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ECON 212
Lecture Notes

I. WHAT IS (MACRO) ECONOMICS?

* What is **economics**?
-- **The study of the allocation of scarce resources, both by individuals and societies.**
---- Does that definition seem a bit vague?
------ **A resource is scarce is there is less of it than we** (or some of us) **would like**. Time is scarce, food is scarce, land is scarce (--> wars), goods are scarce. Good liberal arts colleges in warm climates are scarce. Even government spending is scarce.
-- How do we allocate society's resources? The political debate is largely an argument over the allocation of scarce resources: government vs. private sector, current vs. future, military vs. social spending ("guns vs. butter").
---- But it's not always a zero-sum game. Society's resources are not always used efficiently. Great Depression an obvious example: ten million unemployed, thousands of shut-down factories --> How do we reallocate those resources from "idle" to "in use"?

* **Two "flavors" of economics:**
MICRO (individual firms, households, markets, industries)
and
MACRO aggregates (GDP, unemployment, inflation)

We'll spend most of the next week learning a little micro, since macro grew out of micro, and it's hard to understand any part of economics without understanding basic micro concepts like supply and demand, equilibrium, and opportunity cost.

The "big three" variables in macroeconomics are gross domestic product, unemployment, and inflation.
*** Gross domestic product (GDP)** (or "national output" or "aggregate output")**-- The total quantity of "final" goods and services produced in an economy in a given period.**
*** Unemployment rate-- The percentage of the labor force that is not working and is actively looking for work.**
*** Inflation-- The rate of increase in the overall price level**

Two types of economic questions: POSITIVE and NORMATIVE:

Def. Positive-- "what is" & how does it work.
-- Ex.: "Since Bill Clinton took office, the U.S. unemployment rate has fallen by more than a third (from 7.3% to 4.1%)."

Def. Normative-- "what should be"(more touchy-feely); evaluates outcomes as good or bad, & possibly prescribes solutions or different policies
-- Ex.: "The unemployment rates of certain segments of the population (blacks, teenagers) are still way too high, and the government should take corrective action-- say, federal jobs programs or expanding the money supply."

Both micro and macro have elements of the positive and the normative.
The distinction between positive & normative is not always a clear one.
-- Ex.: "The sharp drop in the unemployment rate is evidence that Bill Clinton's economic program has worked." (Some would disagree; regardless, it's a loaded statement w/ policy implications. As Clinton himself might say, it depends on what your definition of "worked" is...)

Macroeconomics is typically in a state of flux. Micro is relatively more stable; microeconomists tend to agree with each other about a lot more than macroeconomists do. When people say economists always disagree (the playwright George Bernard Shaw: "If all the world's economists were laid end to end, they still wouldn't reach a conclusion"), they typically mean macroeconomists.

Why is macro so controversial?
1) It's a relatively new field, dating back to 1930s (the Great Depression and the publication of John Maynard Keynes's *The General Theory*). Micro, by contrast (just "economics" before 1930s/40s) has been around since 1776 (Adam Smith's *The Wealth of Nations*). Before Keynes, everyone was basically a microeconomist and the government rarely intervened directly in the economy.
2) The issues tend to be more socially and politically charged than in micro. Exs.: taxes, interest rates, inflation-- these are issues that affect people directly, and virtually any policy will benefit some people and hurt others.

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II. INTRODUCTION TO ECONOMIC THEORY

Next week we'll be learning some basic microeconomic theory. Now, what exactly *is* theory?

* **Economic theory: a statement, or set of related statements, about cause and effect or action and reaction in economic life**

* **Model: a formal statement of a theory, often mathematically**

* **Empirical testing: the use of real-life observation to test economic theory**

Now, why do we need all this theory? What does it have to do with the real world? The answer is that it offers a way of *explaining* the real world. Without it, someone once said, we could only stare stupidly at the world, the way cows look up at the sky. Theory is

(ideally) based on observation of the real world. Naturally, any theory is going to have to leave a few things out. The goal is to "simplify, simplify" in order to expose and analyze certain aspects of how things operate.
--> A key assumption: **"ALL OTHER THINGS EQUAL"** (in Latin, *ceteris paribus*). For a theory or model to identify some key relation between two variables - say, the tendency for people to buy more of a good when its price is reduced - we need to hold other things constant.
---- For example, a reduction in the price of Porsche sports cars should increase the demand for Porsches, but you might not notice that effect if you don't take into account changes in the prices of other cars, changes in the general price level, or changes in people's income or tastes.

Economics without theory is kinda like rock music without guitars. It can be done, but what's the point?

III. INTRODUCTION TO MACROECONOMICS

The major players in our economy are: households, firms, the government, and the "rest of the world" (i.e., other countries with which we trade goods and services). A good way to identify those major players in our economy and how they relate to each other is through something called **THE CIRCULAR-FLOW DIAGRAM** of production and income.

-- The circular-flow diagram shows how households supply labor and savings to firms, who use that labor and invest those savings so as to produce goods and services, which they in turn sell back to those households. In other words, resources *flow* from households to firms in the form of labor services and savings, and they flow back from firms to households in the form of goods and services. Or we could think of income flowing from firms to households in the form of wages, interest, and dividends, and then flowing back to firms in the form of revenues for the goods they produce and sell.

Recall from last time: **the "big three" variables in macro are GDP** (national output)**, unemployment, and inflation.** "Economic growth," which all politicians claim to be for, relates to the first of those, GDP.

Defn. **Economic growth: An increase in real** (inflation-adjusted) **output (or real per capita output**, which means real output per person).
-- We need to adjust key measures like GDP for changes in prices, so that we can be sure that an increase in GDP actually represents more output being produced, not just higher prices (inflation).

The economy, as measured by real GDP, typically grows from year to year, and the U.S. economy has shown very impressive growth over long periods of time. It does not always grow at the same constant rate, however. Sometimes it grows very rapidly, sometimes less rapidly, and sometimes it actually falls. A key theme of macroeconomics is this one:

We must distinguish between trend economic growth and business cycle fluctuations.

Defn. **Business cycle: the more or less regular fluctuations of GDP around its long-run trend, along with associated changes in levels of employment, unemployment, and prices**

The best, most precise ways to describe the ups and downs of economic activity:

Defn. **Contraction: a period over which real GDP steadily falls.** (Also sometimes called a RECESSION.)

Defn. **Expansion: a period over which real GDP steadily rises.** (Also sometimes called a RECOVERY.)

Two less precise, but very common, ways to describe the ups and downs of economic activity:

Defn. **Recession:** (no universally accepted definition, but)
(1) conventionally, **a period in which real output declines for two consecutive quarters.**
(2) Alternatively, **a period in which actual GDP falls well short of the trend level of GDP** (this trend level is roughly the same thing as "potential GDP," a concept that will be introduced later).

Defn. **Boom: a prolonged period when actual GDP exceeds the trend level of GDP.**

IV. NATIONAL INCOME & NATIONAL PRODUCT

"National income" and "national output" are roughly the same thing. They reflect the two different approaches to calculating GDP (gross domestic product). They are:
* the product, or expenditure, approach: add up the values of everything that is produced
* the income approach: add up everybody's wages, salaries, interest income, company profits, etc.

-- These two approaches are both valid because **every expenditure by a buyer is at the same time income for the seller**. We see this in the circular-flow diagram, where the flow of households' consumption spending equals the flow of firms' revenues from that consumption.

Defns.:
National product: total output of goods and services.
National income: total payments to factors of production.

Say's Law: Supply creates its own demand.
-- This law, named for the 19th century French economist Jean Baptiste Say, notes that the act of producing goods and services, in the aggregate, generates income sufficient to *buy* those goods and services.
-- The logic behind Say's Law is roughly the same logic behind the circular-flow model.

V. GDP ACCOUNTING

Before we see exactly what gets added up when we calculate GDP, we should learn the following definitions:

Defn. **Gross investment: Additions to the capital stock (plant and equipment) and the housing stock by the private (nongovernmental) sector.**

Defn. **Depreciation** ("capital consumption allowance," or "consumption of fixed capital")**: The amount by which the value of the existing capital stock declines in a given period**, because of rust, wear and tear, and destruction.
-- Note: As you shall see, in the income approach to GDP we add on depreciation, which may seem puzzling since depreciation is clearly not a form of income. Depreciation is only added onto the income side so that the two sides will be equal. The logic of including indirect taxes minus subsidies is similar.

Defn. **Net investment = Gross investment - Depreciation**. Net investment is the net increase in the value of a country's physical capital stock (K, for change in the capital stock) from the previous year.

Defn. **Net exports = Exports minus Imports**. Net exports are the same thing as a country's overall trade surplus. If net exports are negative, as in the U.S. today, then the country is running a *trade deficit*. Currently U.S. exports are about 12% of U.S. GDP and U.S. imports are about 13% of U.S. GDP, hence the trade deficit, or net exports, is -1% of GDP.

U.S. GDP in 1997, by these two computation methods:

PRODUCT / EXPENDITURE APPROACH		**INCOME APPROACH**	
Personal consumption (C)	**68%**	**Wages and salaries**	**58%**
+ Gross private investment (I)	**15%**	**+ Proprietors' income**	**7%**
+ Government purchases of goods and services (G)	**18%**	**+ Corporate profits and taxes**	**10%**
+ Exports (EX)	**12%**	**+ Net interest**	**6%**

- Imports (IM)	**-13%**	**+ Rental income (includes "imputed rent" on owned-occupied housing)**	**2%**
		+ Depreciation	**11%**
		+ Indirect business taxes (sales taxes, customs duties, license fees) **minus subsidies**	**7%**
		+ Net factor payments to foreigners	**0.2%**
TOTAL GDP $8.1 billion	**(100%)**	**TOTAL GDP $8.1 billion**	**(100%)**

We can summarize **the expenditure approach** to GDP as

GDP = C + I + G + (EX-IM)

By national income accounting, we mean the process by which national output is officially calculated. Here are two more precise definitions.

Defn. **GDP (gross domestic product): the total market value of all final goods and services produced in a given year by factors of production located within a country, regardless of who owns the factors of production.**

Defn. **GNP (gross *national* product): the total market value of all final goods and services produced in a given year by factors of production owned by a country's citizens.**
-- Until about 1990, GNP was the standard measure of national output. Now we use GDP instead.

Q: Why do you suppose we've switched our standard measure from GNP to GDP?
A: Because of the growing internationalization of the U.S. economy. TV newscasters sometimes warn that "foreigners are buying up America," and it's partly true. That Subaru plant in Indiana provides a lot more jobs for Americans than does a Chrysler plant in Mexico, so seems logical to include most of its output in our national output, rather than vice versa. In 1990, U.S. GDP > GNP by $37 billion-- there were a lot more foreign-owned businesses in U.S. than U.S.-owned businesses in rest of world. (In recent years, by contrast, GNP has been slightly larger than GDP in the U.S.) Foreign direct investment in the U.S. jumped from $54.5 billion in 1979 to over $400 billion in 1989.

Def. **Per capita GDP: GDP per person**
= GDP/population
-- (Closely related to productivity, which is output/worker.)

U.S. GDP in 1999: about $8.8 trillion, world's largest.
-- U.S. per-capita GDP in 1995 = about $27,000, world's 6th-largest
-- The top five: Switzerland ($40,600); Japan ($39,600); Norway ($31,200); Denmark ($29,900); Germany ($27,510)

VI. THE PRODUCT AND INCOME APPROACHES TO CALCULATING GDP

Remembering all those components of GDP is easier if you employ a couple shortcuts. Using the notation introduced last time, GDP **by the product/expenditure approach** is just:

GDP = C+I+G+EX-IM

Calculating GDP **by the income approach** involves adding together more components, but we can remember it as:

GDP = National Income + "DIN"
|
where "DIN" = Depreciation + Indirect taxes + Net foreign factor income

---- Of course, to remember this we also need to remember the components of national income:
NATIONAL INCOME
= Wages/salaries (plus fringe benefits and tips) + Small business income + Big business profits + Interest + Rents (net of depreciation)
= about 82% of GDP.

-- Personal **Consumption** expenditures, as we saw earlier, make up more than two-thirds of GDP. We can categorize the items that we consume into:
---- **durable goods (things that last three or more years; usually "big-ticket items"** like cars, dishwashers, refrigerators)
---- **nondurable goods (things that are used up fairly quickly**, like groceries, paper, pencils)
---- **services (things we buy that are not actually physical commodities**; see below for examples)
------ About two-thirds of our consumption, and 40% of total GDP, consists of consumption of services.

-- Gross private domestic **Investment** includes:
---- nonresidential investment (physical plant and equipment -- i.e., new capital -- purchased by businesses)
---- residential investment (construction of new houses, apartments, condominiums, etc.)

---- **change in business inventories** (goods produced by businesses but not sold within the same year; see below)

-- **Government purchases of goods and services** are almost twice as large at the state & local level (11.5% of GDP) than at the federal level (6.5% of GDP).

-- **Net exports in the U.S. are negative** and have been since about 1980, meaning that **the U.S. has been running a trade deficit** (importing more than it exports). Economists tend to think that the trade deficit is somewhat overblown as a national problem.

Two additional, and also useful, measures of national output or income are:

Defn. **Net domestic product (NDP) = GDP - Depreciation**
-- This is arguably a more useful measure than GDP, since depreciation in a sense makes us poorer, by reducing our capacity to produce goods and services in the future. The only problem with NDP is that depreciation is hard to measure precisely, so we can get a more precise measure of GDP (using the expenditure approach) than we can of NDP.

Defn. **Disposable income (after-tax income) = Income - Taxes**
-- This is the part of your income that you are able to spend as you see fit. The part that goes into income, payroll, and other taxes is technically income that you've earned but it's income that you never see, so many people consider their disposable income to be the most relevant measure of their income.

VII. WHAT GETS COUNTED IN GDP AND WHAT DOESN'T?

Repeating two key definitions from last time:

Defn. **GDP (gross domestic product): the total market value of all final goods and servicesproduced in a given year by factors of production located within a country (regardless of who owns the factors of production).**

Defn. **GNP (gross *national* product): the total market value of all final goods and services produced in a given year by factors of production owned by a country's citizens.**

Let's dissect the above definitions:

* **"market"-- i.e., the good has to be bought and sold (or available for sale) in an "above-ground" market**. The market must be legal, and the income or transaction must be reported to the government (for tax purposes).
-- Ex.: I get a haircut. If a barber cut it and reported the income to the government, my

payment for it would be counted in GDP. If my wife cut it and didn't report the income, my payment would not be counted in GDP.

* **"final goods"-- at the final stage of production; we don't count intermediate goods or resold goods.**
-- Ex.: Production of a new car counts toward GDP. Production of the tires, dashboard, CD player, etc. that come with the car are not part of GDP, because they are *intermediate goods* used in production of another good. Likewise, if I sold my car, we would not count the sale in GDP.
-- GDP, like the car's final purchase price, **is a measure of the VALUE ADDED at each stage of production.**
-- Omitting intermediate goods and inputs is crucial to avoid DOUBLE COUNTING.

* **"services" -- includes legal, medical, financial, entertainment, auto repair, food services, etc.** Everything, in short, from plumbing to flipping burgers to teaching economics.

* **"produced"-- as opposed to "sold"**
-- **unsold inventories**, even apples rotting on supermarket shelves, **are part of GDP**. If they're sold next year, they're still only part of this year's, but not next year's, GDP.

* **"factors of production"**-- What are they? **Labor (L) , physical capital (K), and land (T)**.

* **"located within a country" (GDP) vs. "owned by a country's citizens" (GNP)**: this is *the* difference between GNP and GDP.
-- Exs.:
---- my teaching services in this classroom: counted in U.S. GNP, because I'm an American citizen, and U.S. GDP.
---- the teaching services of a visiting faculty member from Holland: not in GNP, because he's not a U.S. citizen, but it is in GDP.
---- A car produced at a Subaru plant in Indiana, owned by Japanese but using American labor: some of its output is in GNP; all of its output is in GDP.
---- A car produced at a Subaru plant in Japan: none of its output is in U.S. GNP or GDP.

I. A BIT MORE ABOUT GDP AND GNP

Comparing GDP and GNP: Going back to the definitions of the two, they are the same except for the final phrase:
"located within a country" (GDP) vs. "owned by a country's citizens" (GNP).

National income and product accounting (NIPA), like macro, itself is a relatively new phenomenon, and **was invented in the 1930s**.
-- Recall that John Maynard Keynes published *The General Theory* in 1936, during and

largely as an answer to the Great Depression.

Historical note: In the 1940s, during World War II, the U.S. and England had national income accounting, and Hitler's Germany did not. That knowledge about national production capabilities made a tremendous contribution to the Allies' military victory.

Calculating the level of GNP or GDP is not easy -- the U.S. Commerce Department employs huge teams of economists and accountants to crunch out the "National Income and Product Accounts" (NIPA).

VIII. PROS AND CONS OF GDP

Q: Why should you care about what the level of GDP is?
A: **GDP has been called a country's "economic report card."** It's not bad as a bottom-line measure of how a nation is doing economically.

Per-capita GDP is a reasonable measure of a country's standard of living. In fact, "standard of living" and "per capita GDP" have come to be virtually synonymous. Higher per capita GDP <==> on average, people eating better, living in better dwellings, healthier, better clothed, better educated, consuming more luxuries, etc.

A large *absolute* GDP ==> a powerful country (politically, militarily, diplomatically) -- The U.S., with the world's largest GDP by far, is also "the world's only remaining superpower." Like the 900-pound gorilla that sits wherever it wants, an economic powerhouse like the U.S. wields enormous influence in world politics.

Also, you should care because it's an essential part of macro. Economics is about *measuring* social data as well as interpreting it. Most people would agree that interpreting the data is a lot more fun-- e.g., arguing over whether Reagan's supply-side policies worked or didn't work -- and we'll get to that soon in this course. But for now, let's learn a bit about what the data looks like and where it comes from.

GDP as the nation's "economic report card"? Obviously a bit limited. Economist **Paul Krugman**, by contrast, stresses **three "Roots of Economic Welfare"**:

1. Productivity Growth
-- (Productivity = Output per worker, or Output per worker-hour)
-- very similar to per-capita GDP (= GDP/population)
2. Income Distribution (i.e., should not be <u>too</u> skewed in favor of rich)
3. Job Creation
-- Krugman: "If these things are satisfactory, not much else can go wrong [in the economy]. If they are not, nothing can go right."
-- Note: #1 and #3 are closely related to GDP growth. Productivity growth generally translates into per-capita GDP growth, and rising GDP is generally associated with rising

employment.
-- #2 implicitly makes the obvious point that if most of the gains in national income are going to a very small slice of the population, then most people's "economic welfare" won't be improving much. And, in fact, according to economist Paul Krugman, in the 1980s, 66% of the after-tax gains went to the top 1% of wage-earners.
-- In an earlier lecture we noted that the distribution of U.S. income is very uneven. The distribution of *world* income, as measured by GDP, is even more uneven.
-- The U.S., "Euroland," and Japan together account for *71%* of world economic output.
---- ("Euroland" = the 11 Western European countries that are adopting a common currency, the "Euro")

Other limitations of GDP and NDP:

1. They omit depreciation of the environment.
-- Ex.: If a 3rd-World country cuts down 1 million acres of rainforest in a year to sell timber, the depreciation of the chainsaws and the logging trucks is counted as depreciation, but the depreciation of the rainforest itself is not.
-- Ex.: Exxon Valdez spill was good for GDP! Poisoning of Prince Wm. Sound does not count against GDP, but payments to cleanup crew count towards GDP.

2. They omit important household services, especially those that are normally performed by women (e.g., child-rearing, cooking, and cleaning).
-- Such activities are only counted when you pay someone else to do them (and report that income/payment to the government). Granted, the word "market" doesn't apply to these services when homemakers perform them for free, but when a household hires a maid or a nanny or a cook, those services are counted in GDP. Moreover, not every entry in GDP is a transaction where money changes hands-- ex., "imputed" rent from owner-occupied houses.
-- Ex.: 1950s family: Dad earns $50,000/year, Mom raises their two children, cooks, cleans, etc. Then, Dad gets laid off and takes a lower-paying job and Mom takes job, such that both now earn $25,000/year. They pay a nanny $10,000/year, a cook $10,000/year, and a maid $10,000/year. The family is almost certainly worse off, yet they're now contributing a lot more to GDP than before.
-- Ex.: Two welfare mothers who currently stay home and take care of their kids. Neither is contributing to GDP. Under new reforms, they leave welfare and get jobs, taking care of each other's kids. Now the work they do is counted in GDP.

3. They count military and wartime spending that provide no tangible good or service. While one could think of military spending as providing a service (or "public good") in the form of protection against foreign aggressors, GDP pioneer Simon Kuznets himself advocated a "peacetime" concept of GDP and said:
"there is little sense in talking of protection of life and limb against external enemies as an economic service to individuals -- it is a precondition of such service, not a service in itself."

4. They omit the value of leisure time.
-- If many Americans are "running faster and faster just to stay in place" -- i.e., working ever-longer hours without seeing much of a rise in their pay -- they are probably worse off, yet GDP wouldn't reflect their forgone leisure time.
-- In a recent book called *The Overworked American*, Harvard economist Juliet Schor argues that Americans' work weeks are the longest of any major industrialized country and that the typical American's work week has gotten much longer in recent years.
-- Historical example: After Emancipation in 1865, the total labor supply of former slaves in the American South fell by one-third. Per-capita income per capita went *down* because people -- namely the ex-slaves were *better* off. Instead of being compelled to work in the fields from sunup till sundown, they now had the options of working less (consuming leisure) or spending more time in household production (fixing up their houses, sewing their own clothes, etc.). Clearly their quality of life had greatly improved, yet the South's per-capita GDP would have fallen off greatly.

Alternative measures of economic well-being:

Net Economic Welfare (N.E.W.), invented by two Yale economists, William Nordhaus and James Tobin, in 1972.
-- Start with NNP (Net National Product), modify as follows:
+ value of leisure time
+ underground economy (excludes illegal activities, but includes under-the-table services such as babysitting, etc.)
- environmental damages
...
==> N.E.W. has been growing steadily, but also more slowly, than NNP since 1929.
Since 1940, N.E.W. < NNP.

Genuine Progress Indicator (GPI), created in the 1990s by a group in San Francisco (Redefining Progress). Like the N.E.W., it takes into account environmental damages and leisure time. It also adds in the value of unpaid household production and subtracts out spending on services like anti-theft devices and private bodyguards that are purchased merely as protections against social ills like crime.

IX. NOMINAL VS. REAL GDP

Defn. **REAL: adjusted for inflation; relative to the prices of other goods or other years.**

Defn. **NOMINAL: measured in current dollars, without regard to other prices or purchasing power.**

Defn. **NOMINAL GDP: GDP measured in current dollars; computed by adding up the market value of all final goods and services produced.**
-- How we compute nominal GDP: For each good or service, total up the quantity

produced (*q*) and multiply it by the price (*p*) of that good or service. Then add all of those values together (the product, *p***q*, of each good), and their sum is nominal GDP.
-- Shorthand: **nominal GDP = $\Sigma p_i q_i$, where *i* is each good or service.**
|

Σ is the Greek letter "sigma" and it means "summation," or "sum of."
-- Ex.: A small island economy, which produces just three goods -- beer, pretzels, and bicycles. Using hypothetical prices and quantities of those goods, we can compute nominal GDP as follows:

Commodity	*p*	*q*	*p times q*
Case of beer	$20	100	$2000
Bag of pretzels	$1	100	+ $100
Bicycle	$200	10	+ $2000
TOTAL GDP			$4100

Defn. **REAL GDP: GDP measured in constant dollars, i.e. the prices of a "base" year.** Ex.: 1992 nominal GDP was $6 trillion, 1992 real GDP was $5 trillion in 1987 dollars.

Now for some **notation:**
Q = real GDP
P = price index
-- P = 100 for a *base year* (say, 1992) that we use to compute real GDP
\
The price index is really a *percentage* of the base year's price level. So it's equal to 100% in the base year.
-- The price index we'll be using today is the **GDP price index**, or GDP deflator, which is used for converting nominal GDP into real GDP. It's also our broadest measure of the general price level.

Now, here's **how to compute real GDP from nominal GDP:**

Real GDP = (Nominal GDP)/[(GDP Price Index)/100]

or, writing the same thing in our shorthand notation:
Q = (Nominal GDP)/(P/100)

-- In the base year, when P=100, nominal GDP and real GDP will always be equal.
-- In years when P > 100, real GDP will be less than nominal GDP.
-- In years when P < 100, real GDP will be greater than nominal GDP.

To compute nominal GDP from the GDP price index (P) and real GDP (Q):

Nominal GDP = (P/100) * Q

To compute the GDP price index (P) from nominal GDP and real GDP (Q):

P = [(nominal GDP)/(real GDP)] *100

-- Exs.:

Year	*Nominal GDP (billions$)*	*Real GDP (billions$)*	*GDP price index*
1992	6244.4	6244.4	100.00
1993	6558.1	6389.6	_____
1995	7265.4	_____	107.76

-- The base year is 1992. We know that because the price index (P) = 100 in 1992.

-- Now, let's fill in the blanks:

---- Real GDP in 1995 = (nominal GDP)/(P/100) = 7265.4/(107.76/100) = 7265.4/1.0776 = 6741.3

---- GDP price index in 1993 = ((nominal GDP)/Q) * 100 = 6558.1/6389.6 (*100) = 1.0264 * 100 = 102.64

X. CALCULATING REAL GDP AND THE GDP PRICE INDEX: AN EXAMPLE

	1998	1998	1998	1999	1999	1999
Commodity	*p*	*q*	*p * q*	*p*	*q*	*p * q*
Cases of beer	$20	100	$2000	$22	95	$2090
Bags of pretzels	$1	100	+ $100	$1.20	90	+ $108
Bicycles	$200	10	+ $2000	$210	10	+$2100
			======			=====
NOMINAL GDP			$4100 in 1998			$4298 in 1999

Lakeland's nominal GDP was $198 (=$4298-$4100) higher in 1999 than in 1998, an increase of 4.8% [= 100% * (($4298-$4100)/$4100))], but we can see that the quantities

produced two of the commodities (beer, pretzels) are actually smaller than before and the quantity of the other commodity (bicycles) is the same as before. Thus the increase in nominal GDP gives the misleading impression that Lakeland's economy has gotten bigger, when in fact it has gotten smaller. To make a valid comparison between 1998 and 1999, we should **calculate *real* GDP, which we do for each year by multiplying that year's quantities by the base-year's prices**. Let us use 1998 as our base year.
-- Since we are using 1998 as our base year, then, for 1998, real GDP will be the same as nominal GDP, $4100, since we are multiplying those 1998 quantities by the same prices as before.
-- Let us now calculate real GDP for 1999, with 1998 prices (since 1998 is the base year):

	1998 price	*1999 quantity*	
Commodity	*(p_{1998})*	*(q_{1999})*	$p_{1998} * q_{1999}$
Cases of beer	$20	95	$1900
Bags of pretzels	$1	90	+ $90
Bicycles	$200	10	+ $2000
			=========
1999 REAL GDP (IN 1998 DOLLARS)			$3990

Real GDP fell by $110 (=$4100-$3990, a drop of 2.7%) from 1998 to 1999; the drop accurately reflects the fact that production did not rise for any of the three goods and actually fell for two of them.

We can also calculate the GDP price index (or "GDP price deflator") for any given year *t*, which tells us how much it costs to buy all of the base year's GDP at year *t* prices, relative to how much it cost in the base year. We multiply that ratio by 100 so as to "normalize" it to 100, so that we can make easy comparisons between different years:

GDP price index for year *t*
= 100* (cost of buying base-year's GDP at year *t* prices)/(cost of buying base-year's GDP at base-year's prices)

In 1998, when GDP was $4100, it would have cost $4100 to purchase 100 cases of beer, 100 bags of pretzels, and 10 bicycles. Since 1998 is the base year, the GDP price index for 1998 must be 100. Let us check on that:

GDP price index for 1998
= 100* (cost of buying base-year's GDP at 1998 prices)/(cost of buying base-year's GDP at base-year's prices)
= 100 * $4100/$4100
= 100 * 1
= 100

Now let us compute the GDP price index for 1999. To do so, we must multiply the base-year quantities by 1999 prices (just the opposite of what we did in calculating real GDP for 1999), and then add up all of those products:

	1999 price	*1998 quantity*	
Commodity	*(p_{1999})*	*(q_{1998})*	$p_{1999} * q_{1998}$
Cases of beer	$22	100	$2200
Bags of pretzels	$1.20	100	+ $120
Bicycles	$210	10	+ $2100
			=========
COST OF BUYING 1998'S GDP IN 1999 PRICES			$4420

Now, to get the GDP price index for 1999, take that number and divide it by the base-year's GDP (which is also what it cost to purchase every item in the base-year's GDP, at the base-year prices), and multiply by 100:

GDP price index for 1999
= 100* (cost of buying base-year's GDP at 1999 prices)/(cost of buying base-year's GDP at base-year's prices)
= 100 * $4420/$4100
= 100 * 1.078
= 107.8

So buying that entire "bundle of goods" in 1999 would cost 107.8% as much as it cost in 1998. Alternatively, that bundle of goods cost 7.8% more in 1999 than it did in 1998.

We could conclude that Lakeland was in a recession in 1999, since real output fell 2.7%, and also experienced fairly high inflation in 1999, since the GDP price index rose 7.8%.

XI. CONTRACTIONS, RECESSIONS, AND DEPRESSIONS

Now that we know what real GDP is (i.e., inflation-adjusted GDP, or GDP in constant-valued dollars, or GDP at constant prices), Week 1's definition of CONTRACTIONS and RECESSIONS should make a bit more sense.

Defn. **CONTRACTION: a period over which real GDP steadily falls**.
-- Defining a contraction as a period over which *nominal* GDP falls would not make as much sense, since it is possible for nominal GDP to fall while real GDP is rising, if prices

fall faster than quantities rise. (This actually appears to have happened a few times in the 19th century, though not in the 20th century.)

The more common, but less precise, term for an economic slump is a RECESSION. There are at least two competing definitions of what a recession is:

Defn. **RECESSION:**
(1) conventionally, **a period in which real GDP declines for at least two consecutive quarters.** By this definition, a recession would be marked by *rising* unemployment, since the unemployment rate rises when real GDP falls.
(2) alternatively, **a period in which real GDP is declining or simply falls way short of its "normal" level**. By this definition, a recession would be marked by *high* unemployment.

A very severe recession (by the second definition) **is called a DEPRESSION.**
-- When does a recession become severe enough to be a depression? There's an old saying that a recession is when your neighbor loses his job and a depression is when you lose *your* job. In the U.S., a good rule of thumb might be that it's a depression if the unemployment rate is over 10% for a prolonged period.
---- The last time the U.S. unemployment rate rose above 10% was in the recession of 1981-82, for a period of several months.
---- The last time the U.S. unemployment rate was above 10% for years at a time was during the **Great Depression of the 1930s**.

The Great Depression lasted roughly from late 1929 until early 1941. The U.S. unemployment rate was over 10% for most of that time, and peaked at 25% in 1933. Even when the economy grew, in 1933-37 and 1938-40, it grew much too slowly to bring the unemployment rate below 10%. (Thus the second definition of recession seems preferable to the first, since the first would imply that there was no Great Depression in 1933-37 because real GDP was rising then, however slowly.)

XII.UNEMPLOYMENT

Unemployment refers to the condition of being unable to find a job. "Unemployed" is not quite the same thing as "jobless," because the official definition of unemployment includes only those jobless persons who are *looking* for work.

A flurry of definitions:

* **UNEMPLOYED: a person 16+ years old who is not working, is available for work, and has made specific efforts to find work over the past four weeks.**
-- By contrast, **someone who isn't working and *isn't* looking for work is categorized as OUT OF THE LABOR FORCE** (exs.: stereotype of welfare recipients, full-time students, full-time homemakers, retirees).

* **LABOR FORCE: the number of people employed plus the number of unemployed;**

Labor force = Employed + Unemployed

-- **(WORK FORCE = total number of employed**.
People who are working part time, even if they'd prefer to be working full time, are still counted as employed.)

* **UNEMPLOYMENT RATE (UR): the ratio of the number of people unemployed to the total number of people in the labor force**

UR = Unemployed/(Labor force) = Unemployed/(Employed + Unemployed)

*** LABOR FORCE PARTICIPATION RATE (LFPR): the ratio of the labor force to the total population 16+ years old.**

LFPR = (Labor force)/(Adult population) = (Employed + Unemployed)/(Adult population)

---- Note that the labor force is much, much smaller than the total adult population. The total U.S. population altogether, including children, is about 275 million, so only half of the total U.S. population is in the labor force. Of the adult population, about two-thirds is in the labor force (LFPR = 67%).
---- The LFPR has been rising steadily since 1953; the reason why is that the LFPR of married women has risen substantially, and in fact has done so for all of the past century.)
---- In 1997, about 67 million adult Americans were not in the labor force. The rest were either employed (130 million) or unemployed (6.7 million). The number of unemployed is probably closer to 6 million today.

Unemployment is anything but an equal-opportunity affliction. The rapper Paris once said that when the American economy catches a cold, black America gets double pneumonia. He was referring to the unusually high rates of unemployment among blacks, which skyrocket even further during recessions. Other groups with higher-than-average rates of unemployment are teenagers, blue-collar workers, and people with a high school education or less. These patterns hold both in "good" times (e.g., the current expansion) and "bad" times (recession years like 1982).

---- Note that in both years the highest unemployment rates by far were for black teenage males, whose jobless rates of 52.4% (in 1982) and 31.8% (in 1998) were worse than the *overall* unemployment rate has *ever* been in this country, even in the Great Depression. In the "good" year of 1998, the following groups still had unemployment rates over 10%: black teenagers, white teenage males, high school dropouts. The groups with the lowest unemployment rates were white-collar workers (3.4% in 1997) and college graduates (2.2%).

Q: If someone is looking for a job but has turned down a job or two, is she still unemployed?
A: Yes -- to be considered unemployed, one need only be jobless and looking for work. It's not a question of how picky you are. (In fact, it sometimes pays to be picky. Instead of accepting your first job offer, you might want to wait and see if any better ones come along.)
-- For the record, government unemployment benefits are not available to people who have turned down jobs in their own field. But they *are* available to people who've turned down jobs that they are obviously overqualified for.
---- If you're a recently minted CPA who walks by the "help wanted" sign in McDonald's on your way to the unemployment office, nobody there is going to ask you why you won't take a job flipping burgers. (They recognize that taking such a job would probably not be in your self-interest -- it signals desperation and may detract from your job-search time.)
---- On the other hand, a recently minted CPA who has turned down offers from local accounting firms in the hope of catching on with a Big Ten accounting firm would not qualify for unemployment benefits.

There is perhaps a thin line between being unemployed-and-picky and being out of the labor force altogether.
-- Ex.: If I'm out of work and actively looking for an econ professor job that pays at least $100,000 a year, I'm probably not going to find one, but I'd still be counted as unemployed. If I conclude that nobody will hire me for that kind of salary and give up looking for work altogether, then I'm "out of the labor force."
----> The **"discouraged worker" effect refers to what happens when people who want to work but can't find work eventually become discouraged and stop looking for work.** (The term is really a misnomer, since it doesn't refer to someone who's working. "Discouraged former job-seeker" or "discouraged jobless person" would be more like it.) Once a person stops looking for work, he is officially no longer part of the labor force and is no longer counted as unemployed. Other things equal, if a lot of people become "discouraged workers," the unemployment rate would drop, but human misery would be just as great as before. The discouraged-worker effect is a form of "phantom unemployment."

* **Three types of unemployment:**

(1) <u>frictional ("search") unemployment</u>: Arises from normal turnover (new entrants to labor force, quits) of the job market.
-- Exs.: recent college graduates, women who re-enter the labor force after having children.
-- This is the most benign, or least harmful, of the three, since it tends to be short-term and sometimes reflects a choosiness that can be a desirable quality in job-seekers.

(2) <u>structural ("long-term mismatch") unemployment</u>: Arises from changes in the structure of the economy that result in a significant loss of jobs in certain industries. A "mismatch" exists between the skills of laid-off workers and the skills desired by current

employers.
-- Exs.: steel/textile/auto workers after plant closings or layoffs, laid-off workers in some defense-related industries.
-- This is probably the harshest form of unemployment, because it can be difficult and costly to acquire those new skills that employers are looking for.

(3) <u>cyclical unemployment</u>: arises when the overall demand for labor is low because of insufficient aggregate demand.
-- Much of the unemployment in recessions and depressions is cyclical.

Parting question: Case & Fair's textbook, after going through the obvious and devastating costs of recessions, says they may have at least one important benefit. Namely, *"recessions may help to reduce inflation."*
-> Q: How could a recession help to reduce inflation?

XIII. THE UNEMPLOYMENT-INFLATION TRADEOFF: THE PHILLIPS CURVE

We left off with unemployment, and a parting question: How could a recession help to reduce inflation? Before we deal with that question, which relates to the possible *benefits* that a recession might bring (despite the high unemployment that a recession also brings), lets look at the social consequences of unemployment and recessions:
-- Unemployment is probably the biggest problem that capitalism generates. Even in this long-term economic expansion, there are still six million unemployed people, and the average spell of unemployment last three to four months. Problems associated with unemployment:
---- Unemployed people and their families obviously suffer a big drop in their standard of living, since unemployment benefits aren't that generous and run out after a couple months. (A lot of people don't even apply for them.)
---- Unemployed people tend to become very depressed and frustrated. In recessions, when unemployment rises, a host of other social ills spread as well: rates of crime, divorce, suicide, alcoholism, drug abuse, spouse and child abuse all tend to rise along with unemployment.
------ Welfare dependency rises in times of recession, as many unemployed people drop out of the labor force altogether and many families break up. In the last recession (1990-92), which was relatively mild, the number of welfare recipients rose by almost three million. (That number fell by almost two million as the economy recovered from 1992-96.)

So recessions are bad. Nobody would disagree with that statement. And yet, most economists would tell you that the last two recessions in the U.S. (1980-82, 1990-92) were more or less *planned*: the Federal Reserve raised interest rates and tightened credit in order to deliberately slow down the economy. The Fed raised interest rates in both of those cases in order to reduce inflation. Which brings us back to our parting question:

Q: How could a recession help to reduce inflation?

A: In a recession, overall demand is low and jobs are scarce, therefore:

(1) companies will raise their prices more slowly (or perhaps not at all);
(2) workers will be less likely to demand higher wages.

-> There is a short-run tradeoff between inflation and unemployment: when one rises, the other will tend to fall.

The PHILLIPS CURVE illustrates the tradeoff between inflation and unemployment (two "bads") or, by extension, between higher output and lower prices (two "goods").

To repeat myself a bit:

Q: Why is there a tradeoff between inflation and unemployment? (Or, equivalently, why is there a tradeoff between low prices and real GDP growth? Or, why does the Phillips Curve slope downward?)

A: Two main reasons:

(1) It's easier for firms to raise prices when incomes (and hence product demand) are high. Sometimes they're just following supply and demand -- if demand increases and the firm faces diminishing returns to expanding production in the short run, then the new supply price of the firm's good will have to be higher than the old price. Firms in noncompetitive industries -- i.e., firms that have some price-setting ability will often take advantage of high product demand to raise their prices, because they know they can do that without losing a lot of customers.
(2) When firms want to expand production, workers tend to get paid higher wages. This is because expanding firms will require more labor, which often requires paying a higher wage to (a) attract more workers and/or (b) induce their existing workers to work overtime. Also, with tight labor markets, workers are harder to replace and thus are in a better position to demand higher wages. **The higher wages are then passed onto consumers in the form of higher product prices.**

Q: Why does the Phillips Curve "curve" (i.e., why does it get flatter as you follow it from left to right?)
A: The economy has an "inflationary bias" -- it's much easier for prices and wages to go up than to go down. Companies are reluctant to cut the prices of their products, even in periods of slack demand; and workers fiercely resist any attempts to cut their nominal wages. So periods of rapid economic growth and low unemployment will generate many price and wage increases, and hence be very inflationary; by contrast, even a severe economic recession, while it will reduce the rate of growth of prices, will probably be unable to wipe out inflation altogether. A certain amount of "inertial inflation" is simply built into the system.

In the 1970s, inflation and unemployment frequently increased at the same time, something that had never really happened before. There was no obvious tradeoff between inflation and unemployment, which led many people to charge that the whole concept of the Phillips Curve was pure bunk.
--> What's more likely is that **the Phillips Curve can shift up or down**, and did so during the 1970s. In particular, the Phillips Curve shifted up at least twice during the 1970s. (It also seems to have shifted down in the mid-1980s and again in the 1990s.)
---- Economist Arthur Okun said it best: "The Phillips curve has become an unidentified flying object."

Today, the Phillips Curve is somewhat controversial -- it is not popular (which may be why your textbook doesn't introduce it until Chapter 15), but most economists do agree that there is *some* tradeoff between unemployment and inflation. Recessions cause firms to moderate their price increases and workers to moderate their wage demands. The Fed's Board of Governors seem to operate under the assumption that their policies will affect both unemployment and inflation. It is almost universally accepted that the Fed's tight-money policies in 1979-82 were responsible both for lowering inflation and for producing the 1981-82 recession. To quote Case & Fair:
"There is a tradeoff between inflation and unemployment, but other factors besides unemployment affect inflation. Policy involves much more than simply choosing a point along a nice, smooth [Phillips] curve."

XIV. INFLATION

* *Defns.:*

INFLATION: an increase in the overall price level.

DEFLATION: a decrease in the overall price level.
-- a major deflation has not occurred in this country since the Great Depression of the 1930s. A very minor one did occur in 1954, when the consumer price index fell 0.4% (the inflation rate was -0.4%).

DISINFLATION: a decline in the rate of inflation
-- recent ex.: early 1980s: inflation reduced from > 10% in 1979-81 to about 4% in early 1980s
-- **The costs of a deliberate disinflation tend to be high, because the only sure way to reduce inflation is by creating a recession.**

***

Recall: **INFLATION: a persistent increase in the overall price level.**

There are different measures of inflation that correspond to different price levels.
-- The most commonly used price level in calculating the rate of inflation is the

consumer price index (CPI), which measures the cost of purchasing a "basket" of certain consumer goods (including basic items like food, clothing, rent, and transportation).
-- The **producer price index**, formerly called the wholesale price index, measures the cost of industrial commodities at the wholesale level; hence it measures the prices that companies receive for the goods they produce, as opposed to the retail prices that we pay.
-- The broadest measure of the price level is the **GDP price index, or GDP implicit price deflator**, which measures the cost of purchasing all of the goods and services in GDP; so it includes the prices not just of consumer goods but also of investment goods, government-purchased goods and services, exports, and imports.

INFLATION RATE: the annual percent change in the overall price level (usually in the CPI).
-- The (CPI) inflation rate averaged 3.9% from 1982-1990 and is **currently about 2%**. It has fallen fairly steadily since the early 1990s.
-- Ex.: If the CPI was 152.4 in 1995 and 156.9 in 1996 (meaning that prices in 1995 and 1996 were 152.4% and 156.9% as high as prices were in the base year, which was 1982-84), then:
1996 inflation rate = {(1996 price level)/(1995 price level)} - 1 * 100%
= {156.9/152.4 - 1} * 100%
= {1.0295 - 1} * 100%
= .0295 * 100%
= 2.95%

How to construct a price index:

A price index measures the cost of buying a certain "basket" of goods, so one must:
(1) total up the dollar cost of buying given quantities of all of the items in the basket, for each of the years we are looking at.
Then, so that we may more easily compare price levels for different years, we index those cost totals to the however much it costs to buy that basket of goods in the base year, which is whatever year we choose to be our basis of comparison. Thus, we must
(2) choose a base year. Then, for each year, compute the price index by dividing the total cost of the basket of goods in that year by the total cost of that basket of goods in the base year, and then multiply by 100. So the price index for the base year is always 100, because we're dividing a number by itself and then multiplying by 100. If the same basket of goods costs 4% more (i.e., 104% as much) in the next year, then the next year's price index is 104.

price index for year *t* = 100 * (cost total for year *t*)/(cost total for base year)

Example of constructing a price index and calculating the inflation rate from it:

Imagine the same small island economy that we used in our nominal-vs.-real GDP example from earlier. In 1995, which we will use as our base year, the average person

there consumed just three commodities -- beer, pretzels, and bicycles -- in the following quantities:

1995

Commodity	*p*	*q*	*p * q*
Case of beer	$20	1	$20
Bag of pretzels	$1	20	+ $20
Bicycle	$200	1	+$200
TOTAL COST OF GOODS			$240

-- Since 1995 is the base year, the price index for 1995 is: {$240/$240} * 100 = 100

-- In 1996, the price of beer was still $20, and the price of a bag of pretzels rose to $1.50 and the price of a bike rose to $210. Now that same basket of goods costs a bit more:

1996

Commodity	*1996 p*	*1995 q*	*p * q*
Case of beer	$20	1	$20
Bag of pretzels	$1.50	20	+ $30
Bicycle	$210	1	+$210
TOTAL COST OF GOODS			$260

-- In 1996, the price index was: {$260/$240} * 100 = 1.0833 * 100 = 108.33
-- The 1996 inflation rate was just the difference between the two, or 8.33%. To verify:
1996 inflation rate = {(108.33/100) - 1} * 100
= (1.0833 - 1) * 100
= .0833 * 100
= 8.33%

XV. COSTS OF INFLATION

Inflation and unemployment are perhaps the two most visible macroeconomic problems. The costs of unemployment are clear enough -- lost output, a lower standard of living, the despondency of joblessness, etc. -- and arguably are a lot more severe than the costs of inflation. When unemployment rates rise, suicide, crime, and divorce rates rise, too. People don't kill themselves over inflation, by contrast.
-- *"Inflation, like every teenager, is grossly misunderstood, and this gross*

misunderstanding blows the political importance of inflation out of all proportion to its economic importance" (-- economist Alan Blinder).
-- Yet the same Alan Blinder has said that the 1970s proved that the U.S. economy does not function well under high inflation. Why not? We shall see...

Q: What are the costs of inflation?
A:

(1) Arbitrary redistribution of income
(a) People whose incomes do not increase at the same rate as the price level will lose purchasing power -- i.e., their real incomes will fall. Inflations are rarely balanced -- real wages go up for some people, down for others. People's whose incomes are not "indexed" to inflation (some pensioners, welfare recipients, people with multi-year fixed-wage contracts) will see their real incomes fall.
-- Historically, wage increases have kept pace with price increases, so that real wages on average have risen or stayed the same, despite inflation.
-- Still, since inflations are rarely balanced, some people's real incomes do fall. If inflation causes a lot of people's real incomes to fall, then complaints about inflation will tend to be widespread.
(b) Inflation redistributes income from creditors to debtors (i.e., from savers and lenders to borrowers)
-- Defn.: **REAL INTEREST RATE. The real, or inflation-adjusted, interest rate is computed as:**

real interest rate = interest rate - inflation rate

---- An unanticipated inflation lowers the real interest rate on existing loans. Ex.: If you borrow money at 10% today, when inflation is 2%, then you're probably expecting to pay a real interest rate of 8% (10% - 2%). If inflation then rises to 10%, then the real interest rate is 0%, so you're in effect getting an interest-free loan. That's great news for you, but bad news for the bank. Thus inflation is good for borrowers and bad for lenders.
---- Note: an unanticipated deflation has just the opposite effect: if you borrow money, prices fall (and your salary probably does, too), but your debt and interest payments are still the same, so the burden of your debt is greater.
---- Note also: if the inflation is anticipated, lenders can just raise their nominal interest rates so that the real interest rate is unchanged. When the inflation rate is high, (nominal) interest rates are high, too.
---- Aside: "Redistribution of income" is typically taken to mean "from rich to poor"-- e.g., tax the rich, feed the poor. That's not precisely what "redistribution of income" means in this case, yet some people say "inflation is good because it helps poor people." This is partly true in the sense that poor people tend to be debtors, while rich people tend to be creditors. But the poorest of the poor typically live on fixed incomes (e.g., welfare) or receive wages (e.g., the minimum wage) that are not indexed to inflation.

(2) Inefficient allocation of resources
-- Inflation robs people of information about relative prices, thereby making it harder for them to get the best deals or make the best decisions.
---- Ex.: You go to the supermarket and all prices have doubled from last week --> you

might think, "I'm never shopping here again!" You drive to another supermarket and find that prices have doubled there, too. Disgusted, you drive to a third supermarket, only to find that they too are charging twice as much as last week. By now you realize that prices have doubled everywhere, but in the meantime you've wasted quite a bit of time looking around for a cheaper supermarket.
---- Without knowing the relative prices of the goods you might consume, it's easy to make bad decisions, and very hard to maximize your consumer satisfaction according to the Econ 101 principle of buying more and more of whatever goods give you the most marginal utility per price, until the marginal utility per price of every good you consume is the same. That's hard to do when those prices keep changing.
-- People waste more time making trips to the bank, because the nominal interest rate goes up as a result of a higher inflation rate. When your bank is paying higher rates of interest, you carry less cash, since cash pays no interest, and leave more money in the bank. The only way to do this without cutting back on your spending is to make smaller but more frequent withdrawals from your bank account -- say, withdrawing $20 once a day instead of $140 once a week. Making all those extra trips to the bank tends to be time-consuming and very inconvenient. Economists refer to those extra trips to the bank as the "shoe-leather costs of inflation" (since you might literally wear out the soles of your shoes more quickly if you have to make all these extra trips to the bank).

(3) Increased investment risk and (possibly) slower long-term economic growth
-- When unanticipated inflation occurs regularly, the degree of risk associated with new investments increases. Uncertainty about future inflation may inhibit people from investing in capital and long-term projects. Lower investment lowers the long-term rate of economic growth.

XVI. CAUSES OF INFLATION

Q: What causes inflation?
A: There are **two main types of inflation:**

(1) Demand-pull inflation (the not-so-bad kind)-- inflation that is initiated by an increase in demand-driven economic growth. Demand-pull inflation can be caused by any of the following: increased government spending, a "consumption binge" in which households try to consume a lot more, an "investment binge" in which firms rush to build new plant and equipment, or a big increase in the supply of money and credit that causes people and firms to borrow more money to finance new consumption or investment.
-- Exs.: the inflation of the late 1960s was fueled by the government's high levels of spending on the Vietnam War; the rapid inflation of 1977-79 was fueled by the Federal Reserve's rapid expansion of bank credit.

(2) Cost-push, or supply-side, inflation (the worse kind) -- inflation that is initiated by an increase in input or materials costs (independent of demand shifts). For example, a big increase in wages (say, because of stronger unions) would raise

production costs and cause firms to pass on those higher costs in the form of higher prices. So would an increase in energy costs, since energy is necessary for all types of industrial production.
-- **Exs.: the OPEC (Oil Producers' Exporting Cartel) oil shocks** of 1973-74 and 1979-80 caused big increases in the inflation rate because oil is a vital input in production and because gasoline is a big part of consumers' budgets.
-- Closely related is "inertial" inflation, occurs when firms raise their prices because they expect other prices to go up, too.

Expectations of higher inflation in the future tend to become self-fulfilling.

XVII. HYPERINFLATION

Defn. **HYPERINFLATION: a very rapid rise in the price level, of at least 100% and usually by more than 1000%.**

The United States has never experienced a hyperinflation in its modern history, but it did during the Revolutionary War, when the value of a "Continental" dollar at war's end was only one-hundredth of its earlier value. Also, the Confederacy experienced a hyperinflation of its currency during the Civil War.

The most famous hyperinflation occurred in Germany during the 1920s and led to a total breakdown of German society that helped pave the way for Adolf Hitler's rise to power.
-- After Germany's defeat in World War I in the late 1910s, the country faced massive war-related debts and a huge bill for reparations payments to the Allies. Unable to raise such huge sums through taxes, the German Weimar Republic attempted to pay its bills the old-fashioned way -- by printing money.
-- When a government tries to finance its spending by printing money, the typical result is a massive inflation. Germany's was all the more so. To quote economist Campbell McConnell:
"During 1922 the German price level went up 5,470 percent. In 1923, the situation worsened; the German price level rose 1,300,000,000,000 [1.3 trillion] times. By October of 1923, the postage on the lightest letter sent from Germany to the United States was 200,000 marks. Butter cost 1.5 million marks per pound, meat 2 million marks, a loaf of bread 200,000 marks, and an egg 60,000 marks. Prices increased so rapidly that waiters changed the prices on the menu several times during the course of a lunch. Sometimes customers had to pay double the price listed on the menu when they ordered."

XVIII. WHAT IS MONEY?

Before we go any further, let us recall that the macroeconomist's usage of the term "money" refers *not* to wealth or income (as in "I have a lot of money" or "I make a lot of money") but to the following definition:

-- MONEY - the medium of exchange; anything that is generally accepted as payment; "liquidity."

The money supply is not the same thing as GDP. Students sometimes confuse the money supply with GDP, but they are two very different things. GDP is the economy's total output of final goods and services in a given year; **the money supply is**, roughly speaking, **the total amount of cash plus bank accounts in the economy *at a given point in time***. GDP is a "flow" measure, in that it measures the output of something over a particular interval; the money supply is a "stock" measure, in that it measures the quantity of money at a particular point in time.

Again, money is defined as anything that is generally accepted as payment or, in a word, as *liquidity*. Since having liquidity is a much smaller priority for most people than earning a high income or becoming wealthy is, we need to figure out what it is that money is good for. Economists have identified **three main functions of money:**

1. Medium of exchange -- you can use it to buy whatever you want. Money makes it much easier for people to exchange the goods and services they produce for the goods and services that they want. Money "greases the wheels of commerce," by making it much easier for people to exchange the goods and services they produce for the goods and services that they want. Having a generally accepted currency **eliminates the need for barter (trading goods and services for each other)**, and makes the volume of transactions a lot larger than it would otherwise be.

2. Unit of account -- with a standard monetary unit, like the dollar, we can easily *price* individual goods and services, putting a single price on each item instead of having to compute a different exchange price for every different pair of commodities (e.g., 1 cup of coffee = 2 newspapers = 6 minutes of office work as a temp = 3 minutes of my teaching services).

3. Store of value -- money has some use as an asset, because it holds its nominal value over time and, unlike stocks or bonds, **its value does not fluctuate from day to day.** Unlike stocks or bonds, there is no risk that dollars will suddenly become worthless. In sum, money is a virtually **riskless asset**. It is **also a very *liquid* (convertible into cash; spendable) asset**, which is another desirable quality.

At various times and places, many different things have been used as money. Long ago, most types of money were:
COMMODITY MONEY: items used as money that also have (*intrinsic*) value in some other use.
-- Ex.: gold coins

Today, almost every country's currency is instead:
FIAT MONEY: items designated as money that are intrinsically worthless.
-- Ex.: U.S. paper money - only other value is as paper
-- Fiat money has value only because the government declares it to be *legal tender* and

because people *believe* it has value.
---- **LEGAL TENDER: money that a government has required to be accepted as payment for debts.**

XIX. MONETARY POLICY: AN INTRODUCTION

There are two main approaches that economic policymakers can use to influence the level of real GDP, unemployment, and inflation:

(1) **FISCAL POLICY: the spending and taxing policies used by the government to influence the economy.**
-- has not really been used since the early 1980s.

(2) **MONETARY POLICY: the steps that the Federal Reserve takes to influence the economy through changes in the supply of money and credit (which usually take the form of changes in interest rates).**
-- has become more important than ever before. Today, *"the Federal Reserve runs the economy."*

In most countries, including the **U.S**., **monetary policy is carried out by** a *central bank*, which has the power to change the supply of money and credit through its actions. In the U.S., that central bank is not one single bank but a whole network called **the FEDERAL RESERVE SYSTEM** (a.k.a. the Federal Reserve, or the Fed). **At the head of the Federal Reserve is Alan Greenspan**, who has been its Chairman since 1987.

Despite the confusion between the word "Fed" (nickname for Federal Reserve) and "Feds" (the federal government), **the Fed is not part of the government.** It is what we'd call a **"quango" -- a quasi-non-governmental organization.**
-- The Fed is **technically an independent, private agency,** but--
---- Its most powerful members are appointed by the President and confirmed by the Senate (much like Supreme Court Justices).
---- The chairperson of the Fed serves a four-year term, which means that each President gets the chance to appoint a Fed chair of his choosing.
------ Alan Greenspan was originally appointed by Ronald Reagan in 1987 and was reappointed by George Bush and Bill Clinton.
---- Also, the Fed, unlike a truly private organization, must return 100% of any excess profits it makes to the government (although it does not get its funding from the government).

The Federal Reserve System consists of:
*** 12 regional Federal Reserve Banks (FRB's, or Fed banks)**.
-- The **New York Fed**, located in the Wall Street financial district, is by far the most powerful. Most major U.S. financial centers have a Fed bank -- these include Chicago,

San Francisco, Boston, Atlanta, Dallas, and St. Louis.
* **about 8000 commercial banks**. **All banks are required to set a certain fraction of their deposits aside as *reserves*, to be held as cash at the bank or at the nearest regional Fed bank.** The Fed manipulates the levels of bank reserves in order to control the money supply and interest rates.
* the **Federal Open Market Committee (FOMC) --** the group that really controls monetary policy.
-- The FOMC has **12 members**. They are:
---- the **president of the New York Fed** (who serves as Vice-Chairman)
---- **four presidents from the other 11 regional Fed Banks**, who serve on the FOMC on a rotating basis;
---- **the seven members of the Federal Reserve Board of Governors.**
------ The seven Fed Governors are economists who serve 14-year terms and are headquartered in Washington, DC. Since they are the most permanent and prestigious members of the FOMC, they are also the most powerful.
-- The **FOMC meets every six weeks to plot the course of monetary policy. It usually does this by adjusting two interest rates:**
---- DISCOUNT RATE: the interest rate at which the regional Fed banks loan money to commercial banks (currently 5.25%);
---- **FEDERAL FUNDS RATE: the interest rate at which banks loan reserves to each other**, on an overnight basis (currently about 5.75%).
------ The Fed does not set the federal funds rate directly, but rather sets a *target* for it, and then takes steps to keep the federal funds rate close to that target. It does this by manipulating the supply of bank reserves so as to affect the federal funds rate by affecting supply and demand in that market.

XX. THE MONEY SUPPLY

The money supply is controlled by the Federal Reserve. **Official measures of the money supply:**
-- The narrowest, sometimes called "transactions money," is:
M1 = currency + checking account deposits + travelers' checks = $1.1 trillion (~13% of GDP)
-- A much larger and broader measure is:
M2 = currency + checking account deposits + travelers' checks + Savings deposits + Small CD's (time deposits) + money-market mutual funds (MMF's) + money-market deposit accounts (MMDA's) = ~$4 trillion
-- There are still-broader measures such as M3, L, and "Debt," but we won't be getting into those.

Note that both are considerably smaller than GDP, which is about $9 trillion. That is because GDP is measured over the course of a year, whereas the money stock is measured a single point in time. Nearly every item bought and sold in GDP is financed by an exchange of money, but money "turns over" several times in the course of a year.

(Just imagine, for example, how many times the $1 bill in your pocket will get used, by different people and in different transactions, in the course of the next year.)

XXI. HOW BANKS CREATE MONEY

While the most obvious form of money is cash (paper money) and coins, most of the money supply consists of bank account deposits. Before we go any further, here are a couple key definitions:

Defns.

FINANCIAL INTERMEDIARIES: Banks and other institutions that act as links between those who have many to lend and those who want to borrow money.

BANK: A financial intermediary that accepts deposits and makes loans.

The total amount of bank account deposits is more than ten times larger than the total amount of cash that banks keep as reserves (e.g., in their vaults). We call this banking system...

FRACTIONAL RESERVE BANKING: the modern system of banking, in which **banks do not keep all of their deposits as cash reserves but instead loan or invest most of them so as to earn interest**.

How do banks do that? It sounds kind of like a shell game, doesn't it?It wasn't always this way; instead, this system evolved over time. Way back in the 15^{th} and 16^{th} centuries, people used gold as money. Because gold coins and bars were too heavy and bulky to carry around conveniently, people looked for a safe place to store it, and many of them stored it with *goldsmiths* for safekeeping. The goldsmith was providing a valuable storage service, so he charged a fee for it.
-- So far, the goldsmith was acting as no more than a warehouse, but eventually the paper receipts that he issued to each depositor began to be *traded*, from a depositor to someone who was selling goods. The receipts took the place of gold coins in some exchanges, and why not? They were lighter, easier to conceal from potential thieves, and were readily accepted in transactions. So the depositors did not need to make frequent trips to the goldsmith to withdraw their gold.
---- At some point, the goldsmiths realized that they were sitting on a potential profit opportunity. Gold withdrawals were infrequent, and their stocks of golds were always fairly large, so it occurred to them that they could lend out some of their extra gold and receive interest on it, because they always had more than enough on hand to meet normal deposit outflows.

------ At that point, modern banking, or fractional reserve banking, basically began. By issuing those gold receipts, or *gold certificates*, the goldsmiths made the monetary system more efficient than it had been. But the real change came when they started making loans: the goldsmiths would loan out their surplus gold, the borrowers would spend it and then the merchant who received their payment in gold would deposit it with another goldsmith, who would issue a receipt and loan out some of that gold.
-------- The goldsmiths had gained the power to create money. The same "chain of deposit creation" that characterizes modern banking - banks loan out their excess reserves, they get redeposited, the re-deposits get loaned out again, etc. - was now in place. The total amount of gold in the economy was the same, but the amount of *money* in circulation was much larger.
---------- With more money available to facilitate transactions, the volume of trading became much larger as well, so the beginning of modern banking did much to promote Renaissance Europe's economic development.

XXII. BANK BALANCE SHEETS, IN BRIEF

The standard accounting tool for listing a bank's assets and liabilities is called a *T-account*, so named because it's a table that you begin by drawing a big letter "t." A bank's *balance sheet* is just a listing of the bank's assets and liabilities. **Assets (how the bank *uses* its funds; what the bank OWNS)** go on the left side, while **liabilities (sources of funds**, or how the bank *gets* its funds, or what the bank OWES) go on the right side.

The first rule of accounting is that both sides add up to the same amount; in other words, the two sides of the balance sheet must *balance*. Yet a bank whose assets and liabilities are exactly equal would not be a very healthy bank - a bank likes to have some kind of cushion of funds so that a sudden dip in its assets doesn't make it insolvent. So a bank wants to have more assets than liabilities, but the balance sheet must balance. The way we make it balance is to add the bank's *net worth* (assets minus liabilities) to the liabilities side, as in the balance sheet below. So remember:

Assets - Liabilities = Net Worth (or Bank Capital);

Assets = Liabilities + Net Worth

The following table, showing the combined balance sheet of all U.S. banks and noting the relative share of each item in the totals, will be familiar to anyone who's taken accounting:

ASSETS		**LIABILITIES AND NET WORTH**	
Reserves	**5%**	**Deposits**	**66%**
Securities (Government bonds)	**21%**	**Borrowings (loans *from* others)**	**26%**
Loans to firms, individuals,	**68%**		

other banks, etc.			
Other assets (physical capital, etc.)	**6%**	**_____**	**___%**
TOTAL ASSETS	**100%**	**TOTAL LIABILITIES + NET WORTH**	**100%**

(The blank line, which is the difference between Total Assets and Total Liabilities, is **Net Worth, 8%.** Since total liabilities {= Deposits + Borrowings = 66% + 26%} are equal to 92% of total assets, then Net Worth is 8%.)

(Total bank assets are about $5 trillion.)

The first item on a bank's balance sheet is *reserves*, which banks keep to meet deposit outflows (withdrawals, checks drawn on the bank, etc.) and because they're required to do so by the Federal Reserve.
-- Banks are required by the Fed to hold a certain proportion of their deposits as *reserves*, mainly to guard against "runs on the bank" and to allow the Fed to manipulate the money supply. Reserves can be **held either as cash or in accounts at the Fed**. Currently, the ***required reserve ratio (RRR)*** is 10% on checking accounts and zero on savings and money-market accounts.

The difference between a bank's total reserves and its required reserves is its *excess reserves:*

excess reserves (ER) = actual reserves - required reserves
= actual reserves - (.10)(checking deposits)

Excess reserves are mainly kept by banks as a precaution. In good times, banks generally try to keep as few excess reserves as possible, since they earn no interest on them. The Fed's reserve requirements are typically much higher than what banks actually need in order to be able to handle deposit outflows. In fact, adhering to the Fed's reserve requirements, which are set considerably higher than the amount most banks actually net to meet the normal demand for withdrawals, is costly to banks, because they earn no interest on their reserves, whereas they could earn interest by loaning those reserves out.

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XXIII. MONEY SUPPLY, MONEY DEMAND, AND THE EQUILIBRIUM INTEREST RATE

Defn. **INTEREST RATE -- the annual interest payment on a loan expressed as a % of the loan.** It is equal to the amount of interest received per year divided by the amount of the loan.
-- It is **the "price" of money**, or rather the price of borrowing someone else's money.

-- **Notation: *i* = interest rate**
-- Ex.: If you borrow $100 and must pay $105, *i* = (interest payment)/(loan amount) = $5/$100 = .05 = 5%
---- (We don't count the repayment of the original $100, which is called the *principal* on the loan. The interest rate is the *net* payment you make; we say that the *gross* interest rate = 105%, but that usage is uncommon.)

One of the best ways to understand movements in interest rates is through the **money market** -- a representation of the supply and demand of money and the resulting equilibrium point. So the money market is just another supply-and-demand diagram, with the price of money on the vertical axis, the quantity of money on the horizontal axis, and a downward-sloping money-demand curve.
-- The only variations on the usual supply-and-diagram are that:
(1) the **supply curve of money is perfectly vertical**, instead of upward-sloping, **because the supply of money is fixed by the Fed without regard to the interest rate**;
(2) **the "price of money" is not a dollar amount but rather is the interest rate. The interest rate is the opportunity cost of holding money**, since money pays no interest and alternative assets like bonds, savings accounts, and CD's do pay interest. When you hold money, you are giving up the interest that you could be receiving if that money were in a bond or savings account or CD. The higher the interest rate, the more interest you lose out on by holding money, so you'll carry less money and keep more in the bank. Likewise, when the interest rate is very low, you don't lose much by carrying a lot of money, so you will carry (or demand) more money.
The quantity of money demanded is a negative function of the interest rate (i) --> the money demand curve slopes downward.

Q: Considering that money earns a lower rate of return (0%) than virtually every other asset there is, why hold money at all? Even when *i* is low, as long as it's greater than 0, holding money means that you are losing out on the interest that you could be earning on bonds, CDs (certificates of deposit), or savings accounts, not to mention the positive returns you could be earning on things like stocks or real estate.

A: There are at least four good **MOTIVES FOR HOLDING MONEY**. They are:

(1.) <u>Transactions demand</u> (the most obvious motive) -- **We need it to buy things**, since money is the universal medium of exchange.
---- Corollary: the more you earn, the more money you'll demand.
------ After a Mets game in the mid-1980s, it was reported that pitcher Ron Darling's wife lost purse at the game, and that the Darlings were upset because the purse had over $400 of cash in it. Why would she have been carrying so much money in the first place? (Probably because her husband was a multimillionaire.)
--------> **The greater your income and wealth, the greater your consumption will be, hence the greater your transactions demand for money will be.**

(2.) <u>Precautionary demand</u> ("save it for a rainy day")
---- Ex.: Say I normally spend about $20/day --> then if I go to the bank every 5 days, I

should withdraw $100 every time, right? Not necessarily -- even though $100 is what I'd need on average, I might have some abnormal expenses -- unexpected emergencies, bills, great sales, etc. So I might withdraw more than $100.
------ **Money is the most liquid of assets, thus you might want to set some aside to be ready for any emergencies that might arise.**

(3.) **Avoid transactions costs of bank trips** (ATM fees, time and inconvenience of trips to the bank). Because of those costs, it is often desirable to make very large withdrawals of cash when you visit the bank, so that you won't have to visit the bank again for a long while. The larger your average bank withdrawal, the greater your money demand. Putting those two observations together, **money demand will be greater when the transactions costs of bank trips are high.**

(4.) **Asset demand** - money is a riskless asset and is extremely *liquid*. Thus, money is somewhat **useful as a store of value.**

Despite all of these good reasons to hold money, it's still true that money earns a lower rate of return than bonds and other interest-bearing assets, so people will try to economize on their holdings of money somewhat, by keeping only small amounts of money as cash or in their checking accounts, while keeping the rest of their unspent income in bonds or other assets that earn competitive rates of interest. In particular, **the higher the interest rate, the less money people will want to hold; the demand curve for money slopes downward.**
[-- The money-demand curve I drew in class is much like Figure 12.4, on p. 255, in Case & Fair's book.]

The intersection of the money demand and (vertical) money supply curves is the equilibrium in the money market and determines the equilibrium interest rate. (The equilibrium quantity of money, by the way, is always equal to the supply of money -- since the money supply curve is vertical, the equilibrium quantity of money will not be affected by shifts in the demand curve for money.)
[-- Again, refer to Figure 12.6, on p. 261 of Case & Fair's book.]

XIV. HOW MONEY AFFECTS THE ECONOMY (THE MONETARY TRANSMISSION MECHANISM)

Monetary policy affects the economy because changes in the money supply affect interest rates, and interest rates affect GDP by affecting consumption (C), planned investment (I_p or I), and net exports (EX-IM).
-- The unemployment rate (which rises when real GDP falls)**, the price level (P**, which tends to rise when GDP rises**), and the inflation rate** (which tends to rise when unemployment falls, as in the Phillips Curve) **will also be affected.**

Monetary policy can be:
(1) expansionary - when the Fed increases the money supply and lowers interest

rates in order to raise real GDP and reduce unemployment;
[-- The diagram I drew in class is similar to Figure 12.7 (p. 262) of Case & Fair's book.]
(2) contractionary - when the Fed contracts the money supply and raises interest rates in order to reduce inflation;

(3) neutral - just trying to keep the economy on an even keel, with interest rates and the unemployment rate remaining close to the NAIRU.

The step-by-step process by which changes in monetary policy affect real GDP and the price level is as follows, considering first the case of an ***expansionary monetary policy*:**

(1) The Fed increases the level of bank reserves, using one of its three tools of monetary policy.
-> (2) Banks loan out their excess reserves to firms (planned investment increases) and households (consumption increases, especially durable goods consumption).
---> (3) As loans are redeposited back into bank accounts (usually after the loan money is spent - i.e., money loaned for the purchase of a new car is deposited by the car dealer into his bank account), **the money supply increases**, since the money supply is cash plus bank accounts. The bank will loan out most of the new deposits, and those loan monies will be redeposited somewhere else, and the cycle of reserves->loans->deposits->reserves will continue. Eventually the money supply will increase **by a multiple of the original increase in reserves**.
-----> (4) The increase in the money supply (M^s) causes the equilibrium interest rate to fall
(increased M^s --> i decreases)
-------> (5) With lower borrowing costs, and a lower opportunity cost of spending one's money, **planned I and durable-goods consumption both increase** (decreased i --> I_p, $C_{durables}$ both increase)
---------> (6) Real GDP (Y) increases, , since C and I are two key components of GDP, **and the price level (P) increases**, too, since increases in real GDP tend to be associated with increases in P (similar to the Phillips Curve relationship between unemployment and inflation).

In sum:

- **Monetary policy affects output by changing the levels of (planned) investment and consumption.**
- **Expansionary monetary policy raises real GDP by reducing interest rates, which increases interest-sensitive spending:**

increased reserves -> M^s increases --> i decreases --> I, C increase --> Y, P increase

- **Contractionary monetary policy reduces inflation by raising interest rates, which decreases interest-sensitive spending:**

decreased reserves -> M^s decreases --> i increases --> I, C decrease --> Y, inflation decrease

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II. TOOLS OF MONETARY POLICY

When the Fed conducts monetary policy, it directly affects the level of bank reserves, causing banks to have either excess reserves (which they loan out) or a reserve deficiency (which causes them to call in loans). In either case, the supply of money changes by a multiple of the original change in reserves:

money multiplier = (change in money supply)/(change in bank reserves) = 1/RRR

The Fed has three tools that it uses to conduct monetary policy:

(1) changes in the required reserve ratio (RRR)

(2) changes in the discount rate
-- The Fed controls the **DISCOUNT RATE (the interest rate at which the Fed loans money to banks)**

(3) open market operations (OMO)
-- In OMO, **the Fed buys or sells bonds, usually from the banks, in order to affect** the level of bank reserves and **the FEDERAL FUNDS RATE (the interest rate at which commercial banks loan each other money**, in the form of reserves, on an overnight basis). In turn, the money supply and other interest rates will be affected, too.
-- **OMO is the Fed's most important and most-used policy tool.**
-- **The Fed uses OMO to affect the federal funds rate, which is its mostly widely watched interest-rate target.**

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XV. TOOLS OF MONETARY POLICY

The Fed's three policy tools, in a bit more depth:

(1) Changes in banks' required reserve ratio (RRR)
-- The required reserve ratio (RRR) is now 10% of banks' checking deposits.
-- It was lowered from 12% in early 1990's.
-- The RRR on savings account, CD's, and money-market deposit accounts is zero.
-- Changes in the RRR have large effects on money supply: increasing RRR causes a decrease in banks' excess reserves and a decrease in the money multiplier (1/RRR), so the money supply decreases by a lot.
----> Because this tool's effects are so powerful as to preclude "fine tuning" (making

small changes in monetary policy as needed), it is rarely used. It is just too blunt an instrument.

(2) Changes in the discount rate (the interest rate at which the Fed loans money to banks)
-- When the Fed lowers the discount rate, bank reserves will increase, because banks will take advantage of the lower rates by borrowing more reserves from the Fed (and then loaning those reserves out).
-- Although the Fed is officially a "lender of last resort" to banks, to be used only when banks are in desperate situations, when it lowers the discount rate it is generally signaling a relaxation of that rule, i.e. an increased willingness to make ordinary loans to banks in order to expand the volume of money and credit.

*** (3) Open market operations (OMO)**
-- How OMO works: when the Fed buys or sells securities (government bonds) from banks, it makes or collects the payment for those bonds by **crediting or debiting the banks' reserve accounts at the Fed and thereby changing the level of bank reserves, which changes the money supply in the same direction**. These operations are carried out solely by the regional Fed bank of New York.
---- **Expansionary monetary policy calls for open-market purchases: Fed buys securities, pays by crediting banks' reserve accounts --> money supply expands, interest rates fall.**
---- Contractionary monetary policy: open-market sales: Fed sells securities, collects payment by debiting banks' reserve accounts --> money supply shrinks, interest rates rise.

XVI. OMO AND THE FEDERAL FUNDS RATE

The Fed's most-watched policy instrument is the **FEDERAL FUNDS RATE (the interest rate at which banks make overnight loans of reserves to other banks).** Since it is commercial banks, not the Fed, that makes these loans, the Fed does not set the federal funds rate directly. Instead, it is determined by **the supply and demand for overnight loans and reserves (the FEDERAL FUNDS MARKET)**, as in the following diagram.
The Fed uses OMO to affect the federal funds rate. Open-market purchases and sales by the Fed affect the federal funds rate because they affect the supply of bank reserves.

-- If the Fed makes an open-market purchase of a security from a bank, it pays for the security by crediting the bank's reserve account at the Fed; thus it is adding to the total supply of reserves. That addition corresponds to an outward shift of the supply curve of federal funds, which will cause the interest rate on reserves (i.e., the federal funds rate, or the "price" of borrowing reserves) to fall.
-- If the Fed makes an open-market sale of a security to a bank, it collects payment by debiting the bank's reserve account at the Fed; thus it is decreasing the total supply of

reserves. That decrease corresponds to a leftward shift of the supply curve of federal funds, which will cause the interest rate on reserves (the federal funds rate) to rise.

XVII. AN EXAMPLE OF MULTIPLE DEPOSIT CREATION

Let us consider an example of an expansionary monetary policy move by the Fed. **Suppose that the Fed conducts expansionary OMO** by making an open-market purchase of securities. Specifically, the Fed **buys $100 in securities from the First National Bank**. **(The required reserve ratio, RRR, for checking deposits is 10%.** We will assume that First National and all other banks initially have zero excess reserves. Also assume that all loans get redeposited into checking accounts at First National.) The Fed pays for the securities by crediting First National's reserve account at the Fed with $100. We would like to know: **What is the ultimate change in the money supply, after the entire chain of deposit creation has run its course?**

THE SHORT WAY: Fast-forwarding a bit, we can answer that question right now, because we know the initial change in reserves (+$100) and can compute the money multiplier (1/RRR = 1/.10 = 10). **The ultimate change in the money supply will be:**
{increase in money supply} = {increase in reserves} * {money multiplier}
= ($100) * (10)
= $1000

THE LONG WAY: To see just how we got from an initial increase in reserves of $100 to a cumulative increase in the money supply of $1000, we can look at the changes in First National's balance sheet. The initial change in First National's balance sheet is:

(FIRST STAGE)

ASSETS		**LIABILITIES AND NET WORTH**	
Reserves	**+ $100**		
Government bonds	**- $100**		

First National now has excess reserves of $100.
First National will loan out those excess reserves -- say, to me. I use that $100 to buy something (say, $100 worth of compact discs), and the CD merchant will either deposit that $100 in the banking system or spend it himself; either way, someone will eventually deposit that $100 cash in the banking system -- if not at First National, then at some other bank. With that new deposit the (cumulative) change in the banking system's balance sheet is as follows:

(SECOND STAGE)

ASSETS		LIABILITIES AND NET WORTH	
Reserves	**+ $100**	**Checking deposits**	**+ $100**
Government bonds	**- $100**		
Loans	**+ $100**		

The money supply has expanded by $100, since the money supply includes checking deposits. The money-creation process will continue because the bank that received the $100 cash deposit now has **excess reserves (= actual reserves - required reserves)** of

$$\$100 - (.10)(\$100) = \$100 - \$10 = \$90.$$

The bank will loan out that $90 and it, too, will eventually be redeposited as cash in the banking system. Now the cumulative change in the banks' balance sheet is:

(THIRD STAGE)

ASSETS		LIABILITIES AND NET WORTH	
Reserves	**+ $100**	**Checking deposits**	**+ $190**
Government bonds	**- $100**		
Loans	**+ $190**		

The banks have excess reserves of $81 (= $100 - (.10)($190) = $100 - $19). They will loan them out and the money will be redeposited in the banking system, increasing checking deposits by another $81 dollars. Then 90 percent of that will be loaned out and redeposited, and 90 percent of that will be loaned out and redeposited, etc. The total increase in bank deposits (and hence in the money supply) will be:

$$\$100 + \$90 + \$81 + (\$)(.90) + (\$81)(.90^2) + ...$$
$$= \$100 + (\$100)(.90) + (\$100)(.90^2) + (\$100)(.90^3) + (\$100)(.90^4) + ...$$

This seemingly endless sum is a *geometric series*, and is solvable as

$$\$100 * 1/(1-.90) = \$100 * (1/.10) * \$100 * 10 = \$1000,$$

which is where the money multiplier (1/RRR) comes from. Thus total bank deposits increase by $1000, as does the money supply. The total change in the banking system's balance sheet, when there are no more excess reserves remaining, is:

(FINAL STAGE)

ASSETS		LIABILITIES AND NET WORTH	
Reserves	**+ $100**	**Checking deposits**	**+ $1000**

Government bonds	**- $100**		
Loans	**+ $1000**		

That $1000 increase in checking deposits all came about as the result of an initial increase in reserves of $100. Thus the total amount of deposits has expanded by a multiple (ten) of the original change in reserves.

To review:
* In this example, the Fed injects $100 in reserves into the banking system, by purchasing a $100 security from the First National Bank. *To see how that increases the money supply, we need to keep track of the increase in checking deposits.* After the Fed's purchase, First National has $100 in excess reserves. They loan those reserves out as $100 cash, and that $100 cash gets redeposited into a checking account at the bank. Then the bank has $100 in reserves again, and $90 of that is excess reserves (the remaining $10 has to be kept to meet their 10% reserve requirement on checking deposits; they can loan out 90% of any increase in cash deposits, so they loan out .90*$100 = $90). They loan out those excess reserves -- $90 cash -- and that $90 gets redeposited. They can lend out 90% of that (.90*.90*$100 = $81), and it will be redeposited. And so on.
* The sum of all these additional checking deposits is a *geometric sum*, which means that we have a simple formula for finding the total increase in deposits:

total increase in deposits = initial increase in deposits * (1/RRR)

* The initial increase in reserves of $100 ultimately leads to a $1000 increase in checking deposits, or a $1000 increase in the money supply.

XVIII. MULTIPLE DEPOSIT CREATION & DESTRUCTION

Where we left off: Multiple deposit creation. Banks can create money by loaning out their excess reserves (ER) - as that money loaned out gets redeposited into bank accounts, money is created. Not only that, but when cash is redeposited, banks will have excess reserves. If the cash is deposited into a checking account (10% reserve requirement), the bank can loan out 90% of that cash. (If it's deposited into a savings account or CD, the bank can loan out all of it. For the sake of simplicity, though, we usually assume all loans are redeposited into checking accounts.) The **cycle of ER being loaned out and redeposited and loaned out again** will typically continue until ER=0, because every dollar of ER is an opportunity for banks to make a profit by loaning out that money. When that cycle, known as the **chain of deposit creation**, runs its course, then:

change in money supply = (initial change in reserves) * (money multiplier)
= (initial change in reserves) * (1/RRR)
= 10 * (initial change in reserves) (if RRR = 10%)

Also,
change in money supply = change in checking deposits = change in bank loans.

Reserves, like matter, cannot be created or destroyed, at least not by the banks themselves. Reserves *can*, however, be created or destroyed by the Fed.

Expansionary monetary policy is conducted by the Fed when it wants to stimulate the economy (raise real GDP). In expansionary monetary policy, the Fed expands the level of bank reserves, and after the chain of deposit creation runs its course, **the money supply [M^s] increases** by a multiple of the increase in reserves. Interest rates [*i* (or *r*, if we want to use the same notation as Case & Fair] fall, (durable-goods) consumption [C] and (business) investment [I] increase, and real GDP [Y] increases (also, the price level [P] rises, the inflation rate [π] rises, and the unemployment rate [UR] falls; the economy moves northwest along the Phillips Curve).
-- The sequence, in shorthand:
Fed increases ER
-> M^s increases -> *i* decreases (*r* decreases) -> C increases, I increases -> Y increases; P increases, π increases, UR decreases

-- **To conduct expansionary monetary policy, the Fed can do any or all of the following:**
(1) lower the required reserve ratio (RRR)
(2) lower the discount rate
(3) make open market purchases of government bonds (expansionary OMO), causing the federal funds rate to fall

Contractionary monetary policy is conducted by the Fed when it wants to reduce the rate of inflation, or reduce inflationary pressures (e.g., from rapid economic growth). In contractionary monetary policy, the Fed decreases the level of bank reserves, and all of those up/down arrows are reversed. The economy moves southeast along the Phillips Curve, to a point of lower inflation but higher unemployment.
-- The sequence, in shorthand:
Fed decreases ER
-> M^s decreases -> *i* increases (*r* increases) -> C decreases, I decreases -> Y decreases; π decreases,
UR increases

-- **To conduct contractionary monetary policy, the Fed can do any or all of the following:**
(1) increase the required reserve ratio (RRR)
(2) increase the discount rate
(3) make open market sales of government bonds (contractionary OMO), causing the federal funds rate to rise

Other key interest rates, notably the PRIME INTEREST RATE (the interest rate for banks' best corporate customers) and MORTGAGE RATES (the interest rates

on home loans), will move in the same direction as the federal funds rate, and by about the same amount.

XIX. AN EXAMPLE OF MULTIPLE DEPOSIT DESTRUCTION

Imagine a bank (call it The Bank) whose balance sheet initially looks like the one below. Assume RRR=10% on checking deposits, all ER are loaned out, and all loans are redeposited into checking accounts at The Bank. Also assume that all loans are repaid by checks drawn on checking accounts at The Bank (or, more generally, by drawing down checking deposits at The Bank).

ASSETS		**LIABILITIES AND NET WORTH**	
Reserves	**$ 500**	**Checking deposits**	**$5000**
Government bonds	**$1500**	**Savings deposits**	**$2000**
Loans	**$5000**	**Net worth**	**$1000**
Other assets	**$1000**		
TOTAL ASSETS	**$8000**	**TOTAL LIABILITIES +N.W.**	**$8000**

ER = $500 - (.10)*($5000) = $500 - $500 = $0

Now suppose the Fed decides to contract the money supply by making an open-market sale of $100 in government bonds, from The Bank. The Fed will collect the payment by debiting The Bank's reserve account at the Fed. What will be the ultimate change in the money supply?

THE SHORT WAY: As in the previous example, we can answer that question right now, without drawing any more balance sheets, because we know the initial change in reserves (-$100) and can compute the money multiplier (1/RRR = 1/.10 = 10). **The ultimate change in the money supply will be:**

{increase in money supply} = {increase in reserves} * {money multiplier}
= (-$100) * (10)
= -$1000

THE LONG WAY: To appreciate the cycle of deposit destruction (loans being called in and deposits being drawn down) that causes the money supply to fall by so much, we need to look at the step-by-step changes in The Bank's balance sheet. Immediately after

the Fed's open-market sale of $100 in bonds, the resulting *change in* The Bank's balance sheet will be:

(FIRST STAGE)

ASSETS		**LIABILITIES AND NET WORTH**	
Reserves	**- $100**		
Government bonds	**- $100**		

The Bank now has a *reserve deficiency* of $100. (ER = -$100; The Bank has negative excess reserves). The Bank must somehow increase its reserves by $100 (which it cannot do by itself, since only the Fed can create or destroy bank reserves) or reduce its required reserves by $100. The Bank will initially call in $100 in loans, and those loans will be repaid by the borrowers' drawing down their checking accounts at The Bank. The running change in The Bank's balance sheet is now:

(SECOND STAGE)

ASSETS		**LIABILITIES AND NET WORTH**	
Reserves	**- $100**	**Checking deposits**	**- $100**
Government bonds	**+ $100**		
Loans	**- $100**		

The Bank still has a reserve deficiency at this point. Its reserves have not increased, because the loan was repaid by the borrower's drawing down her checking account at The Bank. (If she'd repaid the loan with cash from outside The Bank, it would be a different story.) Now, the change in the bank's excess reserves (ER) is:

change in ER = (change in actual reserves) - (change in required reserves)
= (-$100) - (.10)*(-$100)
= (-$100) - (-$10)
= (-$100) + ($10)
= -$90

If The Bank were to call in $90 more in loans, it would reduce its ER a little (because $90 would be drawn down on somebody's checking account at The Bank, reducing The Bank's required reserves by $9), but not entirely. The running change in The Bank's balance sheet would now be:

(THIRD STAGE)

ASSETS		**LIABILITIES AND NET WORTH**	
Reserves	**- $100**	**Checking deposits**	**- $190**

Government bonds	**+ $100**		
Loans	**- $190**		

At this point, the change in the bank's excess reserves (ER) is:

change in ER = (change in actual reserves) - (change in required reserves)
= (-$100) - (.10)*(-$190)
= (-$100) - (-$19)
= (-$100) + ($19)
= -$81

The Bank will surely realize that to make up a $100 reserve deficiency, it will have to reduce its required reserves by $100, which it can do by calling in $1000 in loans, which will be repaid by drawing down $1000 in checking deposits at The Bank. So when ER=0 again and The Bank's balance sheet is back in equilibrium, the final change in that balance sheet will be:

(FINAL STAGE)

ASSETS		**LIABILITIES AND NET WORTH**	
Reserves	**- $100**	**Checking deposits**	**- $1000**
Government bonds	**+ $100**		
Loans	**- $1000**		

(Let's verify that the change in ER = 0:)
change in ER = (change in actual reserves) - (change in required reserves)
= (-$100) - (.10)*(-$1000)
= (-$100) - (-$100)
= (-$100) + ($100)
= $0

What has happened is that the Fed's sale of $100 in government bonds has led to a reduction of $1000 in loans, a reduction of $1000 in checking deposits, and most importantly **a reduction of $1000 in the money supply** (since checking deposits are part of the money supply).

XX.. AGGREGATE DEMAND

New concept:
PLANNED INVESTMENT (I_p): total business expenditures on plant and equipment (i.e., on capital goods), plus planned production of inventories (inventory investment)

Recall:
INVESTMENT (I): total business expenditures on plant and equipment, plus (total) production of inventories.

I_p is not always equal to I

I - I_p = UNPLANNED INVENTORY INVESTMENT, which can be either positive (*unintended inventory accumulation*; you produced too much**) or negative (*unintended inventory decumulation*;** you produced too little and had to run down your inventories**)**

Recall: GDP (Y), by the product/expenditure approach is:

Y = C + I + G + EX - IM
New concept:
AGGREGATE DEMAND (AD): The total quantity of goods and services demanded (i.e., purchased).
AD = C + $I_{planned}$ + G + EX - IM
-- To repeat: Planned investment does not include "unintended inventory accumulation". If firms produce goods (say, Edsels) but can't sell them, those goods are counted in GDP, as (unintended) inventory investment (I), but they are not part of aggregate demand, because, plainly, nobody was demanding those goods.
-- The difference between AD and GDP is the difference between planned investment and total investment. In a word, that difference is *inventories*. Unintended inventory accumulation counts total gross investment (I) but not toward planned investment. Unintended inventory investment can also be negative (we would call it unintended inventory *de*cumulation), if AD exceeds output and firms meet the excess demand by selling off goods that they'd been planning to keep as inventories for the future.
-- AD is often referred to as ***effective demand***, notably by Keynes.

AGGREGATE EXPENDITURES MODEL: a model in which GDP is ultimately determined by aggregate demand, and equilibrium GDP is the level of GDP where aggregate expenditures (AD) equal aggregate production (output).
-- also known as **the MULTIPLIER MODEL**

XXI. THE MULTIPLIER MODEL

The term *multiplier* refers to the way that an initial increase in aggregate expenditures (C, I, G, net EX) causes a ripple effect that leads to more and more spending and raises GDP by a *multiple* of that initial increase in spending. The main reason why this happens is because when you spend money, the person who receives that money from you as payment will turn around and spend some of it. And the same thing will happen when *that* person spends his money -- the person he paid the money to will turn around and spend some it, too. The chain of spending continues until there's nothing left to spend.

Key concept: the ***marginal propensity to consume*** **(MPC) -- the fraction of an extra dollar of a person's disposable income that the person will spend on consumer goods.**

How does this multiplier work? A hypothetical example:
-- First off, suppose everyone has the same MPC, 0.75
-- I withdraw $100 from my savings acct and spend it all on a leather jacket
-- Biff, the leather jacket salesman, since he has MPC = 0.75, spends $75 (on a hat)
-- Cheryl, the hat salesperson, spends 0.75*$75 = $56 (on a puppy)
-- Ralph, the dog breeder, spends $(0.75)^2$*$75 = $42 (on a haircut)
-- Olga, the hairstylist, spends $(0.75)^3$*$75 = $32 ...
-- and so on. Note that each subsequent amount spent is 75% of the previous amount. After many more iterations the amount spent will be so tiny (75% of a fractional cent) that we can forget about it. But by then the total increase in spending will have been quite large.

Numerically, let's keep track of the total, cumulative increase in spending that results from an injection of $100 into the spending stream. We have assumed MPC = 0.75 and that it's the same for everyone.
-- I spend $100 on a leather jacket. The leather jacket vendor spends $75 (.75*$100) on a hat, and so on...
-> Increase in equilibrium GDP
= Increase in total spending
= $100
+ (.75)($100)
+ (.75)(.75)($100)
+ (.75)(.75)($100)
+ ...
= $100 * $(1 + .75 + .75^2 + .75^3 + ...)$
|
(GEOMETRIC SERIES -- converges to a finite number, according to a simple formula)

= $100 * [1/(1-.75)]
|
4
= $400

Note that in this example .75 is the MPC.

multiplier = 1/(1-MPC)
Note: the multiplier model is a **Keynesian** economic model -- that is, it was first proposed by John Maynard Keynes, in *The General Theory*. (The book devotes three whole chapters to the marginal propensity to consume and the multiplier.) The multiplier model is a model of *output determination* -- it tells you what the level of output (GDP)

will be, based on the behavior of consumption, planned investment, and the other components of aggregate demand.

Consumption accounts for about two-thirds of both GDP and aggregate demand, so let's start by examining the behavior of consumption. First, some notation:
Y = GDP
C = consumption
S = saving
DI = disposable income (i.e., after-tax income)

All of a person's disposable income goes toward consumption and saving, i.e.,
DI = C + S

For now, we will assume there are no taxes, so Y = DI and
C = Y - S

Although in the real world there are several factors that determine a household's or a society's consumption, this model focuses on just two -- (1) everyone's basic subsistence needs (food, clothing, shelter, etc.), which each of us would somehow provide for even if we had no income, by borrowing or living off our past savings; and (2) income (people consume more when they have more income to spend). We break those two types of consumption down into (1) *autonomous consumption* and (2) *induced consumption*.

Thus we divide people's consumption into two parts:

Consumption = autonomous consumption + induced consumption
---------- ----------
| |
a constant; rises as income rises
unaffected by changes in income

or symbolically:

C = a + bY
|
b = marginal propensity to consume (MPC)
b = *slope* of the consumption function when we graph it

(*a* is autonomous consumption; *bY* is induced consumption.)

We assume that:
$a > 0$ (people's autonomous consumption is some positive number)
$0 < b < 1$ (the MPC is positive but less than 100% of people's income)

The above equation is a **consumption function** -- a simple linear (straight-line) equation that depicts consumption as a function of disposable income. Since we're assuming no

taxes for now, the consumption function shows consumption as a function of total income, or GDP (Y).

Equivalently, we can use the two above equations (Y = C+S and C=a+bY) to derive a **saving function**:

S = Y - C
  = Y - (a+bY)
  = -a + (1-b)Y
    | |
    | **1 - b = marginal propensity to save (MPS)** = the *slope* of the saving function
    |
  -a = autonomous saving

Note: **MPC + MPS = 1**
(just as consumption + saving = income. There is a mathematical connection between the two equations.)

-- *[Technical note: For those of you who've had calculus, the connection is this: If you take the derivatives of both sides of the equation*

$$C + S = Y$$

with respect to Y, you'll get MPC + MPS = 1.]

-- Verify: b + (1 - b) = b + 1 - b = 1

----> Since the multiplier = 1/(1-MPC) and MPS + MPC = 1 (--> MPS = 1 - MPC), then it's also true that the
multiplier = 1/MPS

XXII. HIGH SCHOOL ALGEBRA AND THE CONSUMPTION AND SAVING FUNCTIONS

A quick review of some high-school algebra: Algebra is just the use of letters (like *x* and *y*) to represent numbers, especially numbers whose values can vary (we call such numbers *variables*) or are unknown. In macroeconomics, the multiplier model is most straightforwardly an algebraic model, where C represents consumption spending, S represents savings, Y represents real GDP, etc.

Algebra and geometry naturally go together. In geometry, we often draw two-dimensional graphs, with a **horizontal axis (which we call the *x-axis*)** and a **vertical axis (the *y-axis*).** We would say that such a graph is in **(*x, y*) space**, since any point on the graph can be written as (*x, y*), based on the values of *x* and *y* at that point.

Any straight line can be written algebraically as the ***equation of a line***:

y = b + mx,
where:

***x* is the independent variable** (*x* does not depend on *y*);

***y* is the dependent variable** (*y* depends on *x*);

***b* is the vertical intercept** (or "*y*-intercept" -- it is **the value of y at the point where the line crosses the vertical axis** -- when $x = 0$, $y = b$);

***m* is the slope (the change in *y* that is associated with a one-unit change in *x*)**.

-- Computationally, when we compare any two points on the line,

slope = (change in *y*) / (change in *x*)
= Δy / Δx (Recall: Δ = "change in")

If we are given a line and we know the values of any **two points -- (x_1 , y_1) and (x_2 , y_2)** -- on the line, then we can find the slope, *m*, of that line. **The slope will be:**

$m = \Delta y / \Delta x = (y_2 - y_1)/(x_2 - x_1) = (y_1 - y_2)/(x_1 - x_2)$
(It doesn't matter which point comes first; the answer will come out the same.)
We can then use the value of the slope and the values (or "coordinates") of x and y at either of those points to find *b*, by writing out the slope equation with one of the given points and with the point (0, *b*), which corresponds to the vertical intercept (see example below). **Then we have everything we need to write the line in equation form (*y = mx + b*).**

-- Ex.: Suppose we have a line that includes the points (2,3) and (5,7). *[I drew the line on the board. Someday I'll include a graph of it in these notes on the web.]* The slope of this line is:

$m = (3-7) / (2-5)$
$= (-4) / (-3)$
$= 4 / 3$
$= 1.33$

Knowing that the slope is 4/3, solve for *b* by plugging one of the given points (say, (2,3)) and the point (0, *b*) into the slope formula:

$4/3 = (3 - b) / (2 - 0) = (3 - b) / 2$

=> 2 * (4/3) = 3 - *b*
=> 8/3 = 3 - *b*
=> *b* = 3 - 8/3 = 9/3 - 8/3 = 1/3 = 0.33

So now we have an equation, of the form $y = b + mx$, for the line that runs through the two points (2,3) and (5,7). It is:

$$y = 0.33 + 1.33x$$

The consumption function, from last time, can be expressed as the equation of a line:

$$C = a + bY,$$

where *C* is the dependent variable (it goes on the *y*-axis), *a* is the vertical intercept (and autonomous consumption), *b* is the slope ($\Delta C/\Delta Y$, also the marginal propensity to consume, MPC), and *Y* is real GDP (equivalently, output or real income). When the consumption function is given to us in equation form, it is easy to graph.

The saving function can also be expressed as the equation of a line:

$$S = -a + (1-b)*Y,$$

where *S* is the dependent variable (it goes on the *y*-axis), *-a* is the vertical intercept (and autonomous saving), *1-b* is the slope ($\Delta S/\Delta Y$, also the marginal propensity to save, MPS), and *Y* is real GDP.

XXIII. INVESTMENT

Total investment (I) is the sum of planned investment (I_p) and unplanned investment (I_u).
-- **Unplanned investment is unintended inventory production.** For example, if a company produces 100 cars, expecting to sell all of them this year but only sells 50 this year, then the remaining 50 are counted in GDP as unplanned inventory investment. (The first 50 are counted as consumption.)

In real life, planned investment is a function of many factors, including real interest rates, expectations of future profitability (which would make firms want to expand production), and the current level of production (the more you produce, the more you wear out the physical capital stock and need to replace it). **At its simplest,** however, **the multiplier model assumes planned investment is fixed** at some constant level (e.g., $I_p = 100$). Since investment, as a constant, does not depend on the level of GDP, we say it is a type of *autonomous* spending, just like autonomous consumption (and, in later lectures, government spending and exports and imports).

The level of government purchases of goods and services (**G**) also depends on many factors, but for now, to keep things simple, we will **assume it's fixed at zero** (anarchy!). We will **assume imports and exports, and hence net exports, are zero** (autarky; no foreign trade).

XIV. EQUILIBRIUM GDP IN THE MULTIPLIER MODEL

Y = Aggregate output (GDP)
AD = $C + I_p + G + EX - IM$
(aggregate demand; same as *effective demand*, or planned *aggregate expenditures)*

Equilibrium occurs when aggregate output (Y) equals planned aggregate expenditure (AD), so **the economy is in equilibrium when** $Y = C + I_p + G + EX - IM$ (**Y = AD**)
-- Note: $Y = C + I + G$ (where I =actual investment, including unplanned inventory accumulation or decumulation), but $Y = C + I_p + G$ holds only when the economy is in equilibrium.
----> $I = I_p$ if, and only if, economy is in equilibrium
----> $I_{unplanned} = 0$ if, and only if, economy is in equilibrium

Since we're assuming G = 0 and EX - IM = 0, then aggregate demand is just consumption plus planned investment:

$AD = C + I_p$

When the economy is in equilibrium, it will also be the case that saving equals planned investment. This follows from the original equilibrium condition, AD = Y and the fact that Y = C + S:
-- If AD = Y then, subtracting C from both sides,
AD - C = Y - C

===> $C + I_p - C = S$ (substituting $C + I_p$ for AD and S for Y-C)

===> $I_p = S$ (or, as it's usually written, $\mathbf{S = I_p}$)

An example of finding the equilibrium Y, with real numbers:

-- Assume no government (G=0) and no foreign sector (EX=IM=0) and that consumption and investment functions are as follows:
$C = 100 + 0.75Y$
$I_p = 100$

--> To find the equilibrium level of Y, plug those equations for C and I_p into the equation $Y = C + I_p + G + EX - IM$.

$$
\begin{aligned}
C &= 100 + 0.75Y \\
I_p &= 100 \\
G &= 0 \\
EX &= 0 \\
-\ IM &= 0 \\
\text{---} & \text{---} \\
Y &= 200 + 0.75Y
\end{aligned}
$$

--> $0.25Y = 200$
--> $Y = 800$

--> $C = 100 + 0.75(Y)$
$= 100 + 600$
$= 700$

--> $S = Y - C$
$= 800 - 700$
$= 100$

($S=I_p$ in equilibrium; and, indeed, $I_p = 100$, too)

XV. THE MULTIPLIER AND EQUILIBRIUM GDP

Example from last time:
-- Find equilibrium Y, C, and S when:
$C = 100 + 0.75Y$
$I_p = 100$
$G = 0$, $T = 0$, $EX = 0$, $IM = 0$
-- Equilibrium condition is: $Y = C + I_p + G + EX - IM$
-- Solve for Y, end up with:
In equilibrium,
$Y = 800$
$C = 700$
$S = 100$

We can represent this graphically, a la Case & Fair's Chapter 9, as follows:

Aggregate demand (AD) function:
$AD = C + I_p + G + EX - IM$
$= (100 + 0.75Y) + 100 + 0 + 0 - 0$
$= 200 + 0.75Y$

Equilibrium condition:

AD = Y (graphs as 45-degree line from the origin, because y-intercept is 0 & slope is 1. On any graph where the vertical and horizontal axes are scaled the same, a line that extends out from the origin and has a slope of 1 will be a 45-degree line.)

In equilibrium, it's also true that $S = I_p$

We can represent that graphically, too. First, we must derive the saving function:

S = Y - C
= Y - (100 + 0.75Y)
= 1.00Y - 100 - 0.75Y
= -100 + 1.00Y - 0.75Y
= -100 + 0.25Y

From before, $I_p = 100$.

-- Note that the ratio of equilibrium Y to "autonomous" spending is 800/200 = 4. The multiplier is also 4:

multiplier = 1/(1-MPC) = 1/(1-.75) = 1/.25 = 4

Four formulas for the multiplier:
(1) multiplier = 1/(1-MPC)
(2) multiplier = 1/MPS
(3) multiplier = (equilibrium GDP)/(total autonomous spending)
(4) multiplier = (change in equilibrium GDP) / (change in autonomous spending).

The multiplier is probably most easily calculated as 1/(1-MPC).
As long as you recall that in a consumption function, $C = a + bY$, b is the MPC, then the computation is straightforward:

-- Ex.: C = 100 + 0.75Y
|
MPC = 0.75

multiplier = 1/(1-MPC) = 1/(1-0.75) = 1/0.25 = 4

More generally and more realistically, investment and import spending would also depend on the level of income, as might the government's spending, which historically has risen as GDP has risen. In that case we would also speak of a *marginal propensity to invest*, a *marginal propensity to import*, and *the government's marginal propensity to spend*. And the multiplier would be equal to

1 / (1 - MPC - Marginal Propensity to Invest - Government's Marginal Propensity to Spend + Marginal Propensity to Import)

(No, this extended multiplier will not be on the exam. But you should know the simple multiplier, 1/(1-MPC), inside and out.)

The quickest way to find the multiplier and equilibrium GDP:
(1) Compute the multiplier as 1/(1-MPC)
(2) Add up the total autonomous spending (= autonomous C + I + G + EX - IM)
(3) $Y_{equil.}$ = (total autonomous spending) * (multiplier)

Ex.: Suppose you are asked to find equilibrium GDP given the following consumption and investment functions, and that government spending, taxes, and net exports are all zero:

$C = 100 + 0.9Y$
$I_p = 100$

Step (1): multiplier = 1/(1-MPC) = 1/(1-0.9) = 1/0.1 = 10

Step (2): total autonomous spending $= C_{autonomous} + I_p + G + EX - IM$

$= 100 + 100 + 0 + 0$
$= 200$
Step (3): $Y_{equil.} = 10 * 200 = 2000$

XVI. DISEQUILIBRIUM: RECESSIONARY, INFLATIONARY GAPS

Q: What happens when AD is *not* equal to Y?
A: Economy is in *disequilibrium* -- it will either be in a recession or it will be in an inflationary boom.

If AD < Y:
The economy is in a recession or "recessionary gap" -- goods will be piling up on shelves (unintended inventory accumulation)
--> What will happen? Firms will cut back on their production, try to sell off those inventories. Eventually, equilibrium will be reached at a *lower level.* Production will adjust to that lower-than-expected level of aggregate demand.

If AD > Y:
The economy has an "inflationary gap" -- since demand outstrips production, firms will sell off much of their inventories of goods that they had been planning to sell later. With a large excess demand for goods, prices of those goods will be bid up, generating inflation. Firms will expand their production to meet the higher-than-expected demand, and eventually equilibrium will be reached at a *higher level.*

XVII. FISCAL POLICY: AN INTRODUCTION

Defn. **FISCAL POLICY-- the spending and taxing policies used by the government to influence the economy.**

-- Fiscal policy can be complex (since there are many different taxes and many different spending programs, and they have different multipliers associated with them), but for now we will focus on changes in the absolute levels of government purchases (G) and tax revenues (T).

G = purchases of goods & services by the government (federal, state, & local).
-- Note: does not include transfer payments (Social Security, welfare), interest payments on the national debt (to government bond holders), or subsidies.

T = total tax receipts (to be precise, T stands for *net* taxes, which are tax revenues minus transfer payments and subsidies).

--> **G - T is the government's budget deficit.** If G - T > 0, deficit; if G - T < 0, surplus.
T - G is the government's budget surplus.

-- **LUMP-SUM TAX: A tax that is collected as a "lump-sum" dollar amount, regardless of income.**
---- Ex.: Everyone pays $10, so if there are 200 people, T = $2000
---- This obviously isn't the way most taxes work, but it makes the math in these models way, way easier.

-- **INCOME TAX: Taxes are proportional to income.** If everyone is taxed at the same rate *t* (we call this a *flat tax*), then T = *t*Y.
---- Ex.: If the tax rate is 15%, then T = .15Y (and *t* = .15).

Fiscal policy can be either EXPANSIONARY (intended to increase real GDP) **or CONTRACTIONARY** (intended to reduce inflation or reduce the budget deficit).

***

XVIII. FISCAL POLICY

(1) EXPANSIONARY FISCAL POLICY occurs when the government deliberately increases its deficit in order to stimulate the economy.
-- In expansionary fiscal policy, the government **increases its spending (G) or cuts taxes (T) or both.**
---- Expansionary fiscal policy stimulates the economy because it **increases aggregate demand (AD).**
------ **When the government increases G, it adds directly to AD, since G is part of AD** (= $C+I_p+G+EX-IM$).
------ **When the government cuts T, it increases people's disposable income** (total income minus taxes), and people will spend much of that extra income, so **consumption (C) increases**.
------ In both cases, **AD will also increase indirectly through the multiplier effect**, as the initial increase in G or C touches off a whole chain of consumption.
------ In both cases, real GDP will increase and so will the price level. Expansionary

fiscal policy (or a *fiscal expansion*) means the economy is moving northwest along the Phillips Curve, to a point of lower unemployment and higher inflation. (This is an example of *demand-pull inflation*.) **This will cause equilibrium real GDP (Y) to increase and the equilibrium price level (P) to increase.**

(2) CONTRACTIONARY FISCAL POLICY occurs when the government deliberately reduces its deficit in order to slow down the economy (usually with the goal of reducing inflation or of reducing the deficit for its own sake).
-- In contractionary fiscal policy, the government **cuts its spending (G) or raises taxes (T) or both.**
---- Contractionary fiscal policy contracts the economy because it **decreases AD.**
---- The net effect of contractionary fiscal policy, all other things equal, is to induce a recession or at least slow down the rate of growth of the economy. A fiscal contraction would cause the economy to move southeast along the Phillips Curve, to a point of **higher unemployment and lower inflation**. **As a result, equilibrium Y decreases and equilibrium P decreases.**

A few examples of real-life fiscal policy decisions:

- In the early 1980s, the economy was slumping, and Congress in 1981, in response, voted to cut tax rates by 25%. Many Congressman said they voted for the tax cut because "we had to do something" to get the economy moving again.
- In the late 1960s, during the Vietnam War boom, Congress imposed a 10% tax increase ("tax surcharge") on corporate and personal incomes. The purpose was to rein in private spending (AD) and the associated demand-pull inflation, which by then had started to accelerate.
- In the 1990s, Japan's economy has been in a decade-long slump, and the Japanese government has responded by repeatedly increasing its spending and cutting taxes to boost aggregate demand.

--> Common thread: The government often uses its spending and taxing decisions (fiscal policy) in order to influence the state of the economy.

Of the government's two main tools for managing the economy, fiscal policy and monetary policy, Keynes and early Keynesians (economists who generally agreed with Keynes's ideas) emphasized fiscal policy.

XIX. FISCAL POLICY AND THE MULTIPLIER

When the government increases G, the people whom it pays for those extra goods and services now have higher incomes, and they will spend some of that extra income (consumption increases), touching off a whole chain of consumption (C). **The ultimate, cumulative increase in AD and Y will be a multiple of the original increase in G, because C will increase, too.**

When the government cuts taxes, people spend their extra after-tax income, and that initial increase in consumption leads to more consumption, by the people who sell the goods or services in each round of consumption. Again, because of the multiplier effect, **the ultimate increase in AD and Y (which is entirely an increase in C in this case) will be a multiple of the original tax cut.**

The government spending multiplier is the same as the regular multiplier:

{spending multiplier} = 1 / (1-MPC),

because G is a component of autonomous spending.

-- Ex.: If MPC = 0.9, then the government spending multiplier is 10 (= 1/(1-0.9) = 1/0.1).

The multiplier associated with a given change in taxes, **the *tax multiplier*, is negative, because higher taxes reduce people's disposable income, thereby reducing their consumption. The tax multiplier is smaller (in absolute value) than the spending multiplier** because not all of a tax increase represents income that otherwise would have been consumed -- the marginal propensity to consume is less than 1, so some fraction of every dollar gets saved, which does not add to aggregate demand or GDP. The initial change in consumption associated with a $1 tax increase is

- MPC * ($1) = -MPC.

That amount is the change in autonomous spending that results from a $1 tax increase, and we multiply it by the regular multiplier to get:

{tax multiplier} = - MPC / (1-MPC)

-- If MPC = 0.9, then the tax multiplier is -9 (= -0.9/(1-0.9) = -0.9/0.1 = -9/1).

Q: What would happen if the government increased spending and taxes by equal amounts, applying these multipliers?

-- (The result may surprise you. For most of us, our automatic response is to think that would somehow be a *bad* thing for the level of GDP, since higher taxes plainly lower our disposable incomes and leave less for our consumption. Or we might think that it would have zero effect on GDP, because the higher spending and the higher taxes would seem to offset each other. But, in the context of the multiplier model, both of those guesses would be *wrong.* Instead....)

A: **An equal increase in G and T would actually *raise* GDP, in the context of the multiplier model.**

-- Why: Recall that the government-spending multiplier is

{spending multiplier} = 1 / (1-MPC),

and the tax multiplier is

{tax multiplier} = - MPC / (1-MPC).

-- Add the two together and you get the multiplier for an equal increase in government spending and taxes. Equivalently, it is the increase in equilibrium GDP that results from a $1 increase in G and a $1 increase in T. We call it the **BALANCED-BUDGET MULTIPLIER (BBM**; or perhaps more accurately the ***tax-and-spend multiplier***), and it is equal to the sum of those other two:

{BBM} = 1/(1-MPC) - MPC/(1-MPC)
= (1-MPC) / (1-MPC) (combining the two terms, which have a common denominator)
= 1

So the balanced-budget multiplier is 1, meaning that a given increase in G (say, $1 million) coupled with an equal increase in T ($1 million) would raise equilibrium GDP by that same amount ($1 million).

-- We call it the *balanced-budget* multiplier because an equal increase in G and T would not change, let alone increase, the government's budget deficit. If the budget were balanced to begin with (a deficit of $0), it would still be balanced after an equal increase in G and T.
-- (The term *balanced-budget multiplier* does *not* necessarily mean that the overall budget is in balance, just that we're increasing G and T by equal amounts.)
-- This is a startling result. Having grown up in a conservative era in which politicians of both parties say they're against "big government" and talk about how they want to cut government spending ("Put an end to tax and spend!"), it's easy to forget that government spending, even when it's wasteful, is counted in GDP and provides incomes for the people from whom the government is purchasing goods and services. This, by the way, is why many political conservatives hate Keynes, since Keynes originated the concept of the multiplier, including the balanced-budget multiplier.
-- **Why the balanced-budget multiplier is positive: The spending multiplier is larger than the tax multiplier, because some fraction of any dollar of income that is taxed would have been saved instead of consumed, and savings do not contribute to GDP.** (That fraction, by the way, is the marginal propensity to save, and is estimated as .05 for the United States today.)

A three-part example

Let us compare the different equilibrium levels of GDP for the same economy (1) with no government spending or taxes, (2) with government spending but no taxes, and (3) with equal amounts of government spending and taxes. Consumption, planned investment, and net exports in this economy are:

C = 500 + 0.95*DI (DI = disposable income = Y - T)
I_p = 500
EX = IM = EX-IM= 0
(1)
If G=T=0, then the economy is:

C = 500 + 0.95*DI = 500 + 0.95*(Y-0) = 500 + 0.95Y
I_p = 500
G = 0
EX-IM = 0
Solving with our favorite shortcut ([i] find total autonomous spending, $C_{autonomous}$ + I_p + G + EX - IM, [ii] find the multiplier, 1/(1-MPC), and then [iii] multiply them together to get equilibrium GDP ($Y_{equil.}$):
(i) {autonomous spending} = $C_{autonomous}$ + I_p + G + EX - IM = 500 + 500 + 0 + 0 = 1000
(ii) {multiplier} = 1/(1-MPC) = 1/(1-.95) = 1/.05 = 20
(iii) $Y_{equil.}$ = {autonomous spending} * {multiplier} = 1000 * 20 = 20,000
(2)
Now assume that the government spends $100 but collects no taxes. With a multiplier of 20, we can already conclude that equilibrium GDP will be $2000 [=20*$100] higher than before and hence will be $22,000, but let's do it the long way. The economy is now:
C = 500 + 0.95*DI = 500 + 0.95*(Y-0) = 500 + 0.95Y
I_p = 500
G = 100
EX - IM = 0
Solving for $Y_{equil.}$:
(i) {autonomous spending} = $C_{autonomous}$ + I_p + G + EX - IM = 500 + 500 + 100 + 0 = 1100
(ii) {multiplier} = 1/(1-MPC) = 1/(1-.95) = 1/.05 = 20
(iii) $Y_{equil.}$ = {autonomous spending} * {multiplier} = 1100 * 20 = 22,000
Note that the increased government spending (G increased from $0 to $100) has caused GDP to increase by 20 times that amount. The government-spending multiplier here is 20.

(3)
Now assume the government spends $100 and collects $100 in lump-sum taxes. (Note: its deficit, G-T, is $0.) The economy is now:

C = 500 + 0.95*DI = 500 + 0.95*(Y-100) = 500 + 0.95Y - 95 = 405 + 0.95Y
I_p = 500
G = 100
EX - IM = 0
Solving for $Y_{equil.}$:
(i) {autonomous spending} = $C_{autonomous}$ + I_p + G + EX - IM = 405 + 500 + 100 + 0 = 1005
(ii) {multiplier} = 1/(1-MPC) = 1/(1-.95) = 1/.05 = 20
(iii) $Y_{equil.}$ = {autonomous spending} * {multiplier} = 1100 * 20 = 20,100
Comparing the results of (1) and (3), we see that equilibrium GDP is $100 higher ($20,100) when the government taxes and spends $100 than when government spending and taxes were both zero (equilibrium GDP was $20,000).
-- Another notable result is that despite the higher taxes in (3) as compared to (1), private consumption is the same in both cases. To verify, equilibrium consumption is:
---- in case (1): $C_{equil.}$ = 500 + 0.95*$Y_{equil.}$ = 500 + 0.95*20000 = 500 + 19000 = 19,500

---- in case (2): $C_{equil.} = 405 + 0.95*Y_{equil.} = 405 + 0.95*20100 = 405 + 19095 = 19,500$
---- While the tax increase on its own would have hurt consumption and GDP, the equal spending increase, through its larger multiplier effect, raises GDP and leaves consumption unchanged. Society is better off in the sense that consumption has not fallen and now there is $100 in extra government services.

Parting question: In the U.S. today, the MPC is about .95, which would imply that the multiplier is 20 (as in the above example). Yet empirical estimates of the multiplier in the U.S. economy put it at about 1.4. The question is, What makes the real-life multiplier so much smaller than 20? (Or, how do we "beat the multiplier down" from 20 to 1.4?)

XXX. THE DEFICIT'S INFLUENCE ON THE ECONOMY

Where we left off: **In simple multiplier models, the government-spending multiplier, as 1/(1-MPC), is huge, and the tax and balanced-budget multipliers are also very large.** Plugging in the estimated MPC for the U.S. today, which is .95, the multiplier would be 20 (=1/(1-.95)=1/.05). The tax multiplier would be -19 (= -.95/(1-.95) = -.95/.05 = -95/5), and the balanced-budget multiplier would be 1.
-- **In the real world, however, those multipliers are a lot smaller. The spending multiplier is about 1.4, the tax multiplier is about -1.3, and the balanced-budget multiplier is about 0.1**, even though the U.S. MPC, as noted, is about .95.
-->
Parting question from last time:
Q: What makes the real-life multiplier so much smaller than 20? (Or, how do we "beat the multiplier down" from 20 to 1.4?)
A: In real life, **there are several LEAKAGES from that whole chain of consumption that drives the multiplier process, namely:**
(1) taxes on incomes and sales, which mean that some fraction of every dollar spent goes not to the person selling the good or service but to the government.
(2) imports - some of every extra dollar of consumer spending is spent on imported goods instead of U.S.-produced goods, and imports are *subtracted* from GDP. Also, the money spent on imports is mostly re-spent in the foreign country that produced the import, not in the U.S.
(3) inflation - instead of passively responding to the increased product demand by simply supplying more goods at the same price as before, many producers will respond (and maximize their profits) by raising their prices. Those higher prices mean inflation, and the increase in real GDP will therefore be smaller than the increase in nominal GDP.
(4) higher interest rates as a result of the extra aggregate demand. Some of that extra consumption spending is on expensive durable goods, like cars and dishwashers, that are normally financed through consumer loans. Increased demand for durable goods means increased demand for loans, and the equilibrium interest rate will increase, thereby ***crowding out* some** of that **durable-goods consumption and also crowding out some investment.**
-- The **CROWDING-OUT EFFECT** refers to **the tendency for larger budget deficits to cause private investment (and durable-goods consumption) to fall.**
---- How it works: (1) To run a bigger deficit, the government must sell more Treasury

bonds; (2) To sell more T-bonds, it must offer a higher interest rate; (3) Interest rates on loans and corporate bonds go up, too; (4) At those higher interest rates, businesses don't borrow as much for new investment.

We should also note that when these multipliers are so small (1.4 for spending, -1.3 for taxes, 0.1 for BBM), the impact of any change in G or T on equilibrium GDP is easily offset by a change in monetary policy, such as a raising or lower of interest rates, by the Federal Reserve.

Still, even if the multipliers are only 1.4 (for government spending) and -1.3 (for taxes), in **simple multiplier models,** like the ones we've seen, the deficit helps the economy and doesn't hurt it at all. In such models, **the bigger the deficit the better, because it will increase equilibrium GDP.**
-- There is no "limit" to GDP (no concept of "potential GDP" or "capacity GDP") in the multiplier model.
-->
Q: So, then, why not have as big a deficit as possible? Eliminate all taxes. Let every Congressperson's request for greater spending for his or her district be granted, so that the government spends as much money as it could ever imagine.

A: First off, the multiplier model applies to a *depressed economy*, operating on the flat part of the AS curve; if we're only looking at a range of low values of GDP, then we're so far away from potential GDP that we don't need to worry about pushing the economy beyond its sustainable limit. But **bigger and bigger deficits would eventually increase GDP to the point where it reached the intermediate part of the AS curve, at which point larger deficits become inflationary.**
-- **Once real GDP (Y) reaches potential GDP (Y*)** (i.e., once the unemployment rate falls below the NAIRU), **larger deficits cause** not just increased inflation but also ***accelerating inflation.***

XXXI. REINTRODUCING THE PRICE LEVEL (P)

The multiplier model is a *fixed-price model* -- it never mentions prices, and implicitly assumes the price level (P) is fixed at all times.

The most widely used macro model, at the introductory-course level, is the aggregate demand-aggregate supply (AD-AS) model, in which aggregate demand (AD) and aggregate supply (AS) curves, which look a bit like the micro supply and demand curves, are plotted in (Y,P) space. That is, Y (real GDP) is on the horizontal axis and P (the price level) is on the vertical axis.
-- The AD-AS model, unlike the multiplier model, is a *variable-price model*, because it realistically assumes that the price level can and does change from time to time.

The aggregate demand (AD) curve is a schedule or curve that shows the level of real domestic output that will be demanded at each price level.
-- The AD curve slopes downward, just like a micro demand curve; and the AS curve slopes upward, just like a micro supply curve. The similarity to micro supply-and-demand models ends there, however, because the factors driving the shapes and shifts of these curves are different. First, note that P represents the *aggregate* price level -- not, as in micro supply-and-demand diagrams, the price of a specific commodity (say, bananas) with all other prices held constant. The AD curve (or "schedule") tell us how the aggregate quantity demanded of *all* goods and services (by households, firms, government, and foreigners) is affected by the price level.

The aggregate supply (AS) curve is a schedule or curve showing the level of real domestic output that will be produced at each aggregate price level.
-- The AS curve tells us how the aggregate quantity supplied of all goods and services (by firms) is affected by the price level.

XXXII. AGGREGATE DEMAND (AD) AND THE PRICE LEVEL

Aggregate demand (AD) has an inverse relationship with the price level (P)
-- A lower price level is good for AD (i.e., increases the sum of C, $I_{planned}$, G, and EX - IM)
-- A higher price level is bad for AD (i.e., decreases the sum of C, $I_{planned}$, G, and EX - IM
--> The AD curve slopes downward.

There are **three reasons why the AD curve slopes downward** (or, equivalently, why a lower price level raises AD):

(1) Real-wealth effect
-- A lower price level raises the real value of the money in people's pockets and bank accounts, and raises real wealth in general. (This is the flip side of how inflation -- a higher price level -- *lowers* people's real wealth.) Wealthier people consume more, so the **increase in aggregate real wealth raises household consumption.**

*** (2) Interest-rate effect**
-- (This one has the asterisk {*} next to it because it's the most important of the three reasons.)
-- **A lower price level will reduce interest rates, which will stimulate durable-goods consumption and business investment** (both of which are types of *interest-sensitive spending*), through the following channel:
---- P falls --> in the money market, less money is needed for a given level of transactions --> money demand falls --> the price of money (which is the interest rate, *i*) falls -> investment rises, durable-goods consumption increases
------ Shorthand: P falls -> M^d falls -> i falls -> I_p increases, $C_{durables}$ increases (AD increases)

(3) Foreign purchases effect (real-exchange-rate effect)
-- **A lower domestic price level, *relative to the price levels of other countries*, means the home country's products become cheaper relative to foreign products** (and hence the real foreign exchange rate rises). If the American price level falls, relative to the world price level, then foreigners will buy more American exports and Americans will buy fewer foreign imports, and American **net exports increase**.

Q: Hey, wait a minute: What about the fact that a lower price level is bad for debtors by raising the real burden of debt? Think back to our unit on inflation; we call this phenomenon the ***debt-deflation effect***, and it has severe, adverse effects on AD, because an increased debt burden forces indebted consumers and firms to retrench (the households' consumption falls, the firms' investment falls) and, in many cases, declare bankruptcy or default on their debts, in which case their creditors take a hit, too.
A: Based on the empirical evidence, it seems that the combined positive effects -- (1), (2), and (3) -- of a lower price level on AD outweigh the negative debt-deflation effect, so the **net effect of lower prices on AD is still positive**. But the debt-deflation effects on debtors and many creditors are sufficiently severe that U.S. economic policymakers have made sure to keep the U.S. out of deflation ever since the 1940s.

A summing up

A lower price level raises aggregate demand ($AD = C + I_{planned} + G + EX - IM$) as follows:

AD =	**C +**	**$I_{planned}$ +**	**G+**	**EX - IM**
	increases through (1) real wealth effect and (2) interest-rate effect on durable-goods consumption	increases through (2) interest-rate effect		increases through (3) foreign-purchases effect

(Note: The favorable effect of lower prices on interest-sensitive consumption and investment spending outweighs the debt-deflation effect.)

XXXIII. DETERMINANTS OF AGGREGATE DEMAND

Determinants of AD / Factors that shift the AD curve

(1) Changes in consumer spending
-- consumer wealth (wealthier consumers will consume more. Rising household wealth because of, say, rising stock prices, will cause consumption to increase.)
-- consumer expectations (a.k.a. "consumer confidence," which measures consumers'

willingness to buy big new durable goods, based on their expectations of what their individual financial situations will be in the future)
-- **household indebtedness** (puts pressure on households to cut back their consumption, so this is bad for consumption)
-- **taxes** (higher taxes lower disposable income and thus lower consumption)
-- **interest rates** (affect durable-goods consumption in particular)

(2) Investment spending (firms' expenditures on new plant and equipment)
-- **interest rates** (lower interest rates raise the level of investment spending, by making the cost of borrowing cheaper and by lowering the opportunity cost of investment projects -- an investment with an expected return of 6% is not worth pursuing if you can earn 8% by holding bonds, but it is worth pursuing if you can only earn 4% by holding bonds.)
-- **expected returns on investment projects** (the higher the expected return on investing, the more likely firms are to invest. Expected returns will be higher when the economy appears strong and growing and when the political situation appears stable. Changes in business psychology -- what Keynes called "animal spirits" -- can also strongly affect expectations of future returns.)
-- **business taxes** (higher business taxes lower the after-tax return on any investment, so they are bad for investment)
-- **technology** (the availability of good new technology will tend to induce firms to invest in new, state-of-the-art plant and equipment)
-- **degree of excess capacity** (the higher this is, the less need there is for investment, since firms with a lot of excess capacity, such as the typical firm in a recession, can expand just by utilizing more of their existing capacity.)
-- **stock prices** (when stock prices are low, a company that is looking to expand can often do so most cheaply by buying up another firm in the same industry. When stock prices are high, acquiring other firms becomes more costly, and it is often cheaper to expand "from scratch," by building new plant and equipment on one's own.)

(3) Government spending
-- The determinants of government spending are mostly political, not economic.
-- A few types of government spending, such as unemployment insurance and anti-poverty spending like food stamps and welfare, depend on the state of the economy because they are higher in recessions, when many people are thrown out of work and into poverty. Such programs are called *automatic stabilizers*; we will learn more about them in our unit on fiscal policy.

(4) Net export spending
-- **national income abroad** (prosperity in foreign countries, especially among our biggest trading partners, means greater spending by their citizens on U.S. exports, and recessions in foreign countries lower spending on U.S. exports)
-- **exchange rates** (when the dollar depreciates, becoming less expensive in terms of foreign currency, U.S. exports rise, because they have become cheaper relative to foreign products, and Americans buy fewer foreign imports, because those have become more expensive relative to American products. Both of those effects cause U.S. net exports to

rise).
-- **tariffs** (taxes on foreign imports) -- Other things equal, if a country imposes higher tariffs on imports, that country's spending on imports will fall, raising its net exports. (Other things, however, are often not equal, since higher tariffs in one country often invite retaliation in the form of higher tariffs in other countries, which hurt the first country's exports and may make the net change in net exports a wash.)

When the AD curve shifts outward or rightward (AD increases), it means that people are willing to buy more goods and services at any given price level than they were before.

When the AD curve shifts inward or leftward (AD decreases), it means that people are willing to buy *fewer* goods and services at any given price level than they were before.

Recall from the multiplier model that the levels of consumption and aggregate demand depend not only on those above, autonomous factors but also on the level of real GDP. When real GDP is higher, then (typically) real disposable, or after-tax, income is higher, too, and consumption and AD both increase. Then, through the multiplier process, that induced increase in consumption spending leads to still more consumption spending, because anyone who receives payment for providing goods and services will spend most of the income he receives on his own consumption, and so on. It's still true that an initial increase in autonomous spending will ultimately result in a total increase in spending (or, equivalently, an increase in AD) that is much larger.
--> One could think of an initial shift in the AD curve as touching off a cascade of progressively smaller shifts, until the cumulative shift is many times as large as the initial shift. In other words, **the multiplier process is a series of increases in AD.** But for the sake of simplicity, we draw just one big AD shift, the cumulative shift, which includes both the initial change in autonomous spending and the induced change in spending that occurs through the multiplier process. In other words,

horizontal amount of shift in AD curve = (change in autonomous spending)*(multiplier)

XXXIV. AGGREGATE SUPPLY (AS) AND THE PRICE LEVEL

Aggregate supply (AS) is roughly the same thing as GDP. Both differ from aggregate demand (AD) because they include all goods or services that are *produced*, not just all the ones that are sold. Unsold goods are counted in GDP as inventory investment (*unintended inventory investment* if sales fall short of producers' expectations). Only in equilibrium does AD=GDP, and only in equilibrium does AD=AS (more on this later. Also note that in equilibrium there is no unintended inventory investment.)

We draw the AS curve in (Y,P) space, with three ranges:

- **horizontal (when the economy is very depressed)**;

- **upward-sloping (intermediate**; where the economy is almost all of the time);
- **vertical (at capacity GDP**, the economy's uppermost limit).

The intermediate or upward-sloping part of the AS curve closely corresponds to the Phillips Curve. Recall that the Phillips Curve shows the tradeoff between unemployment and inflation, whereas the upward-sloping part of the AS curve shows how real output (Y) and the price level (P) move in the same direction.
-- Start with a Phillips Curve *[drawn on board; see Case & Fair's Figure 15.5 (page 326) if you've forgotten what a Phillips Curve looks like]*
--> Recall that low rates of unemployment and high levels of real GDP go hand in hand. **Combining the Phillips Curve tradeoff between unemployment and inflation with the inverse relationship between unemployment and real GDP, we note that higher levels of real GDP (relative to potential GDP) are associated with higher rates of inflation.**
----> Since higher inflation rates mean higher price levels, it's a short step to note that **higher levels of real GDP (relative to potential GDP) are associated with higher price levels.** So we can now draw an AS curve that is upward-sloping. (Potential GDP is assumed fixed in the short run, which is what these diagrams represent.)

For the record, **a shift of the aggregate demand (AD) curve corresponds to a *movement along* the Phillips Curve.**
-- An outward (rightward) shift of the AD curve corresponds to a northwest movement along the Phillips Curve, toward lower unemployment and higher inflation.
-- An inward (leftward) shift of the AD curve corresponds to a southeast movement along the Phillips Curve, toward higher unemployment and lower inflation.

A shift of the aggregate supply (AS) curve corresponds to a *shift* of the Phillips Curve.

Determinants of AS / Factors that shift the AS curve:

(1) changes in input prices
-- domestic resource availability-- land, labor, capital, entrepreneurial ability
-- prices of imported resources (oil, foreign exchange)
-- market power / degree of monopoly (monopolies raise prices and restrict output, so greater industrial concentration means a leftward or inward shift of the AS curve)

(2) changes in productivity

(3) changes in the legal and institutional environment (government)
-- business taxes and subsidies
-- government regulation
---- bad for AS: constraints on what businesses can and can't do; "red tape"
---- good for AS: police and property-rights protection

Things that cause aggregate supply to increase (AS curve shifts out):
*** lower input prices / more labor, capital, or land**
*** higher productivity**
*** lower business taxes**
*** less regulation**

Things that cause aggregate supply to decrease (AS curve shifts in):
*** higher input prices** (e.g., OPEC oil shocks, higher wages)
*** lower productivity**
*** higher business taxes**
*** increased regulation**

XXXV. AD-AS EQUILIBRIUM

... corresponds to the point where the AS and AD curves intersect. At that point, AD=AS and there is no unintended inventory accumulation, just like in the multiplier-model equilibrium. Since the graph has two dimensions, P and Y, the AS-AD equilibrium shows the equilibrium levels of Y (real GDP) and P (the price level).

The AD curve corresponds to equilibrium in both the goods market (Y = AD, or Y = $C+I_p+G+EX-IM$) and the money market ($M^s = M^d$).
-- If the economy is in disequilibrium, then it is not on the AD curve.
The economy is always on the AS curve, just as the economy is always on the Phillips Curve. The AS curve just shows the combinations of P (the price level) and Y (real GDP) that the economy happens to generate, given different levels of aggregate demand.

XXXVI. CHANGES IN THE AD-AS EQUILIBRIUM

P and Y will change when either the AS or the AD curve shifts. When the AD curve shifts, the nature of the changes in P and Y will depend on what region of the AS curve the economy is on. If it's on the flat region, shifts of the AD curve affect real GDP but not the price level, just as in the multiplier model. If it's on the vertical region, GDP is already equal to capacity GDP and a higher level of AD cannot raise real GDP but will only raise the price level. But **since the economy is usually on the upward-sloping portion of the AS curve, shifts of AD will affect both P and Y.**

What happens when one of the curve shifts? Four possible shifts, and their effects:

(1) increase in AD --> Y increases, P increases (demand-pull inflation, economic expansion)
(2) decrease in AD --> Y decreases, P decreases (deflation and recession)
-- Caveat: in real life, deflation is almost nonexistent -- what more likely happens is

merely a decline in the inflation rate.
(3) increase in AS --> Y increases, P decreases (supply-driven growth)
(4) decrease in AS --> Y decreases, P increases (stagflation; cost-push inflation)
Ex.: Expansionary fiscal policy (Congress raises G and cuts T) causes the AD curve to shift out, as in (1)
==> P increases, Y increases. (AD increases because G and C increase.)

Ex.: Contractionary monetary policy (Fed reduces money supply) causes the AD curve to shift in, as in (2)
==> P decreases, Y decreases. (AD falls because $C_{durables}$ and I_p fall.)

Ex.: The OPEC oil cartel collapses, and gas prices fall to 25 cents a gallon.This would cause the AS curve to shift out, as in (3)
==> P decreases, Y increases. (AS increases because production becomes cheaper, on account of lower input prices.)

Ex.: The government imposes strict new regulations on business. This would cause the AS curve to shift in, as in (4)
==> P increases, Y decreases. (AS decreases because the cost of doing business has gone up.)

XXXVII. SUPPLY-SIDE ECONOMICS

Keynesian economics took a beating in the 1970s. The basic Keynesian model, which focused on AD, had virtually nothing to say about supply shocks and stagflation. Since those were two of the dominant economic issues of the 1970s, along with the productivity slowdown, it's perhaps no wonder that a "crisis in Keynesian economics" developed.

Alternative schools of macroeconomics gained ground during the 1970s. One alternative approach that became popular with only a handful of economists but with several very influential politicians was SUPPLY-SIDE ECONOMICS. President Ronald Reagan, Congressman Jack Kemp, and Senator William Roth were among the most powerful backers of supply-side economics. The most famous supply-side economist was Arthur Laffer.

The supply-siders emphasized the role of aggregate-supply (AS) factors in movements in GDP. They said Keynesians were overly preoccupied with aggregate-demand fluctuations and neglected supply. **They said that by cutting tax rates and eliminating many regulations on business, the government could generate big increases in aggregate supply (big rightward shifts of the AS curve)**, because tax cuts and reduced regulation would increase labor supply, productivity, and investment. Those increases in AS would correspond to increases in potential GDP (Y*) as well as actual GDP.

The promises of the supply-siders were seductive. If you were given the choice of stimulating the economy by shifting the AD curve out or by shifting the AS curve out, which would you choose? (Probably **shifting the AS curve out-- no demand-pull inflation; instead, P actually *falls****[or, if there's also an increase in AD, then P might rise, but by a much smaller amount than if there were no shift in AS.]*)
-- Keynesian theory implies, however, that there's really no way for government policies to generate big AS shifts. (So does the empirical evidence, which we'll see a bit later.)
-- **In the supply-side case, AS shifts are more important than AD shifts**. If cutting taxes raises GDP, it's because the lower tax rates produce a dramatic increase in labor supply and Y*; the increase in consumption, which Keynesians would say is the reason why a tax cut raises GDP, is secondary.

The favorite supply-side remedy was for the government to pursue policies that increase AS. They especially favored cuts in income tax rates. Arthur Laffer said that U.S. tax rates were so high that they were strangling economic growth and yielding *lower* revenues than could be attained with lower tax rates. The reason, he said, was because current tax rates were so high that they discouraged people from working long hours and discouraged some people from working at all.
-- The "**LAFFER CURVE**" illustrates this argument. It is **a graph showing total tax revenues (T) as a function of the tax rate (t)**. If the tax rate is 0%, then obviously the government gets zero tax revenues. If the tax rate is 100%, then nobody will work and the government will also get zero tax revenues. Somewhere in between is the optimal or revenue-maximizing tax rate. Laffer said the income tax rates of the late 1970s were higher than that optimal rate, so that you could cut tax rates and actually increase tax revenues.

The Kemp-Roth "supply-side" tax cuts (of July 29, 1981) cut income tax rates by 25%, and began the indexation of taxes for inflation. Reagan, Laffer, and other supply-siders said the tax cuts would pay for themselves, because the increase in people's after-tax wages would cause a huge increase in labor supply, so that the tax base would increase by more than the tax rate fell. You could have a big tax cut *and* have a balanced budget, they said, because with more people working and putting in more hours, tax revenues would go up.
-- **Did supply-side economics work?** Most economists would say no, or at least not in the way that they were intended to work. Big AS shifts did not occur; nor did labor supply increase appreciably because of the tax cut. What did happen was that the economy began to recover, beginning in late 1982, and entered a prolonged expansion that lasted until 1990. **The tax cuts**, and an easing of monetary policy (lowering of interest rates) by the Federal Reserve, **helped the economy, but they did so in traditional Keynesian demand-side fashion -- the tax cuts generated big AD shifts, because they raised people's disposable income and consumption increased.**
---- **The tax cuts failed to generate big increases in tax revenues, and instead helped contribute to huge and growing budget deficits in the 1980s**, of $200 billion and up.
---- In sum, the extreme promises of the supply-siders did not come true. The soaring deficits of the 1980s would not have occurred had the tax cuts raised as much revenue as the Reagan Administration's original budget projections predicted. The shortfall in taxes

was the main reason that Reagan was unable to deliver on his promise to cut taxes and balance the budget at the same time.

---- Also, the huge budget deficits led to enormous political and public pressure to reduce the deficit, and made expansionary fiscal policy unthinkable in the next recession, in 1990-91. The 1981 tax cut was the last fiscal expansion the U.S. has ever seen; **since the mid-1980s, expansionary fiscal policy has been dead.** Now that the budget is in surplus again, fiscal policy might make a comeback during the next recession, but that remains to be seen.