

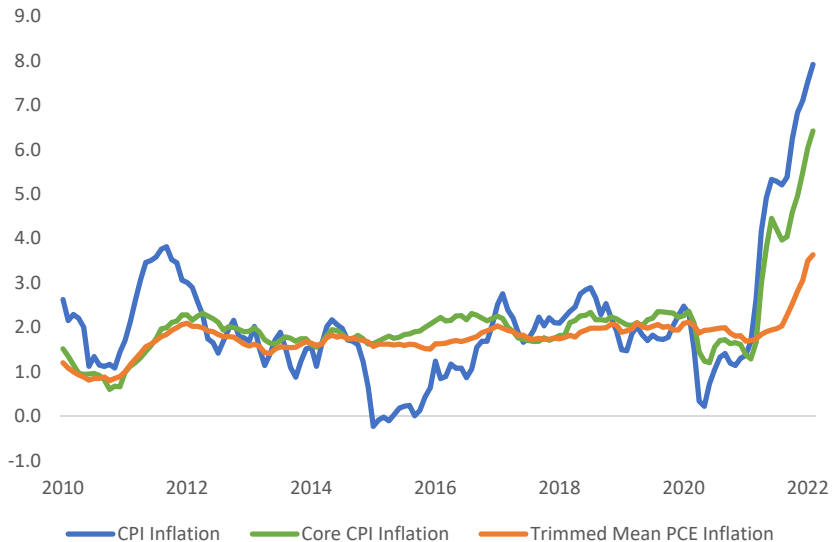
INFLATION, MONETARY POLICY AND THE PHILLIPS CURVE

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INFLATION HAS RISEN SUBSTANTIALLY

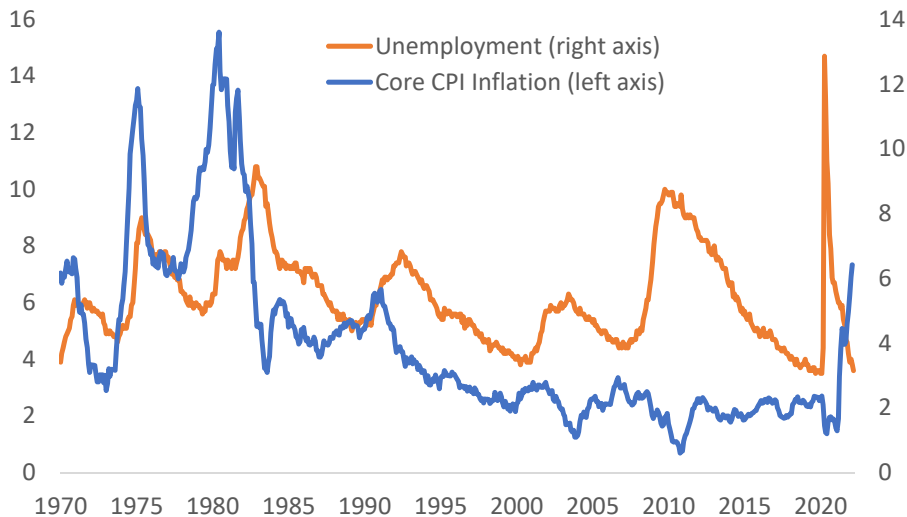


- New Keynesian formalization:

$$\pi_t = \beta E_t \pi_{t+1} - \kappa(u_t - u_t^n) + \nu_t$$

- Drivers of inflation:
 - Expected inflation: $E_t \pi_{t+1}$
 - Measure of “output gap”: $u_t - u_t^n$
 - Supply shocks: ν_t
- Slope of the Phillips curve: κ
 - In a Neoclassical model, κ is large
 - In a Keynesian model, κ is small

PRE-COVID “PUZZLES”



CONVENTIONAL WISDOM (PRE-COVID)

- Volcker disinflation:
 - Tight policy → high unemployment → lower inflation
 - Suggests the Phillips curve is steep
- Since 1990:
 - Muted response of inflation to unemployment
 - Great Recession: missing disinflation
 - Late 2010s and 1990s: missing rise in inflation
- Phillips curve is getting flatter or hibernating (or dead)
 - Perhaps an important flaw in the Keynesian model

CONVENTIONAL WISDOM (PRE-COVID)

- Assume adaptive expectations: $\beta E_t \pi_{t+1} = \pi_{t-1}$

- In this case,

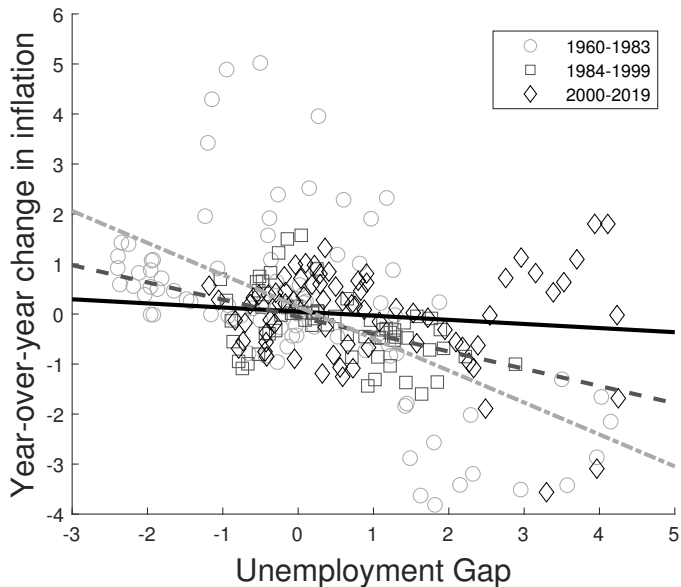
$$\pi_t = \beta E_t \pi_{t+1} - \kappa(u_t - u_t^n) + \nu_t$$

becomes

$$\Delta \pi_t = -\kappa(u_t - u_t^n) + \nu_t,$$

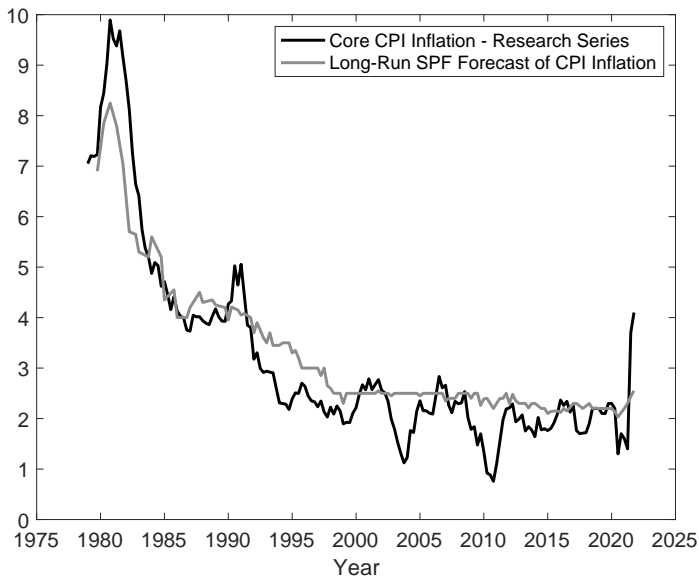
- Stock and Watson (2019):
 - $\Delta \pi_t$: Annual change in 12-month core PCE inflation
 - $u_t - u_t^n$: CBO unemployment gap
 - Refer to κ as “Phillips correlation”

FLATTENING PHILLIPS CURVE



- Volcker disinflation:
 - Sharp regime shift
 - Rapid fall in long-run inflation expectations
 - Rapid fall in inflation
- Since 1990:
 - Long-run inflation expectations have become anchored
 - Consequently, inflation has become more stable
- Apparent “flattening” of Phillips curve due to anchoring of inflationary expectations (Bernanke, 2007; Mishkin, 2007)

LONG-RUN INFLATION EXPECTATIONS



TWO STORIES (PRE-COVID)

1. Flattening Phillips Curve Story:

- Volcker lowered inflation by moving along a steep Phillips curve
- Phillips curve has since flattened

2. Anchored Expectations Story:

- Volcker lowered inflation by engineering a rapid fall in expectations
- Expectations then became anchored
- Phillips curve always had modest slope

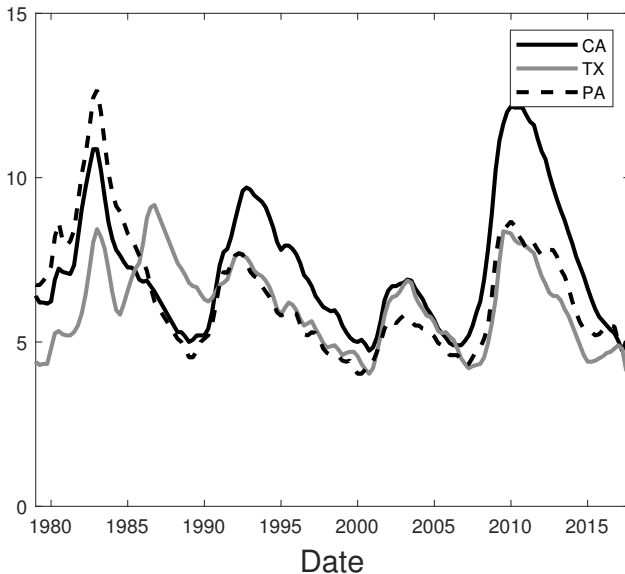
HOW CAN WE TELL THE DIFFERENCE?

- Many confounding shocks in macro time series!
- Can regional data help?

Example:

- Texas goes into recession but Illinois does not
- How much does inflation fall in Texas *relative* to Illinois?
(diff-in-diff approach)
- Advantages of panel data
 - More datapoints, more options for identification
 - Citation: Hazell, Herreno, Nakamura, Steinsson, “The Slope of the Phillips Curve: Evidence from U.S. States” (*QJE*, Forthcoming)

REGIONAL BUSINESS CYCLES



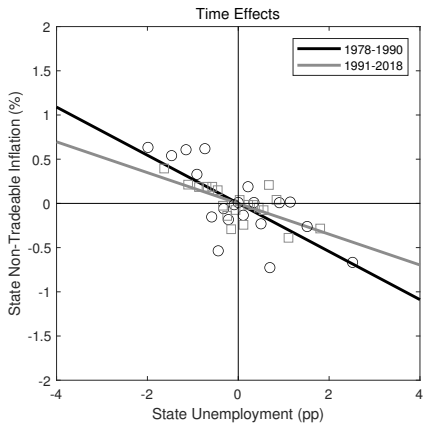
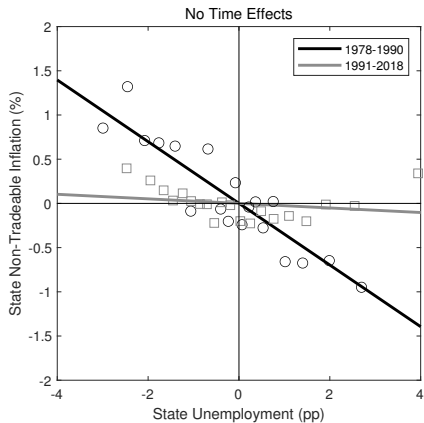


FIGURE: Scatterplots—Non-Tradeable Inflation and Unemployment

Regional identification (RHS) yields more stable Phillips curve; Much less flattening

- Apparent “flattening” mainly due to anchoring of expectations
 - No time fixed effects: Factor >100 flattening
 - With time fixed effects: Factor 2 flattening
 - Interpretation: Time fixed effects absorb movements in long-run inflation expectations
- Demand-driven inflation:
1% increase in unemp. \rightarrow 1/3% decrease in inflation
(if inflation expectations remain unchanged)

- Results suggest beliefs about monetary regime are important
- But how does the monetary authority change (keep control over) long-run inflation expectations
 - Fundamentally hard!!
 - Sometimes beliefs do change rapidly (e.g., Volcker disinflation, ends of hyperinflations)
 - How does the central bank convince people that it is “serious” about inflation?

DIGRESSION: WAR AGAINST THE US GREAT INFLATION

- Many (unsuccessful) attempts to curb inflation in 70's
 - Nixon 1971: Wage and price controls
 - Ford 1974: Inflation “public enemy number one”

WIN: Whip inflation now



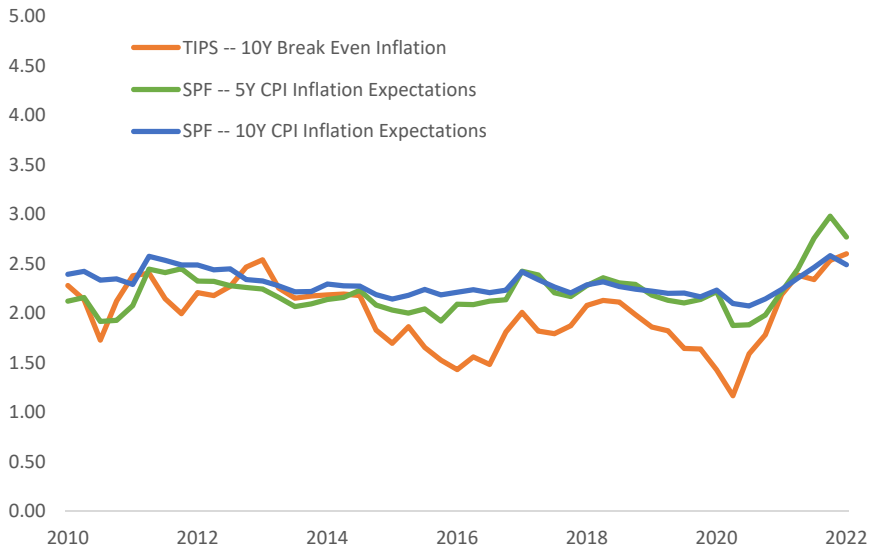
- Carter:
 - “Persistent high inflation threatens the economic security of our country”
 - Oct 1979: Appoints Paul Volcker Chairman of Fed

HOW DOES ONE CHANGE LONG-RUN BELIEFS?

- In 1979/80 the newly appointed chairman of the U.S. Federal Reserve, Paul Volcker
 - Sets as a goal to bring inflation below 4%
 - Dramatically raises interest rates
 - Fed funds rate reached record high of 20% in 1980!
- Volcker tightened policy dramatically
 - Caused massive recession
 - Didn't get fired
- Perhaps this was crucial in changing beliefs about long-run monetary regime

1. **Long-run inflation expectations key driver of inflation**
2. Demand-driven inflation:
1% increase in unemp. \rightarrow 1/3% decrease in inflation
3. Shelter/rent has strongest relationship with unemployment
4. Hard to explain experience of 1970s/80s without supply shocks

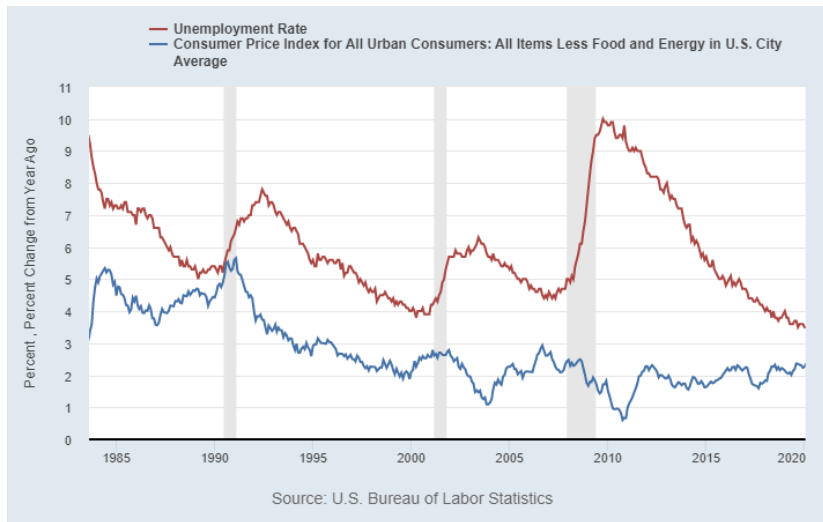
INFLATION EXPECTATIONS ROSE MODESTLY



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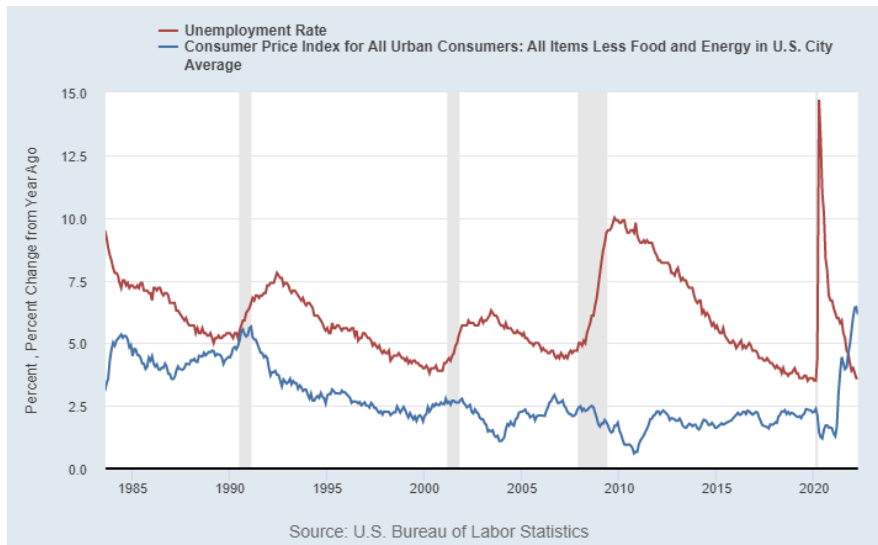
CORE CPI AND UNEMPLOYMENT: PRE-COVID, POST-1990

Pre-COVID:



CORE CPI AND UNEMPLOYMENT: 1990-2022

Including COVID:

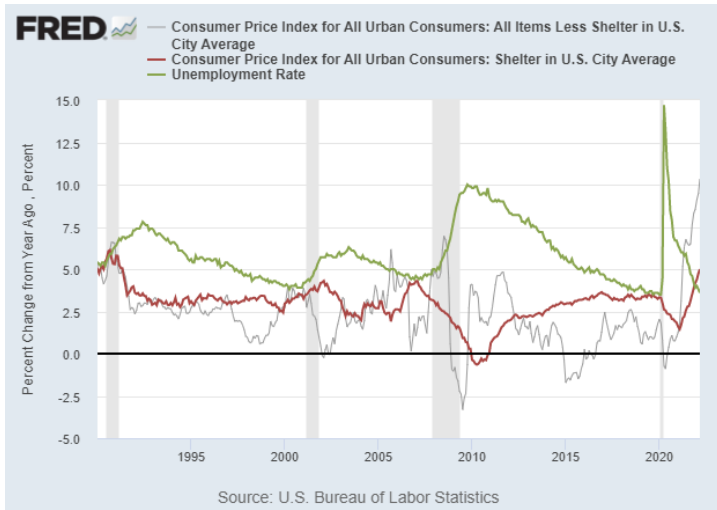


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CPI: SHELTER VS. NON-SHELTER

Green line: Unemployment

Red Line: CPI shelter Grey Line: CPI Non-shelter



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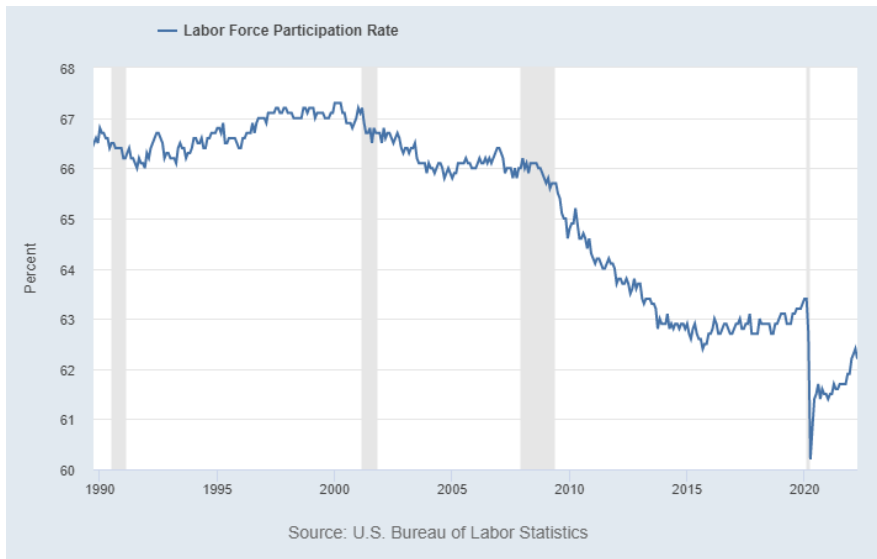
SUPPLY SHOCKS ARE BACK!

- Ukraine war; China's zero-COVID policy
- Labor market: Declining labor force participation
- COVID sick days, safety precautions etc.

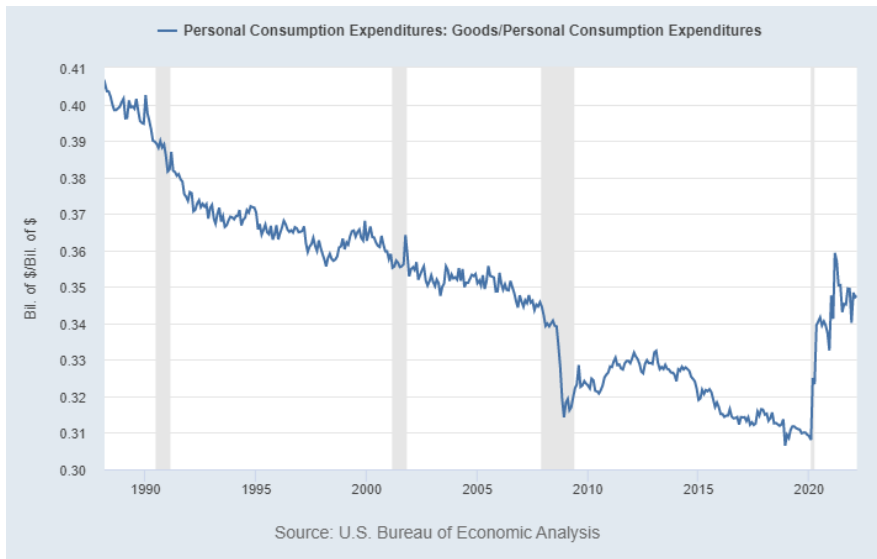
Also, relative price shocks

- Massive structural shift from services to goods
- “Looks like” supply shock in a model

LABOR FORCE PARTICIPATION



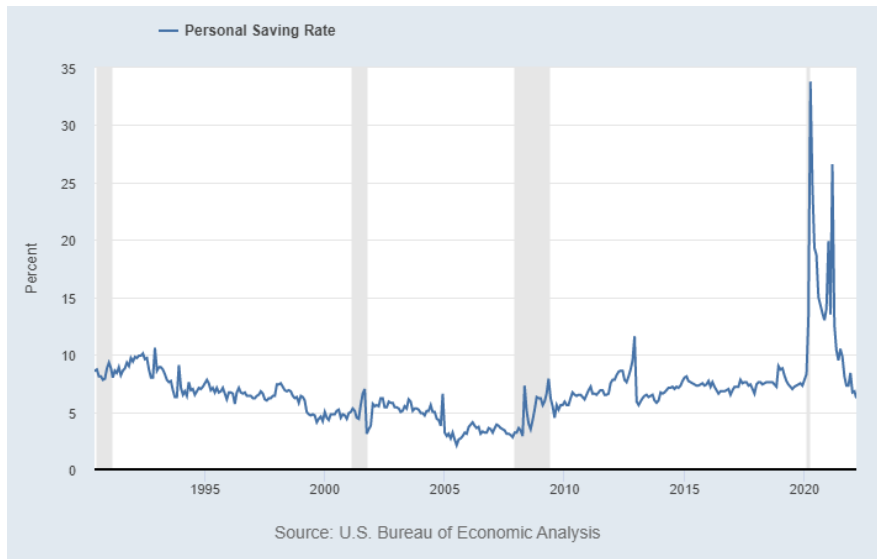
GOODS SPENDING: FRAC. TOTAL CONSUMER EXPENDITURES



CHALLENGES FOR MONETARY POLICY

- The Fed has long believed that both demand and supply shocks are transitory
- Inflationary pressure would dissipate without aggressive action
- Still possible that inflationary pressure will diminish:
 - Supply shocks may normalize
 - Relative demand may mean-revert
 - Demand may moderate

PERSONAL SAVING AS FRAC. DISP. PERSONAL INCOME (BEA)



CHALLENGES FOR MONETARY POLICY

- In the 1970s, supply shocks, relative price shocks led to inflation expectations to become unhinged
 - Pulled up nominal anchor
- Recently Fed has dramatically tightened of monetary policy
- Designed to demonstrate Fed will “do whatever it takes” to bring inflation down
- Crucial for maintaining credibility

ZERO COUPON YIELDS: 1, 5, 10 YEARS

