KEEP CALM AND FINANCE ON

Will Inflation Impact a Municipality's Finances?

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What is the Consumer Price Index?

- The Consumer Price Index (CPI) is a measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services

- The CPI reflects spending patterns for each of two population groups: all urban consumers (CPI-U) and urban wage earners and clerical workers (CPI-W)
  - The CPI-U represents about 87% of the total U.S. population
  - The CPI-U, which is not seasonally adjusted, determines the limiting rate for entities subject to PTELL

CPI-U (Unseasonally adjusted) Since 2020

Date	Index	Month Over Month	Year over Year	Year To Date
December 31, 2019	256.974	-0.1%	2.3%	2.3%
January 31, 2020	257.971	0.4%	2.5%	0.4%
February 28, 2020	258.678	0.3%	2.3%	0.7%
March 31, 2020	258.115	-0.2%	1.5%	0.4%
April 30, 2020	256.389	-0.7%	0.3%	-0.2%
May 31, 2020	256.394	0.0%	0.1%	-0.2%
June 30, 2020	257.797	0.5%	0.6%	0.3%
July 31, 2020	259.101	0.5%	1.0%	0.8%
August 31, 2020	259.918	0.3%	1.3%	1.1%
September 30, 2020	260.280	0.1%	1.4%	1.3%
October 31, 2020	260.388	0.0%	1.2%	1.3%
November 30, 2020	260.229	-0.1%	1.2%	1.3%
December 31, 2020	260.474	0.1%	1.4%	1.4%
January 31, 2021	261.582	0.4%	1.4%	0.4%
February 28, 2021	263.014	0.5%	1.7%	1.0%
March 31, 2021	264.877	0.7%	2.6%	1.7%
April 30, 2021	267.054	0.8%	4.2%	2.5%
May 31, 2021	269.195	0.8%	5.0%	3.3%
June 30, 2021	271.696	0.9%	5.4%	4.2%
July 31, 2021	273.003	0.5%	5.4%	4.7%
August 31, 2021		-	-	-
September 30, 2021		-	-	-
October 31, 2021		-	-	-
November 30, 2021		-	-	-
December 31, 2021		-	-	-

Deflationary Effects

Date	Index	Month Over Month	Year over Year	Year To Date
January 31, 2008	211.080	0.5%	4.3%	0.5%
February 28, 2008	211.693	0.3%	4.0%	0.8%
March 31, 2008	213.528	0.9%	4.0%	1.7%
April 30, 2008	214.823	0.6%	3.9%	2.3%
May 31, 2008	216.632	0.8%	4.2%	3.1%
June 30, 2008	218.815	1.0%	5.0%	4.1%
July 31, 2008	219.964	0.5%	5.6%	4.6%
August 31, 2008	219.086	-0.4%	5.4%	4.2%
September 30, 2008	218.783	-0.1%	4.9%	4.1%
October 31, 2008	216.573	-1.0%	3.7%	3.1%
November 30, 2008	212.425	-1.9%	1.1%	1.2%
December 31, 2008	210.228	-1.0%	0.1%	0.1%

Demand-Pull vs. Cost-Push Inflation

- Demand-Pull Inflation
  - Results from demand growing faster than economy's productive capacity
  - Causes overall increase in cost of living and the economy to overheat
- Cost-Push Inflation
  - Results from constricted supply and money is transferred from one economic sector to another
  - An increase in production costs such as raw materials is passed on to consumers in the form of higher prices for finished goods
  - Restricts output, drives up prices, and erodes incomes, leading to weaker economy

Inflation of 1980: Cost-Push Inflation

- CPI in late 1980s [(1)]
  - 1978: 9.0%
  - 1979: 13.3%
  - 1980: 12.5%
  - 1981: 8.9%

- Causes of inflation
  - Iranian revolution caused oil price shock of 1979
  - Led to stagflation; in 1980 [(2)]:
    - GDP growth was -0.3%
    - Unemployment was 7.2%
    - Inflation was 12.5%
  - Traditional economic theory suggested this should not have been possible since inflation should have an inverse relationship with unemployment

(1) US Department of Treasury
(2) The balance, "Fed Funds Rate History: Its Highs, Lows, and Charts"

Inflation of 1980: Cost-Push Inflation

- Municipal bond interest rates rose as the Fed increased the Fed Funds rate to 18% in 1980 [(1)] in order to battle inflation
  - Resulted in a flat yield curve
  - 1-Year US Treasury reached a peak in 1981 of 17.31% [(2)]
  - 10-Year US Treasury reached a peak in 1981 of 15.84% [(2)]
  - 30-Year US Treasury reached a peak in 1981 of 15.21% [(2)]

(1) The Bond Buyer, "Inflation: Risk or reality for US bond markets"
(2) Federal Reserve Board

Inflation of Mid-2000s: Demand-Pull Inflation

- CPI in mid-2000s
  - 2003: 1.9%
  - 2004: 3.3%
  - 2005: 3.4%
  - 2006: 2.5%
  - 2007: 4.1%
  - 2008: 0.1% (January 2008 – July 2008, CPI was 4.6%)

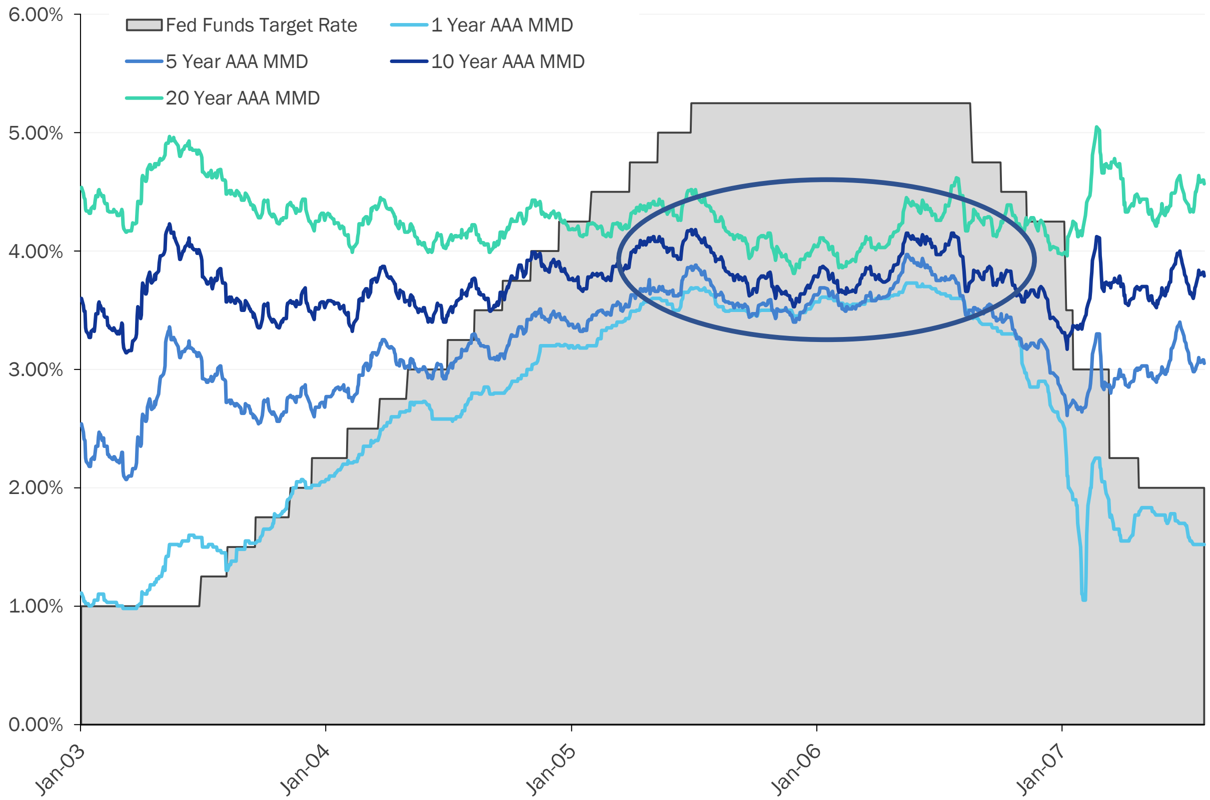
- Financial derivatives, like Credit Default Swaps, were a form of technological innovation that drove demand-pull inflation
  - As banks increased demand for mortgages to underwrite these derivatives, the price of housing increased
  - The Fed also implemented easy monetary policy by lowering the Fed Funds Rate to 1% by 2003
  - With low interest rates and nearly no down payment requirements (due to deregulation), Americans were incentivized to take out mortgages and use residual income for other goods and services
  - As a result, the housing market fell into a crisis causing the 2008 recession

Inflation of Mid-2000s: Flattening Yield Curve

- In order to constrain demand-pull inflation, the Fed started increasing Fed Funds Target Rate
  - Hit 5.25% by June 2006, remained there until September 2007
  - Eventually came down 0.25% in December 2008, remained there for seven years

- Municipal bond interest rates responded to Fed's initiatives
  - Short-term rates increased as Fed Funds Rate increased
  - Long-term rates remained relatively stable throughout this period
  - Yield curve flattened

Inflation of Mid-2000s: Flattening Yield Curve



What Is Defining Inflation Now?

- Some argue it is increased monetary supply (demand-pull) as the Fed prints $120 billion per month in the form of its asset purchasing program and the federal government passes trillion-dollar stimulus and infrastructure packages

- Some argue it is a cost-push inflation as supply shocks create a shortage of necessary materials, resulting in higher prices for consumers

- Is the current inflation <u>transitory</u>?
  - The Fed has stated that it believes inflation to be transitory
  - Caused by base effects, pent-up consumer spending and supply bottlenecks
  - If so, how long is transitory? Through end of 2021? 2022?
  - What does the bond market tell us?

Inflation of Mid-2000s: Flattening Yield Curve

Concluding Thoughts

- If base effects are a significant cause of the current inflation, we should expect to see inflation fall in the later months of this year
- If supply chain bottlenecks are a significant cause of the current inflation, we should also expect to see inflation fall as those bottlenecks are resolved
- Broader macroeconomic deflationary pressures remain
  - Globalization
  - Technology
  - Aging demographics
- If inflation does not prove to be transitory, the Fed will have a much larger problem on its hands than it originally thought
  - Interest rates will likely rise to counter the sustained inflation
  - This may cause another flattening of the yield curve if short-term rates increase more than long-term rates

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What Are The Challenges of Investing With High Inflation?

- Inflation erodes the value of a bond’s coupon
  - Real interest rates (bond yield minus inflation) can turn negative
- Inflation can cause short-term and long-term rates to rise
  - Rising rates put downward pressure on bond prices
- Interest rates can move quickly and unexpectedly
- Inflation can have negative impacts on issuers’ credit quality

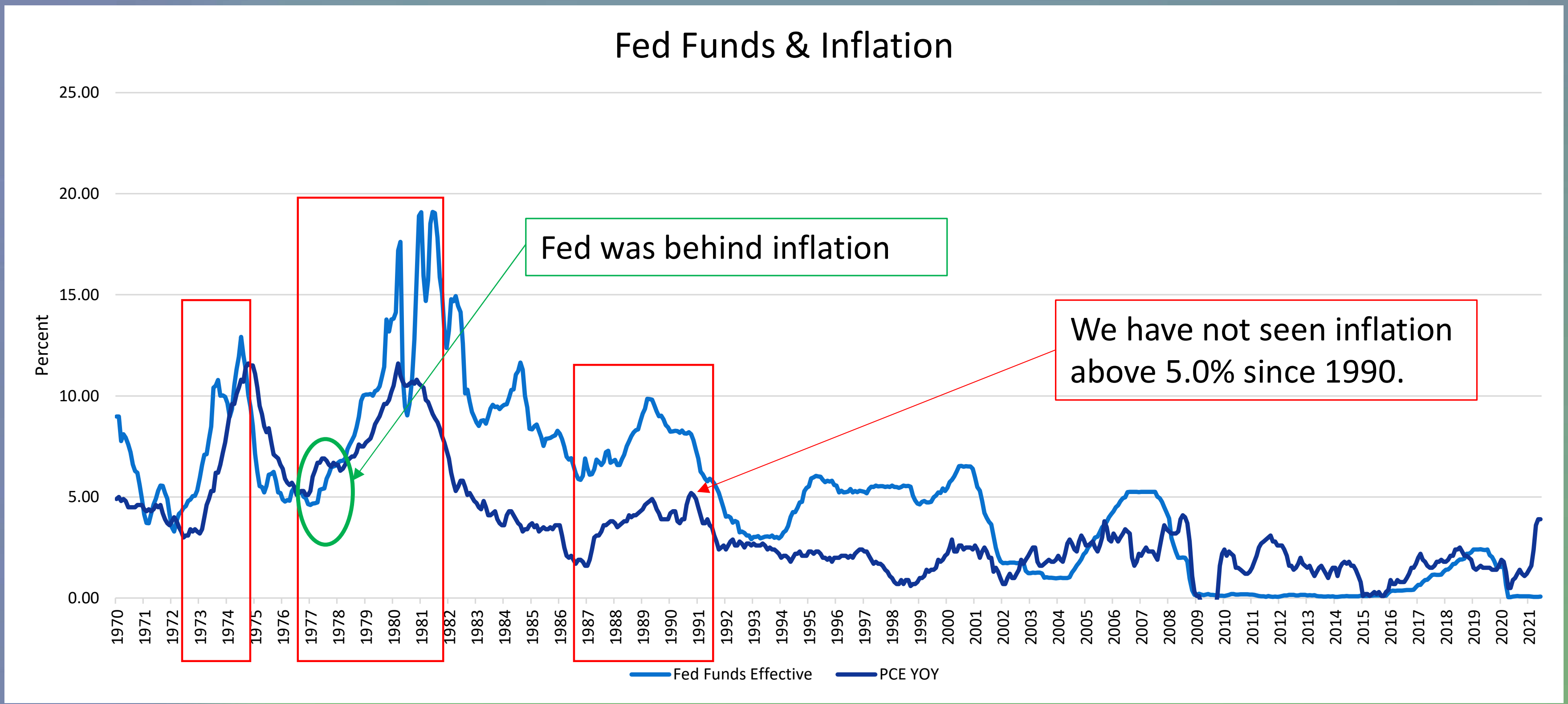
What Drives Interest Rates?

- A LOT of things
- In general:
- Short-term rates are impacted by:
  - Federal Reserve Monetary Policy
  - Business cycle
- Long-term rates are impacted by:
  - Growth expectations
  - Inflation expectations
  - Uncertainty / Term premium
  - The Federal Reserve through Quantitative Easing (buying long-term bonds)
  - Issuance of bonds (supply) & investment in bonds (demand)

Federal Reserve Policy Tool Kit

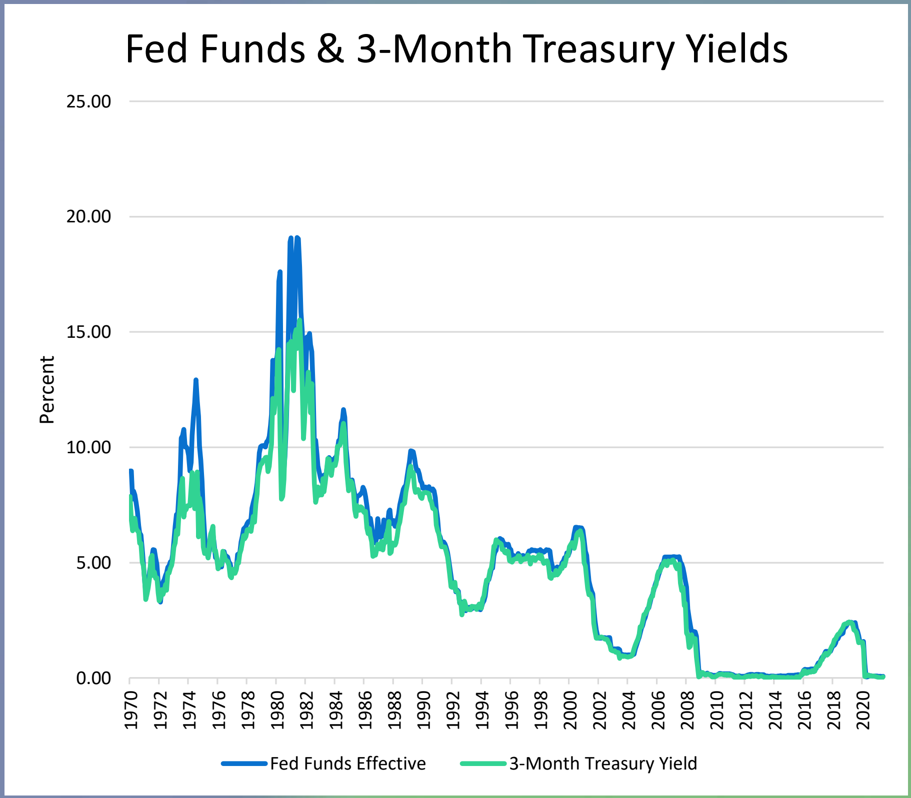
Policy Tool	Risks
Raise Fed Funds Rate	Economic Slowdown
	Higher Unemployment
	Recession
Slow Asset Purchases (or Sell Bonds)	Rising Rates
	Slower Housing
	Fiscal Pressure
	Corporate Earnings Pressure
	Reduced Market Liquidity
Policy Guidance	Diminished Trust

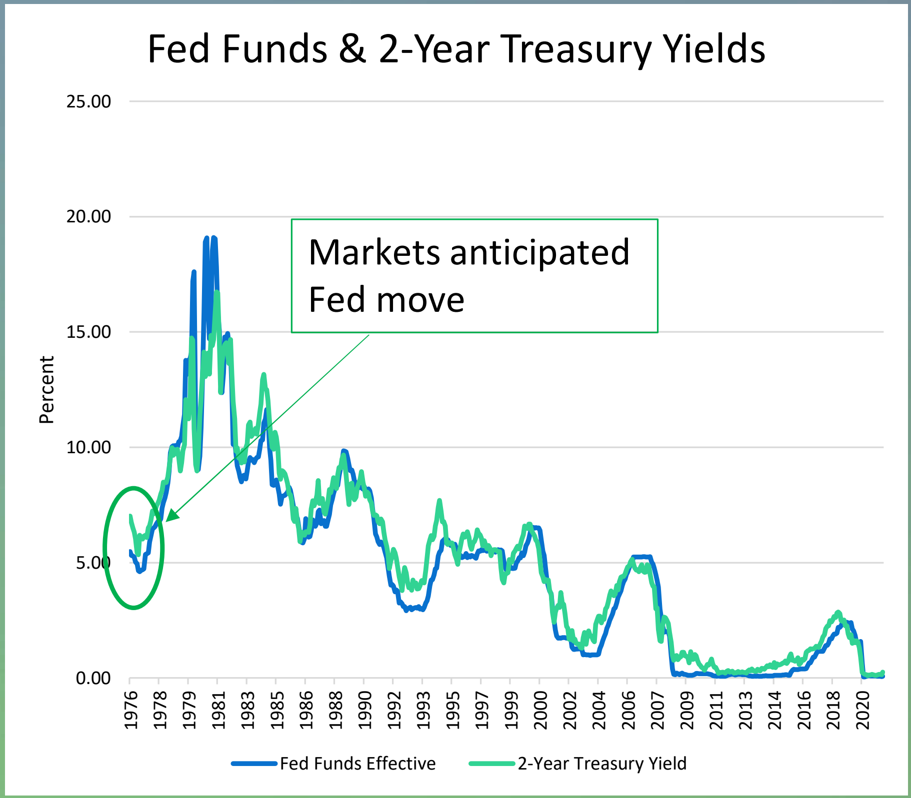
Fed Fight Inflation by Hiking the Fed Funds Rate



Source: Bloomberg

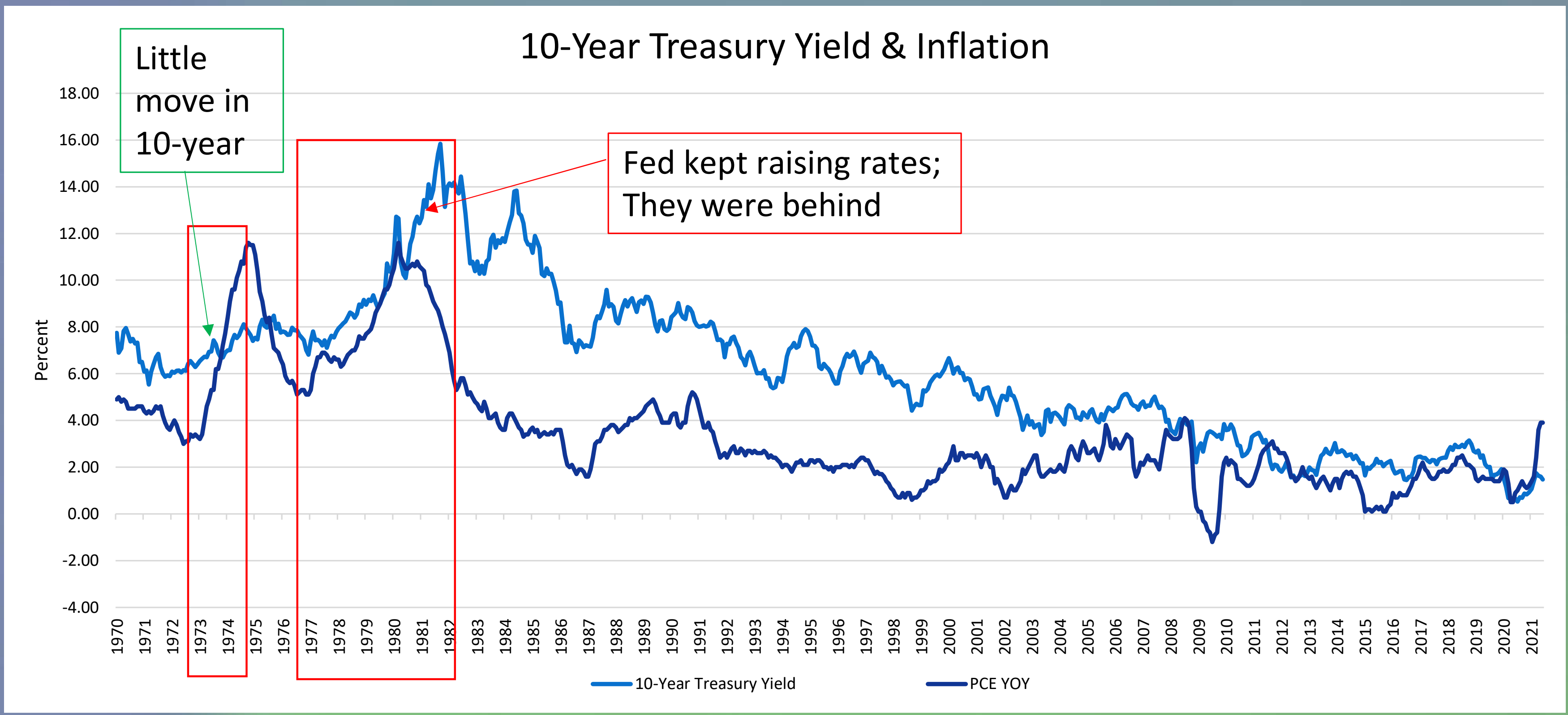
Short-Term Interest Rates





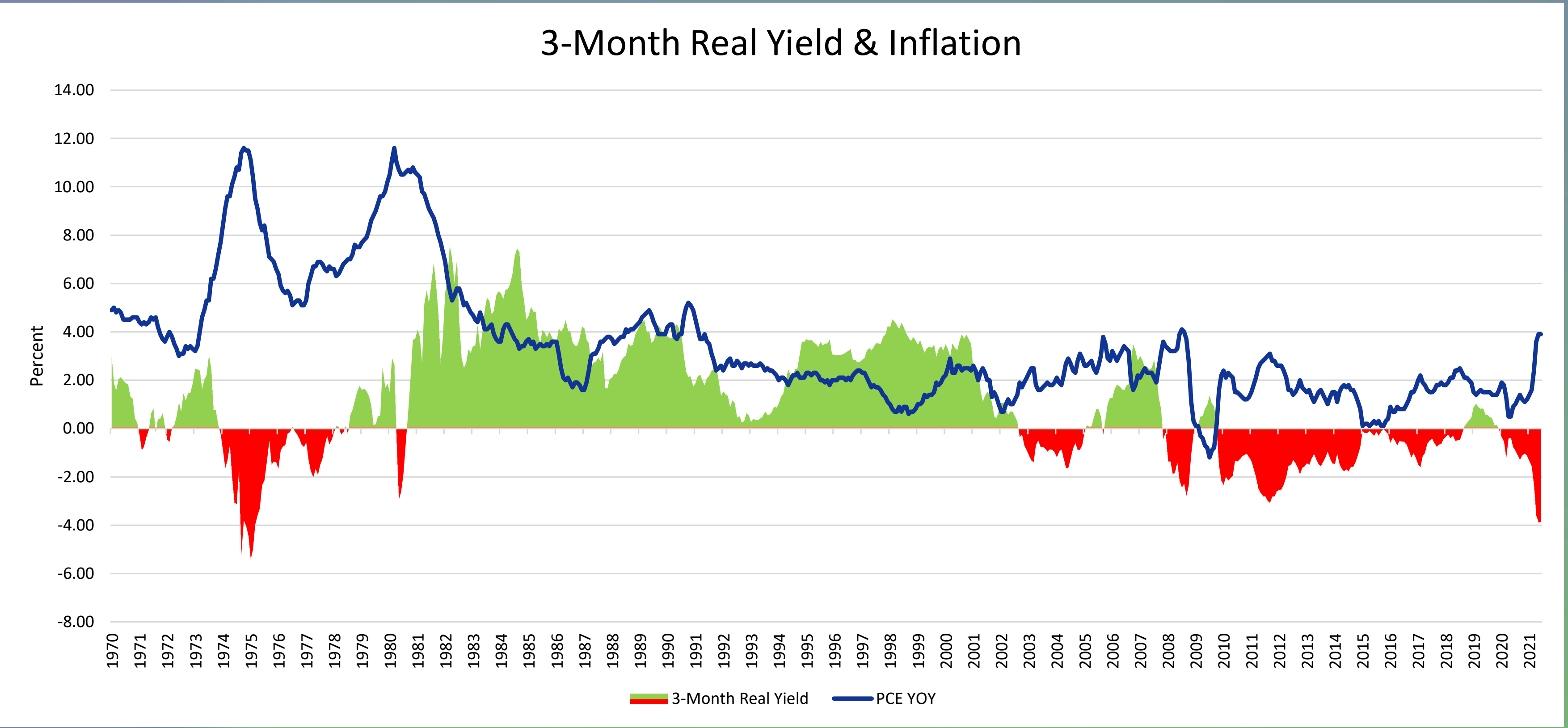
Source: Bloomberg

Long-Term Interest Rates



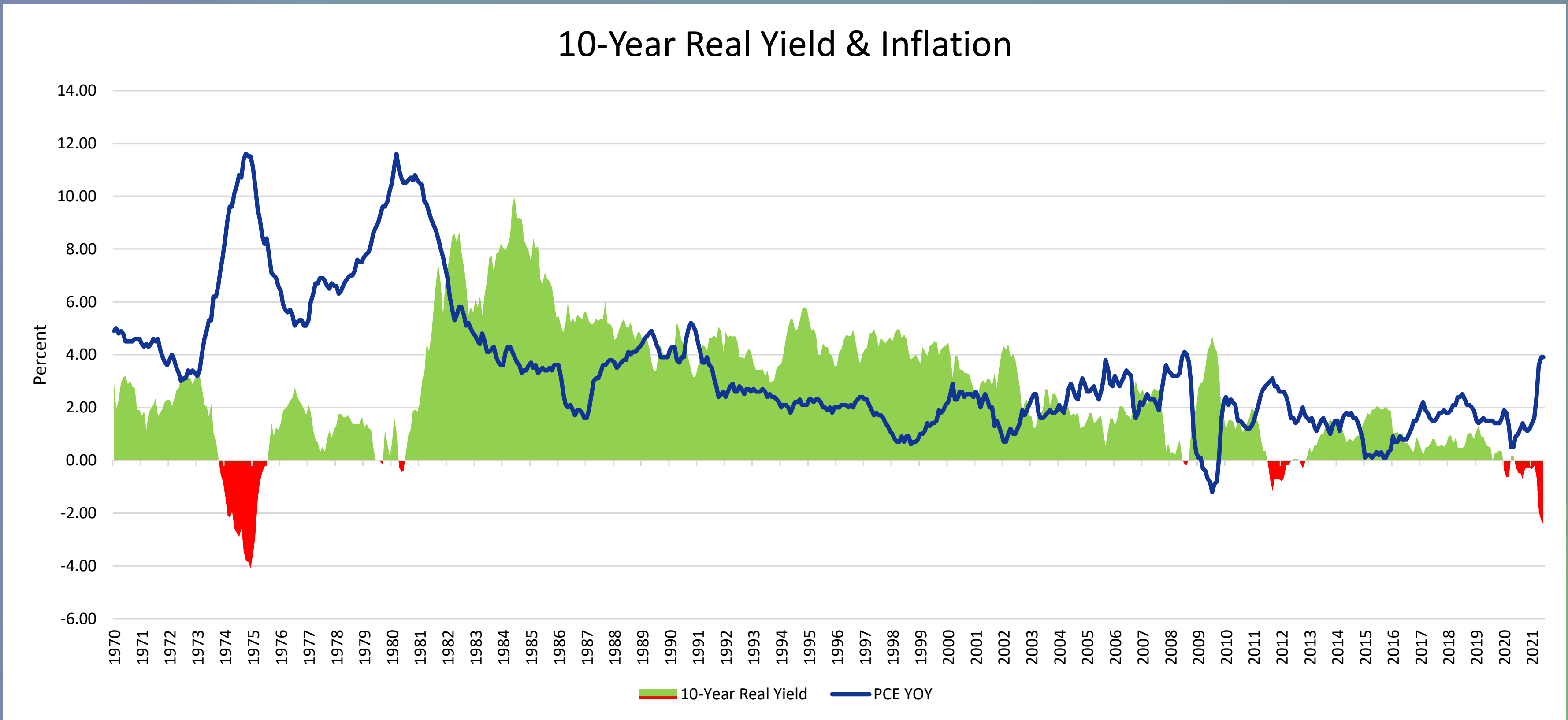
Source: Bloomberg

Erosion of Short-Term Coupon (Yield)



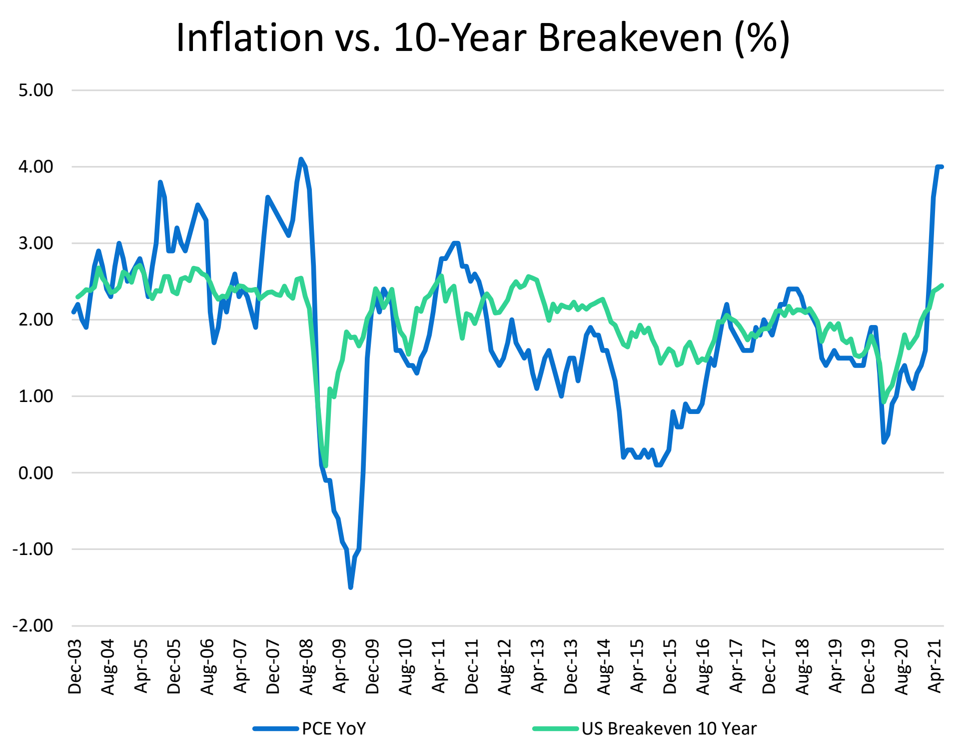
Source: Bloomberg

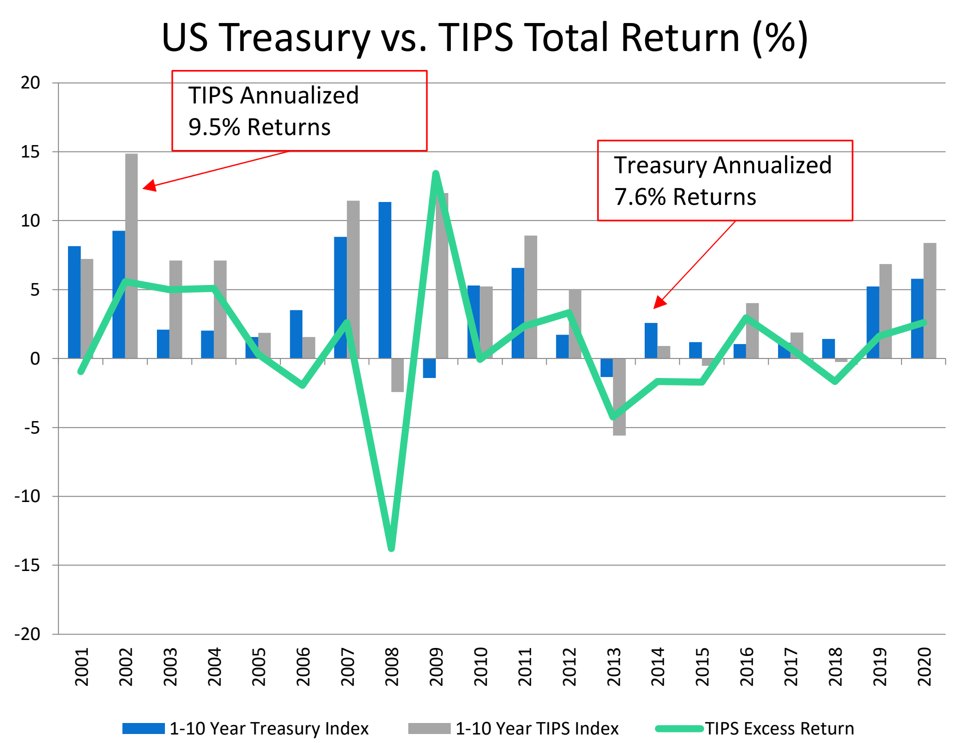
Erosion of Long-Term Coupon (Yield)



Source: Bloomberg

Inflation Expectations & Returns

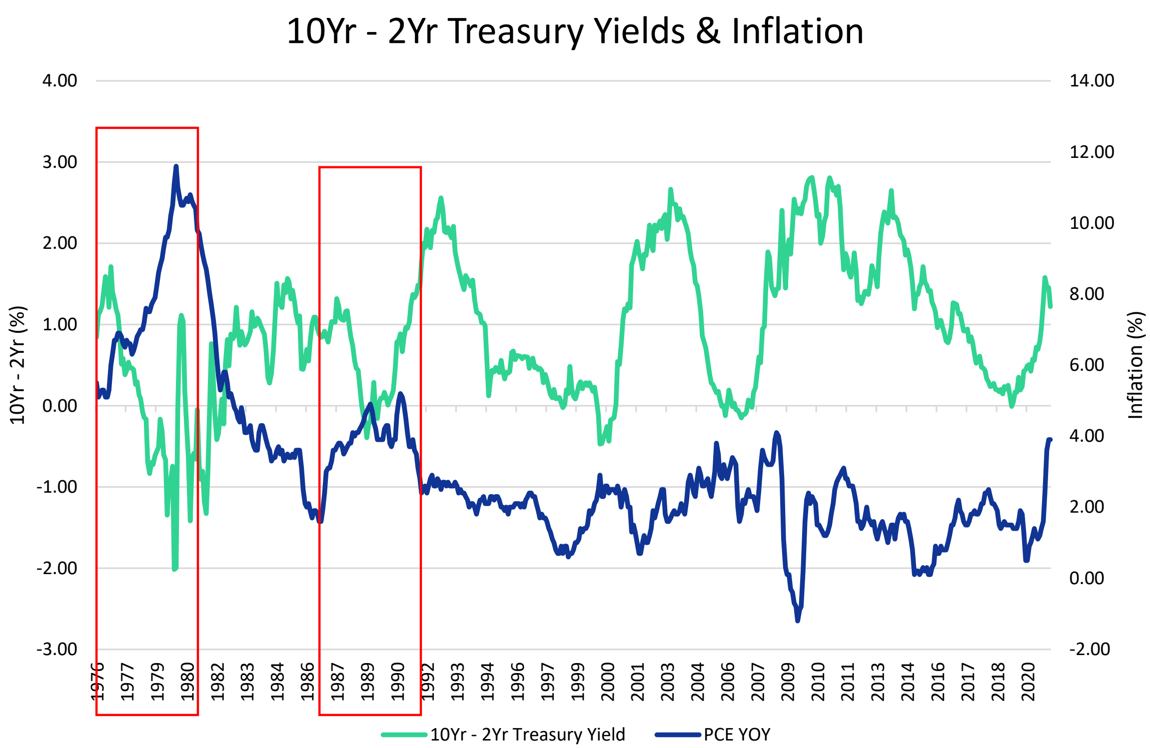




Source: Bloomberg

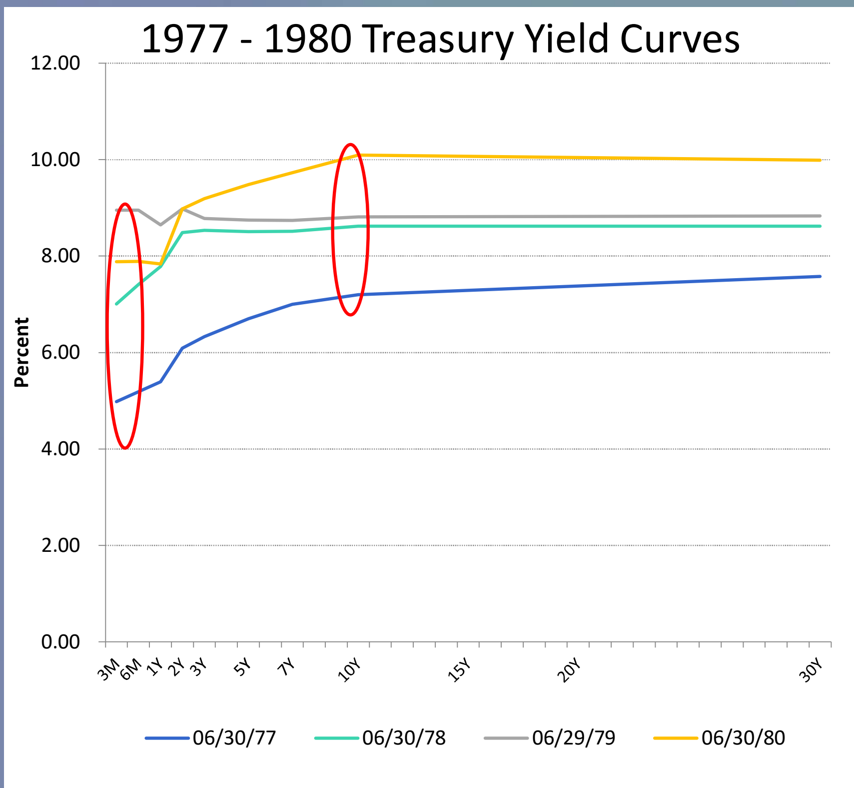
Inflation Has Resulted in a Flatter Yield Curve

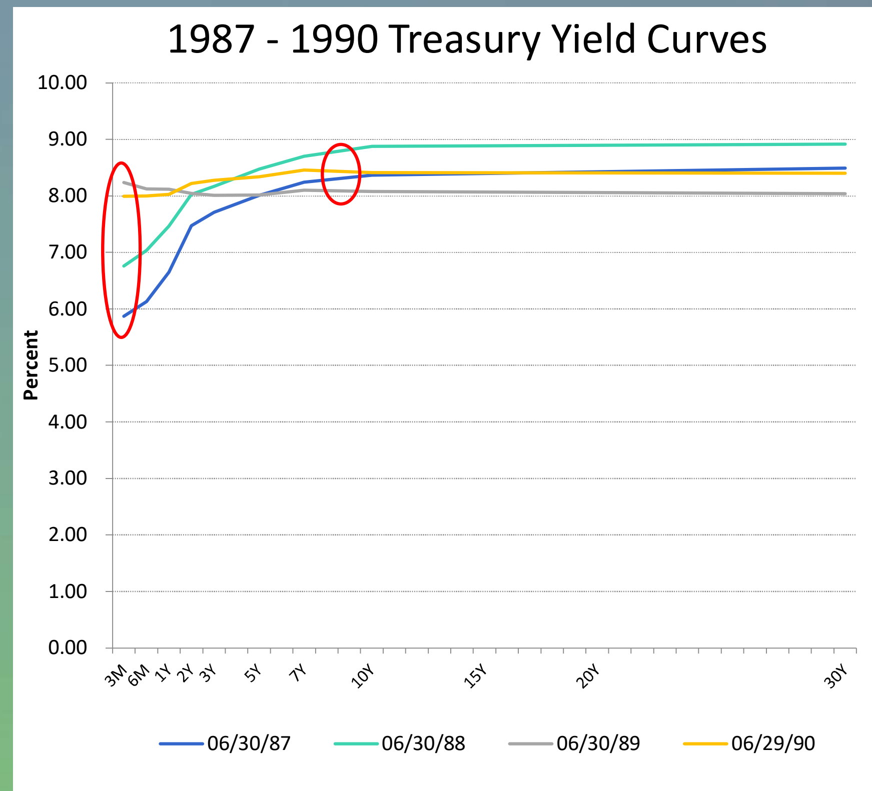
- Rising Fed Funds Rate
- 10-Year Rising, But Less
- However, if the Fed is perceived as too slow to raise rates, the curve can steepen



Source: Bloomberg

Closer Look at Changes in the Yield Curve





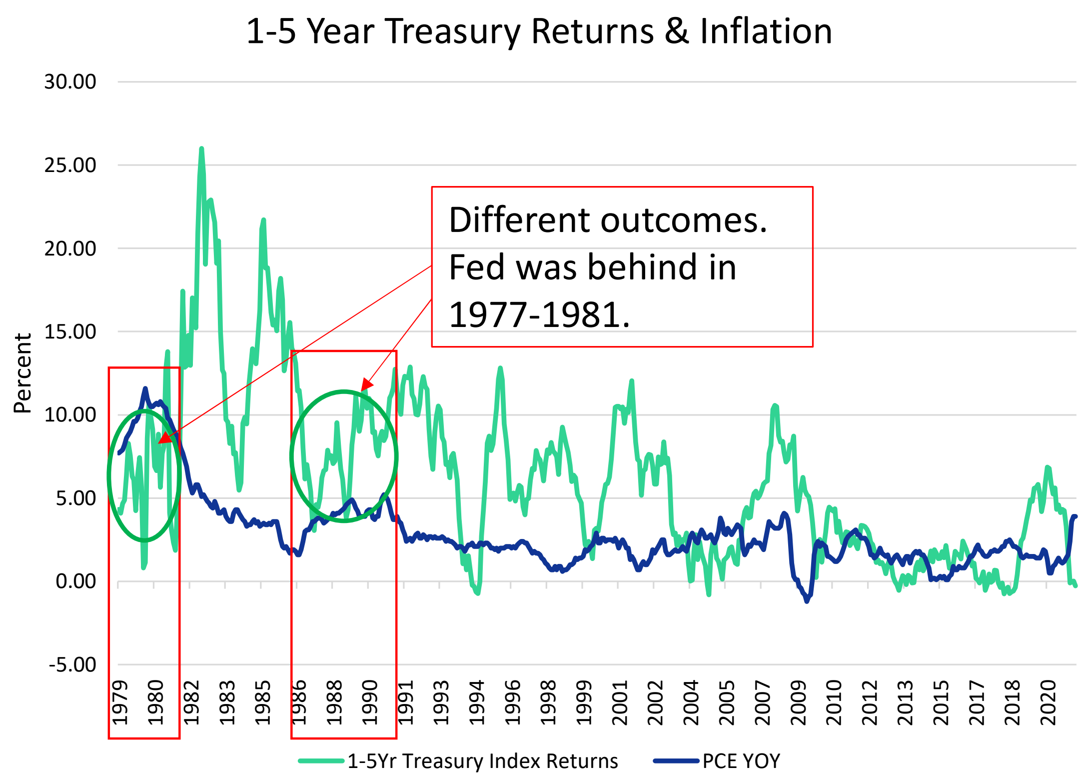
Source: Bloomberg

Yield Curve Takeaways & Investing

- Fed drives short-term rates
- Real short-term rates can turn deeply negative
- Inflation expectations are priced into the curve
- Exposure across the curve provides diversification
- Yield curve rarely shifts in a parallel fashion
- The curve tends to twist

Invest With a Purpose

- Markets Can Change Quickly
- Diversify by Time to Maturity
- Longer Duration Aids Income and Returns
- Stay Disciplined
- TIPS Can Help
- Remember Credit Considerations
- Stay High Quality



Source: Bloomberg

Questions?

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