The Impact of Inflation

Consider the following…

A large tech company establishes a major office in a small college town.

The company employs 1500 people: 750 are single, 375 have partners, 375 have families.

Salaries are substantially higher than the average for the area.

What will be the effect on prices for 1BR and 2BR apartments and single-family homes in the area? What about areas adjacent to the college town?

Consider the following...

What will be the effect on prices for 1BR and 2BR apartments and single-family homes in the area?

Before the tech boom, the supply and demand of housing in the college town was in equilibrium.

With the tech workers moving there, demand for housing goes up.

In the short run, the supply of housing is fixed.

The higher demand and lack of supply creates competition for housing that does become available.

With more disposable income, tech employees are willing and able to pay more for housing.

Like an auction, housing prices go up until the highest bidder wins, usually the tech employee.

Housing prices re-equilibrate at the higher price.

Consider the following…

After the tech boom, developers realize opportunity in new, higher-end housing options to meet the demands of a more affluent population.

Older areas are torn down, and new housing developments take over, but a higher price point.

The supply of nice housing attracts more workers that can afford it, establishing a new price equilibrium in the college town housing market.

What about the adjacent areas?

People living in the college town see higher housing prices. Many are "priced out of the market" and need to move to lower cost adjacent locations.

The surrounding areas now see an influx of more people seeking housing, and the cycle repeats itself.

Demand-Driven Price Increases

Market supply and demand is in equilibrium.

Higher demand for the same supply drives up prices.
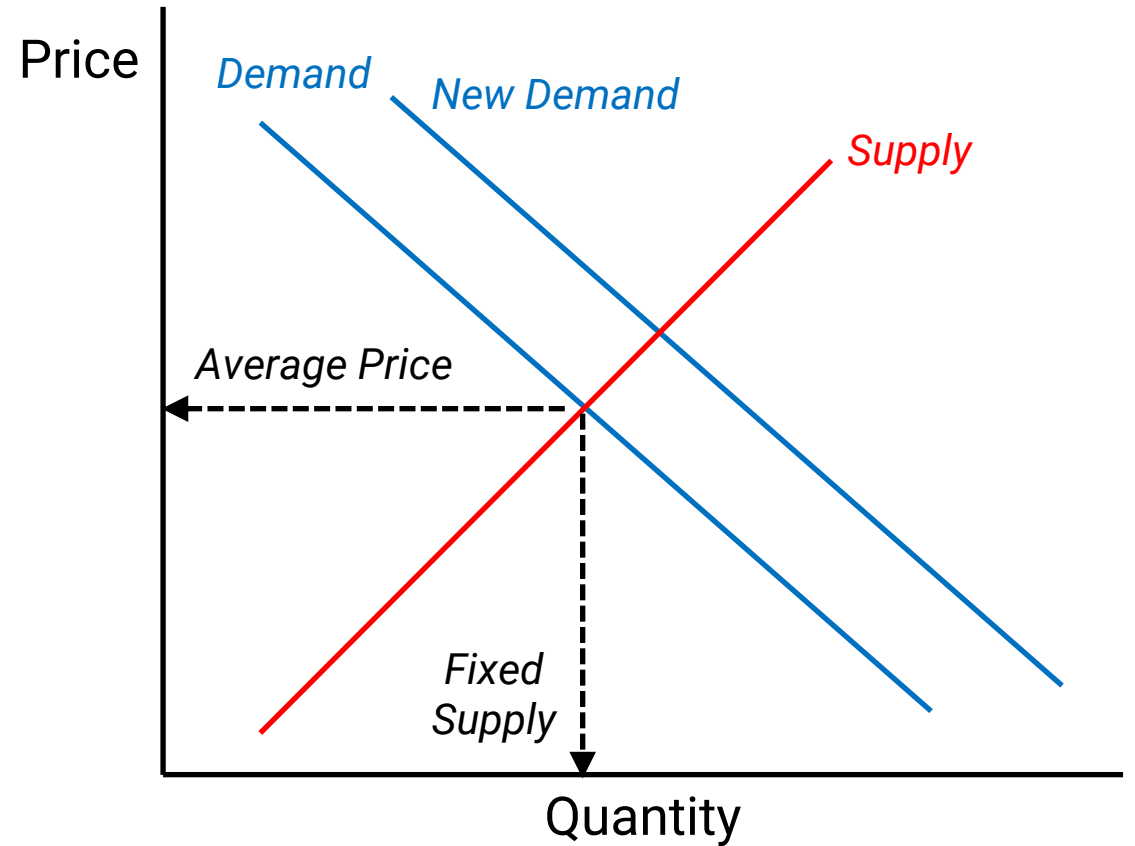
Demand-Driven Price Increases

Market supply and demand is in equilibrium.

Higher demand for the same supply drives up prices.

The average price increases, especially where demand is highest.

The higher average price encourages new supply priced for a more affluent market.

Higher prices quickly spread to other markets.

If supply is constant, new demand drives up prices in the short-term and the long-term.

Price

New Supply

Demand   *New Demand*

Supply

New Average Price

Average Price

Fixed Supply

Quantity
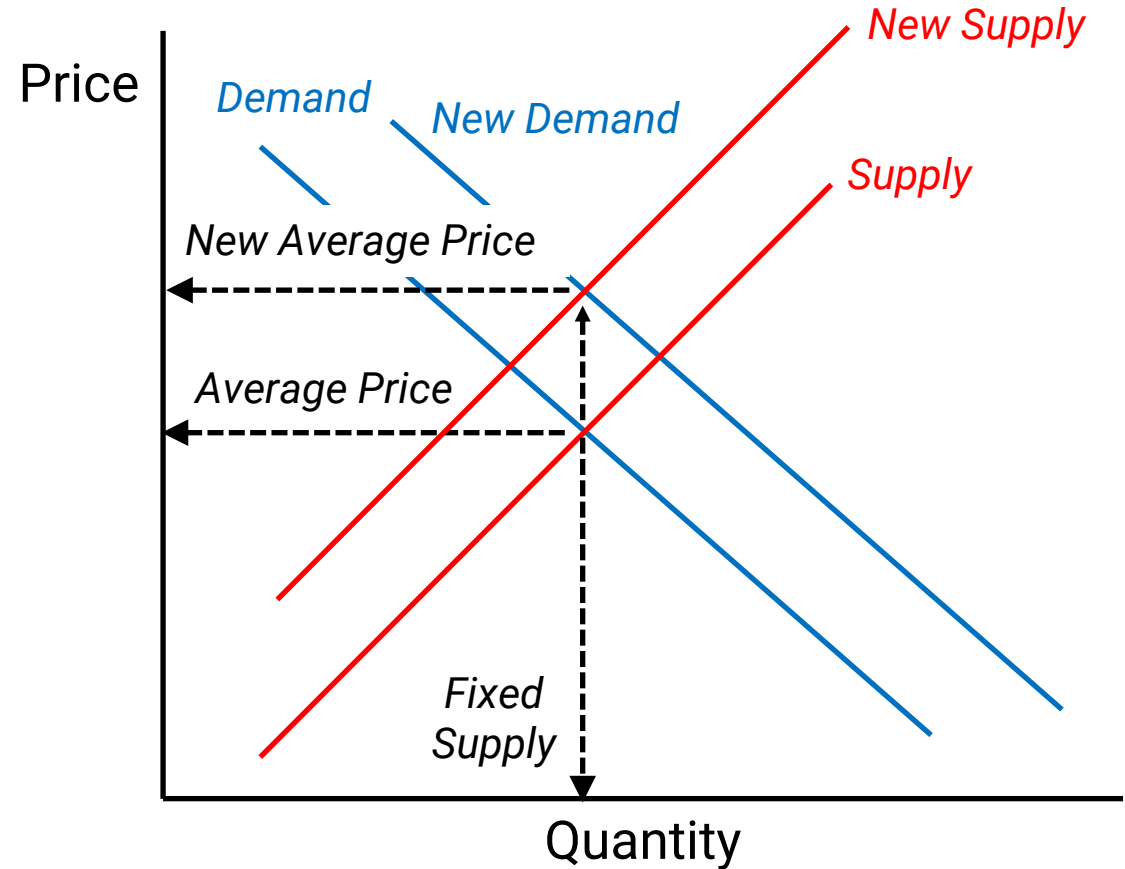
Consider the following…

You currently pay $10 for baby formula.

A supply chain disruption reduces the supply of baby formula.

Demand remains the same.

What will be the effect on the price for baby formula?
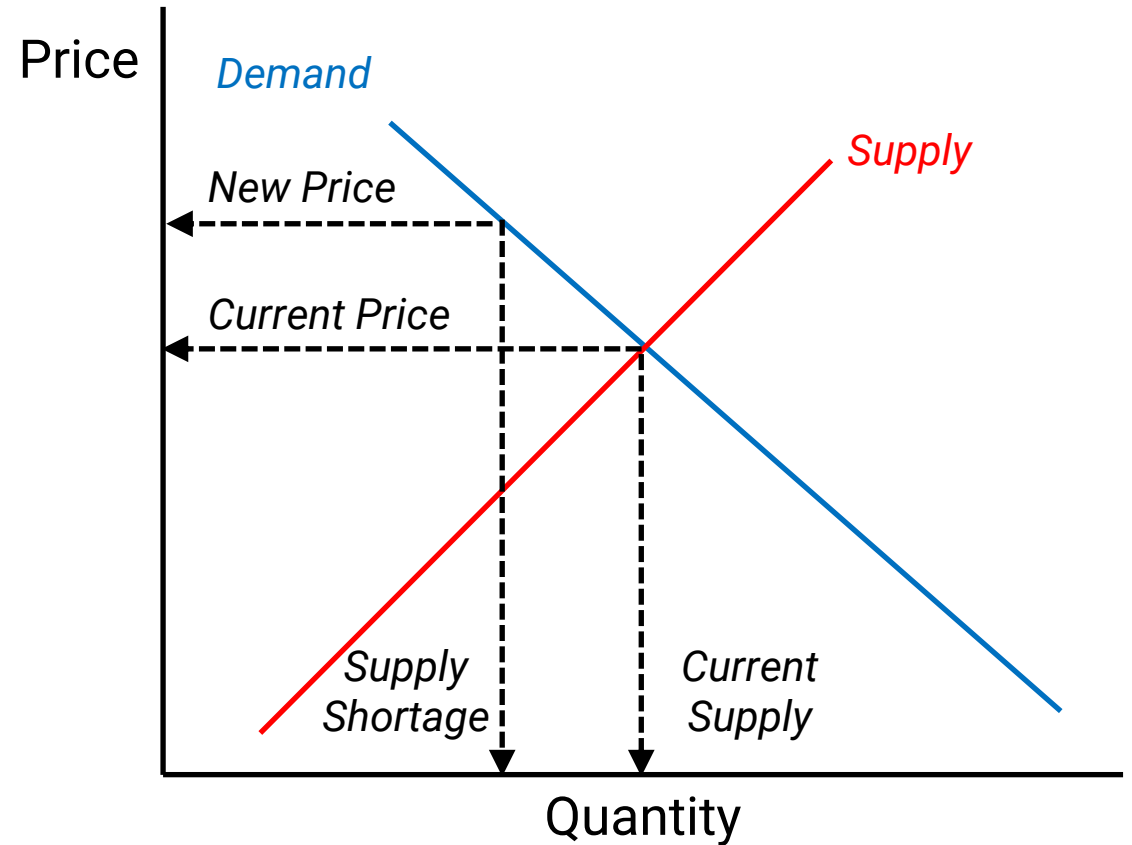
Supply-Driven Price Increases

Market supply and demand are in equilibrium.

A supply shortage drives up prices.

Higher prices encourage new supply chain options.

Supply shortages drive up prices in the short-term, but eventually return to pre-shortage levels over time.

Price

Demand

Supply

New Price

Current Price

Supply
Shortage

Current
Supply

Quantity

Inflation and Increasing Prices

Inflation: the general increase in price for goods and services from one year to the next - usually due to some macroeconomic affects such as supply and demand, money supply, and interest rates set by the Federal Reserve.

If the inflation rate for 2022 is 7%, and the price of a weeks worth of groceries costs you $100, what will the same groceries cost you in 2023 if inflation stays at this rate?

$$Cost_{2023} = Cost_{2022} * (1 + \text{Inflation Rate})$$

$$Cost_{2023} = \$100 (1 + 0.07)$$

$$\textbf{Cost}_{\textbf{2023}} \textbf{ = \$107}$$

Inflationary Impacts on Future Prices

What will $100 of Groceries (today) cost 10 years from now?

$Cost_{Future} = Cost_{Today} * (1 + Inflation\ Rate)^N$

$Cost_{2032} = \$100\ (1 + 0.07)^{10}$

$Cost_{2032} = \$100\ (1.97)$

$Cost_{2032}$ = $197!

$$FC = PC\ (1+f)^N$$

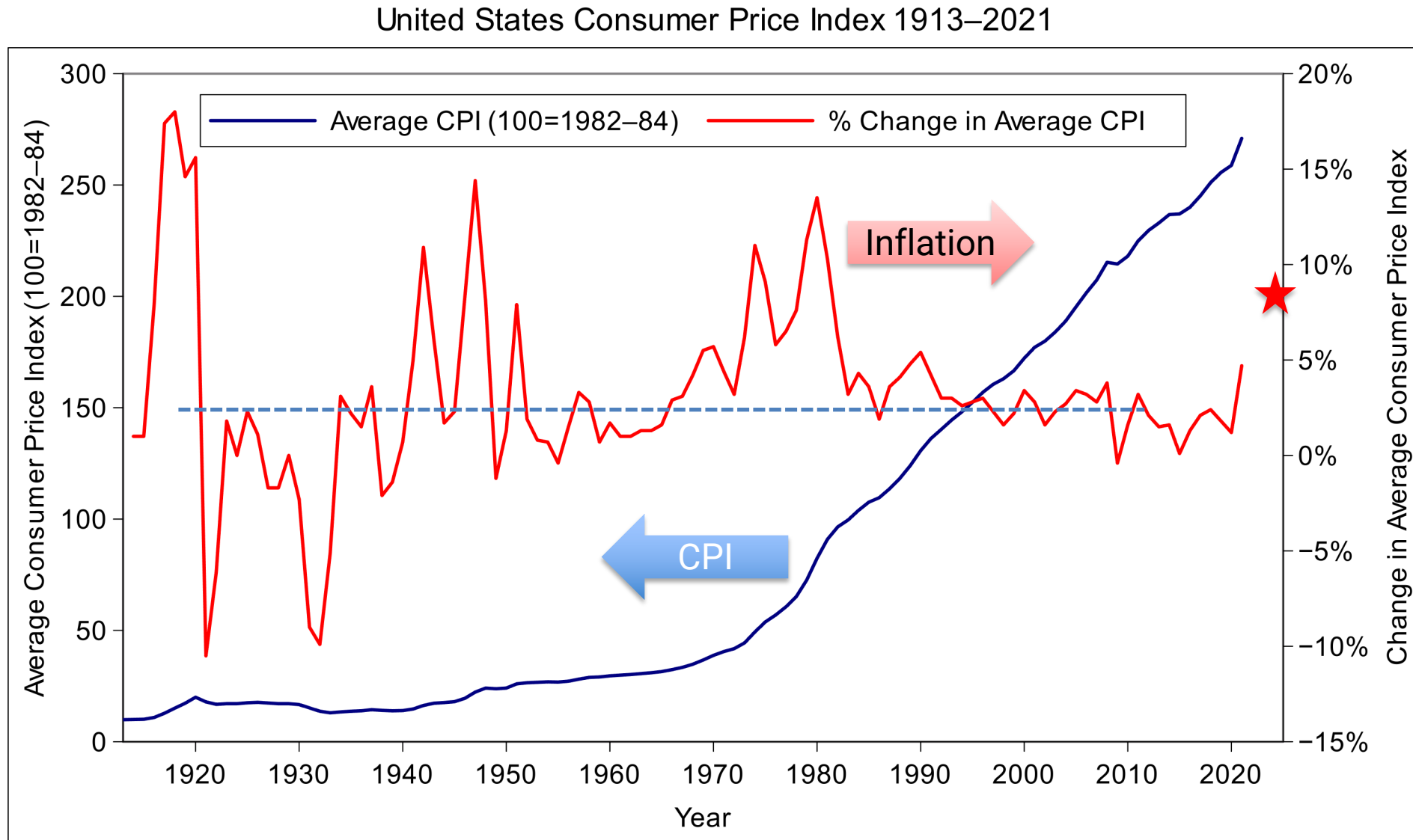*Where:*
    FC = future cost of a good or service
    PC = present cost of a good or service
    f   = inflation rate
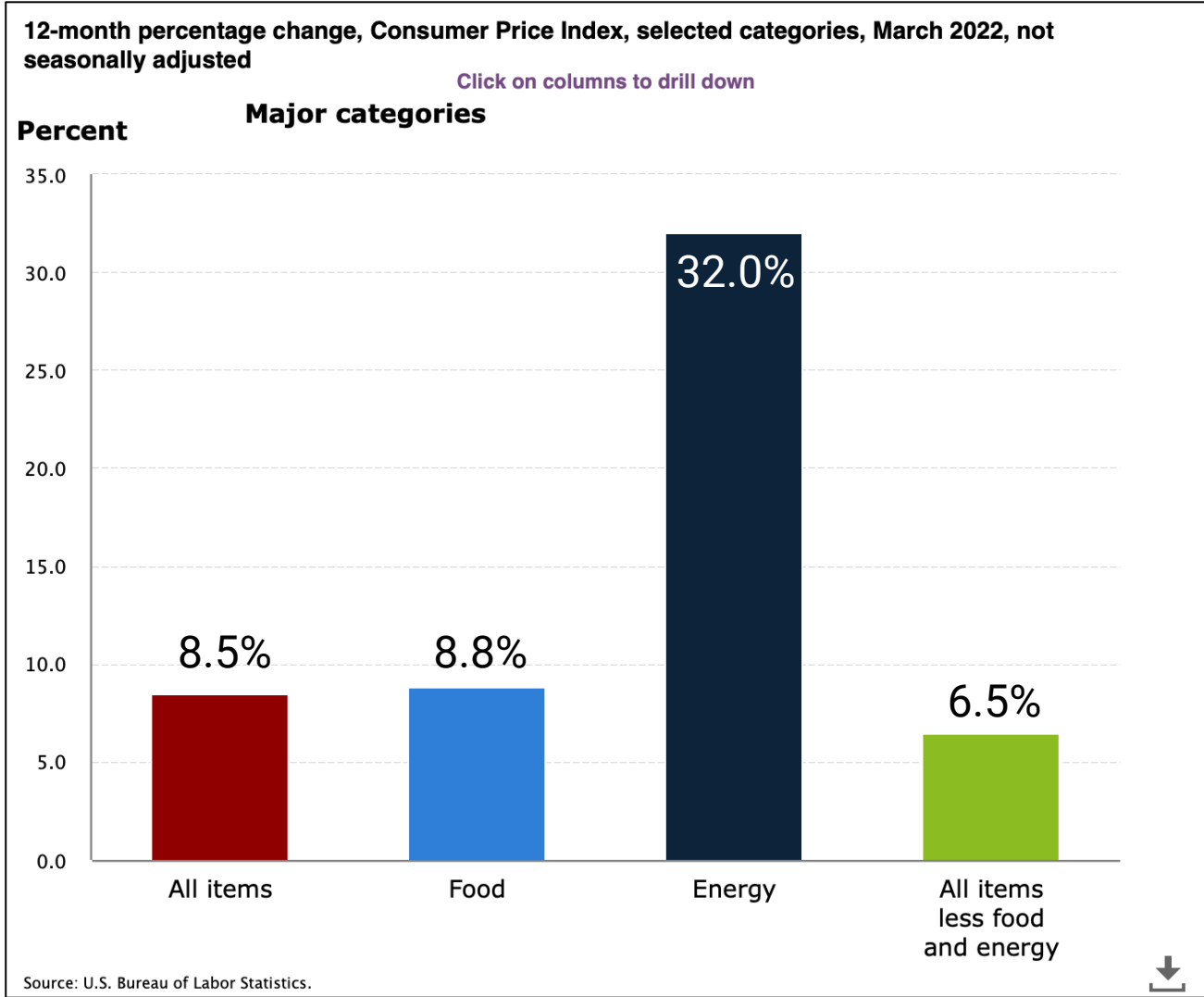   N   = number of years

Hmmm.   Looks strangely familiar.

It costs more in the future than it does to buy the same products today.

The Inflation Rate & The Consumer Price Index (CPI)

United States Consumer Price Index 1913–2021

The Inflation Rate & The Consumer Price Index (CPI)

12-month percentage change, Consumer Price Index, selected categories, March 2022, not seasonally adjusted

Click on columns to drill down

Major categories

Percent

- All items: 8.5%
- Food: 8.8%
- Energy: 32.0%
- All items less food and energy: 6.5%

Source: U.S. Bureau of Labor Statistics.

CPI Average Price Data, U.S. city average (AP)
(Select from list below)

- ☐ Bacon, sliced, per lb. - APU0000704111
- ☐ Bananas, per lb. - APU0000711211
- ☐ Bread, white, pan, per lb. - APU0000702111
- ☐ Chicken, fresh, whole, per lb. - APU0000706111
- ☐ Coffee, 100%, ground roast, all sizes, per lb. - APU0000717311
- ☐ Eggs, grade A, large, per doz. - APU0000708111
- ☐ Flour, white, all purpose, per lb. - APU0000701111
- ☐ Milk, fresh, whole, fortified, per gal. - APU0000709112
- ☐ Oranges, navel, per lb. - APU0000711311
- ☐ Rice, white, long grain, uncooked, per lb. - APU0000701312
- ☐ Tomatoes, field grown, per lb. - APU0000712311
- ☐ Electricity per KWH - APU000072610
- ☐ Fuel oil #2 per gallon - APU000072511
- ☐ Gasoline, all types, per gallon - APU00007471A
- ☐ Gasoline, unleaded regular, per gallon - APU000074714

The Inflation Rate & The Consumer Price Index (CPI)

Compiled monthly by the US Bureau of Labor and Statistics…(bls.gov)

Historical Consumer Price Index for All Urban Consumers (CPI-U): U.S. city average, all items, by month — Continued
[1982-84=100, unless otherwise noted]

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1971	39.8	39.9	40.0	40.1	40.3	40.6	40.7	40.8	40.8	40.9	40.9	41.1
1972	41.1	41.3	41.4	41.5	41.6	41.7	41.9	42.0	42.1	42.3	42.4	42.5
1973	42.6	42.9	43.3	43.6	43.9	44.2	44.3	45.1	45.2	45.6	45.9	46.2
1974	46.6	47.2	47.8	48.0	48.6	49.0	49.4	50.0	50.6	51.1	51.5	51.9
1975	52.1	52.5	52.7	52.9	53.2	53.6	54.2	54.3	54.6	54.9	55.3	55.5
1976	55.6	55.8	55.9	56.1	56.5	56.8	57.1	57.4	57.6	57.9	58.0	58.2
1977	58.5	59.1	59.5	60.0	60.3	60.7	61.0	61.2	61.4	61.6	61.9	62.1
1978	62.5	62.9	63.4	63.9	64.5	65.2	65.7	66.0	66.5	67.1	67.4	67.7
1979	68.3	69.1	69.8	70.6	71.5	72.3	73.1	73.8	74.6	75.2	75.9	76.7
1980	77.8	78.9	80.1	81.0	81.8	82.7	82.7	83.3	84.0	84.8	85.5	86.3
1981	87.0	87.9	88.5	89.1	89.8	90.6	91.6	92.3	93.2	93.4	93.7	94.0
1982	94.3	94.6	94.5	94.9	95.8	97.0	97.5	97.7	97.9	98.2	98.0	97.6
1983	97.8	97.9	97.9	98.6	99.2	99.5	99.9	100.2	100.7	101.0	101.2	101.3
1984	101.9	102.4	102.6	103.1	103.4	103.7	104.1	104.5	105.0	105.3	105.3	105.3
1985	105.5	106.0	106.4	106.9	107.3	107.6	107.8	108.0	108.3	108.7	109.0	109.3
1986	109.6	109.3	108.8	108.6	108.9	109.5	109.5	109.7	110.2	110.3	110.4	110.5
1987	111.2	111.6	112.1	112.7	113.1	113.5	113.8	114.4	115.0	115.3	115.4	115.4
1988	115.7	116.0	116.5	117.1	117.5	118.0	118.5	119.0	119.8	120.2	120.3	120.5
1989	121.1	121.6	122.3	123.1	123.8	124.1	124.4	124.6	125.0	125.6	125.9	126.1
1990	127.4	128.0	128.7	128.9	129.2	129.9	130.4	131.6	132.7	133.5	133.8	133.8
1991	134.6	134.8	135.0	135.2	135.6	136.0	136.2	136.6	137.2	137.4	137.8	137.9
1992	138.1	138.6	139.3	139.5	139.7	140.2	140.5	140.9	141.3	141.8	142.0	141.9
1993	142.6	143.1	143.6	144.0	144.2	144.4	144.4	144.8	145.1	145.7	145.8	145.8
1994	146.2	146.7	147.2	147.4	147.5	148.0	148.4	149.0	149.4	149.5	149.7	149.7
1995	150.3	150.9	151.4	151.9	152.2	152.5	152.5	152.9	153.2	153.7	153.6	153.5
1996	154.4	154.9	155.7	156.3	156.6	156.7	157.0	157.3	157.8	158.3	158.6	158.6
1997	159.1	159.6	160.0	160.2	160.1	160.3	160.5	160.8	161.2	161.6	161.5	161.3
1998	161.6	161.9	162.2	162.5	162.8	163.0	163.2	163.4	163.6	164.0	164.0	163.9
1999	164.3	164.5	165.0	166.2	166.2	166.2	166.7	167.1	167.9	168.2	168.3	168.3
2000	168.8	169.8	171.2	171.3	171.5	172.4	172.8	172.8	173.7	174.0	174.1	174.0
2001	175.1	175.8	176.2	176.9	177.7	178.0	177.5	177.5	178.3	177.7	177.4	176.7
2002	177.1	177.8	178.8	179.8	179.8	179.9	180.1	180.7	181.0	181.3	181.3	180.9
2003	181.7	183.1	184.2	183.8	183.5	183.7	183.9	184.6	185.2	185.0	184.5	184.3
2004	185.2	186.2	187.4	188.0	189.1	189.7	189.4	189.5	189.9	190.9	191.0	190.3
2005	190.7	191.8	193.3	194.6	194.4	194.5	195.4	196.4	198.8	199.2	197.6	196.8
2006	198.3	198.7	199.8	201.5	202.5	202.9	203.5	203.9	202.9	201.8	201.5	201.8
2007	202.416	203.499	205.352	206.686	207.949	208.352	208.299	207.917	208.490	208.936	210.177	210.036
2008	211.080	211.693	213.528	214.823	216.632	218.815	219.964	219.086	218.783	216.573	212.425	210.228
2009	211.143	212.193	212.709	213.240	213.856	215.693	215.351	215.834	215.969	216.177	216.330	215.949
2010	216.687	216.741	217.631	218.009	218.178	217.965	218.011	218.312	218.439	218.711	218.803	219.179
2011	220.223	221.309	223.467	224.906	225.964	225.722	225.922	226.545	226.889	226.421	226.230	225.672
2012	226.665	227.663	229.392	230.085	229.815	229.478	229.104	230.379	231.407	231.317	230.221	229.601
2013	230.280	232.166	232.773	232.531	232.945	233.504	233.596	233.877	234.149	233.546	233.069	233.049
2014	233.916	234.781	236.293	237.072	237.900	238.343	238.250	237.852	238.031	237.433	236.151	234.812
2015	233.707	234.722	236.119	236.599	237.805	238.638	238.654	238.316	237.945	237.838	237.336	236.525
2016	236.916	237.111	238.132	239.261	240.229	241.018	240.628	240.849	241.428	241.729	241.353	241.432
2017	242.839	243.603	243.801	244.524	244.733	244.955	244.786	245.519	246.819	246.663	246.669	246.524
2018	247.867	248.991	249.554	250.546	251.588	251.989	252.006	252.146	252.439	252.885	252.038	251.233
2019	251.712	252.776	254.202	255.548	256.092	256.143	256.571	256.558	256.759	257.346	257.208	256.974
2020	257.971	258.678	258.115	256.389	256.394	257.797	259.101	259.918	260.280	260.388	260.229	260.474
2021	261.582	263.014	264.877	267.054	269.195	271.696	273.003	273.567	274.310	276.589	277.948	278.802
2022	281.148	283.716	287.504	–	–	–	–	–	–	–	–	–

Year												
2015	233.707	234.722	236.119	236.599	237.805	238.638	238.654	238.316	237.945	237.838	237.336	236.525
2016	236.916	237.111	238.132	239.261	240.229	241.018	240.628	240.849	241.428	241.729	241.353	241.432
2017	242.839	243.603	243.801	244.524	244.733	244.955	244.786	245.519	246.819	246.663	246.669	246.524
2018	247.867	248.991	249.554	250.546	251.588	251.989	252.006	252.146	252.439	252.885	252.038	251.233
2019	251.712	252.776	254.202	255.548	256.092	256.143	256.571	256.558	256.759	257.346	257.208	256.974
2020	257.971	258.678	258.115	256.389	256.394	257.797	259.101	259.918	260.280	260.388	260.229	260.474
2021	261.582	263.014	264.877	267.054	269.195	271.696	273.003	273.567	274.310	276.589	277.948	278.802
2022	281.148	283.716	287.504	–	–	–	–	–	–	–	–	–

$\text{CPI}_{2020} = 260.474$

$\text{CPI}_{2021} = 278.802$

$$f_{2021} = \frac{\text{CPI}_{2021} - \text{CPI}_{2020}}{\text{CPI}_{2020}}$$

$$f_{2021} = \frac{278.802 - 260.474}{260.474} = 0.07 = 7.0\%$$

Accounting for Inflation in a Cash Flow Analysis

In many cases, we know certain costs will go up in the future:

- raw materials
- salaries
- energy costs
- …

We take this into account by increasing appropriate costs by the annual inflation rate (often making a 10-year forecast for inflation!).

	A	B	C	D	E	F	G	H	I	J	K
1	**Inflation Example**										
2											
3		End of Year									
4	*Personnel Costs*	1	2	3	4	5	6	7	8	9	10
5	Base-Case	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
6	w 3% inflation	$1,000,000	$1,030,000	$1,060,900	$1,092,727	$1,125,509	$1,159,274	$1,194,052	$1,229,874	$1,266,770	$1,304,773

$$\text{Cost}_{\text{Year N}} = \text{Cost}_{\text{Today}} (1+f)^N$$

Main Takeaways…

Inflation is the general increase in price for goods and services.

Inflation results from many factors, such as increased demand or decreased supply.

The annual inflation rate comes from the Consumer Price Index, the CPI, tracked by the US Bureau of Labor and Statistics.

We account for anticipated price increases in our project financial analyses by forecasting inflationary impacts on future cash flows.

Inflation is something we learn to live with, provided it is not too high (2-3%). And we anticipate it in the future. Therefore, we account for it in our project cash flow analysis.

Next Time…

Building the Business Case

Credits & References

Slide 1: Dates falling dollar by Kuleshin, Adobe Stock (70713883.jpeg).

Slide 2-4: Successful team at work. Group of mixed race business people working together in the creative office by Svitlana, Adobe Stock (310080344.jpeg).

Slide 7: Baby milk formula on kitchen background by Africa Studio, Adobe Stock (118583904.jpeg).

Slide 11: By Original image by donarreiskoffer, new SVG version made with Gnumeric (from BLS data; now covers 1913–2021) - Data source at [1], specifically in the "... index averages" table in this PDF file (US Government – public domain); Original image at File:Consumer Price Index US 1913-2004.png, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=2250088 (accessed May 23, 2022).

Slide 12-13: https://www.bls.gov/charts/consumer-price-index/consumer-price-index-by-category.htm (accessed May 23, 2022).

Slide 16: Salesman painting over charts on wall by ra2 studio, Adobe Stock (103886684.jpeg).