Today:

Assignment 3 Q3: time step example

Two examples / situations to get you thinking

    One to discuss today

    One to discuss next time

Chapter 14

Business Casing Example

- Measuring environmental and social benefits: Does the value of local jobs count as a benefit?

Business Casing Example
(to discuss on Wednesday)

Real life example - UBC story:

https://www.cbc.ca/news/canada/british-columbia/ubc-trees-petition-1.6350023

How could you conduct an appropriate analysis of the costs and benefits, and what would be included in scope?

14

Lecture 11: Inflation and Price Change

Learning Objectives

Inflation

- Describe inflation, explain how it happens, and discuss its effects on purchasing power
- Define real inflation vs market inflation
- Define real dollars vs actual dollars, and conduct real-dollar and actual-dollar analyses
- Develop and use cash flows that inflate at different interest rates and cash flows subject to different interest rates per period

Indices

- Define and use composite and commodity-specific price indexes

Key Summary: Update

- Variables and parameters (puzzle pieces):
  - Different kinds of interest rates
  - Discount rates
  - Costs and cost savings or revenues, now and in the future
  - Different expected lives of the possible project/purchases
  - Salvage value
  - Taxes and tax savings
  - **How these escalate**
- Analysis methods (ways to put the pieces together):
  - Present worth analysis (Net Present Value)
  - Equivalent uniform annual cost analysis
  - Rate of return analysis
  - Benefit-cost ratio analysis
  - Payback period
  - Cost-effectiveness analysis

Inflation matters, especially now.

- https://www.cbc.ca/news/business/canada-inflation-april-1.6457520
- https://www.cbc.ca/news/business/canada-inflation-january-1.6353464
- https://www.nationalnewswatch.com/2021/10/20/annual-inflation-rate-hits-4-4-per-cent-in-september-statistics-canada-says/
- https://www.cbc.ca/news/business/jobs-wages-parliament-column-don-pittis-1.6334912
- https://www.cbc.ca/news/business/us-inflation-january-1.6346282

Meaning and Effect of Inflation

- Suppose you get a raise next year: instead of making $50,000, you'll make $51,000. Your spending power rose 2%, right?
- Maybe not: what if prices for all goods also went up, say by 5%. We call this inflation. (Can you buy more?)
- We need to adjust for this, to discover how much your 'real' purchasing power went up.
- Inflation makes future dollars less valuable than present dollars.
- When purchasing power increases over time, this is called deflation. (discuss some examples)

What Causes Inflation?

- Inflation depends on:
  - Money supply
    - If there is too much money in the system in relation to goods and services, the value tends to decrease.
    - Role of federal banks

Federal banks add money to the economy on purpose with the goal of having some (low) inflation

  - Demand-pull
    - Increase in demand cause price increases, when supply can't increase as quickly
  - Cost-push
    - Producers of goods and services have to pay more for supplies, and pass the costs on to consumers
  - Exchange rates
    - Strength of the dollar in world markets subsequently changes its value because (for example) corporations will increase prices to make up for a loss in the world market value.

Hyperinflation

- The phenomenon of demand-pull leads to a positive feedback mechanism.
  - If we expect inflation to occur, we will want to spend our money as quickly as possible, rather than waiting for it to become worthless
  - The faster we and our fellow citizens spend our money, the greater the demand-pull, and hence the higher the rate of inflation
  - See examples, including from Zimbabwe (2007-2009) and Germany (1920s) (hyperinflation examples)

Definitions for Considering Inflation in Engineering Economy

- Inflation rate (f)
  - Annual rate of increase in the number of dollars needed to pay for the same services
- Real interest rate (i')
  - Measures the 'real' growth of our money, excluding the effect of inflation (inflation-free rate)
  - Increase in purchasing power
- Market interest rate (i)
  - The rate that one obtains in the general marketplace (combined rate—because it includes both inflation and real interest)

Definitions for Considering Inflation in Engineering Economy, cont'd

- Mathematical relationship for market rate:
  - $i = i' + f + i'f$ *or, equivalently,* $i' = (i-f)/(1+f)$
  - **Example 1:** Base salary $50k. If you earn 10% more, but inflation rises by 6%, then your real increase in earning is less than 10%: It's (10%-6%) / (1+6%) = 3.8%
  - **Example 2**: if you earn 1.5% in a year on a savings certificate (GIC) in the bank, but inflation (all costs in general) rise by 2% that year, then i' = -.49%: You lost money in real purchasing terms.

Definitions for Considering Inflation in Engineering Economy, cont'd

- **Actual dollars:**
  - What we normally think of as actually existing physically. The number you see on your bill.
  - Sometimes called inflated dollars because they carry the effect of inflation (decreased purchase power)
  - Market interest rates are connected to actual dollars.

- **Real dollars:**
  - Constant dollars that represent purchasing power of a base year (inflation-free dollars)
  - Real dollars are calculated, by adjusting for (stripping out the effect of) inflation

Definitions for Considering Inflation in Engineering Economy, cont'd

Building on Example 1:

- Next year's pay in actual dollars: \$55,000
- Next year's pay in real dollars: \$50,000 x (1+3.8%) = \$51,887
- Meaning of "real"

Inflation: Problem

A university scholarship established 25 years ago was $10,000. It was increased this year to $18,000. If the average inflation rate over those 25 years was 3% per year, has the increase been enough to offset inflation?

<see Excel example>

Inflation: Problem, cont'd

Solution

Amount required to offset inflation

$$F = 10{,}000(F/P, 3\%, 25)$$
$$= 10{,}000(2.0938)$$
$$= \$20{,}938 > \$18{,}000$$

Therefore, the increase is not enough to offset inflation.

Analysis: Real Dollars versus Actual Dollars

- Two ways to approach economic analysis:
  - Ignore inflation.
  - Incorporate inflation.
- In some analyses, inflation is addressed by using real-dollar terms and using a "real" interest rate because it is generally assumed that costs and benefits will increase at the same rate of inflation as the economy as a whole.
- There are advantages to working in either assumption.

Analysis: Real Dollars versus Actual Dollars

- Each analysis assumption has some advantages.
- For example, future budgeting requires 'actual' dollars.
  Which method is best for decision making?
- Converting to 'real' dollars requires coming up with one inflation rate to use. Weakness of this approach:
- My recommendation:

Analysis: Real Dollars versus Actual Dollars

Example 14-1:

Suppose a professional golfer wants to invest some recent golf winnings in her hometown bank for one year. Currently, the bank is paying a rate of 5.5% compounded annually. Assume inflation is expected to be 2% a year. In each case, identify i, f, and i'.

The bank is paying a market rate (i). The inflation rate (f) is given. What is the real interest rate (i')?

Working from the version of equation 14-1 in which we have solved for i': *i' = (i-f)/(1+f)*

i'=(0.055 – 0.02) / (1+0.02) = 0.034 = 3.4% per year

Analysis: Real Dollars versus Actual Dollars

Example 14-1:

Suppose a professional golfer wants to invest some recent golf winnings in her hometown bank for one year. Currently, the bank is paying a rate of 5.5% compounded annually. Assume inflation is expected to be 2% a year. In each case, identify i, f, and i'.

The bank is paying a market rate (i). The inflation rate (f) is given. What is the real interest rate (i')?

Working from the version of equation 14-1 in which we have solved for i': *i' = (i-f)/(1+f)*

i'=(0.055 – 0.02) / (1+0.02) = 0.034 = 3.4% per year

This means the golfer will have 3.4% more purchasing power than she had a year ago. At the end of the year, she can buy 3.4% more good and services than she could have at the beginning of the year.

For example, assume she was buying golf balls that cost $5 each, and that she had invested $1,000. At the beginning of the year, she could buy ($1000/$5) = 200 balls.

At year end, she could buy ($1000)(F/P, 5.5%, 1) / ($5 x $(1+0.02)^1$ = $1,055 / $5.10 = 207 balls.

Potential break point

Cash Flows that Inflate at Different Rates

- It is not uncommon for different parameters to inflate at different rates.
- Historical price indexes can be used as one indicator of future estimates (we'll cover those later in this lecture).
- Situation and possible approach:
  - Prices of different commodities in an analysis may inflate at different rates.
  - Use of individual commodity inflation rates:
  - Use of market interest rate:

Different Inflation Rates per Period

- Inflation rates can change over time.
  - Handle by applying the inflation rates in the years they occur and convert to actual dollars.
  - A discount rate can be established and applied to the future actual dollars, when you need to evaluate in present-day terms (like NPW). The chosen discount rate will need to be one that also includes inflationary aspects.

How to work with Inflation

- Use either real rates or market rates
- It's possible to translate
- Sometimes you have to make translations

Different Inflation Rates per Period, cont'd

EXAMPLE 14-7

While working as a clerk at the IGA Store, Rajiv has learned much about the cost of different foods. The kitchen manager at Pacific Diner called recently, requesting Rajiv to estimate the raw material cost over the next five years of introducing rice and dahl (lentils) to the buffet line. To develop his estimate, Rajiv has used his advanced knowledge of soil growing conditions, world demand, and government subsidy programs for these two crops. He has estimated the following data:

- Costs for lentils will inflate at 3% per year for the next three years and then at 4% for the following two years.
- Costs for rice will inflate at 8% per year for the next two years and then will decrease by 2% in each of the following three years.

The kitchen manager wants to know the equivalent annual cost of providing rice and dahl on the buffet line over the five-year period. His before-tax MARR is 20%. An average of 50 kilos each of lentils and rice will be needed every day. The hotel kitchen operates six days a week, 52 weeks a year. Current costs are \$0.35/kg for lentils and \$0.80/kg for rice.

(see Excel example)

Different Inflation Rates per Period, cont'd

EXAMPLE 14-7

While working as a clerk at the IGA Store, Rajiv has learned much about the cost of different foods. The kitchen manager at Pacific Diner called recently, requesting Rajiv to estimate the raw material cost over the next five years of introducing rice and dahl (lentils) to the buffet line. To develop his estimate, Rajiv has used his advanced knowledge of soil growing conditions, world demand, and government subsidy programs for these two crops. He has estimated the following data:

- Costs for lentils will inflate at 3% per year for the next three years and then at 4% for the following two years.
- Costs for rice will inflate at 8% per year for the next two years and then will decrease by 2% in each of the following three years.

The kitchen manager wants to know the equivalent annual cost of providing rice and dahl on the buffet line over the five-year period. His before-tax MARR is 20%. An average of 50 kilos each of lentils and rice will be needed every day. The hotel kitchen operates six days a week, 52 weeks a year. Current costs are \$0.35/kg for lentils and \$0.80/kg for rice.

SOLUTION

Today's cost for one year's supply is

Lentils $\quad \$0.35/\text{kg} \times 50\ \text{kg/day} \times 6\ \text{day/wk} \times 52\ \text{wk/yr} = \$5{,}460/\text{yr}$

Rice $\quad \$0.80/\text{kg} \times 50\ \text{kg/day} \times 6\ \text{day/wk} \times 52\ \text{wk/yr} = \$12{,}480/\text{yr}$

Year	Lentils	Rice	Total
0	\$5,460	\$12,480	
1	5,460(1.03) = 5,624	12,480(1.08) = 13,478	\$19,102
2	5,624(1.03) = 5,793	13,478(1.08) = 14,556	20,349
3	5,793(1.03) = 5,967	$14{,}556(1.02)^{-1} = 14{,}271$	20,238
4	5,967(1.04) = 6,206	$14{,}271(1.02)^{-1} = 13{,}991$	20,197

$$\begin{aligned}\text{EUAC} &= [19{,}102(P/F, 20\%, 1) + 20{,}349(P/F, 20\%, 2) + 20{,}238(P/F, 20\%, 3) \\ &\quad + 20{,}197(P/F, 20\%, 4) + 20{,}171(P/F, 20\%, 5)](A/P, 20\%, 5) \\ &= \$19{,}900 \text{ per year}\end{aligned}$$

Different Inflation Rates per Period, cont'd

EXAMPLE 14-8

If general price inflation is estimated to be 5% for the next five years, 7.5% for the three years after that, and 3% the following five years, at what market interest rate (i) would you have to invest your money to maintain a real purchasing power growth rate (i') of 10% during those years?

SOLUTION

In Years 1–5 you must invest at $0.10 + 0.050 + (0.10)(0.050) = 0.1550 = 15.50\%$ per year.
In Years 6–8 you must invest at $0.10 + 0.075 + (0.10)(0.075) = 0.1825 = 18.25\%$ per year.
In Years 9–13 you must invest at $0.10 + 0.030 + (0.10)(0.030) = 0.1330 = 13.30\%$ per year.

(*Note*: Most interest-bearing investments have fixed, up-front rates that the investor understands well when making an investment. On the other hand, inflation is not quantified, and its effect on our real return is not measured until the end of the year. Therefore, the real investment return (i') may not turn out to be what was originally required.)

(see Excel example)

Analysis challenges

- Two additional examples I created in Excel which aren't in the book
  - Dining out
  - Renting or buying a home
- Revisit fleet selection tool, adding in inflation
- <switch to Excel>

Potential break point

Learning Objectives

Inflation

- Describe inflation, explain how it happens, and discuss its effects on purchasing power
- Define real inflation vs market inflation
- Define real dollars vs actual dollars, and conduct real-dollar and actual-dollar analyses
- Develop and use cash flows that inflate at different interest rates and cash flows subject to different interest rates per period

Indices

- Define and use composite and commodity-specific price indexes

Price Change with Indexes

- Comparing 2010-based dollars with 2015-based dollars is like comparing apples and oranges. They don't have the same purchasing power.
- *Imagine using a 20-year old estimate for purchasing a turbine: is it of much use? What if the estimate for the building to house it is 10 years old? This won't work… You need prices in the same terms (same years), and (most helpfully) in the current year or at least a recent year.*
- Price indexes measure inflation. They describe the relative price fluctuation of goods and services.

$$\%\,increase, n = \frac{Index\ (n) - Index(n-1)}{Index(n-1)} \times 100\%$$

- To calculate the average rate of increase:
  - Inflation compounds over time, so solve for i in this equation:
    - $F = P(1 + i)^n$

An example of a Price Index

Table 14.1 Benefit-Cost Ratio Analysis

Year	Cost of Postage Stamp	LCI	Annual Increase for n	Year	Cost of Postage Stamp	LCI	Annual Increase for n
1943	$0.03	50.0		1979	0.17	283.3	21.4%
1944	0.03	50.0	0.0%	1980	0.17	283.3	0.0%
1945	0.03	50.0	0.0%	1981	0.17	283.3	0.0%
1946	0.03	50.0	0.0%	1982	0.3	500.0	76.5%
1947	0.03	50.0	0.0%	1983	0.32	533.3	6.7%
1948	0.03	50.0	0.0%	1984	0.32	533.3	0.0%
1949	0.03	50.0	0.0%	1985	0.34	566.7	6.3%
1950	0.03	50.0	0.0%	1986	0.34	566.7	0.0%
1951	0.03	50.0	0.0%	1987	0.36	600.0	5.9%
1952	0.03	50.0	0.0%	1988	0.37	616.7	2.8%
1953	0.03	50.0	0.0%	1989	0.38	633.3	2.7%
1954	0.04	66.7	33.3%	1990	0.39	650.0	2.6%
1955	0.04	66.7	0.0%	1991	0.4	666.7	2.6%
1956	0.04	66.7	0.0%	1992	0.42	700.0	5.0%
1957	0.04	66.7	0.0%	1993	0.43	716.7	2.4%
1958	0.04	66.7	0.0%	1994	0.43	716.7	0.0%
1959	0.04	66.7	0.0%	1995	0.45	750.0	4.7%
1960	0.04	66.7	0.0%	1996	0.45	750.0	0.0%
1961	0.04	66.7	0.0%	1997	0.45	750.0	0.0%
1962	0.04	66.7	0.0%	1998	0.45	750.0	0.0%
1963	0.04	66.7	0.0%	1999	0.46	766.7	2.2%
1964	0.04	66.7	0.0%	2000	0.46	766.7	0.0%
1965	0.04	66.7	0.0%	2001	0.47	783.3	2.2%
1966	0.04	66.7	0.0%	2002	0.48	800.0	2.1%
1967	0.04	66.7	0.0%	2003	0.48	800.0	0.0%
1968	0.04	66.7	0.0%	2004	0.49	816.7	2.1%
1969	0.06	100.0	50.0%	2005	0.5	833.3	2.0%
1970	0.06	100.0	0.0%	2006	0.51	850.0	2.0%
1971	0.07	116.7	16.7%	2007	0.52	866.7	2.0%
1972	0.08	133.3	14.3%	2008	0.52	866.7	0.0%
1973	0.08	133.3	0.0%	2009	0.54	900.0	3.8%
1974	0.08	133.3	0.0%	2010	0.57	950.0	5.6%
1975	0.08	133.3	0.0%	2011	0.59	983.3	3.5%
1976	0.1	166.7	25.0%	2012	0.61	1,016.7	3.4%
1977	0.12	200.0	20.0%	2013	0.63	1,050.0	3.3%
1978	0.14	233.3	16.7%				

An example of a Price Index

Table 14.1 Benefit-Cost Ratio Analysis

Year	Cost of Postage Stamp	LCI	Annual Increase for n	Year	Cost of Postage Stamp	LCI	Annual Increase for n
1943	$0.03	50.0		1979	0.17	283.3	21.4%
1944	0.03	50.0	0.0%	1980	0.17	283.3	0.0%
1945	0.03	50.0	0.0%	1981	0.17	283.3	0.0%
1946	0.03	50.0	0.0%	1982	0.3	500.0	76.5%
1947	0.03	50.0	0.0%	1983	0.32	533.3	6.7%
1948	0.03	50.0	0.0%	1984	0.32	533.3	0.0%
1949	0.03	50.0	0.0%	1985	0.34	566.7	6.3%
1950	0.03	50.0	0.0%	1986	0.34	566.7	0.0%
1951	0.03	50.0	0.0%	1987	0.36	600.0	5.9%
1952	0.03	50.0	0.0%	1988	0.37	616.7	2.8%
1953	0.03	50.0	0.0%	1989	0.38	633.3	2.7%
1954	0.04						
1955	0.04						
1956	0.04						
1957	0.04						
1958	0.04						
1959	0.04						
1960	0.04						
1961	0.04						
1962	0.04						
1963	0.04						
1964	0.04						
1965	0.04						
1966	0.04						
1967	0.04						
1968	0.04						
1969	0.06						
1970	0.06						
1971	0.07						
1972	0.08						
1973	0.08						
1974	0.08						
1975	0.08						
1976	0.1						
1977	0.12	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
1978	0.14	233.3	16.7%				

Year	Cost of Postage Stamp	LCI	Annual Increase for n
1967	0.04	66.7	0.0%
1968	0.04	66.7	0.0%
1969	0.06	100.0	50.0%
1970	0.06	**100.0**	0.0%
1971	0.07	116.7	16.7%
1972	0.08	133.3	14.3%

Composite versus Commodity Indexes

- There are two types of Cost indexes:
  - Composite indexes
    - To track historical prices of bundles or market baskets of assets
    - Examples:
      - Consumer Price Index (CPI)
        - Statistics Canada provides as an indicator of inflation
      - Producer Price Index (PPI)
  - Commodity specific indexes
    - Examples: Construction labour, iron-ore, and other specific products

- Which is best to use?

One that best matches your situation

Composite versus Commodity Indexes, cont'd

EXAMPLE 14-5

In January 2005, bids were opened for a new building in Los Angeles. The low bid and the final construction cost were \$5.25 million. Another building of the same size, quality, and purpose is planned with a bid opening in January 2020. Estimate the new building's low bid and cost.

SOLUTION

According to the website just cited, in January 2016 the California Construction Cost Index (CCCI) had a value of 6,106 and in January 2005 the value was 4,339. If we wanted a cost estimate for January 2016, we could simply use the former value. But we want a value for January 2020, which is outside our data set. (That is true for all future estimates.)

(see Excel example)

Composite versus Commodity Indexes, cont'd

(see Excel example)

EXAMPLE 14-5

In January 2005, bids were opened for a new building in Los Angeles. The low bid and the final construction cost were \$5.25 million. Another building of the same size, quality, and purpose is planned with a bid opening in January 2020. Estimate the new building's low bid and cost.

SOLUTION

According to the website just cited, in January 2016 the California Construction Cost Index (CCCI) had a value of 6,106 and in January 2005 the value was 4,339. If we wanted a cost estimate for January 2016, we could simply use the former value. But we want a value for January 2020, which is outside our data set. (That is true for all future estimates.)

The solution is to estimate the average annual rate of increase, and then to apply that for the longer period.

$$F = 6{,}106,\ P = 4{,}339,\ n = 11,\ \text{find } f$$
$$F = P(1 + f)^n$$
$$f = (6{,}106/4{,}339)^{1/11} - 1 = 3.15\% \text{ per year}$$

Now we can apply the inflation rate for $n = 15$ years to the cost of the building in 2005.

$$F = \$5.25 \text{ million} \times (1.0315)^{15} = \$8.36 \text{ million}$$

How to Use Price Indexes in Engineering Economic Analysis

- Historical indexes are usually better indicators of future prices than other predictions.

How to Use Price Indexes in Engineering Economic Analysis

Except:

.

- Historical indexes are usually better indicators of future prices than other predictions.

How to Use Price Indexes in Engineering Economic Analysis

- Historical indexes are usually better indicators of future prices than other predictions.
- You can use "average historical percentage increases" from indexes along with other sources to estimate costs and benefits.

Details matter:

How to Use Price Indexes in Engineering Economic Analysis

- Historical indexes are usually better indicators of future prices than other predictions.
- You can use "average historical percentage increases" from indexes along with other sources to estimate costs and benefits.
- If no specific index exists, use the best matching composite index to make the calculation.

How to Use Price Indexes in Engineering Economic Analysis, cont'd

Table 14-2 CPI Index Values and Yearly Percentage Increases 1952–2011

2002 = 100

Year	CPI Value*	CPI % Change	Year	CPI Value*	CPI % Change	Year	CPI Value*	CPI % Change
1952	14.2	2.9%	1972	21.9	4.8%	1992	84	1.4%
1953	14	−1.4	1973	23.6	7.8	1993	85.6	1.9
1954	14.1	0.7	1974	26.2	11	1994	85.7	0.1
1955	14.1	0	1975	29	10.7	1995	87.6	2.2
1956	14.3	1.4	1976	31.1	7.2	1996	88.9	1.5
1957	14.8	3.5	1977	33.6	8	1997	90.4	1.7
1958	15.2	2.7	1978	36.6	8.9	1998	91.3	1
1959	15.3	0.7	1979	40	9.3	1999	92.9	1.8
1960	15.5	1.3	1980	44	10	2000	95.4	2.7
1961	15.7	1.3	1981	49.5	12.5	2001	97.8	2.5
1962	15.9	1.3	1982	54.9	10.9	2002	100	2.2
1963	16.1	1.3	1983	58.1	5.8	2003	102.8	2.8
1964	16.4	1.9	1984	60.6	4.3	2004	104.7	1.8
1965	16.8	2.4	1985	63	4	2005	107	2.2
1966	17.5	4.2	1986	65.6	4.1	2006	109.1	2
1967	18.1	3.4	1987	68.5	4.4	2007	111.5	2.2
1968	18.8	3.9	1988	71.2	3.9	2008	114.1	2.3
1969	19.7	4.8	1989	74.8	5.1	2009	114.4	0.3
1970	20.3	3	1990	78.4	4.8	2010	116.5	1.8
1971	20.9	3	1991	82.8	5.6	2011	119.9	2.9

*2002 = 100
Source: Statistics Canada

How to Use Price Indexe Economic Analys

Table 14-2 CPI Index Values and Yearly Percentage Incre

2002 = 100

Year	CPI Value*	CPI % Change
1992	84	1.4%
1993	85.6	1.9
1994	85.7	0.1
1995	87.6	2.2
1996	88.9	1.5
1997	90.4	1.7
1998	91.3	1
1999	92.9	1.8
2000	95.4	2.7
2001	97.8	2.5
	100	2.2
2003	102.8	2.8
2004	104.7	1.8
2005	107	2.2
2006	109.1	2
2007	111.5	2.2
2008	114.1	2.3
2009	114.4	0.3
2010	116.5	1.8
2011	119.9	2.9

Historical average

Recent significant changes

*2002 = 100
Source: Statistics Canada

How to Use Price Indexes in Engineering Economic Analysis, cont'd

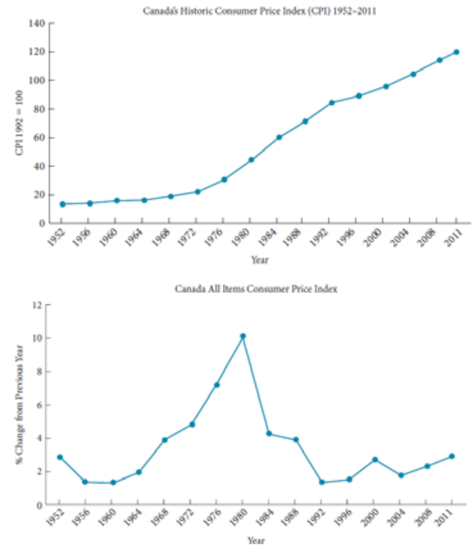
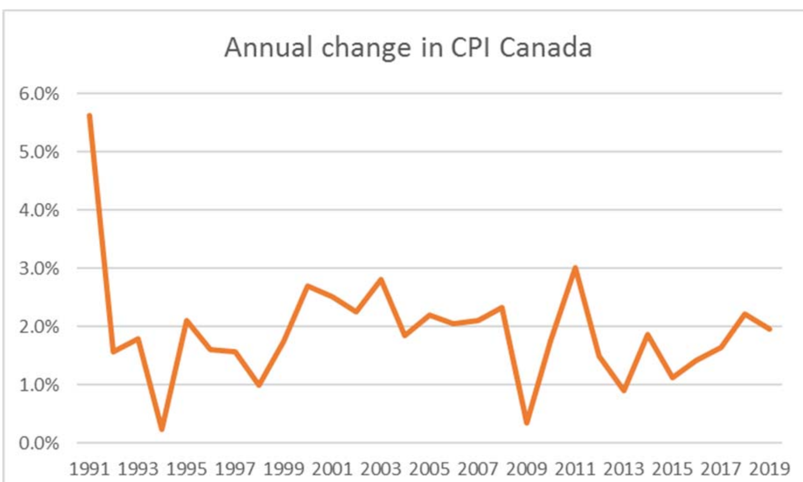
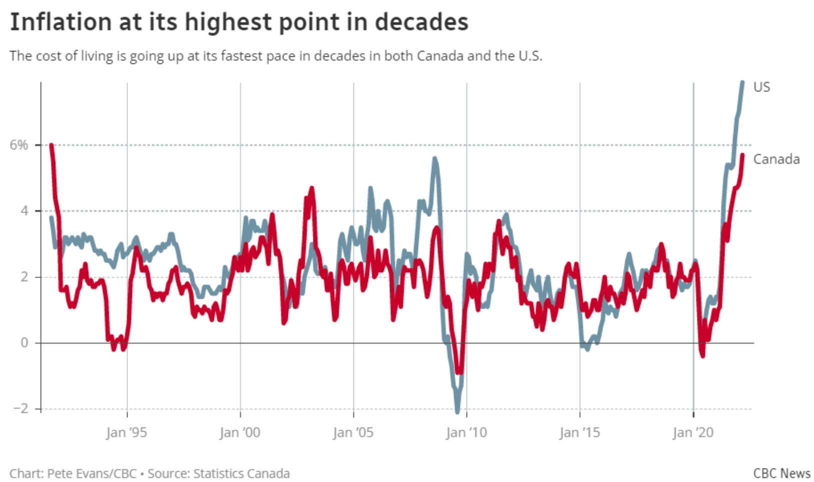


FIGURE 14-5 CPI historical inflation rate.

How to Use Price Indexes in Engineering Economic Analysis, cont'd

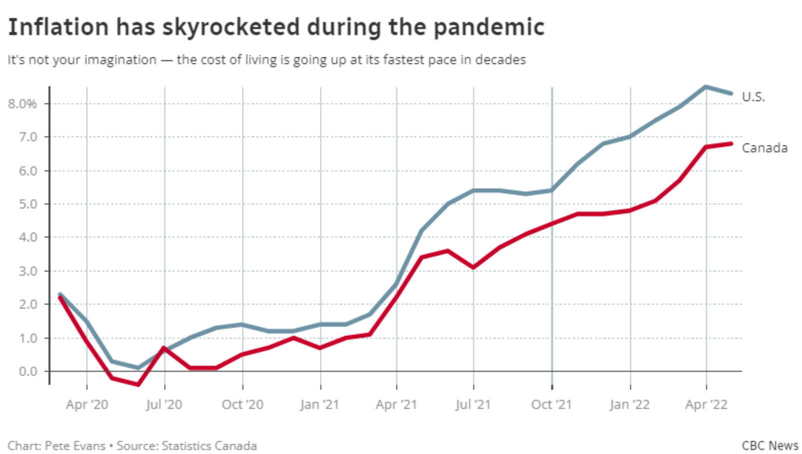


Recent Significant Changes in Inflation



Source: https://www.cbc.ca/news/business/canada-inflation-february-1.6386536

Recent Significant Changes in Inflation

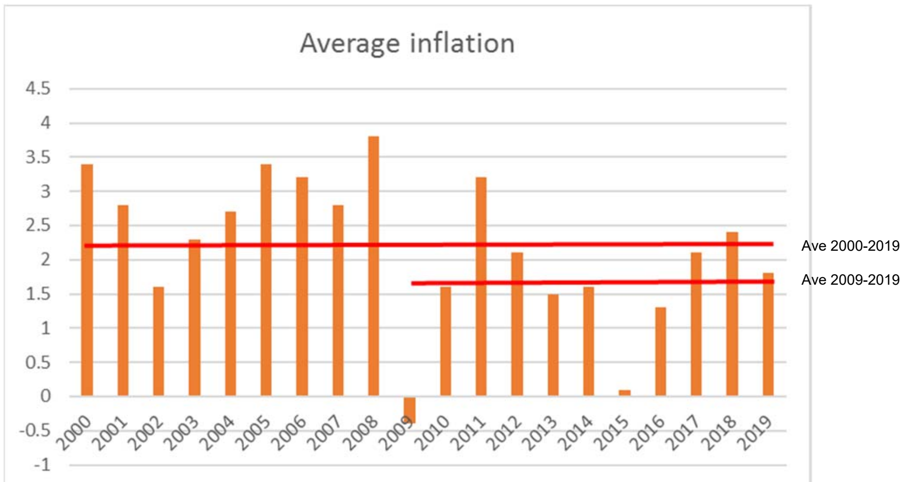


Food 9.7%, shelter 7.4% annual increases

Drivers?

Source: https://www.cbc.ca/news/business/canada-inflation-april-1.6457520

Inflation and the Cost of Borrowed Money



Inflation and the Cost of Borrowed Money

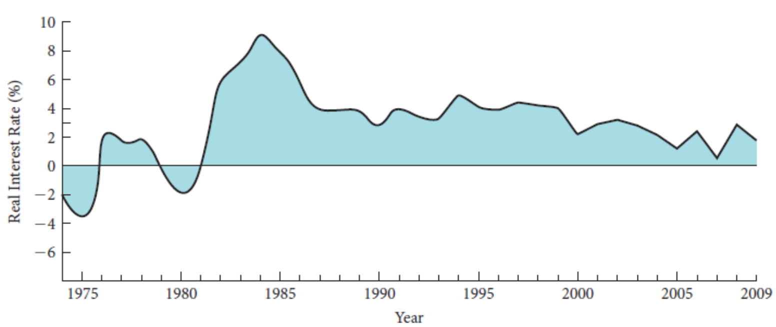


FIGURE 14-6 *The real interest rate*. The interest rate on 20-year US Treasury bonds *minus* the inflation rate, *f*, as measured by changes in the US Consumer Price Index.

Price Indexes (Ch 14 ppt Problem 2)

An item with a cost of $1200 in 1997 is estimated to cost $2100 in 2009. If the cost index in 1997 was 435, what is the cost index for 2009?

<see Excel example>

Price Indexes: Problem, cont'd

Solution

$$2100 = 1200\left(\frac{index}{435}\right)$$

$$index = 761.25$$