## CHAPTER 9: COMPENSATION AND INCOME DISTRIBUTION

## 9.1 - WHY IT MATTERS: INCOME DISTRIBUTION

## Why analyze the distribution of income?



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In a market economy, labour markets work efficiently to match job seekers with employers needing their skills who, in turn, pay wages and salaries based on the value that workers bring to firms. Since not everyone has the same job skills, labour markets result in considerable income inequality.

In 2016, the median American household income was $\$ 59,039$ (the median is the level where half of all families had more than that level and half had less). At the same time, the lowest quintile of American households (a quintile is one fifth or $20 \%$ ) earned no more $\$ 24,002$, while the highest quintile earned at least $\$ 121,019$. While income inequality can motivate people to work harder and improve their skills, recent evidence suggests that if income inequality gets too extreme, it can adversely affect the functioning of the economy as a whole.

Labour markets do not take into account how much income a family needs for food, shelter, clothing, and health care. Market forces do not worry about what happens to families when a major local employer goes out of business. Market forces do not take time to contemplate whether those who are earning higher incomes should pay an even higher share of taxes.

According to the U.S. Census Bureau, in 2016 the federal government classified almost 41 million Americans as living with family incomes below the poverty line. Think about a family of three-perhaps a single mother with two children—attempting to pay for the basics of life on perhaps $\$ 17,916$ per year. After paying for rent, healthcare, clothing, and transportation, such a family might have $\$ 6,000$ to spend on food. Spread over 365 days, the food budget for the entire family would be about $\$ 17$ per day. To put this in perspective, most cities have restaurants where $\$ 17$ will buy you an appetizer for one.

This module begins by exploring how the U.S. government defines poverty, the balance between assisting the poor without discouraging work, and how federal antipoverty programs work. The module also discusses income inequality-how economists measure inequality, why inequality has changed in recent decades, the range of possible government policies to reduce inequality, and the danger of a tradeoff that too great a reduction in inequality may reduce incentives for producing output.

In this module, we will consider questions such as:

- What can be done to reduce the amount of poverty?
- How does the social safety net result in a poverty trap?
- Can we, and should we, reduce the amount of economic inequality?
- If so, what's the best way?


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# 9.2 - INTRODUCTION TO POVERTY AND ECONOMIC INEQUALITY 

## Occupy Wall Street

In September 2011, a group of protesters gathered in Zuccotti Park in New York City to decry what they perceived as increasing social and economic inequality in the United States. Calling their protest "Occupy Wall Street," they argued that the concentration of wealth among the richest 1\% in the United States was both economically unsustainable and inequitable, and needed to be changed. The protest then spread to other major cities, and the Occupy movement was born.

Why were people so upset? How much wealth is concentrated among the top 1\% in our society? How did they acquire so much wealth? These are very real, very important questions in the United States now, and this chapter on poverty and economic inequality will help us address the causes behind this sentiment.

The labour markets that determine the pay that workers receive do not take into account how much income a family needs for food, shelter, clothing, and health care. Market forces do not worry about what happens to families when a major local employer goes out of business. Market forces do not take time to contemplate whether those who are earning higher incomes should pay an even higher share of taxes.

However, labour markets do create considerable income inequalities. In 2014, the median American family income was $\$ 57,939$ (the median is the level where half of all families had more than that level and half had less). According to the U.S. Census Bureau, the federal government classified almost nine million U.S. families as below the poverty line in that year. Think about a family of three—perhaps a single mother with two children-attempting to pay for the basics of life on perhaps $\$ 17,916$ per year. After paying for rent, healthcare, clothing, and transportation, such a family might have $\$ 6,000$ to spend on food. Spread over 365 days, the food budget for the entire family would be about $\$ 17$ per day. To put this in perspective, most cities have restaurants where $\$ 17$ will buy you an appetizer for one.

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Inequality (https://openstax.org/books/principles-economics-2e/pages/15-introduction-to-poverty-and-economic-inequality)" In Principles of Economics 2e (https://openstax.org/books/principles-economics-2e/pages/ 1 -introduction) by Steven A. Greenlaw \& David Shapiro, licensed under CC BY 4.0. Access for free at https://openstax.org/books/principles-economics-2e/pages/1-introduction / Adaptations include the removal of next chapter explanation and learning objectives.

## 9.3 - DRAWING THE POVERTY LINE

## Learning Objectives

- Explain economic inequality and how the poverty line is determined
- Analyze the U.S. poverty rate over time, noting its prevalence among different groups of citizens

Comparisons of high and low incomes raise two different issues: economic inequality and poverty. Poverty is measured by the number of people who fall below a certain level of income-called the poverty line that defines the income one needs for a basic standard of living. Income inequality compares the share of the total income (or wealth) in society that different groups receive. For example, compare the share of income that the top $10 \%$ receive to the share of income that the bottom $10 \%$ receive.

In the United States, the official definition of the poverty line traces back to a single person: Mollie Orshansky. In 1963, Orshansky, who was working for the Social Security Administration, published an article called "Children of the Poor" in a highly useful and dry-as-dust publication called the Social Security Bulletin. Orshansky's idea was to define a poverty line based on the cost of a healthy diet.

Her previous job had been at the U.S. Department of Agriculture, where she had worked in an agency called the Bureau of Home Economics and Human Nutrition. One task of this bureau had been to calculate how much it would cost to feed a nutritionally adequate diet to a family. Orshansky found that the average family spent one-third of its income on food. She then proposed that the poverty line be the amount one requires to buy a nutritionally adequate diet, given the size of the family, multiplied by three.

The current U.S. poverty line is essentially the same as the Orshansky poverty line, although the government adjusts the dollar amounts to represent the same buying power over time.The U.S. poverty line in 2015 ranged from $\$ 11,790$ for a single individual to $\$ 25,240$ for a household of four people.

Figure 9.3a shows the U.S. poverty rate over time; that is, the percentage of the population below the poverty line in any given year. The poverty rate declined through the 1960s, rose in the early 1980 s and early 1990 s, but seems to have been slightly lower since the mid-1990s. However, in no year in the last four decades has the poverty rate been less than $11 \%$ of the U.S. population-that is, at best about one American in nine is below the poverty line. In recent years, the poverty rate appears to have peaked at $15.9 \%$ in 2011 before dropping to $14.5 \%$ in 2013. Table 9.3 a compares poverty rates for different groups in 2011. As you will see when we delve further into these numbers, poverty rates are relatively low for Whites, for the elderly, for the well-educated, and for male-headed households. Poverty rates for females, Hispanics, and African Americans are much higher than for Whites. While Hispanics and African Americans have a higher percentage of individuals living in poverty than others, most people in the United States living below the poverty line are White.

## Link It Up

Visit the United States Census Bureau Income and Poverty publication [New Tab]for more information on U.S. poverty.


Figure 9.3a The U.S. Poverty Rate since 1960. The poverty rate fell dramatically during the 1960s, rose in the early 1980s and early 1990s, and, after declining in the 1990s through mid-2000s, rose to $15.9 \%$ in 2011, which is close to the 1960 levels. In 2013, the poverty dropped slightly to 14.5\%. (Source: U.S. Census Bureau). Figure by Steven A. Greenlaw \& David Shapiro (OpenStax), licensed under CC BY 4.0.

Table 9.3a Poverty Rates by Group, 2013

| Group | Poverty Rate |
| :--- | :--- |
| Females | $15.8 \%$ |
| Males | $13.1 \%$ |
| White | $9.6 \%$ |
| Black | $27.1 \%$ |
| Hispanic | $23.5 \%$ |
| Under age 18 | $19.9 \%$ |
| Ages 18-24 | $20.6 \%$ |
| Ages 25-34 | $15.9 \%$ |
| Ages 35-44 | $12.2 \%$ |
| Ages 45-54 | $10.9 \%$ |
| Ages 55-59 | $10.7 \%$ |
| Ages 60-64 | $10.9 \%$ |
| Ages 65 and older | $9.5 \%$ |

The concept of a poverty line raises many tricky questions. In a vast country like the United States, should there be a national poverty line? After all, according to the Federal Register, the median household income for a family of four was $\$ 102,552$ in New Jersey and $\$ 57,132$ in Mississippi in 2013, and prices of some basic goods like housing are quite different between states. The poverty line is based on cash income, which means it does not account for government programs that provide assistance to the poor in a non-cash form, like Medicaid (health care for low-income individuals and families) and food aid. Also, low-income families can qualify for federal housing assistance. (We will discuss these and other government aid programs in detail later in this chapter.)

Should the government adjust the poverty line to account for the value of such programs? Many economists and policymakers wonder whether we should rethink the concept of what poverty means in the twenty-first century. The following Clear It Up feature explains the poverty lines set by the World Bank for low-income countries around the world.

## Clear It Up

## How do economists measure poverty in low-income countries?

The World Bank sets two poverty lines for low-income countries around the world. One poverty line is set at an income of $\$ 1.25 /$ day per person. The other is at $\$ 2 /$ day. By comparison, the U.S. 2015 poverty line of $\$ 20,090$ annually for a family of three works out to $\$ 18.35$ per person per day.

Clearly, many people around the world are far poorer than Americans, as Table 9.3b shows. China and India both have more than a billion people; Nigeria is the most populous country in Africa; and Egypt is the most populous country in the Middle East. In all four of those countries, in the mid-2000s, a substantial share of the population subsisted on less than \$2/day. About half the world lives on less than $\$ 2.50$ a day, and 80 percent of the world lives on less than $\$ 10$ per day. (Of course, the cost of food, clothing, and shelter in those countries can be very different from those costs in the United States, so the $\$ 2$ and $\$ 2.50$ figures may mean greater purchasing power than they would in the United States. )

Table 9.3b Poverty Lines for Low-Income Countries, mid-2000s (Source: http://data.worldbank.org/indicator/SI.POV.DDAY)

| Country | Share of Population below \$1.25/Day | Share of Population below \$2.00/Day |
| :--- | :--- | :--- |
| Brazil (in 2009) | $6.1 \%$ | $10.8 \%$ |
| China (in 2009) | $11.8 \%$ | $27.2 \%$ |
| Egypt (in 2008) | $1.7 \%$ | $15.4 \%$ |
| India (in 2010) | $32.7 \%$ | $68.8 \%$ |
| Mexico (in 2010) | $0.7 \%$ | $4.5 \%$ |
| Nigeria (in 2010) | $68.0 \%$ | $84.5 \%$ |

Any poverty line will be somewhat arbitrary, and it is useful to have a poverty line whose basic definition does not change much over time. If Congress voted every few years to redefine poverty, then it would be difficult to compare rates over time. After all, would a lower poverty rate change the definition, or that people were actually better off? Government statisticians at the U.S. Census Bureau have ongoing research programs to address questions like these.

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## 9.4 - THE POVERTY TRAP

## Learning Objectives

- Explain the poverty trap, noting how government programs impact it
- Identify potential issues in government programs that seek to reduce poverty
- Calculate a budget constraint line that represents the poverty trap

Can you give people too much help, or the wrong kind of help? When people are provided with food, shelter, healthcare, income, and other necessities, assistance may reduce their incentive to work. Consider a program to fight poverty that works in this reasonable-sounding manner: the government provides assistance to the poor, but as the poor earn income to support themselves, the government reduces the level of assistance it provides. With such a program, every time a poor person earns $\$ 100$, the person loses $\$ 100$ in government support. As a result, the person experiences no net gain for working. Economists call this problem the poverty trap.

Consider the situation a single-parent family faces. Figure 9.4 illustrates a single mother (earning $\$ 8$ an hour) with two children. First, consider the labour-leisure budget constraint that this family faces in a situation without government assistance. On the horizontal axis is hours of leisure (or time spent with family responsibilities) increasing in quantity from right to left. Also on the horizontal axis is the number of hours at paid work, going from zero hours on the right to the maximum of 2,500 hours on the left. On the vertical axis is the amount of income per year rising from low to higher amounts of income. The budget constraint line shows that at zero hours of leisure and 2,500 hours of work, the maximum amount of income is \$20,000 ( $\$ 8 \times 2,500$; hours). At the other extreme of the budget constraint line, an individual would work zero hours, earn zero income, but enjoy 2,500 hours of leisure. At point A on the budget constraint line, by working 40 hours a week, 50 weeks a year, the utility-maximizing choice is to work a total of 2,000 hours per year and earn \$16,000.

Now suppose that a government antipoverty program guarantees every family with a single mother and two
children $\$ 18,000$ in income. This is represented on the graph by a horizontal line at $\$ 18,000$. With this program, each time the mother earns $\$ 1,000$, the government will deduct $\$ 1,000$ of its support. Table 9.4 a shows what will happen at each combination of work and government support.


Figure 9.4a The Poverty Trap in Action. The original choice is 500 hours of leisure, 2,000 hours of work at point A , and income of $\$ 16,000$. With a guaranteed income of $\$ 18,000$, this family would receive $\$ 18,000$ whether it provides zero hours of work or 2,000 hours of work. Only if the family provides, say, 2,300 hours of work does its income rise above the guaranteed level of $\$ 18,000$-and even then, the marginal gain to income from working many hours is small. Figure by Steven A. Greenlaw \& David Shapiro (OpenStax), licensed under CC BY 4.0.

The graph shows a downward sloping line that begins at $\$ 20,000$ on the $y$-axis and ends at 2,500 on the $x$-axis. A horizontal line extends from $\$ 18,000$ on the $y$-axis. A dashed plum line extends from $\$ 16,000$ on the $y$-axis and intersects with the vertical line extending from 500 on the x -axis at point A . Beneath the x -axis is an arrow pointing to the right indicating leisure (hours) and an arrow pointing to the left indicating labor (hours).

Table 9.4a Total Income at Various Combinations of Work and Support

| Amount Worked (hours) | Total Earnings (\$) | Government Support (\$) | Total Income (\$) |
| :--- | :--- | :--- | :--- |
| 0 | 0 | 18,000 | 18,000 |
| 500 | 4,000 | 14,000 | 18,000 |
| 1,000 | 8,000 | 10,000 | 18,000 |
| 1,500 | 12,000 | 6,000 | 18,000 |
| 2,000 | 16,000 | 2,000 | 18,000 |
| 2,500 | 20,000 | 0 | 20,000 |

The new budget line, with the antipoverty program in place, is the horizontal and heavy line that is flat at $\$ 18,000$. If the mother does not work at all, she receives $\$ 18,000$, all from the government. If she works full time, giving up 40 hours per week with her children, she still ends up with $\$ 18,000$ at the end of the year. Only if she works 2,300 hours in the year-which is an average of 44 hours per week for 50 weeks a year—does household income rise to $\$ 18,400$. Even in this case, all of her year's work means that household income rises by only $\$ 400$ over the income she would receive if she did not work at all. She would need to work 50 hours a week to reach $\$ 20,000$.

The poverty trap is even stronger than this simplified example shows, because a working mother will have extra expenses like clothing, transportation, and child care that a nonworking mother will not face, making the economic gains from working even smaller. Moreover, those who do not work fail to build up job experience and contacts, which makes working in the future even less likely.

To reduce the poverty trap the government could design an antipoverty program so that, instead of reducing government payments by $\$ 1$ for every $\$ 1$ earned, the government would reduce payments by some smaller amount instead. Imposing requirements for work as a condition of receiving benefits and setting a time limit on benefits can also reduce the harshness of the poverty trap.

Figure 9.4b has the vertical axis income and a horizontal axis labour hours. Figure 9.4b illustrates a government program that guarantees $\$ 18,000$ in income, even for those who do not work at all, but then reduces this amount by 50 cents for each $\$ 1$ earned. The new, higher budget line in Figure 9.4 b shows that, with this program, additional hours of work will bring some economic gain. Because of the reduction in government income when an individual works, an individual earning $\$ 8.00$ will really net only $\$ 4.00$ per hour. The vertical intercept of this higher budget constraint line is at $\$ 28,000$ ( $\$ 18,000+2,500$ hours $\times \$ 4.00=\$ 28,000)$. The horizontal intercept is at the point on the graph where $\$ 18,000$ and 2500 hours of leisure is set. Table 9.4 b shows the total income differences with various choices of labour and leisure.

However, this type of program raises other issues. First, even if it does not eliminate the incentive to work by reducing government payments by $\$ 1$ for every $\$ 1$ earned, enacting such a program may still reduce the incentive to work. At least some people who would be working 2,000 hours each year without this program might decide to work fewer hours but still end up with more income-that is, their choice on the new budget line would be like $S$, above and to the right of the original choice $P$. Of course, others may choose a point like $R$, which involves the same amount of work as P , or even a point to the left of R that involves more work.

The second major issue is that when the government phases out its support payments more slowly, the antipoverty program costs more money. Still, it may be preferable in the long run to spend more money on a program that retains a greater incentive to work, rather than spending less money on a program that nearly eliminates any gains from working.


Figure 9.4b Loosening the Poverty Trap: Reducing Government Assistance by 50 Cents for Every \$1 Earned. On the original labour-leisure opportunity set, the lower budget set shown by the smaller dashed line in the figure, the preferred choice $P$ is 500 hours of leisure and $\$ 16,000$ of income. Then, the government created an antipoverty program that guarantees $\$ 18,000$ in income even to those who work zero hours, shown by the larger dashed line. In addition, every \$1 earned means phasing out 50 cents of benefits. This program leads to the higher budget set, which the diagram shows. The hope is that this program will provide incentives to work the same or more hours, despite receiving income assistance. However, it is possible that the recipients will choose a point on the new budget set like S, with less work, more leisure, and greater income, or a point like R , with the same work and greater income.Figure by Steven A. Greenlaw \& David Shapiro (OpenStax), licensed under CC BY 4.0.

Figure 9.4b Loosening the Poverty Trap: Reducing Government Assistance by 50 Cents for Every \$1 Earned

The x -axis is leisure (hours) and y -axis is Income in thousands. The graph shows a downward sloping line that extends from $\$ 28,000$ on the $y$-axis to $\$ 18,000$ on the $y$-axis (from 0 to 2,500 on the x -axis). Two points $R$ and $S$ appear on the line. Another line starts at $(0, \$ 20,000)$ and ends at $(2,500,0)$. A dashed plum line
extends horizontally from $\$ 18,000$ on the $y$-axis and meets with the vertical line extending from 2,500 on the $x$-axis. Another dashed plum line extends from $\$ 16,000$ on the $y$-axis and intersects with the vertical line extending from 500 on the x -axis at point P . Beneath the x -axis is an arrow pointing to the right indicating leisure (hours) and an arrow pointing to the left indicating labour (hours).

Table 9.4b The Labour-Leisure Tradeoff with Assistance Reduced by 50 Cents for Every Dollar Earned

| Amount Worked (hours) | Total Earnings (\$) | Government Support (\$) | Total Income (\$) |
| :--- | :--- | :--- | :--- |
| 0 | 0 | 18,000 | 18,000 |
| 500 | 4,000 | 16,000 | 20,000 |
| 1,000 | 8,000 | 14,000 | 22,000 |
| 1,500 | 12,000 | 12,000 | 24,000 |
| 2,000 | 16,000 | 10,000 | 26,000 |
| 2,500 | 20,000 | 8,000 | 28,000 |

The next module will consider a variety of government support programs focused specifically on the poor, including welfare, SNAP (Supplemental Nutrition Assistance Program), Medicaid, and the earned income tax credit (EITC). Although these programs vary from state to state, it is generally a true statement that in many states from the 1960s into the 1980s, if poor people worked, their level of income barely rose-or did not rise at all—after factoring in the reduction in government support payments. The following Work It Out feature shows how this happens.

## Work It Out

## Calculating a Budget Constraint Line

Jason earns $\$ 9.00$ an hour, and a government antipoverty program provides a floor of $\$ 10,000$ guaranteed income. The government reduces government support by $\$ 0.50$ for each $\$ 1.00$ earned. What are the horizontal and vertical intercepts of the budget constraint line? Assume the maximum hours for work or leisure is 2,500 hours.
Step 1. Determine the amount of the government guaranteed income. In this case, it is $\$ 10,000$.
Step 2. Plot that guaranteed income as a horizontal line on the budget constraint line.
Step 3. Determine what Jason earns if he has no income and enjoys 2,500 hours of leisure. In this case, he will receive the guaranteed $\$ 10,000$ (the horizontal intercept).
Step 4. Calculate how much Jason's salary will be reduced due to the reduction in government income.

In Jason's case, it will be reduced by one half. He will, in effect, net only $\$ 4.50$ an hour.
Step 5 . If Jason works 1,000 hours, at a maximum what income will Jason receive? Jason will receive $\$ 10,000$ in government assistance. He will net only $\$ 4.50$ for every hour he chooses to work. If he works 1,000 hours at $\$ 4.50$, his earned income is $\$ 4,500$ plus the $\$ 10,000$ in government income. Thus, the total maximum income (the vertical intercept) is $\$ 10,000+\$ 4,500=\$ 14,500$.

## Key Concepts and Summary

A poverty trap occurs when government-support payments for the poor decline as the poor earn more income. As a result, the poor do not end up with much more income when they work, because the loss of government support largely or completely offsets any income that one earns by working. Phasing out government benefits more slowly, as well as imposing requirements for work as a condition of receiving benefits and a time limit on benefits can reduce the harshness of the poverty trap.

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## 9.5 - INCOME INEQUALITY: MEASUREMENT AND CAUSES

## Learning Objectives

- Explain the distribution of income, and analyze the sources of income inequality in a market economy
- Measure income distribution in quintiles
- Calculate and graph a Lorenz curve
- Show income inequality through demand and supply diagrams

Poverty levels can be subjective based on the overall income levels of a country. Typically a government measures poverty based on a percentage of the median income. Income inequality, however, has to do with the distribution of that income, in terms of which group receives the most or the least income. Income inequality involves comparing those with high incomes, middle incomes, and low incomes-not just looking at those below or near the poverty line. In turn, measuring income inequality means dividing the population into various groups and then comparing the groups, a task that we can be carry out in several ways, as the next Clear It Up feature shows.

## Clear It Up

How do you separate poverty and income inequality?
Poverty can change even when inequality does not move at all. Imagine a situation in which income for everyone in the population declines by 10\%. Poverty would rise, since a greater share of the population would now fall below the poverty line. However, inequality would be the same, because
everyone suffered the same proportional loss. Conversely, a general rise in income levels over time would keep inequality the same, but reduce poverty.

It is also possible for income inequality to change without affecting the poverty rate. Imagine a situation in which a large number of people who already have high incomes increase their incomes by even more. Inequality would rise as a result-but the number of people below the poverty line would remain unchanged.

Why did inequality of household income increase in the United States in recent decades? A trend toward greater income inequality has occurred in many countries around the world, although the effect has been more powerful in the U.S. economy. Economists have focused their explanations for the increasing inequality on two factors that changed more or less continually from the 1970 s into the 2000s. One set of explanations focuses on the changing shape of American households. The other focuses on greater inequality of wages, what some economists call "winner take all" labour markets. We will begin with how we measure inequality, and then consider the explanations for growing inequality in the United States.

## Measuring Income Distribution by Quintiles

One common way of measuring income inequality is to rank all households by income, from lowest to highest, and then to divide all households into five groups with equal numbers of people, known as quintiles. This calculation allows for measuring the distribution of income among the five groups compared to the total. The first quintile is the lowest fifth or $20 \%$, the second quintile is the next lowest, and so on. We can measure income inequality by comparing what share of the total income each quintile earns.
U.S. income distribution by quintile appears in Table 9.5a. In 2011, for example, the bottom quintile of the income distribution received $3.2 \%$ of income; the second quintile received $8.4 \%$; the third quintile, $14.3 \%$; the fourth quintile, $23.0 \%$; and the top quintile, $51.14 \%$. The final column of Table 9.5 a shows what share of income went to households in the top $5 \%$ of the income distribution: $22.3 \%$ in 2011. Over time, from the late 1960s to the early 1980s, the top fifth of the income distribution typically received between about $43 \%$ to $44 \%$ of all income. The share of income that the top fifth received then begins to rise. Census Bureau researchers trace, much of this increase in the share of income going to the top fifth to an increase in the share of income going to the top $5 \%$. The quintile measure shows how income inequality has increased in recent decades.

Table 9.5a Share of Aggregate Income Received by Each Fifth and Top 5\% of Households, 1967-2013 (Source: U.S. Census Bureau, Table 2)

| Year | Lowest Quintile | Second Quintile | Third Quintile | Fourth Quintile | Highest Quintile | $\begin{aligned} & \text { Top } \\ & \text { 5\% } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1967 | 4.0 | 10.8 | 17.3 | 24.2 | 43.6 | 17.2 |
| 1970 | 4.1 | 10.8 | 17.4 | 24.5 | 43.3 | 16.6 |
| 1975 | 4.3 | 10.4 | 17.0 | 24.7 | 43.6 | 16.5 |
| 1980 | 4.2 | 10.2 | 16.8 | 24.7 | 44.1 | 16.5 |
| 1985 | 3.9 | 9.8 | 16.2 | 24.4 | 45.6 | 17.6 |
| 1990 | 3.8 | 9.6 | 15.9 | 24.0 | 46.6 | 18.5 |
| 1995 | 3.7 | 9.1 | 15.2 | 23.3 | 48.7 | 21.0 |
| 2000 | 3.6 | 8.9 | 14.8 | 23.0 | 49.8 | 22.1 |
| 2005 | 3.4 | 8.6 | 14.6 | 23.0 | 50.4 | 22.2 |
| 2010 | 3.3 | 8.5 | 14.6 | 23.4 | 50.3 | 21.3 |
| 2013 | 3.2 | 8.4 | 14.4 | 23.0 | 51 | 22.2 |

It can also be useful to divide the income distribution in ways other than quintiles; for example, into tenths or even into percentiles (that is, hundredths). A more detailed breakdown can provide additional insights. For example, the last column of Table 9.5a shows the income received by the top $5 \%$ percent of the income distribution. Between 1980 and 2013, the share of income going to the top $5 \%$ increased by 5.7 percentage points (from $16.5 \%$ in 1980 to $22.2 \%$ in 2013). From 1980 to 2013 the share of income going to the top quintile increased by 7.0 percentage points (from $44.1 \%$ in 1980 to $51 \%$ in 2013). Thus, the top $20 \%$ of householders (the fifth quintile) received over half ( $51 \%$ ) of all the income in the United States in 2013.

## Lorenz Curve

We can present the data on income inequality in various ways. For example, you could draw a bar graph that showed the share of income going to each fifth of the income distribution. Figure 9.5 a presents an alternative way of showing inequality data in a Lorenz curve. This curve shows the cumulative share of population on the horizontal axis and the cumulative percentage of total income received on the vertical axis.


Figure 9.5a The Lorenz Curve. Figure by Steven A. Greenlaw \& David Shapiro (OpenStax), licensed under CC BY 4.0.

Figure 9.5a The Lorenz Curve A Lorenz curve graphs the cumulative shares of income received by everyone up to a certain quintile. The income distribution in 1980 was closer to the perfect equality line than the income distribution in 2011-that is, the U.S. income distribution became more unequal over time.

Every Lorenz curve diagram begins with a line sloping up at a 45 -degree angle. We show it as a dashed line in Figure 9.5a. The points along this line show what perfect equality of the income distribution looks like. It would mean, for example, that the bottom $20 \%$ of the income distribution receives $20 \%$ of the total income, the bottom $40 \%$ gets $40 \%$ of total income, and so on. The other lines reflect actual U.S. data on inequality for 1980 and 2011.

The trick in graphing a Lorenz curve is that you must change the shares of income for each specific quintile, which we show in the first column of numbers in Table 9.5b, into cumulative income, which we show in the second column of numbers. For example, the bottom $40 \%$ of the cumulative income distribution will be the sum of the first and second quintiles; the bottom $60 \%$ of the cumulative income distribution will be the sum of the first, second, and third quintiles, and so on. The final entry in the cumulative income column needs to be $100 \%$, because by definition, $100 \%$ of the population receives $100 \%$ of the income.

Table 9.5b Calculating the Lorenz Curve

| Income <br> Category | Share of Income <br> in 1980 (\%) | Cumulative Share of <br> Income in 1980 (\%) | Share of Income <br> in 2013 (\%) | Cumulative Share of <br> Income in 2013 (\%) |
| :--- | :--- | :--- | :--- | :--- |
| First <br> quintile | 4.2 | 4.2 | 3.2 | 3.2 |
| Second <br> quintile | 10.2 | 14.4 | 8.4 | 11.6 |
| Third <br> quintile | 16.8 | 31.2 | 14.4 | 26.0 |
| Fourth <br> quintile | 24.7 | 55.9 | 23.0 | 49.0 |
| Fifth <br> quintile | 44.1 | 100.0 | 51.0 | 100.0 |

In a Lorenz curve diagram, a more unequal distribution of income will loop farther down and away from the 45 -degree line, while a more equal distribution of income will move the line closer to the 45 -degree line. Figure 9.5a illustrates the greater inequality of the U.S. income distribution between 1980 and 2013 because the Lorenz curve for 2013 is farther from the 45 -degree line than for 1980. The Lorenz curve is a useful way of presenting the quintile data that provides an image of all the quintile data at once. The next Clear It Up feature shows how income inequality differs in various countries compared to the United States.

## Clear It Up

## How does economic inequality vary around the world?

The U.S. economy has a relatively high degree of income inequality by global standards. As Table 9.5b shows, based on a variety of national surveys for a selection of years in the last five years of the 2000s (with the exception of Germany, and adjusted to make the measures more comparable), the U.S. economy has greater inequality than Germany (along with most Western European countries). The region of the world with the highest level of income inequality is Latin America, illustrated in the numbers for Brazil and Mexico. The level of inequality in the United States is lower than in some of the low-income countries of the world, like China and Nigeria, or some middle-income countries like the Russian Federation. However, not all poor countries have highly unequal income distributions. India provides a counterexample.

Table 9.5c Income Distribution in Select Countries
(Source: U.S. data from U.S. Census Bureau Table 2. Other data from The World Bank Poverty and Inequality Data Base, https://data.worldbank.org/indicator/SI.DST.FRST.20?end=2017\&start=2017\&view=ba)

| Country | Survey <br> Year | First <br> Quintile | Second <br> Quintile | Third <br> Quintile | Fourth <br> Quintile | Fifth <br> Quintile |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| United States | 2013 | $3.2 \%$ | $8.4 \%$ | $14.4 \%$ | $23.0 \%$ | $51.0 \%$ |
| Germany | 2000 | $8.5 \%$ | $13.7 \%$ | $17.8 \%$ | $23.1 \%$ | $36.9 \%$ |
| Brazil | 2009 | $2.9 \%$ | $7.1 \%$ | $12.4 \%$ | $19.0 \%$ | $58.6 \%$ |
| Mexico | 2010 | $4.9 \%$ | $8.8 \%$ | $13.3 \%$ | $20.2 \%$ | $52.8 \%$ |
| China | 2009 | $4.7 \%$ | $9.7 \%$ | $15.3 \%$ | $23.2 \%$ | $47.1 \%$ |
| India | 2010 | $8.5 \%$ | $12.1 \%$ | $15.7 \%$ | $20.8 \%$ | $42.8 \%$ |
| Russia | 2009 | $6.1 \%$ | $10.4 \%$ | $14.8 \%$ | $21.3 \%$ | $47.1 \%$ |
| Nigeria | 2010 | $4.4 \%$ | $8.3 \%$ | $13.0 \%$ | $20.3 \%$ | $54.0 \%$ |

## Link It Up

Take A Look At Income Inequality In The United States [New Tab] (https://www.youtube.com/ watch? $\mathrm{v}=\mathrm{qc} 7 \mathrm{~g} 6$ Uhilii4) video to hear more about wealth inequality across the world.

## Causes of Growing Inequality: The Changing Composition of American Households

In $1970,41 \%$ of married women were in the labour force, but by 2015, according to the Bureau of Labor Statistics, $56.7 \%$ of married women were in the labour force. One result of this trend is that more households have two earners. Moreover, it has become more common for one high earner to marry another high earner. A few decades ago, the common pattern featured a man with relatively high earnings, such as an executive or a doctor, marrying a woman who did not earn as much, like a secretary or a nurse. Often, the woman would leave paid employment, at least for a few years, to raise a family. However, now doctors are marrying doctors and executives are marrying executives, and mothers with high-powered careers are often returning to work while their children are quite young. This pattern of households with two high earners tends to increase the proportion of high-earning households.

According to data in the National Journal, even as two-earner couples have increased, so have single-parent
households. Of all U.S. families, $13.1 \%$ were headed by single mothers. The poverty rate among single-parent households tends to be relatively high.

These changes in family structure, including the growth of single-parent families who tend to be at the lower end of the income distribution, and the growth of two-career high-earner couples near the top end of the income distribution, account for roughly half of the rise in income inequality across households in recent decades.

## Link It Up

Take a look at the video Wealth Inequality in America [New Tab] (https://www.youtube.com/ watch?.v=OPKKQnijnsM) too see illustrated data on the distribution of wealth in the United States.

## Causes of Growing Inequality: A Shift in the Distribution of Wages

Another factor behind the rise in U.S. income inequality is that earnings have become less equal since the late 1970s. In particular, the earnings of high-skilled labour relative to low-skilled labour have increased. Winner-take-all labour markets result from changes in technology, which have increased global demand for "stars,"-whether the best CEO, doctor, basketball player, or actor. This global demand pushes salaries far above productivity differences versus educational differences. One way to measure this change is to take workers' earnings with at least a four-year college bachelor's degree (including those who went on and completed an advanced degree) and divide them by workers' earnings with only a high school degree. The result is that those in the 25-34 age bracket with college degrees earned about 1.67 times as much as high school graduates in 2010, up from 1.59 times in 1995, according to U.S. Census data. Winner-take-all labour market theory argues that the salary gap between the median and the top 1 percent is not due to educational differences.

Economists use the demand and supply model to reason through the most likely causes of this shift. According to the National Center for Education Statistics, in recent decades, the supply of U.S. workers with college degrees has increased substantially. For example, 840,000 four-year bachelor's degrees were conferred on Americans in 1970. In 2013-2014, 1,894,934 such degrees were conferred—an increase of over $90 \%$. In Figure 9.5 b , this shift in supply to the right, from $S_{0}$ to $S_{1}$, should result in a lower equilibrium wage for highskilled labour. Thus, we can explain the increase in the price of high-skilled labour by a greater demand, like
the movement from $\mathrm{D}_{0}$ to $\mathrm{D}_{1}$. Evidently, combining both the increase in supply and in demand has resulted in a shift from $E_{0}$ to $E_{1}$, and a resulting higher wage.


Figure 9.5b Why Would Wages Rise for High-Skilled Labour? The proportion of workers attending college has increased in recent decades, so the supply curve for high-skilled labor has shifted to the right, from $\mathrm{S}_{0}$ to $\mathrm{S}_{1}$. If the demand for high-skilled labor had remained at $\mathrm{D}_{0}$, then this shift in supply would have led to lower wages for high-skilled labor. However, the wages for high-skilled labor, especially if there is a large global demand, have increased even with the shift in supply to the right. The explanation must lie in a shift to the right in demand for high-skilled labor, from $D_{0}$ to $D_{1}$. The figure shows how a combination of the shift in supply, from $S_{0}$ to $S_{1}$, and the shift in demand, from $D_{0}$ to $D_{1}$, led to both an increase in the quantity of high-skilled labor hired and also to a rise in the wage for such labor, from $W_{0}$ to $W_{1}$. Figure by Steven A. Greenlaw \& David Shapiro (OpenStax), licensed under CC BY 4.0.

## Figure 9.5b Why Would Wages Rise for High-Skilled Labour? (Text Version)

The vertical axis is Wage (W) and the horizontal axis is quantity of high-skilled labour (Q). Both supply curves ( $S_{0}$ and $S_{1}$ ) slope upwards from left to right and both demand curves $\left(D_{0}\right.$ and $\left.D_{1}\right)$ slope downwards from left to right. The proportion of workers attending college has increased in recent decades, so the supply curve for high-skilled labour has shifted to the right, from $S_{0}$ to $S_{1}$. If the demand for high-skilled labour had remained at $\mathrm{D}_{0}$, then this shift in supply would have led to lower wages for high-skilled labour. However, the wages for high-skilled labour, especially if there is a large global demand, have increased even with the shift in supply to the right. The explanation must lie in a shift to the right in demand for high-skilled labour, from $\mathrm{D}_{0}$ to $D_{1}$. The figure shows how a combination of the shift in supply, from $S_{0}$ to $S_{1}$, and the shift in demand, from $\mathrm{D}_{0}$ to $\mathrm{D}_{1}$, led to both an increase in the quantity of high-skilled labour hired and also to a rise in the wage for such labour, from $W_{0}$ to $W_{1}$. The original supply curve $\left(S_{0}\right)$ and original demand curve $\left(D_{0}\right)$ intersect at $E$, at
point $W_{0}$ and $Q_{0}$. The new supply curve $\left(S_{1}\right)$ and new demand curve $\left(D_{1}\right)$ intersect at $E_{1}$, at point $W_{1}$ and Q1.

What factors would cause the demand for high-skilled labour to rise? The most plausible explanation is that while the explosion in new information and communications technologies over the last several decades has helped many workers to become more productive, the benefits have been especially great for high-skilled workers like top business managers, consultants, and design professionals. The new technologies have also helped to encourage globalization, the remarkable increase in international trade over the last few decades, by making it more possible to learn about and coordinate economic interactions all around the world. In turn, the rising impact of foreign trade in the U.S. economy has opened up greater opportunities for high-skilled workers to sell their services around the world, and lower-skilled workers have to compete with a larger supply of similarly skilled workers around the globe.

We can view the market for high-skilled labour as a race between forces of supply and demand. Additional education and on-the-job training will tend to increase the high-skilled labour supply and to hold down its relative wage. Conversely, new technology and other economic trends like globalization tend to increase the demand for high-skilled labour and push up its relative wage. We can view the greater inequality of wages as a sign that demand for skilled labour is increasing faster than supply. Alternatively, if the supply of lower skilled workers exceeds the demand, then average wages in the lower quintiles of the income distribution will decrease. The combination of forces in the high-skilled and low-skilled labour markets leads to increased income disparity.

## Key Concepts and Summary

Measuring inequality involves making comparisons across the entire distribution of income, not just the poor. One way of doing this is to divide the population into groups, like quintiles, and then calculate what share of income each group receives. An alternative approach is to draw Lorenz curves, which compare the cumulative income actually received to a perfectly equal distribution of income. Income inequality in the United States increased substantially from the late 1970s and early 1980s into the 2000s. The two most common explanations that economists cite are changes in
household structures that have led to more two-earner couples and single-parent families, and the effect of new information and communications technology on wages.

## Attribution

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## 9.6 - GOVERNMENT POLICIES TO REDUCE INCOME INEQUALITY

## Learning Objectives

- Explain the arguments for and against government intervention in a market economy
- Identify beneficial ways to reduce the economic inequality in a society
- Show the tradeoff between incentives and income equality

No society should expect or desire complete equality of income at a given point in time, for a number of reasons. First, most workers receive relatively low earnings in their first few jobs, higher earnings as they reach middle age, and then lower earnings after retirement. Thus, a society with people of varying ages will have a certain amount of income inequality. Second, people's preferences and desires differ. Some are willing to work long hours to have income for large houses, fast cars and computers, luxury vacations, and the ability to support children and grandchildren.

These factors all imply that a snapshot of inequality in a given year does not provide an accurate picture of how people's incomes rise and fall over time. Even if we expect some degree of economic inequality at any point in time, how much inequality should there be? There is also the difference between income and wealth, as the following Clear It Up feature explains.

## Clear It Up

How do you measure wealth versus income inequality?
Income is a flow of money received, often measured on a monthly or an annual basis. Wealth is the
sum of the value of all assets, including money in bank accounts, financial investments, a pension fund, and the value of a home. In calculating wealth, one must subtract all debts, such as debt owed on a home mortgage and on credit cards. A retired person, for example, may have relatively little income in a given year, other than a pension or Social Security. However, if that person has saved and invested over time, the person's accumulated wealth can be quite substantial.

In the United States, the wealth distribution is more unequal than the income distribution, because differences in income can accumulate over time to make even larger differences in wealth. However, we can measure the degree of inequality in the wealth distribution with the same tools we use to measure the inequality in the income distribution, like quintile measurements. Once every three years the Federal Reserve Bank publishes the Survey of Consumer Finance which reports a collection of data on wealth.

Even if they cannot answer the question of how much inequality is too much, economists can still play an important role in spelling out policy options and tradeoffs. If a society decides to reduce the level of economic inequality, it has three main sets of tools: redistribution from those with high incomes to those with low incomes; trying to assure that a ladder of opportunity is widely available; and a tax on inheritance.

## Redistribution

Redistribution means taking income from those with higher incomes and providing income to those with lower incomes. Earlier in this chapter, we considered some of the key government policies that provide support for the poor: the welfare program TANF, the earned income tax credit, SNAP, and Medicaid. If a reduction in inequality is desired, these programs could receive additional funding.

The federal income tax, which is a progressive tax system designed in such a way that the rich pay a higher percent in income taxes than the poor funds the programs. Data from household income tax returns in 2009 shows that the top $1 \%$ of households had an average income of $\$ 1,219,700$ per year in pre-tax income and paid an average federal tax rate of $28.9 \%$. The effective income tax, which is total taxes paid divided by total income (all sources of income such as wages, profits, interest, rental income, and government transfers such as veterans' benefits), was much lower. The effective tax paid by that top $1 \%$ of householders paid was $20.4 \%$, while the bottom two quintiles actually paid negative effective income taxes, because of provisions like the earned income tax credit. News stories occasionally report on a high-income person who has managed to pay very little in taxes, but while such individual cases exist, according to the Congressional Budget Office, the typical pattern is that people with higher incomes pay a higher average share of their income in federal income taxes.

Of course, the fact that some degree of redistribution occurs now through the federal income tax and government antipoverty programs does not settle the questions of how much redistribution is appropriate, and whether more redistribution should occur.

## The Ladder of Opportunity

Economic inequality is perhaps most troubling when it is not the result of effort or talent, but instead is determined by the circumstances under which a child grows up. One child attends a well-run grade school and high school and heads on to college, while parents help out by supporting education and other interests, paying for college, a first car, and a first house, and offering work connections that lead to internships and jobs. Another child attends a poorly run grade school, barely makes it through a low-quality high school, does not go to college, and lacks family and peer support. These two children may be similar in their underlying talents and in the effort they put forth, but their economic outcomes are likely to be quite different.

Public policy can attempt to build a ladder of opportunities so that, even though all children will never come from identical families and attend identical schools, each child has a reasonable opportunity to attain an economic niche in society based on their interests, desires, talents, and efforts. Table 9.6a shows some of those initiatives.

Table 9.6a Public Policy Initiatives

| Children | College Level | Adults |
| :--- | :--- | :--- |
| - Improved day <br> care | - Widespread loans and grants for those in <br> financial need | • Opportunities for retraining and acquiring <br> new skills |
| - Enrichment <br> programs for <br> preschoolers | • Public support for a range of institutions from <br> two-year community colleges to large research <br> universities | • Prohibiting discrimination in job markets <br> and housing on the basis of race, gender, age, <br> and disability |
| - Improved <br> public schools | - | - |
| - After school <br> and community <br> activities | - | - |
| - Internships and <br> apprenticeships | - | - |

Some have called the United States a land of opportunity. Although the general idea of a ladder of opportunity for all citizens continues to exert a powerful attraction, specifics are often quite controversial. Society can experiment with a wide variety of proposals for building a ladder of opportunity, especially for those who otherwise seem likely to start their lives in a disadvantaged position. The government needs to carry
out such policy experiments in a spirit of open-mindedness, because some will succeed while others will not show positive results or will cost too much to enact on a widespread basis.

## Inheritance Taxes

There is always a debate about inheritance taxes. It goes like this: Why should people who have worked hard all their lives and saved up a substantial nest egg not be able to give their money and possessions to their children and grandchildren? In particular, it would seem un-American if children were unable to inherit a family business or a family home. Alternatively, many Americans are far more comfortable with inequality resulting from high-income people who earned their money by starting innovative new companies than they are with inequality resulting from high-income people who have inherited money from rich parents.

The United States does have an estate tax that is, a tax imposed on the value of an inheritance-which suggests a willingness to limit how much wealth one can pass on as an inheritance. However, according to the Center on Budget and Policy Priorities, in 2015 the estate tax applied only to those leaving inheritances of more than $\$ 5.43$ million and thus applies to only a tiny percentage of those with high levels of wealth.

## The Tradeoff between Incentives and Income Equality

Government policies to reduce poverty or to encourage economic equality, if carried to extremes, can injure incentives for economic output. The poverty trap, for example, defines a situation where guaranteeing a certain level of income can eliminate or reduce the incentive to work. An extremely high degree of redistribution, with very high taxes on the rich, would be likely to discourage work and entrepreneurship. Thus, it is common to draw the tradeoff between economic output and equality, as Figure 9.6 a (a) shows. In this formulation, if society wishes a high level of economic output, like point $A$, it must also accept a high degree of inequality. Conversely, if society wants a high level of equality, like point $B$, it must accept a lower level of economic output because of reduced incentives for production.

This view of the tradeoff between economic output and equality may be too pessimistic, and Figure 9.6a (b) presents an alternate vision. Here, the tradeoff between economic output and equality first slopes up, in the vicinity of choice $C$, suggesting that certain programs might increase both output and economic equality. For example, the policy of providing free public education has an element of redistribution, since the value of the public schooling received by children of low-income families is clearly higher than what low-income families pay in taxes. A well-educated population, however, is also an enormously powerful factor in providing the skilled workers of tomorrow and helping the economy to grow and expand. In this case, equality and economic growth may complement each other.

Moreover, policies to diminish inequality and soften the hardship of poverty may sustain political support for a market economy. After all, if society does not make some effort toward reducing inequality and poverty, the alternative might be that people would rebel against market forces. Citizens might seek economic security by demanding that their legislators pass laws forbidding employers from ever laying off workers or reducing wages, or laws that would impose price floors and price ceilings and shut off international trade. From this viewpoint, policies to reduce inequality may help economic output by building social support for allowing markets to operate.

(a) Greater equality always reduces output

(b) Equality and output rise together but then face a tradeoff

Figure 9.6a The Tradeoff between Incentives and Economic Equality. (a) Society faces a trade-off where any attempt to move toward greater equality, like moving from choice A to B, involves a reduction in economic output. (b) Situations can arise like point C, where it is possible both to increase equality and also to increase economic output, to a choice like D. It may also be possible to increase equality with little impact on economic output, like the movement from choice D to E. However, at some point, too aggressive a push for equality will tend to reduce economic output, as in the shift from E to F.Figure by Steven A. Greenlaw \& David Shapiro (OpenStax), licensed under CC BY 4.0. - Norm noted this for removal , but the full section is on this graph, do you want it removed?

The tradeoff in Figure 9.6a (b) then flattens out in the area between points D and E , which reflects the pattern that a number of countries that provide similar levels of income to their citizens-the United States, Canada, European Union nations, Japan, and Australia—have different levels of inequality. The pattern suggests that countries in this range could choose a greater or a lesser degree of inequality without much impact on economic output. Only if these countries push for a much higher level of equality, like at point F , will they experience the diminished incentives that lead to lower levels of economic output. In this view, while a danger always exists that an agenda to reduce poverty or inequality can be poorly designed or pushed too far, it is also possible to discover and design policies that improve equality and do not injure incentives for economic output by very much—or even improve such incentives.

## Bring It Home

## Occupy Wall Street

The Occupy movement took on a life of its own over the last few months of 2011, bringing to light issues that many people faced on the lower end of the income distribution. The contents of this chapter indicate that there is a significant amount of income inequality in the United States. The question is: What should be done about it?

The 2008-2009 Great Recession caused unemployment to rise and incomes to fall. Many people attribute the recession to mismanagement of the financial system by bankers and financial managers-those in the $1 \%$ of the income distribution-but those in lower quintiles bore the greater burden of the recession through unemployment. This seemed to present the picture of inequality in a different light: the group that seemed responsible for the recession was not the group that seemed to bear the burden of the decline in output. A burden shared can bring a society closer together. A burden pushed off onto others can polarize it.

On one level, the problem with trying to reduce income inequality comes down to whether you still believe in the American Dream. If you believe that one day you will have your American Dream-a large income, large house, happy family, or whatever else you would like to have in life-then you do not necessarily want to prevent anyone else from living out their dream. You certainly would not want to run the risk that someone would want to take part of your dream away from you. Thus, there is some reluctance to engage in a redistributive policy to reduce inequality.

However, when those for whom the likelihood of living the American Dream is very small are considered, there are sound arguments in favor of trying to create greater balance. As the text indicated, a little more income equality, gained through long-term programs like increased education and job training, can increase overall economic output. Then everyone is made better off, and the $1 \%$ will not seem like such a small group any more.

## Key Concepts and Summary

Policies that can affect the level of economic inequality include redistribution between rich and poor, making it easier for people to climb the ladder of opportunity; and estate taxes, which are taxes on inheritances. Pushing too aggressively for economic equality can run the risk of decreasing economic incentives. However, a moderate push for economic equality can increase economic output, both through methods like improved education and by building a base of political support for market forces.

## Attribution

Except where otherwise noted, this chapter is adapted from "Government Policies to Reduce Income Inequality (https://openstax.org/books/principles-economics-2e/pages/15-5-government-policies-to-reduce-income-inequality)" and "Key Concepts and Summary" In Principles of Economics 2e (https://openstax.org/ books/principles-economics-2e/pages/1-introduction) by Steven A. Greenlaw \& David Shapiro, licensed under CC BY 4.0./ Adaptations include addition of chapter ley concepts and summary.

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## 9.7 - SELF-CHECK, CRITICAL THINKING \& REVIEW QUESTIONS

## Self-Check Questions

1. Describe how each of these changes is likely to affect poverty and inequality:
2. Incomes rise for low-income and high-income workers, but rise more for the highincome earners.
3. Incomes fall for low-income and high-income workers, but fall more for high-income earners.
4. Jonathon is a single father with one child. He can work as a server for $\$ 6$ per hour for up to 1,500 hours per year. He is eligible for welfare, and so if he does not earn any income, he will receive a total of $\$ 10,000$ per year. He can work and still receive government benefits, but for every $\$ 1$ of income, his welfare stipend is $\$ 1$ less. Create a table similar to Table 15.4 that shows Jonathan's options. Use four columns, the first showing number of hours to work, the second showing his earnings from work, the third showing the government benefits he will receive, and the fourth column showing his total income (earnings + government support). Sketch a labour-leisure diagram of Jonathan's opportunity set with and without government support.
5. Imagine that the government reworks the welfare policy that was affecting Jonathan in question 1 , so that for each dollar someone like Jonathan earns at work, his government benefits diminish by only 30 cents. Reconstruct the table from question 1 to account for this change in policy. Draw Jonathan's labour-leisure opportunity sets, both for before this welfare program is enacted and after it is enacted.
6. We have discovered that the welfare system discourages recipients from working because the more income they earn, the less welfare benefits they receive. How does the earned income tax credit attempt to loosen the poverty trap?
7. How does the TANF attempt to loosen the poverty trap?
8. A group of 10 people have the following annual incomes: $\$ 24,000, \$ 18,000, \$ 50,000$, $\$ 100,000, \$ 12,000, \$ 36,000, \$ 80,000, \$ 10,000, \$ 24,000, \$ 16,000$. Calculate the share of total income that each quintile receives from this income distribution. Do the top and bottom quintiles in this distribution have a greater or larger share of total income than the top and bottom quintiles of the U.S. income distribution?
9. Table 9.7a shows the share of income going to each quintile of the income distribution for the United Kingdom in 1979 and 1991. Use this data to calculate what the points on a Lorenz curve would be, and sketch the Lorenz curve. How did inequality in the United Kingdom shift over this time period? How can you see the patterns in the quintiles in the Lorenz curves?

Table 9.7a Income Distribution in the United Kingdom, 1979 and 1991

| Share of Income | $\mathbf{1 9 7 9}$ | $\mathbf{1 9 9 1}$ |
| :--- | :--- | :--- |
| Top quintile | $39.7 \%$ | $42.9 \%$ |
| Fourth quintile | $24.8 \%$ | $22.7 \%$ |
| Middle quintile | $17.0 \%$ | $16.3 \%$ |
| Second quintile | $11.5 \%$ | $11.5 \%$ |
| Bottom quintile | $7.0 \%$ | $6.6 \%$ |

8. Using two demand and supply diagrams, one for the low-wage labour market and one for the high-wage labour market, explain how information technology can increase income inequality if it is a complement to high-income workers like salespeople and managers, but a substitute for low-income workers like file clerks and telephone receptionists.
9. Using two demand and supply diagrams, one for the low-wage labour market and one for the high-wage labour market, explain how a program that increased educational levels for a substantial number of low-skill workers could reduce income inequality.
10. Here is one hypothesis: A well-funded social safety net can increase economic equality but will reduce economic output. Explain why this might be so, and sketch a production possibility curve that shows this tradeoff.
11. Here is a second hypothesis: A well-funded social safety net may lead to less regulation of the market economy. Explain why this might be so, and sketch a production possibility curve that shows this tradeoff.
12. Which set of policies is more likely to cause a tradeoff between economic output and equality: policies of redistribution or policies aimed at the ladder of opportunity? Explain how the production possibility frontier tradeoff between economic equality and output might look
in each case.
13. Why is there reluctance on the part of some in the United States to redistribute income so that greater equality can be achieved?

## Check your answers

1. a)Poverty falls, inequality rises. b)Poverty rises, inequality falls.
2. Jonathon's options for working and total income are shown in the following table. His labour-leisure diagram is shown in the figure following the table.

Table 9.7b Question 2 Table Data

| Number of Work Hours | Earnings from Work | Government Benefits | Total Income |
| :--- | :--- | :--- | :--- |
| 1,500 | $\$ 9,000$ | $\$ 1,000$ | $\$ 10,000$ |
| 1,200 | $\$ 7,200$ | $\$ 2,800$ | $\$ 10,000$ |
| 900 | $\$ 5,400$ | $\$ 4,600$ | $\$ 10,000$ |
| 600 | $\$ 3,600$ | $\$ 6,400$ | $\$ 10,000$ |
| 300 | $\$ 1,800$ | $\$ 8,200$ | $\$ 10,000$ |
| 0 | $\$ 0$ | $\$ 10,000$ | $\$ 10,000$ |



Question 2 Figure 9.7a. Figure by Steven A. Greenlaw \& David Shapiro (OpenStax), licensed under CC BY 4.0.

## Question 2 Figure 9.7a (Text Version)

The vertical axis is Income (thousands of dollars) and the horizontal axis is leisure in hours. Line 1: "Opportunity set without government support" line slopes downward from left to right at points listed in Question 2 Table Data above in columns Number of Work Hours and Earnings from Work (Line 1).
Line 2: "Opportunity set with government support" is a horizontal line at \$10,000. Points listed in Question 2 Table Data above in columns Government Benefits and Total Income (Line 2).
3. The following table shows a policy where only 30 cents in government support is pulled right back for every $\$ 1$ of income earned. Jonathon's labour-leisure diagram is shown in the figure following the Question 3 Table Data. "Opportunity set after program" extends from (0 hours, $\$ 16,300$ ) to ( 1,500 hours, $\$ 10,000$ ). "Opportunity set before program" slopes downward from (0 hours, \$9,000) to (1,500 hours, \$0).

Table 9.7c Question 3 Table Data

| Number of Work Hours | Earnings from Work | Government Benefits | Total Income |
| :--- | :--- | :--- | :--- |
| 1,500 | $\$ 9,000$ | $\$ 7,300$ | $\$ 16,300$ |
| 1,200 | $\$ 7,200$ | $\$ 7,840$ | $\$ 15,040$ |
| 900 | $\$ 5,400$ | $\$ 8,380$ | $\$ 13,780$ |
| 600 | $\$ 3,600$ | $\$ 8,920$ | $\$ 12,520$ |
| 300 | $\$ 1,800$ | $\$ 9,460$ | $\$ 22,260$ |
| 0 | $\$ 0$ | $\$ 10,000$ | $\$ 10,000$ |



Question 3 Figure 9.7b. Figure by Steven A. Greenlaw \& David Shapiro (OpenStax), licensed CC By 4.0.
4. The earned income tax credit works like this: a poor family receives a tax break that increases according to how much they work. Families that work more get more. In that sense it loosens the poverty trap by encouraging work. As families earn above the poverty level, the earned income tax credit is gradually reduced. For those near-poor families, the earned income tax credit is a partial disincentive to work.
5. TANF attempts to loosen the poverty trap by providing incentives to work in other ways. Specifically, it requires that people work (or complete their education) as a condition of receiving TANF benefits, and it places a time limit on benefits.
6. QA useful first step is to rank the households by income, from lowest to highest. Then, since there are 10 households total, the bottom quintile will be the bottom two households, the second quintile will be the third and fourth households, and so on up to the top quintile. The quintiles and percentage of total income for the data provided are shown in the following table. Comparing this distribution to the U.S. income distribution for 2005, the top quintile in the example has a smaller share of total income than in the U.S. distribution and the bottom quintile has a larger share. This pattern usually means that the income distribution in the example is more equal than the U.S. distribution.

Table 9.7d Question 6 Table Data

| Income | Quintile | \% of Total Income |
| :--- | :--- | :--- |
| $\$ 10,000$ | Total first quintile income: $\$ 22,000$ | $6.0 \%$ |
| $\$ 12,000$ |  |  |
| $\$ 16,000$ | Total second quintile income: $\$ 34,000$ | $9.2 \%$ |
| $\$ 18,000$ |  |  |
| $\$ 24,000$ | Total third quintile income: $\$ 48,000$ | $13.0 \%$ |
| $\$ 24,000$ |  | $23.2 \%$ |
| $\$ 36,000$ | Total fourth quintile income: $\$ 86,000$ | $48.6 \%$ |
| $\$ 50,000$ |  |  |
| $\$ 80,000$ | Total top quintile income: $\$ 180,000$ | - |
| $\$ \mathbf{\$ 3 7 0 , 0 0}$ |  |  |

7. Just from glancing at the quintile information, it is fairly obvious that income inequality increased in the United Kingdom over this time: The top quintile is getting a lot more, and the lowest quintile is getting a bit less. Converting this information into a Lorenz curve, however, is a little trickier, because the Lorenz curve graphs the cumulative distribution, not the amount received by individual quintiles. Thus, as explained in the text, you have to add up the individual quintile data to convert the data to this form. The following table shows the actual calculations for the share of income in 1979 versus 1991. The figure following the table shows the perfect equality line and the Lorenz curves for 1979 and 1991. As shown, the income distribution in 1979 was closer to the perfect equality line than the income distribution in 1991-that is, the United Kingdom income distribution became more unequal over time.

Table 9.7e Question 7 Data Table

| Share of income received | $\mathbf{1 9 7 9}$ | $\mathbf{1 9 9 1}$ |
| :--- | :--- | :--- |
| Bottom $20 \%$ | $7.0 \%$ | $6.6 \%$ |
| Bottom $40 \%$ | $18.5 \%$ | $18.1 \%$ |
| Bottom $60 \%$ | $35.5 \%$ | $34.4 \%$ |
| Bottom $80 \%$ | $60.3 \%$ | $57.1 \%$ |
| All $100 \%$ | $100.0 \%$ | $100.0 \%$ |



Question 7 Figure 9.7c. Figure by Steven A. Greenlaw \& David Shapiro (OpenStax), licensed under CC BY 4.0.
8. In the market for low-wage labour, information technology shifts the demand for low-wage labour to the left. One reason is that technology can often substitute for low-wage labour in certain kinds of telephone or bookkeeping jobs. In addition, information technology makes it easier for companies to manage connections with low-wage workers in other countries, thus reducing the demand for low-wage workers in the United States. In the market for highwage labour, information technology shifts the demand for high-wage labour to the right. By using the new information and communications technologies, high-wage labour can become more productive and can oversee more tasks than before. The following figure illustrates these two labour markets. The combination of lower wages for low-wage labour and higher wages for high-wage labour means greater inequality.


Question 8 Figure 9.7d. Figure by Steven A. Greenlaw \& David Shapiro (OpenStax), licensed under CC BY 4.0.
9. In the market for low-wage labour, a skills program will shift supply to the left, which will tend to drive up wages for the remaining low-skill workers. In the market for high-wage labour, a skills program will shift supply to the right (because after the training program there are now more high-skilled workers at every wage), which will tend to drive down wages for high-skill workers. The combination of these two programs will result in a lesser degree of inequality. The following figure illustrates these two labour markets. In the market for high-wage labour, a skills program will shift supply to the right, which will tend to drive down wages for high-skill workers.

(a) Low-wage labor market


Quantlty
(b) High-wage labor market

Question 9 Figure 9.7e. Figure by Steven A. Greenlaw \& David Shapiro (OpenStax), licensed under CC BY 4.0 .
10. >A very strong push for economic equality might include extremely high taxes on high-wage
earners to pay for extremely large government social payments for the poor. Such a policy could limit incentives for the high-wage workers, lock the poor into a poverty trap, and thus reduce output. The PPF in this case will have the standard appearance: it will be downward sloping.
11. For the second hypothesis, a well-funded social safety net might make people feel that even if their company goes bankrupt or they need to change jobs or industries, they will have some degree of protection. As a result, people may be more willing to allow markets to work without interference, and not to lobby as hard for rules that would prevent layoffs, set price controls, or block foreign trade. In this case, safety net programs that increase equality could also allow the market to work more freely in a way that could increase output. In this case, at least some portion of the PPF between equality and economic output would slope up.
12. Pure redistribution is more likely to cause a sharp tradeoff between economic output and equality than policies aimed at the ladder of opportunity. A production possibility frontier showing a strict tradeoff between economic output and equality will be downward sloping. A PPF showing that it is possible to increase equality, at least to some extent, while either increasing output or at least not diminishing it would have a PPF that first rises, perhaps has a flat area, and then falls.

## Critical Thinking Questions

1. What goods and services would you include in an estimate of the basic necessities for a family of four?
2. If a family of three earned $\$ 20,000$, would they be able to make ends meet given the official poverty threshold?
3. Exercise 15.2 and Exercise 15.3 asked you to describe the labour-leisure tradeoff for Jonathon. Since, in the first example, there is no monetary incentive for Jonathon to work, explain why he may choose to work anyway. Explain what the opportunity costs of working and not working might be for Jonathon in each example. Using your tables and graphs from Exercise
15.2 and Exercise 15.3, analyze how the government welfare system affects Jonathan's incentive to work.
4. Explain how you would create a government program that would give an incentive for labour to increase hours and keep labour from falling into the poverty trap.
5. Many critics of government programs to help low-income individuals argue that these programs create a poverty trap. Explain how programs such as TANF, EITC, SNAP, and Medicaid will affect low-income individuals and whether or not you think these programs will benefit families and children.
6. Think about the business cycle: during a recession, unemployment increases; it decreases in an expansionary phase. Explain what happens to TANF, SNAP, and Medicaid programs at each phase of the business cycle (recession, trough, expansion, and peak).
7. Explain how a country may experience greater equality in the distribution of income, yet still experience high rates of poverty. Hint. Look at the Clear It Up (15-1-drawing-the-povertyline) "How do governments measure poverty in low-income countries?" and compare to Table 15.5. Share of Aggregate Income Received by Each Fifth and Top 5\% of Households, 1967-2013 (Source: U.S. Census Bureau, Table 2)
8. The demand for skilled workers in the United States has been increasing. To increase the supply of skilled workers, many argue that immigration reform to allow more skilled labour into the United States is needed. Explain whether you agree or disagree.
9. Explain a situation using the supply and demand for skilled labour in which the increased number of college graduates leads to depressed wages. Given the rising cost of going to college, explain why a college education will or will not increase income inequality.
10. What do you think is more important to focus on when considering inequality: income inequality or wealth inequality?
11. To reduce income inequality, should the marginal tax rates on the top $1 \%$ be increased?
12. Redistribution of income occurs through the federal income tax and government antipoverty programs. Explain whether or not this level of redistribution is appropriate and whether more redistribution should occur.
13. How does a society or a country make the decision about the tradeoff between equality and economic output? Hint. Think about the political system.
14. Explain what the long- and short-term consequences are of not promoting equality or working to reduce poverty.

## Review Questions

1. How is the poverty rate calculated?
2. What is the poverty line?
3. What is the difference between poverty and income inequality?
4. How does the poverty trap discourage people from working?
5. How can the effect of the poverty trap be reduced?
6. Who are the near-poor?
7. What is the safety net?
8. Briefly explain the differences between TANF, the earned income tax credit, SNAP, and Medicaid.
9. Who is included in the top income quintile?
10. What is measured on the two axes of a Lorenz curve?
11. If a country had perfect income equality what would the Lorenz curve look like?
12. How has the inequality of income changed in the U.S. economy since the late 1970 s?
13. What are some reasons why a certain degree of inequality of income would be expected in a market economy?
14. What are the main reasons economists give for the increase in inequality of incomes?
15. Identify some public policies that can reduce the level of economic inequality.
16. Describe how a push for economic equality might reduce incentives to work and produce output. Then describe how a push for economic inequality might not have such effects.

## Problems

1. In country A , the population is 300 million and 50 million people are living below the poverty
line. What is the poverty rate?
2. In country B , the population is 900 million and 100 million people are living below the poverty line. What is the poverty rate?
3. Susan is a single mother with three children. She can earn $\$ 8$ per hour and works up to 1,800 hours per year. However, if she does not earn any income at all, she will receive government benefits totaling \$16,000 per year. For every \$1 of income she earns, her level of government support will be reduced by $\$ 1$. Create a table, patterned after Self Check Question 3 Table Data. The table should have columns: number of work hours, earnings from work, government benefits, and total income. The first column should show Susan's choices of how many hours to work per year, up to 1,800 hours. The second column should show her earnings from work. The third column should show her level of government support, given her earnings. The final column should show her total income, combining earnings and government support. Based on the table you created, what are the likely impacts of this kind of assistance program on Susan's incentive to work? Are there additional opportunity costs that may reduce her incentive to work?
4. A group of 10 people have the following annual incomes: $\$ 55,000, \$ 30,000, \$ 15,000$, $\$ 20,000, \$ 35,000, \$ 80,000, \$ 40,000, \$ 45,000, \$ 30,000, \$ 50,000$. Calculate the share of total income each quintile of this income distribution received. Do the top and bottom quintiles in this distribution have a greater or larger share of total income than the top and bottom quintiles of the U.S. income distribution for 2005?

## Attribution

Except where otherwise noted, this chapter is adapted from "Self-Check Questions (https://openstax.org/ books/principles-economics-2e/pages/15-self-check-questions)", "Answer Key - Chapter 15 (https://openstax.org/books/principles-economics-2e/pages/chapter-15)", "Critical Thinking Questions (https://openstax.org/books/principles-economics-2e/pages/15-critical-thinking-questions)", "Review Questions (https://openstax.org/books/principles-economics-2e/pages/15-review-questions)" and "Problems (https://openstax.org/books/principles-economics-2e/pages/15-problems)" In Principles of Microeconomics $2 e$ (https://openstax.org/books/principles-microeconomics-2e/pages/1-introduction) (Open Stax) by Steven A. Greenlaw \& David Shapiro, licensed under CC BY 4.0.

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## 9.8 - READINGS LIST

1. Canadian Income Inequality: Is Canada becoming more unequal? [New Tab] (https://www.conferenceboard.ca/hcp/hot-topics/canInequality.aspx)
2. Payroll employment, earnings and hours, and job vacancies, October 2021 [New Tab] (https://www150-statcan-gc-ca.georgian.idm.oclc.org/n1/daily-quotidien/211223/dq211223beng.htm)

Reading List compiled by Norm Smith.

