Introduction to Macroeconomics

ECO1102 Section D, Winter 2013

(Lecture #2, Jan. 15)

Announcements

- Aplia assigment #1 due Wed., Jan. 16, 11 p.m.
- Aplia assigment #2 due Sunday, Jan. 20, 11 p.m.
- Change in my Friday's office hour:
  - From 13:00 to 14:00
- Answers to the problems in the book:
  - On Blackboard Learn, in « Instructor's manual »

Last lecture…

- Started Chapter 5: Measuring a Nation's Income
- Introduced the concept of *GDP*:

  GDP is the market value of all final goods and services produced within a country in a given period of time (loosely speaking, it is how much a country is producing).
- Components of GDP:

$$Y = C + I + G + NX$$

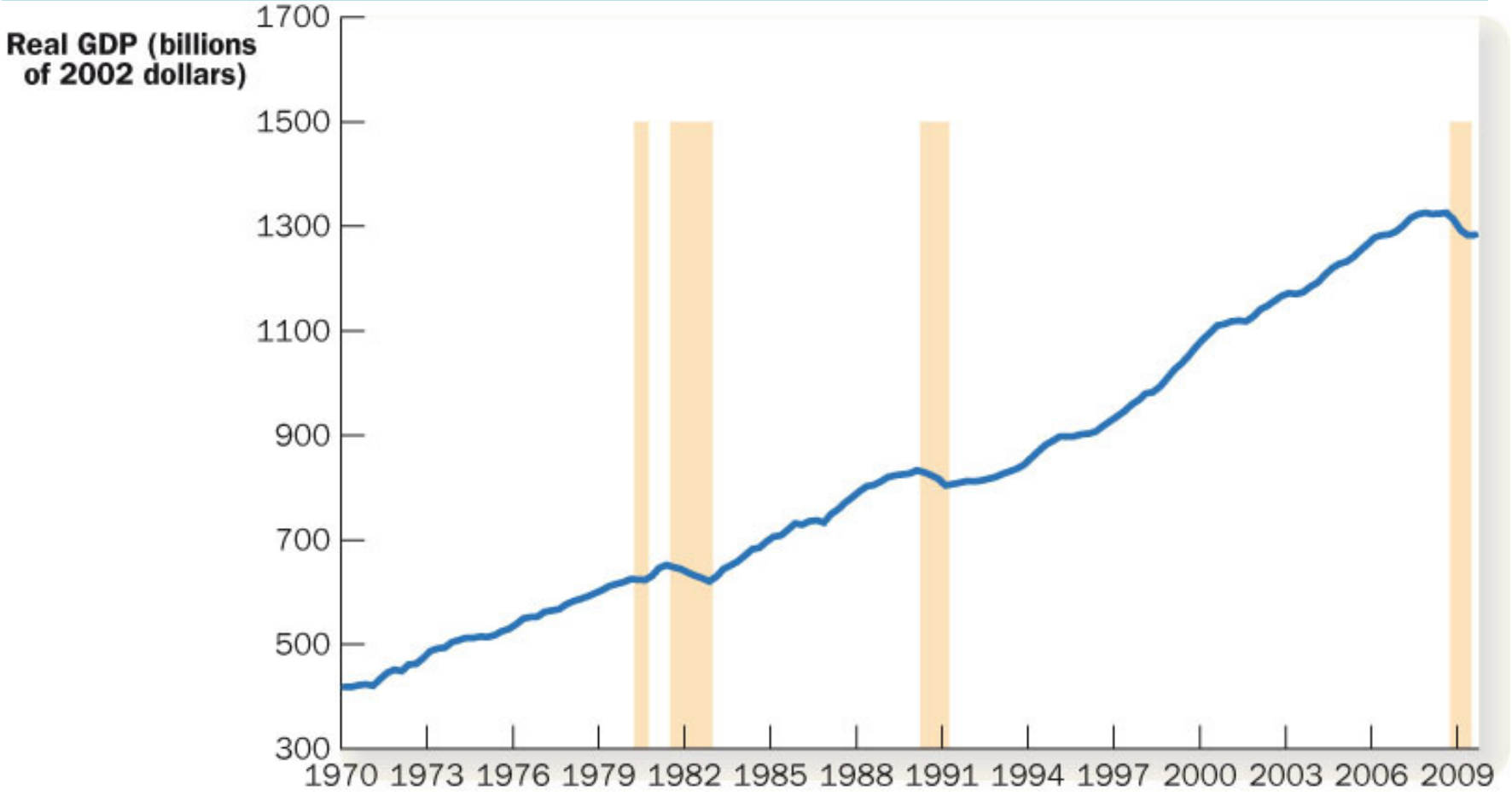
- *Real GDP*: Nominal GDP corrected for inflation

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{GDP deflator}} \times 100$$

This lecture…

- Finish Chapter 5:
  - Real GDP in Canada.
  - GDP and economic well-being.
- Chapter 6: Measuring the Cost of Living

Real GDP in Canada over Recent History

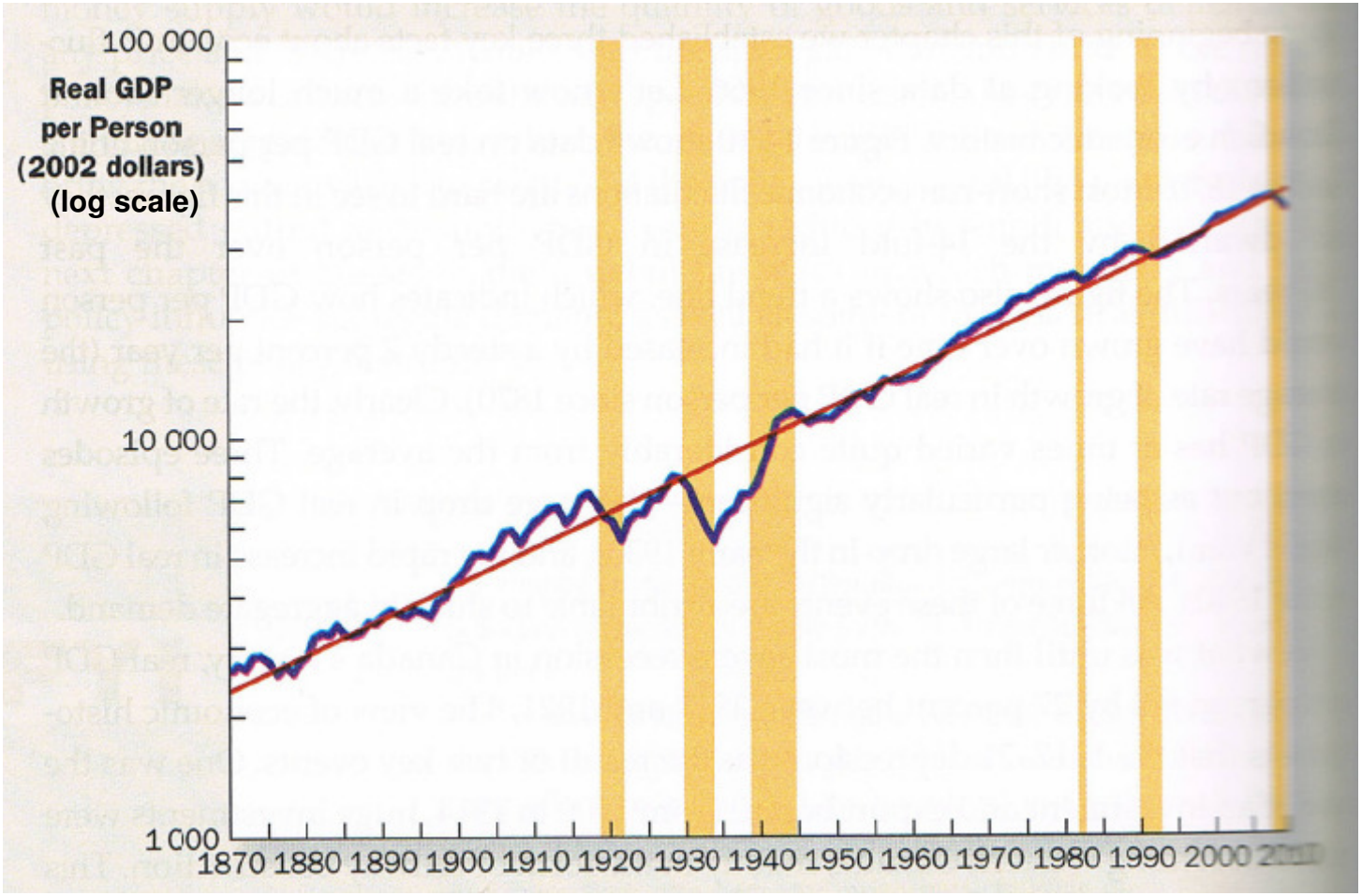


GDP and Economic Well-Being

- ***Real GDP per person is the most often used indicator of a country's average person's standard of living.***

$$\text{Real GDP per person} = \frac{\text{Real GDP of a country}}{\text{Number of persons in country}}$$

Real GDP per person in Canada



- The average rate of growth of GDP per person since 1870 has been 2 percent per year
- But GDP per person is not a perfect measure of well-being.

Gross Domestic Product

…does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials.

It measures neither our courage, nor our wisdom, nor our devotion to our country. It measures everything, in short, except that which makes life worthwhile, and it can tell us everything about America except why we are proud that we are Americans."

- Senator Robert Kennedy, 1968

GDP Does Not Value:

Then why do we care about GDP?

- Having a large GDP enables a country to afford better schools, a cleaner environment, health care, etc.
- The fact is that if a person has a high income, then this person can afford to spend more time with his/her children and do volunteer work—
- Higher incomes allow for more choices. For a society, having a high GDP means having more choices.
- Many indicators of the quality of life are positively correlated with GDP. For example…

GDP, Life Expectancy and Literacy

TABLE 5.4

Country	Real GDP per Person (2007)	Life Expectancy at Birth	Adult Literacy
United States	$45 592	79 years	99%
Canada	35 812	81	99
Japan	33 632	83	99
Germany	34 401	80	99
Russia	14 690	66	99
Mexico	14 104	76	93
Brazil	9 567	72	90
China	5 383	73	93
Indonesia	3 712	70	92
India	2 753	63	66
Pakistan	2 496	66	54
Bangladesh	1 241	66	53
Nigeria	1 969	48	72

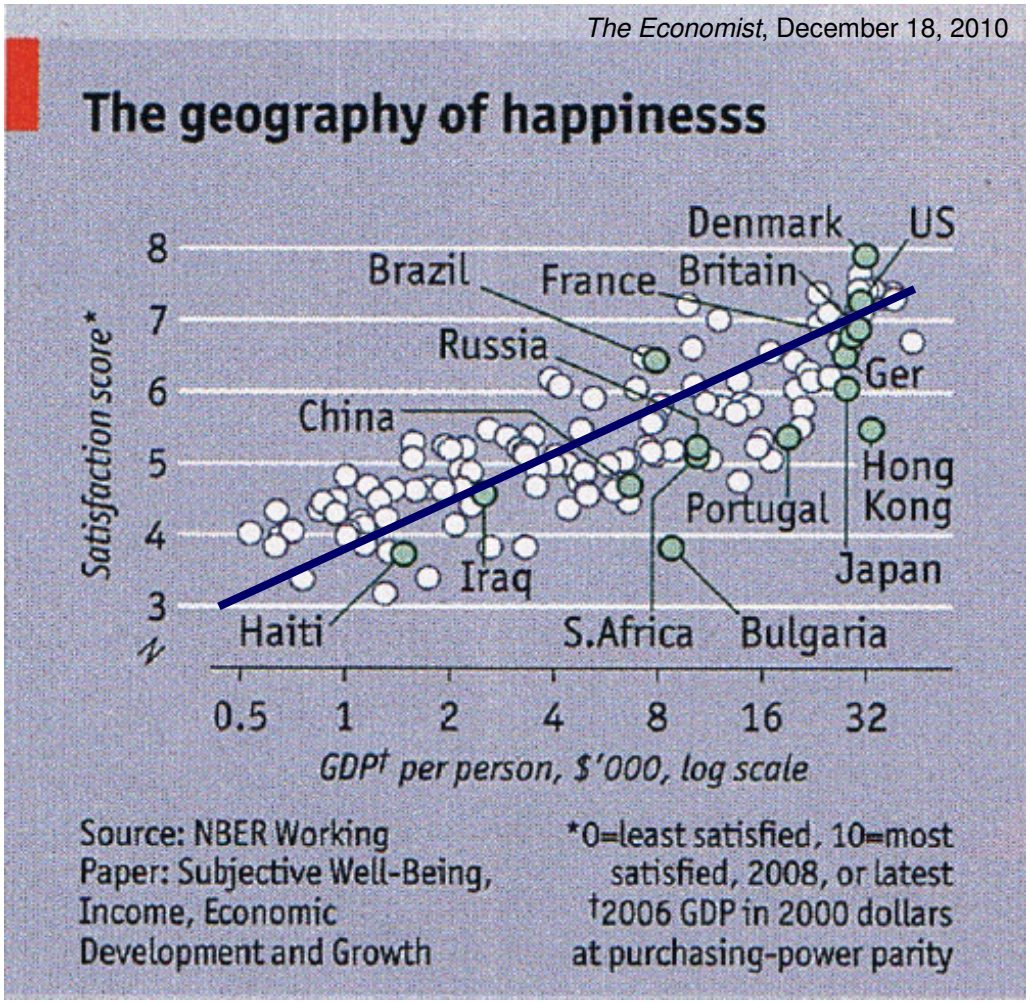
GDP, Life Expectancy, and Literacy

This table shows GDP per person and two measures of the quality of life for 12 major countries.

Source: *Human Development Report 2009.* Reprinted by permission of Palgrave Macmillan.

On the relationship between GDP and quality of life

The Economist, December 18, 2010



WILLIAM WATSON

Money never hurts

This weekend, with the release of Oliver Stone's Gordon Gecko sequel, *Wall Street: Money Never Sleeps*, the very successful Mr. Stone, who presumably is quite well acquainted with money, and his Hollywood-producer backers, who are also not homeless, are going to tell us all again that too much money and the pursuit of it are bad for us.

Easy for them to say. It's a proposition most of us would like to have the chance to test. Until then, we'll remain suspicious when very rich people tell us being very rich really isn't worth it.

Two Stanford economists have just published a paper suggesting that in fact money, in the form of GDP, is an extremely useful thing. It's not the only thing, of course. But if you try to devise other measures of "welfare," ones that in addition to GDP take into account other good things such as leisure, longevity and living in a more equal society, you find that many of these measures are highly correlated with GDP. And taking them into account may not change country rankings all that much.

The two economists conducted a thought experiment. Suppose you were going to be air-dropped into a country other than the United States but you didn't know where in the age or income distribution you'd be placed. How would you feel about such a transfer?

If you were going to a very poor country but would be one of the richest people in that country, you might not mind. But if you didn't know whether you'd be rich or poor, that would be a big risk. So inequality hurts.

Same with longevity. If you were going into a country with high mortality rates and the roulette wheel said you would go in as old, well you might not have much "welfare" at all because chances are you'd be dead.

On the plus side, though in many countries GDP per capita might not be very high in at least some cases that's because people typically don't work as much as they do in the U.S.

When you do control for leisure, longevity and equality, how do the countries measure up?

Take France. French GDP per person is only 71% of U.S. GDP. But the French only work 1,591 hours a year on average, while Americans work 1836. The French also live longer (78.9 years vs. 77) and their income distribution is more tilted toward égalité than the more uneven American distribution is. (Their "Gini coefficient" of inequality is 0.252 versus 0.367 in the U.S.)

Put it all together and the Stanford economists judge that French "welfare" per person is 97% the U.S. level.

That's fairly typical of Western Europe. Take into account the fewer hours worked, the more equal distribution of income and the slightly greater longevity and Western European welfare usually hits the high 90s on a scale where the United States is 100. Sweden, for instance, is under 70% of the U.S. value in per-capita GDP terms, but reaches 99.8% in welfare terms.

How do we do? A certain subsector of Canadians — call them Toronto elites — thinks of this country as combining the best of the United States and Europe and being a kind of halfway house between the two. It turns out that doesn't work here.

Our GDP per capita is 81% of the Americans'. We do work less than they do — 78 hours a year on average, essentially two full weeks less. We also live 2.2 years longer and our income distribution is more even, though not as even as France's. But in welfare terms all that only gets us to 90.3% of the U.S. value, not the high 90s, like Sweden, Germany, France, Austria and the Netherlands.

Despite all their faults, despite our contempt for them, the Americans still beat us in terms of welfare.

And they still beat most places. In per-capita GDP, they're third out of 134 countries studied, behind Luxembourg and Norway. But in this new measure of welfare, they're also third overall — behind the same two countries, though many more countries are closer to them when welfare is at issue rather than GDP. (We're 12th on the welfare listing, though we're 8th in GDP.)

What have we done for us lately? Between 1980, when Ronald Reagan was elected president and Oliver Stone presumably started working on ways to denounce the Wall Street ethos, and 2000, our index of welfare grew by an average of 2.27% per year, which is much better than our GDP, which grew only 1.64%.

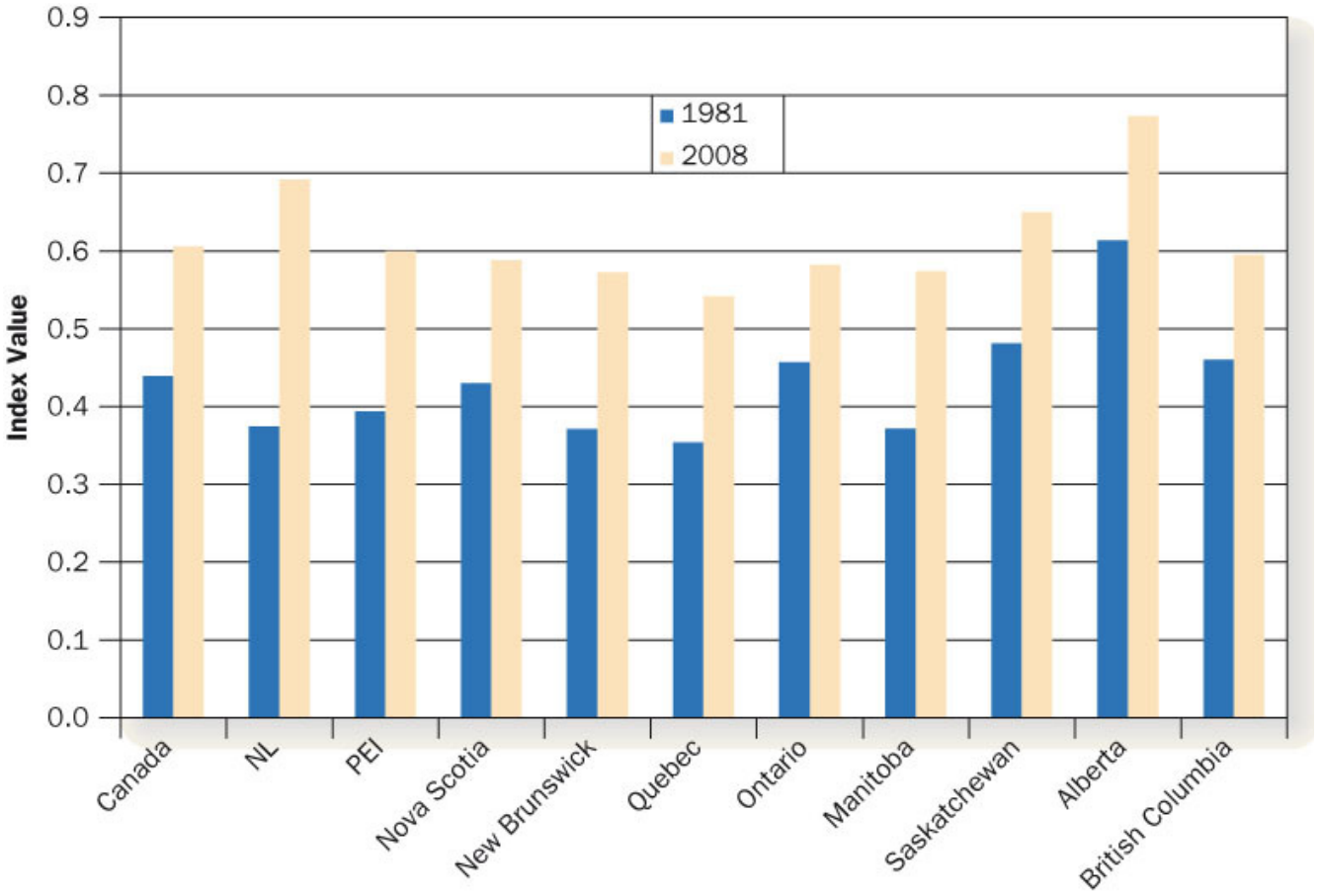
But the United States beat us on both scores. Its GDP grew at more than 2% per year and its index of welfare grew 2.59%.

Our own Oliver Stones take great delight in trumpeting our superiority to the money-grubbing Americans. At least by this measure of welfare, the Americans beat us in both money matters and welfare.

> "Europe catches up when welfare is considered, but Canada lags

National Post, Sept. 25, 2010

Measuring economic well-being in Canada



No better measure?

The calculation of happiness

French President Nicolas Sarkozy's remarkable announcement that he intends to "fight to make all international organizations" rethink the basis of economic accounting is the biggest step forward yet for a swelling movement against traditional exchange-based measures of growth. The concept is sometimes summarized in the phrase "Gross National Happiness." Because we have elaborate, intricate, time-tested systems for measuring economic output — normally stated as the equivalent cash value of a state or region's gross domestic product — we have a strong tendency to judge our politicians, and the overall success of our societies, based on these measures alone.

But our productivity alone doesn't tell us how happy we are. If we had good ways of quantifying happiness or well-being in the same way we quantify output, we would be right to prefer those as the test of our social and polit-

> "GDP's not perfect. But it's the best measure we've got

quantity) or reckoning the value of government services. Even measuring the value of things like medicine or education is not easy, insofar as they add to our quality of life in ways that don't boil down to cash, or to something else, like time, that can be exchanged for cash. And this goes double for leisure.

- GDP measures production, but even on the level of cash or traditional "utility," it is income and consumption that determine quality of life. In the long run, how much we produce may determine how much we have to use and enjoy, but these two quantities can diverge temporarily, sometimes for fairly long periods.
- GDP doesn't have any way to account for the various funds of non-renewable resources we sometimes call upon when we are being productive; there is no distinction made between increases in output that come from inputs we cannot replace, or those that impose irreversible costs on the environment, and increases in output that arrive "free" as a result of pure human ingenuity.
- And there is, of course, plenty of stuff essential to happiness, or nearly essential to it, that GDP doesn't consider at all: friendship, security, love, political autonomy, self-worth. Moreover, people may feel subjectively unhappy for reasons unrelated to any real-world

Financial Post, Sept. 16, 2009

Other Measures of Income

- Gross National Product (GNP) = GDP plus income that Canadians earn abroad minus income that foreigners earn in Canada
- Net National Product (NNP) = GDP minus losses from depreciations (i.e., wear and tear on the stock of equipment and structures)
- National income: NNP minus sales taxes
- Personal income: income that households and unincorporated business receive (National income minus retained earnings)
- Disposable personal income: personal income minus personal taxes (e.g., personal income taxes) and certain nontax payments (e.g., traffic tickets)

Example: MKMR, p. 119, #9

One day Barry the Barber, Inc., collects $400 for haircuts. Over this day, his equipment depreciates in value by $50. Of the remaining $350, Barry sends $30 to the government in sales taxes, takes home $220 in wages, and retains $100 in his business to add new equipment in the future. From the $220 that Barry takes home, he pays $70 in income taxes. Based on this information, compute Barry's contribution to the following measures of income.

a. gross domestic product
b. net national product
c. national income
d. personal income
e. disposable personal income

End Chapter 5

Chapter 6: Measuring the Cost of Living

- Chapter 5 examined issues related to measuring a country's income.
- This chapter examines issues related to measuring a country's consumption over time.
- For example, economists and policy makers are interested in knowing if the well-being of people (that is, consumers) increase over time.
- In Chapter 5, we saw that if we wanted to monitor a country's income overtime we needed to control for changes in prices—the GDP deflator.
- In the same manner, if we want to monitor a country's consumption over time we also need to control for changes in prices—the Consumer Price Index (CPI)

The Consumer Price Index (CPI)

- The *CPI* is a measure of the overall cost of the goods and services bought by a typical consumer.
- Statistics Canada reports the CPI each month.
- It is used to monitor changes in the cost of living over time.
- When the CPI rises, the typical family has to spend more dollars to maintain the same standard of living.

How the CPI is calculated—4 Steps

1. ***Determine the Basket:*** Determine what prices are most important to the typical consumer.
   - If the typical consumer buys more of one good, then the price of that good is more important and is given more weight in measuring the cost of living.
   - Statistics Canada sets these weights by surveying consumers to find out the basket of goods the typical consumer buys.
2. ***Find the Prices:*** Find the prices of each of the goods and services in the basket for each point in time.
3. ***Compute the Basket's Cost:*** Use the data on prices to calculate the cost of the basket of goods and services at different times
4. ***Choose a Base Year and Compute the Index:***
   - Designate one year as the base year
   - Compute the index by dividing the price of the basket in one year by the price in the base year and multiplying by 100.

Computing the CPI—An example

Suppose the residents of Junkyland spend all of their income on two goods: pizzas and lattes.

Suppose also that typically, the residents consume 4 pizzas and 10 lattes:

Year	Price of Pizzas	Price of Lattes
2008	$10	$2.00
2009	$11	$2.50
2010	$12	$3.00

Question: Compute the CPI for 2008, 2009 and 2010 using 2008 as the base year.

Second: Compute the CPI

Inflation rate

- ***Definition:*** The inflation rate is the percentage change in the CPI from the preceding period
  - If the inflation rate is negative, we say that we are in a period of deflation).
- Computed as follows:

$$\text{Inflation Rate in Year 2} = \frac{\text{CPI in Year 2} - \text{CPI in Year 1}}{\text{CPI in Year 1}} \times 100$$

Example: What was the inflation rate in Junkyland in 2005 and 2006?

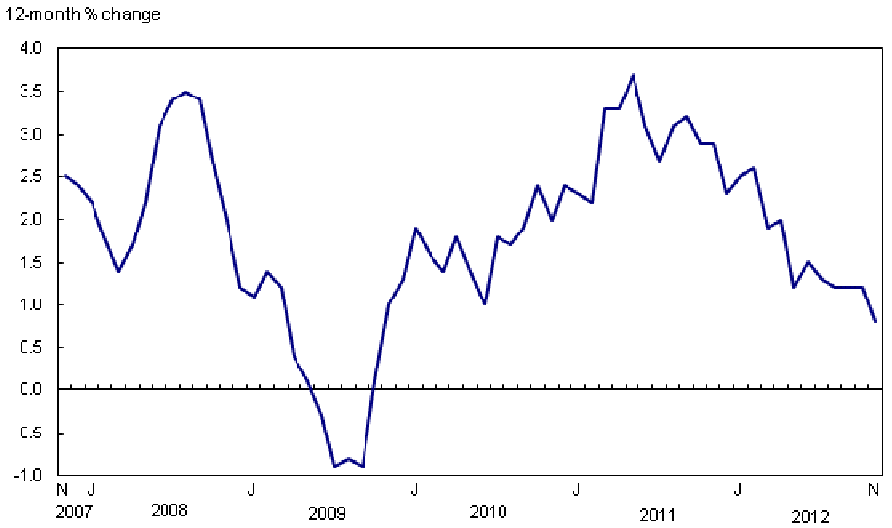
Year	Price of Pizzas	Price of Lattes
2008	$10	$2.00
2009	$11	$2.50
2010	$12	$3.00

Canada's latest CPI inflation rate

- Latest release on *CPI*: Dec. 21
- CPI rose 0.8% between Dec. 2011 and Nov. 2012.
  - ***The (Bank of Canada's) Core CPI:*** A variant of the CPI that excludes eight of the most volatile components prices—which account for 16 per cent of the *CPI* basket—(fruit, vegetables, gasoline, fuel oil, natural gas, mortgage interest, intercity transportation, and tobacco products) as well as the effect of changes in indirect taxes on the remaining components.
  - *Core CPI* rose by 1.2% between Dec. 2011 and Nov. 2012.

Question:

- If you did not get a salary increase this year, were you richer or poorer in Nov. 2012 than you were in Dec. 2011?



Correcting Economic Variables for the Effects of Inflation Using the CPI

- Price indexes such as the CPI are used to correct for the effects of inflation when comparing dollar figures from different time periods.
- Example: Gas is about $1.20 a litre now while it was about 9.5 cents a litre in1957. Is gas more expensive now than in 1957?

Example: MKMR, p. 135, #6

6. The *Ottawa Citizen* cost \$0.10 in 1970 and \$0.50 in 1990. The average wage in manufacturing was \$3.01 per hour in 1970 and \$14.19 in 1990.
   a. By what percentage did the price of a newspaper rise?
   b. By what percentage did the wage rise?
   c. In each year, how many minutes does a worker have to work to earn enough to buy a newspaper?
   d. Did workers' purchasing power in terms of newspapers rise or fall?

a) $\%\Delta P = \{(0.50 - 0.10)/0.10\} \times 100$

$= 400\ \%$

b) $\%\Delta W = \{(14.19 - 3.01)/3.01\} \times 100$

$= 371.4\ \%$

c) Let X : *Minutes to work necessary to buy a newspaper*

Thus X = *(P of newspaper/ Hourly W)*60*

X_{1970} = *(0.10/3.01)*60 = 2 minutes*

X_{1990} = *(0.50/14.19)*60 = 2.11 minutes*

d) It fell as they have to work longer to buy a newspaper

Note also that the price of a newspaper increased more than average wage during that time period.

Problems in Measuring the Cost of Living

- The CPI is an accurate measure of the selected goods that make up the typical bundle, but it is not a perfect measure of the cost of living.
- Three problems with the index are widely acknowledged but difficult to solve
  - Substitution bias
  - Introduction of new goods
  - Unmeasured quality changes
- All these problems result in the CPI overstating the cost of living.
  - The issue is important because many government programs use the CPI to adjust for changes in the overall level of prices.

Problems in Measuring the Cost of Living

- Substitution Bias
  - The basket does not change to reflect consumer reaction to changes in relative prices.
    - Consumers substitute toward goods that have become relatively less expensive.
- Introduction of New Goods
  - The basket does not reflect the change in purchasing power brought on by the introduction of new products.
    - New products result in greater variety, which in turn makes each dollar more valuable.
    - Consumers need fewer dollars to maintain any given standard of living.

Problems in Measuring the Cost of Living (cont)

- Unmeasured Quality Changes
  - If the quality of a good rises from one year to the next, the value of a dollar rises, even if the price of the good stays the same.
  - Statistics Canada tries to adjust the price for constant quality, but such differences are hard to measure

Example: Which of the problems in the construction of the CPI might be illustrated by each of the following situations?

a) More scoops of raisins in each package of Raisin Bran

b) Greater use of fuel-efficient cars after gasoline price increase

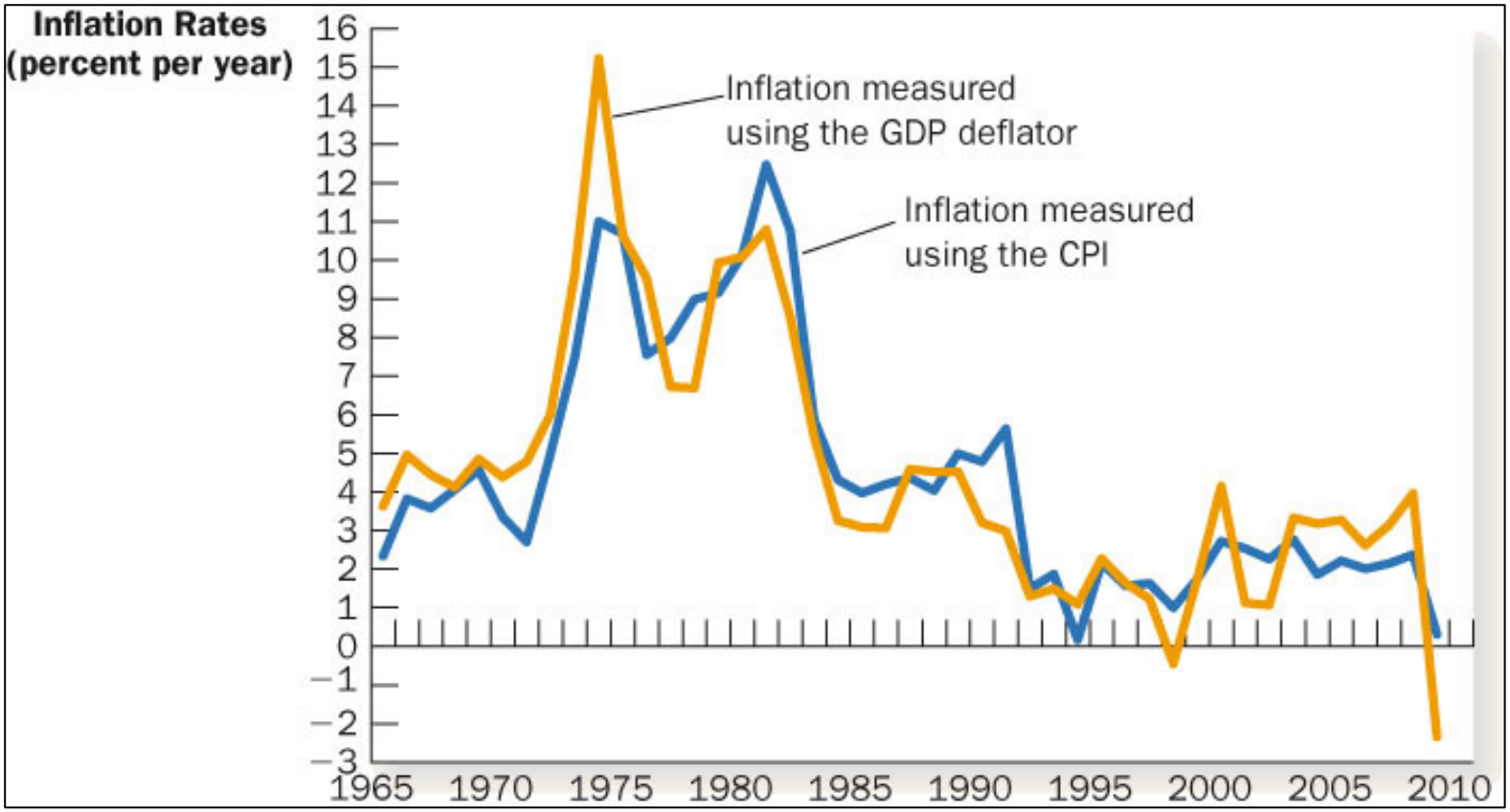
GDP Deflator vs CPI

- Both the GDP deflator and the consumer price index are used to gauge how quickly prices are rising. There are two important differences between the indexes that can cause them to diverge.

1. Which goods and services are included?

2. How are prices weighted?

Two Measures of Inflation (Fig. 6.2, p. 127)



Indexation

- Definition: When some dollar amount is automatically corrected for inflation by law or contract, the amount is said to be *indexed* for inflation.
- Examples:

Real and Nominal Interest Rates

- Interest represents a payment in the future for a transfer of money in the past. It is therefore important to take into account the difference in the purchasing power of the money you lend (or borrow) with the money you will get back (or repay.
- The *nominal interest* rate is the interest rate usually reported and not corrected for inflation.

- The *real interest rate* is the nominal interest rate that is corrected for the effects of inflation—it reflects the purchasing power of the money a lender gets back.

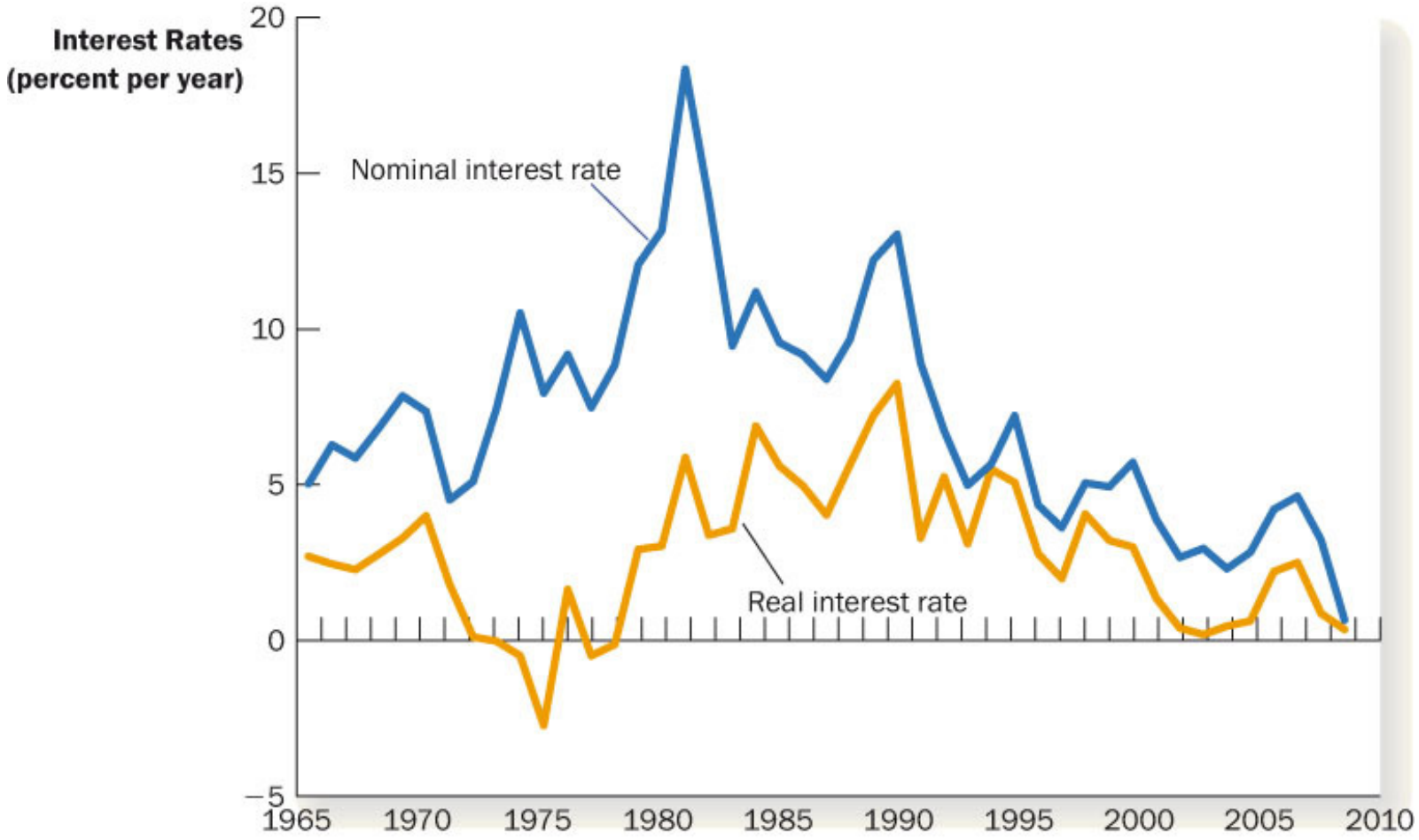
Real and Nominal Interest Rates--Example

- You borrowed $1,000 for one year.
- Nominal interest rate was 15%.
- During the year inflation was 10%

Example: MKMR, p. 135, #11

11. Suppose that a borrower and a lender agree on the nominal interest rate to be paid on a loan. Then inflation turns out to be higher than they both expected.
    a. Is the real interest rate on this loan higher or lower than expected?
    b. Does the lender gain or lose from this unexpectedly high inflation? Does the borrower gain or lose?
    c. Inflation during the 1970s was much higher than most people had expected when the decade began. How did this affect homeowners who obtained fixed-rate mortgages during the 1960s? How did it affect the banks who lent the money?

Real and Nominal Interest Rates (Fig. 6.3, p. 132)



End Chap. 6