker in Afghanistan. Go to kiva.org to explore how.

While the concept of microfinance is extraordinarily simple, it made use of economic insights that simultaneously reflected an understanding of the cultural and social dimensions of the economy.

¹Recently some observers have questioned whether the bank has overstated the payback ratios, but even if they are lower than reported, they are still higher than most people thought possible before the bank was created.