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Investing in a high inflation environment

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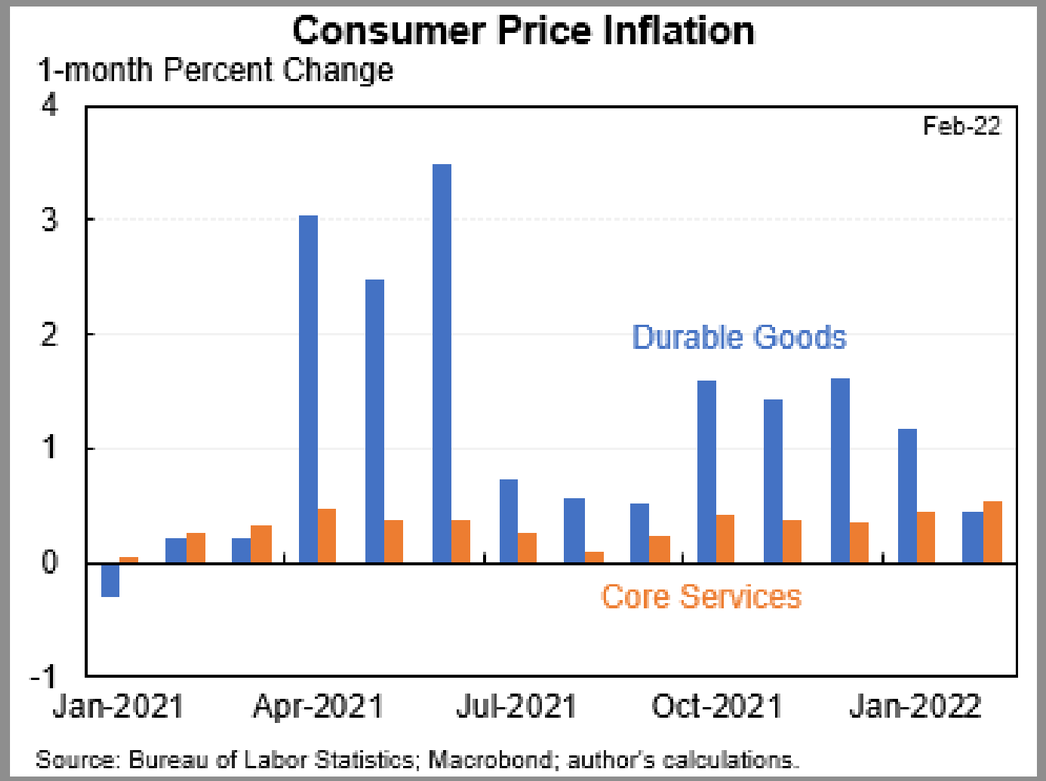
PRINCETON

Inflation news today

- Inflation close to 8% in US
  (data before war in Ukraine)
- Now, also inflation in core services



Inflation = tax on precautionary savings

- Financial repression
  - Force people/banks to hold inflationary assets

⇒ Low real return on safe asset

- Why tax precautionary savings?
  - Push into risky real investment
    - If (idiosyncratic) risk is high ⇒ push more
      - Brunnermeier-Sannikov (2016) "On Optimal Inflation Rate"
  - Tax the poor
    Rich can escape and hold real assets
  - Collateral damage to lower real wages

Inflation hedges

- Stocks as inflation hedge (?)
  - Real claims

	Profits	Hedge	Stock-Bond corr.
Demand inflation	↑	Good	< 0
Supply inflation (stagflation)	↓	Bad	> 0

- Real Estate as inflation hedge
  - Real claim
  - … but **money illusion** (w/ Julliard)
- Other currencies (Hayekian competition)
  - Crypto v. international (flight to safety)
  - Regulation: make private money less attractive/CBDC
    Financial Repression

Inflation Indexed Bonds - TIPS

- Are TIPS such a good inflation hedge?
  - Benefits as inflation rises
  - Bond price declines as (real) interest rate rises
    - Duration risk
    - Taylor principle
  - What's the optimal maturity of TIPS?
- Inflation and wars
  - Warren Buffet:
    "Never hold money during a war."

- The Fed model
- Money illusion

- Inflation and tax “dis”-advantage?

- Stagflation vs. inflation boom (supply vs. demand shock)
  - Stock-bond correlation

- Warren Buffet and wars

Poll

1. Which asset class will perform best if inflation unexpectedly rises?
   a. Stocks
   b. Real estate
   c. Crypto assets
2. Going forward, will there be a "Fed put" on the stock market?
   a. Yes
   b. No
   c. Uncertain
3. What is the probability that the U.S. economy will experience "stagflation" in the next two years?
   a. <25% b. 25%-50%
   c. 50-75% d. >75%

Investing in a High Inflation Environment

Itamar Drechsler and Alexi Savov

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Inflation and Asset Prices: Theory 101

According to theory 101, how should different assets respond to inflation?

1. <u>Nominal bonds</u>: since the bond's payouts are fixed in nominal terms, higher inflation decreases their value
   ⇒ bond prices decline with inflation

2. <u>Stocks</u>: since firms' sales and profits increase one-for-one with inflation, their value is unaffected by inflation
   - note inflation *is* the rate at which firms increase their prices

   ⇒ stock prices should be neutral to inflation

3. <u>Real estate, commodities</u>: like stocks, the value of other real assets should be neutral to inflation

Inflation and Asset Prices: Theory 101

- Stock price P_0 = present value of future cash flows
- Since investors care about the real cash flows C_t they get, they discount future nominal cash flows $C_t(1+i)^t$ by cumulated inflation $(1+i)^t$:

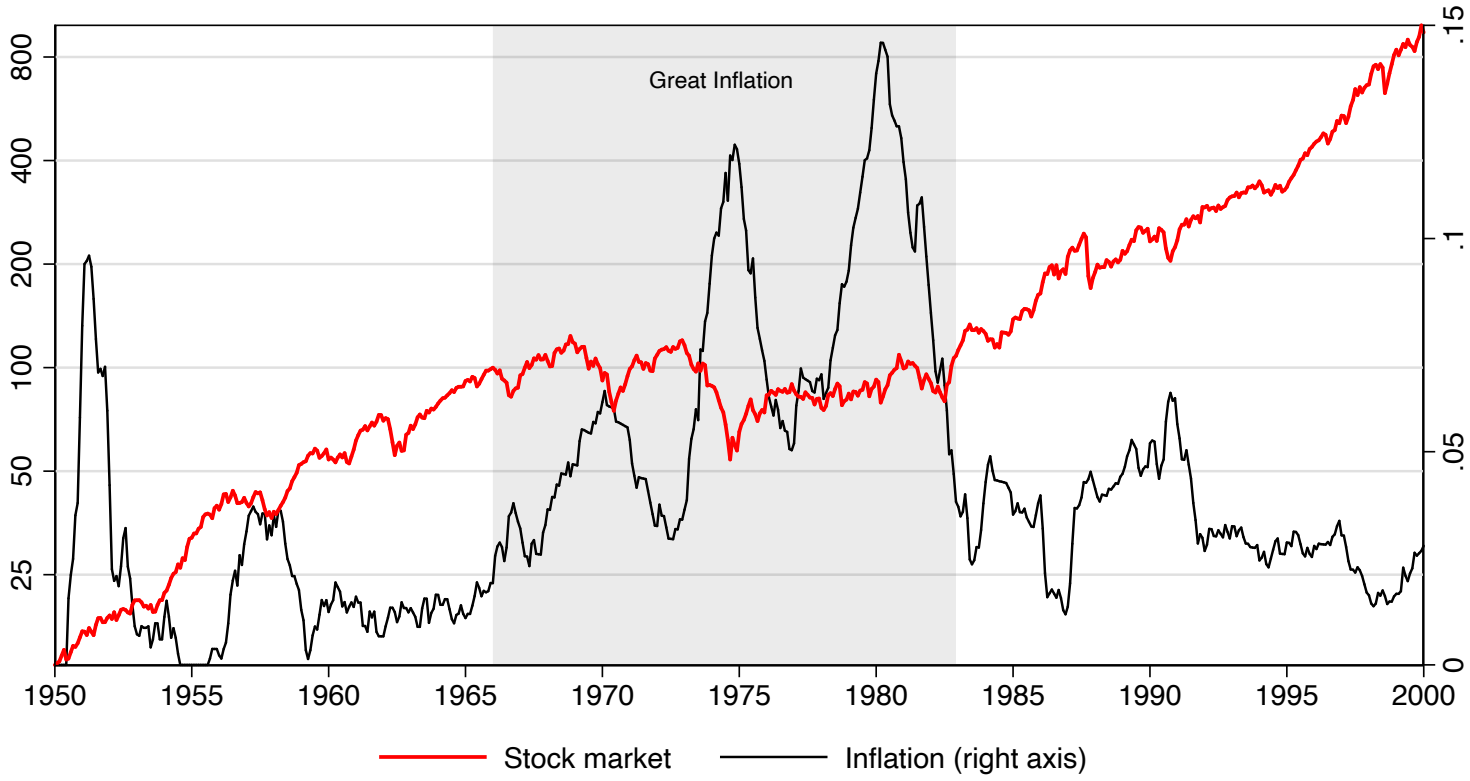
$$P_0 = \frac{C_1\,(1+i)}{(1+R)(1+i)} + \frac{C_2(1+i)^2}{[(1+R)(1+i)]^2} + \frac{C_3(1+i)^3}{[(1+R)(1+i)]^3} + \cdots$$

$$P_0 = \frac{C_1}{(1+R)} + \frac{C_2}{(1+R)^2} + \frac{C_3}{(1+R)^3} + \cdots$$

$\Rightarrow P_0$ is neutral to the inflation rate i

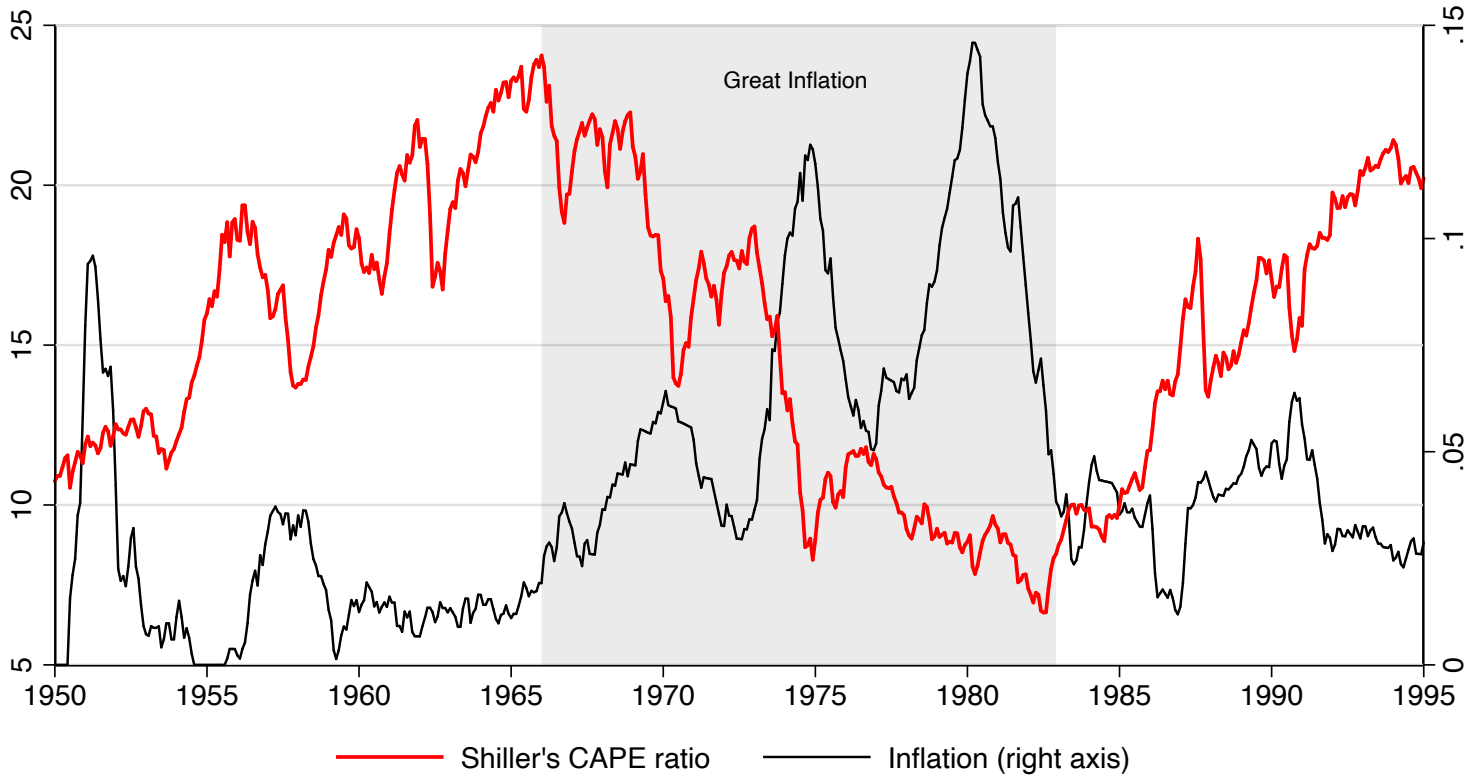
- For inflation to affect stock prices, it must affect the real cash flows C_t or the real discount rate R
  - in the case of nominal bonds, the nominal cash flows are <u>not</u> rising with $(1+i)^t$ so the real value decreases with i

Stocks and Inflation: the historical evidence



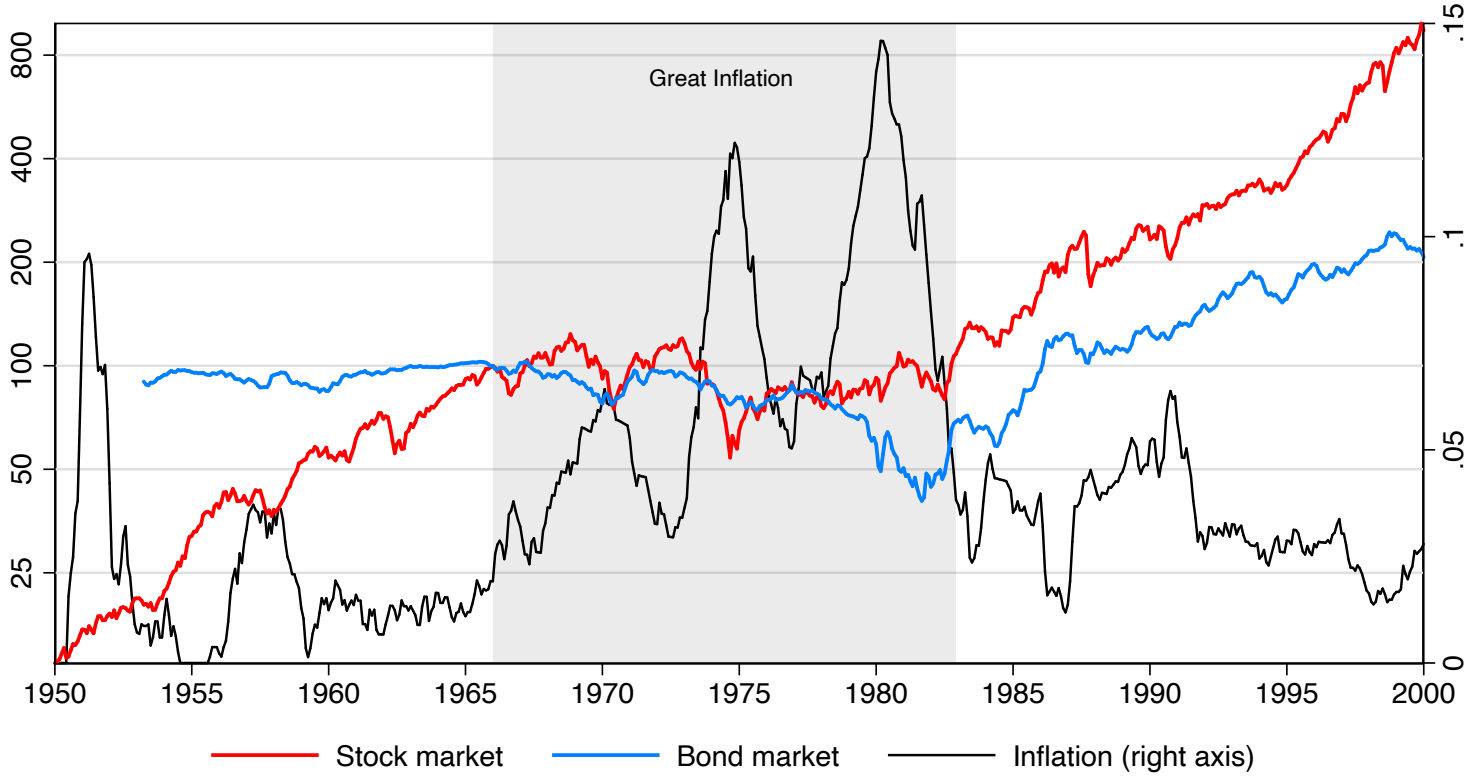
1. Contrary to theory 101, stocks did very poorly during the Great Inflation of 1965-1982
   - had a real return of ~0% over a 17-year period
   - ⇒ led to the view that stocks are negatively impacted by inflation
2. In contrast, stocks did very well outside the Great Inflation period
   - went on a two-decade bull run following the Great Inflation

Stocks and Inflation: Shiller's CAPE Ratio



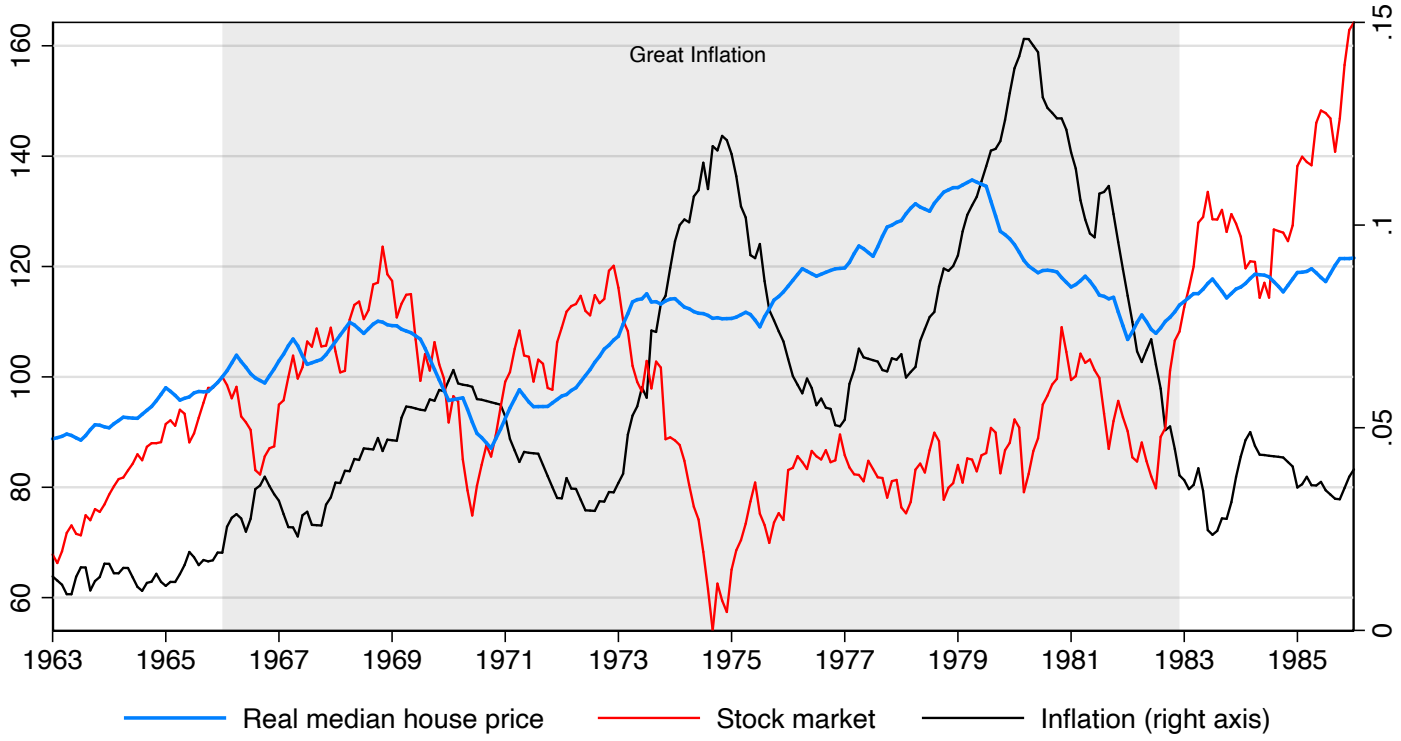
1. Shiller's CAPE ratio falls from 24 to 6 during the Great Inflation
   - lowest valuation in post-war sample (Great Depression bottom was 5.5)
2. Drop in valuation not due to real rate, which was actually falling (until Volcker)

What about bonds?



1. As predicted by theory 101, bonds did extremely poorly during the Great Inflation
   - real return on ten-year Treasury bonds was -60% over 17 years!

What about real estate?



1. Real estate performed well during the Great Inflation
   - as inflation rose people invested in real estate
   - housing returns significantly outperformed stocks even without accounting for implicit rent (i.e., its dividend)

Why Did Stocks Do So Badly?

<u>Two related reasons:</u>

1. The Great Inflation was actually the Great *Stag*flation
   - whenever inflation went up, real GDP fell (4 severe recessions)

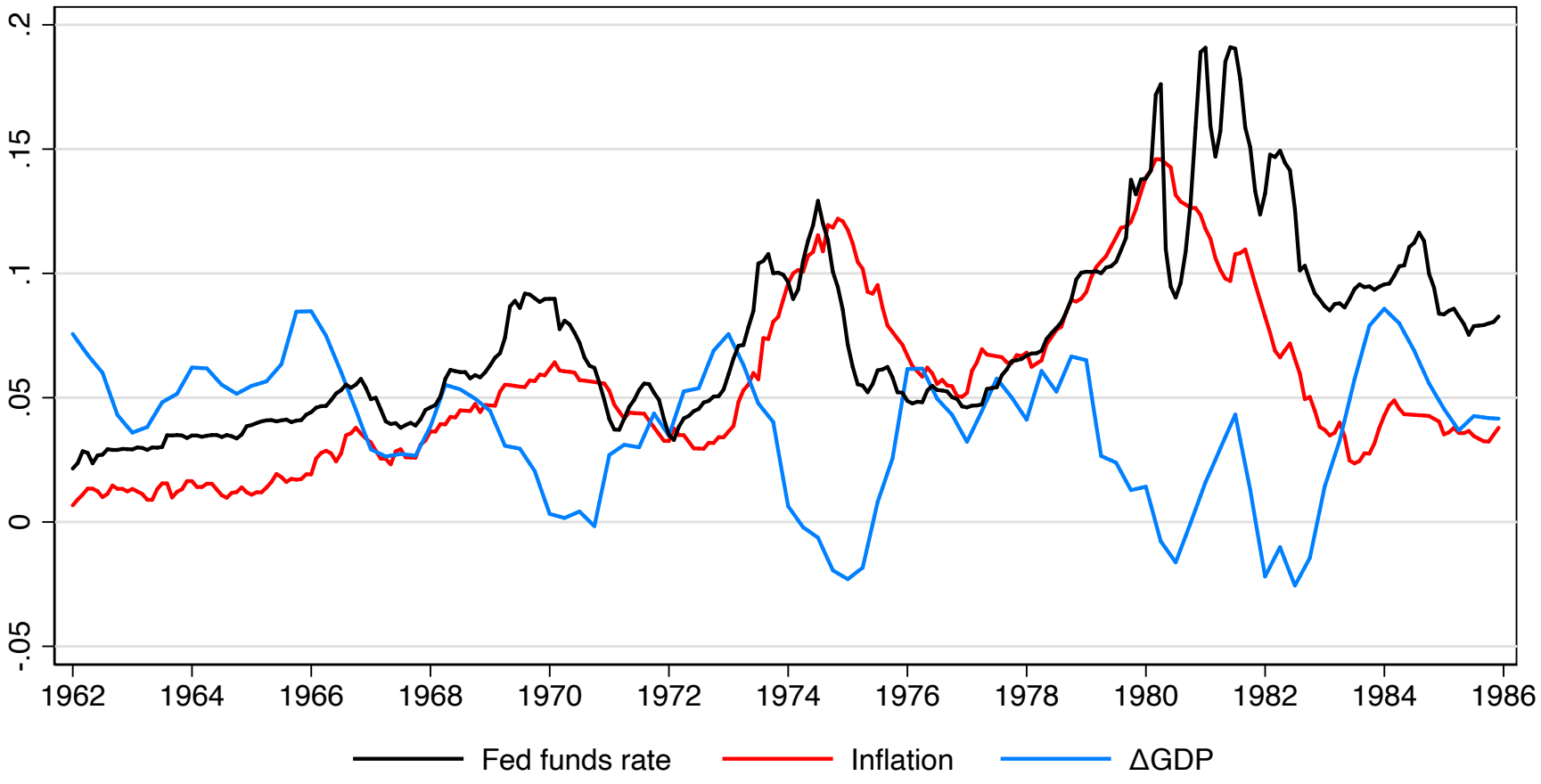
   ⇒ firms' profits decreased → lower real cash flows C_t → stock prices fall

2. The financial system was dysfunctional due to the infamous banking law *Regulation Q* (Drechsler, Savov, and Schnabl 2022)
   - *Reg Q* capped bank deposit rates at around 5% even when inflation was >10%
   - banks suffered large deposit outflows whenever rates rose → credit crunches

   ⇒ credit crunches hurt firms' ability to produce → lower C_t

   ⇒ forced deleveraging by investors in the stock market → higher R_t ⇒ stock prices fall

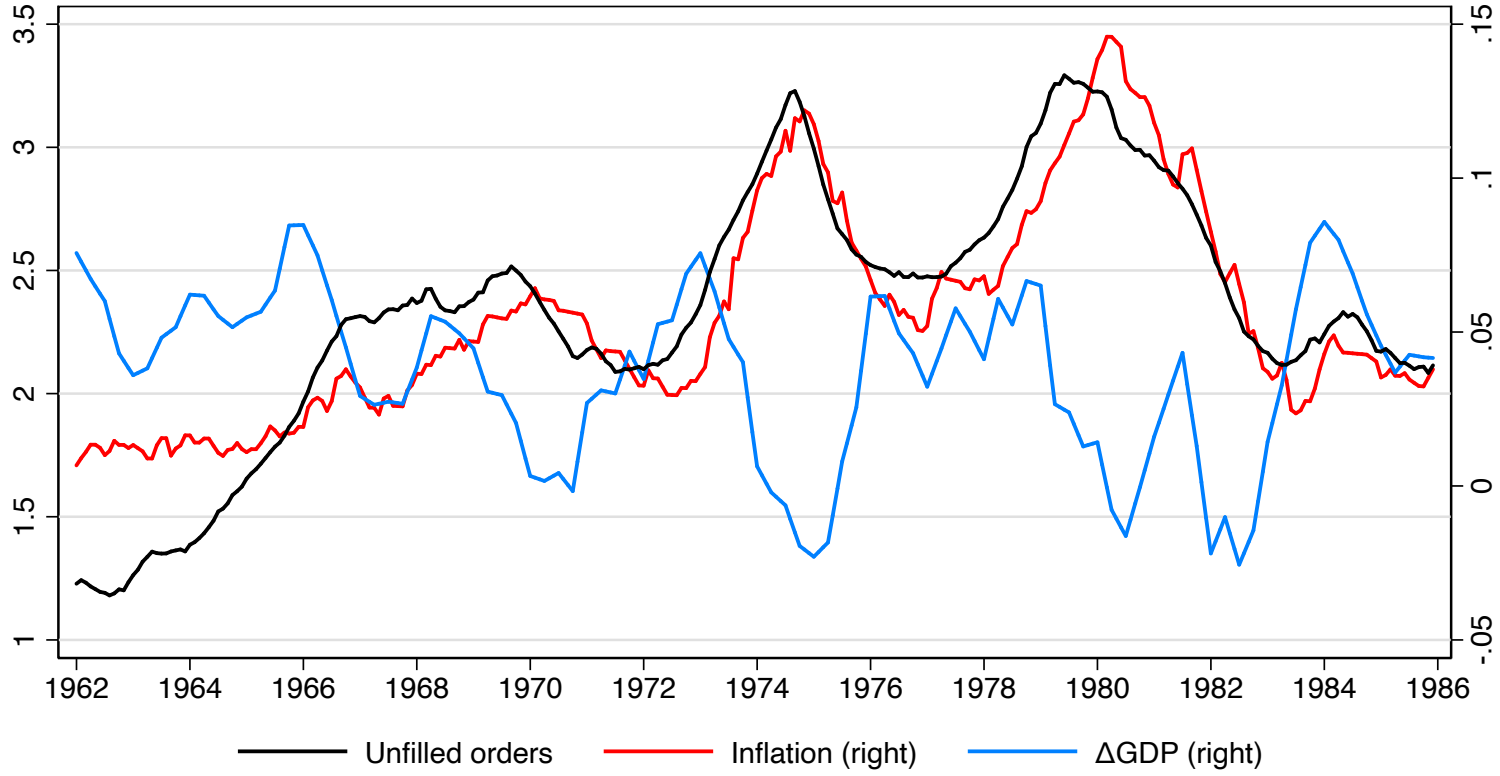
The Great Stagflation (1965-1982)



1. When inflation was high GDP growth fell sharply
   ⇒ net negative <u>supply</u> shocks (price and output inversely related)

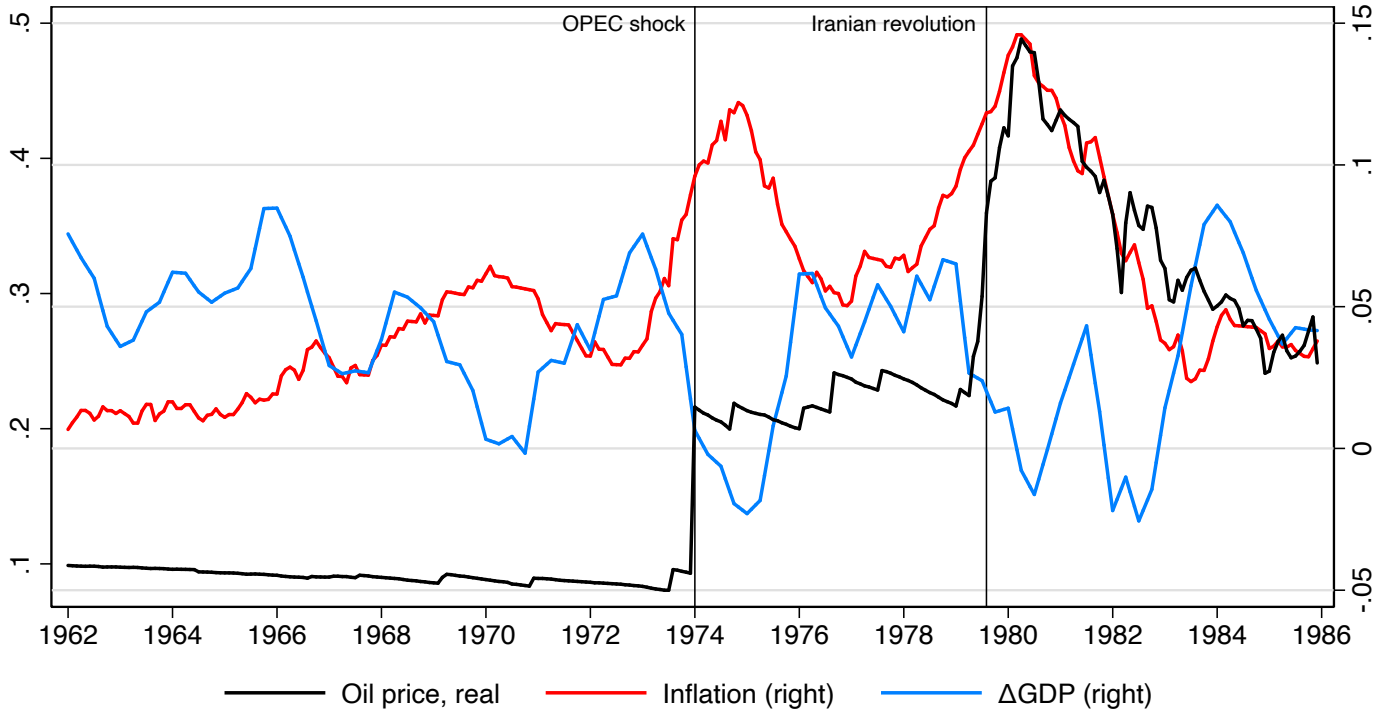
Unfilled Orders

Like post-Covid, there were large supply shortages:



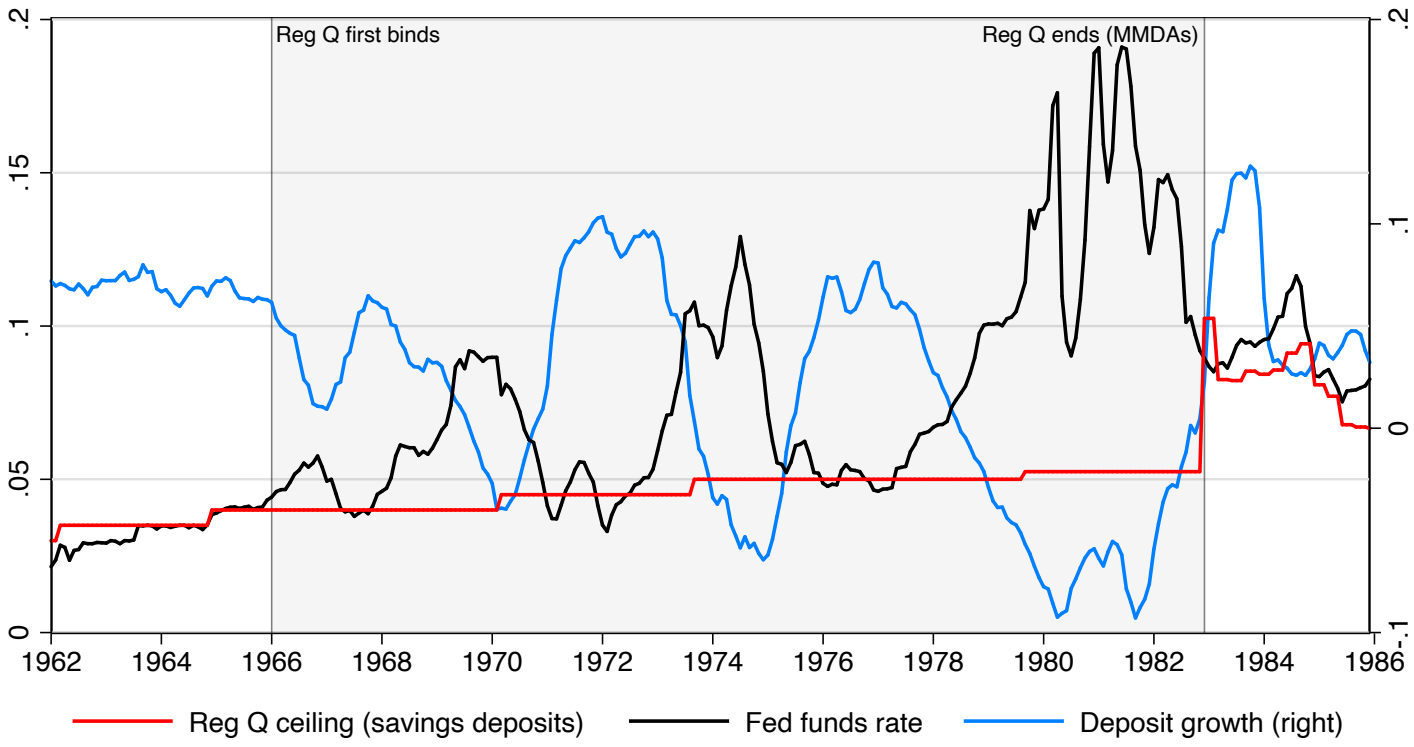
1. Unfilled orders are highest when growth is lowest!
2. Unfilled orders predict inflation ⇒ inflation not (just) due to unanchored inflation expectations

What about oil?



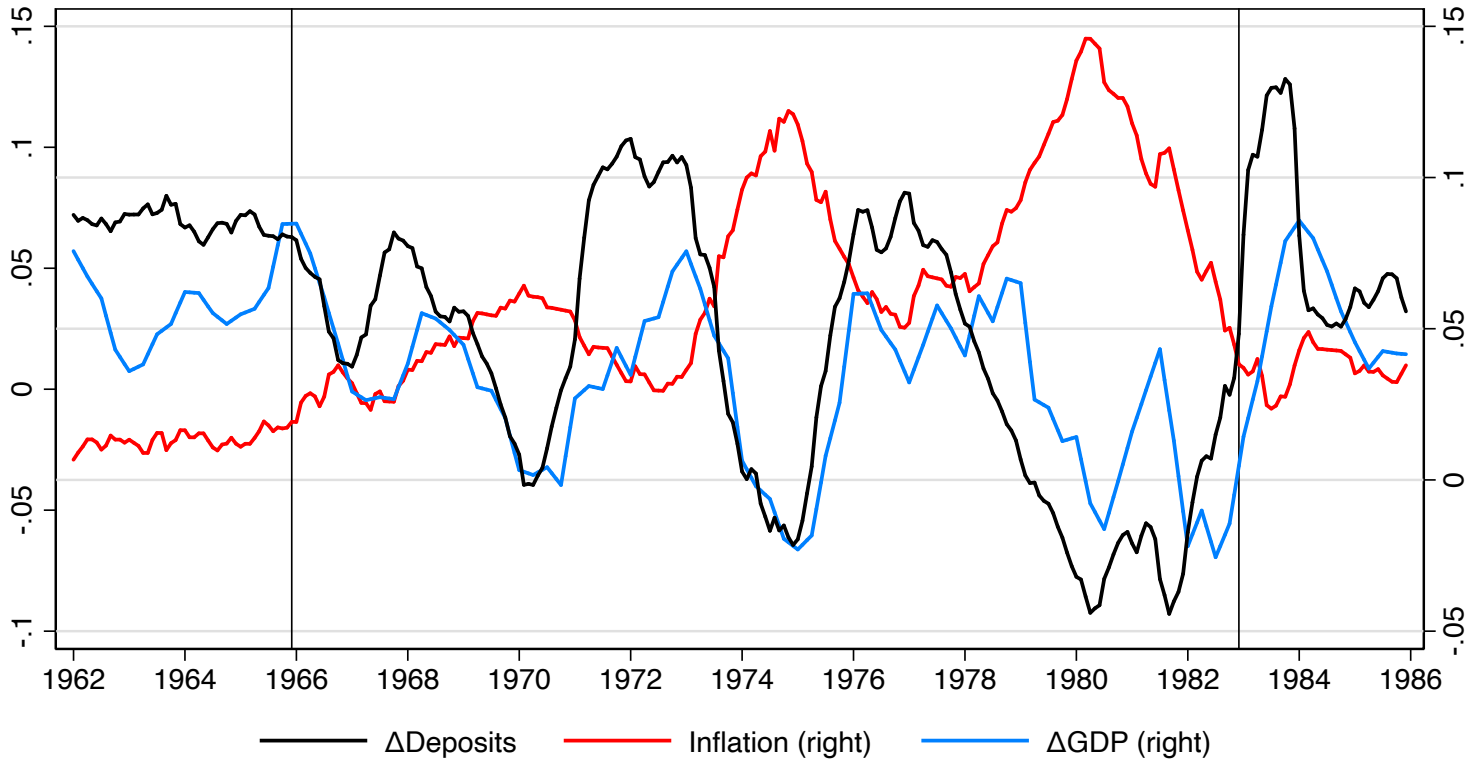
1. Until December 1973, the real price of oil was falling → cannot explain first two inflationary cycles
2. Timing: in 1973 and 1979 inflation was already high and output was already falling before the oil shocks

Reg Q Deposit Rate Ceiling → Credit Crunches



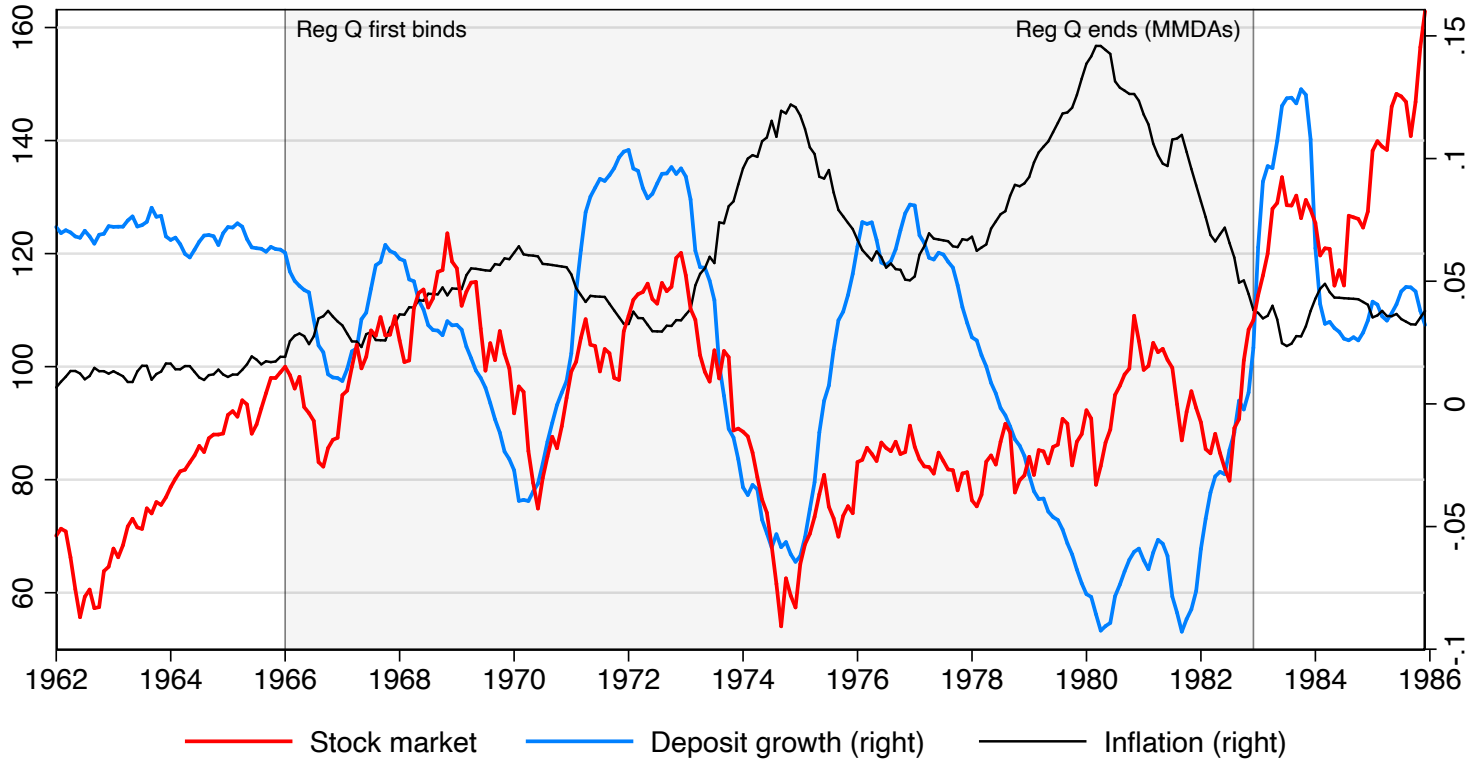
1. In 1965, *Reg Q* deposit rate ceiling first binds → deposit growth collapses
    - Fed thought deposit outflows reduce inflation by slowing money growth
    - in reality, *Reg Q* made deposits a dominated asset and hence more like money
2. From 1965 until 1982 (when *Reg Q* ended), deposits flowed out whenever the Fed funds rate exceed the deposit rate ceiling → credit crunches

Credit Crunches and Stagflation



1. Credit crunches and GDP growth are strongly related
   - once deposits start flowing in, GDP rebounds sharply

Credit Crunches and the Stock Market

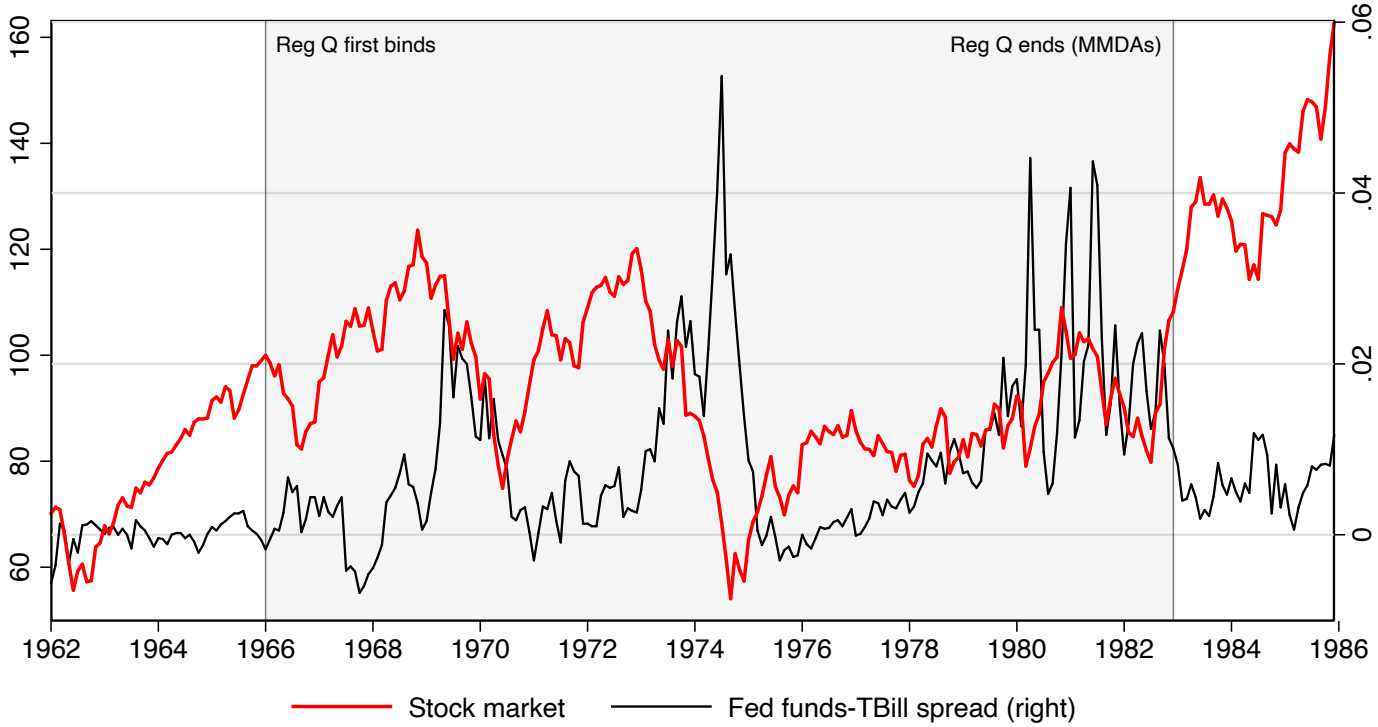


1. Deposit flows correlate strongly with stock prices throughout the *Reg Q* period
   - both on the way down and up

2. Starts with original credit crunch of 1966: stock market fell ~20%
   - the term "credit crunch" was first coined to describe this episode (Burger, 1969)

Financial Markets were Disrupted

The spread between the Fed funds rate and Treasury Bill yield is a measure of tight financial conditions (note: in 2008 this spread peaked at 1.35%)



1. Spread aligns closely with each of the stock market crashes
2. Spread rose to >5% at the bottom of the 1974 crash
   - stock market fell 60% in real terms (worst outside of Great Depression)
3. When *Reg Q* ends, the spread collapses (financial conditions normalize) → stock market takes off

Part 1 Takeaway

1. Stocks did terribly during the Great Inflation because of stagflation and financial disruptions (credit crunches)
   - in Drechsler, Savov, and Schnabl (2022) we argue that the credit crunches led to stagflation
2. In the current environment, there is less risk of a credit crunch and stagflation
   - underlying economic growth has been strong

⇒ Stocks likely to hold up better than during the Great Inflation

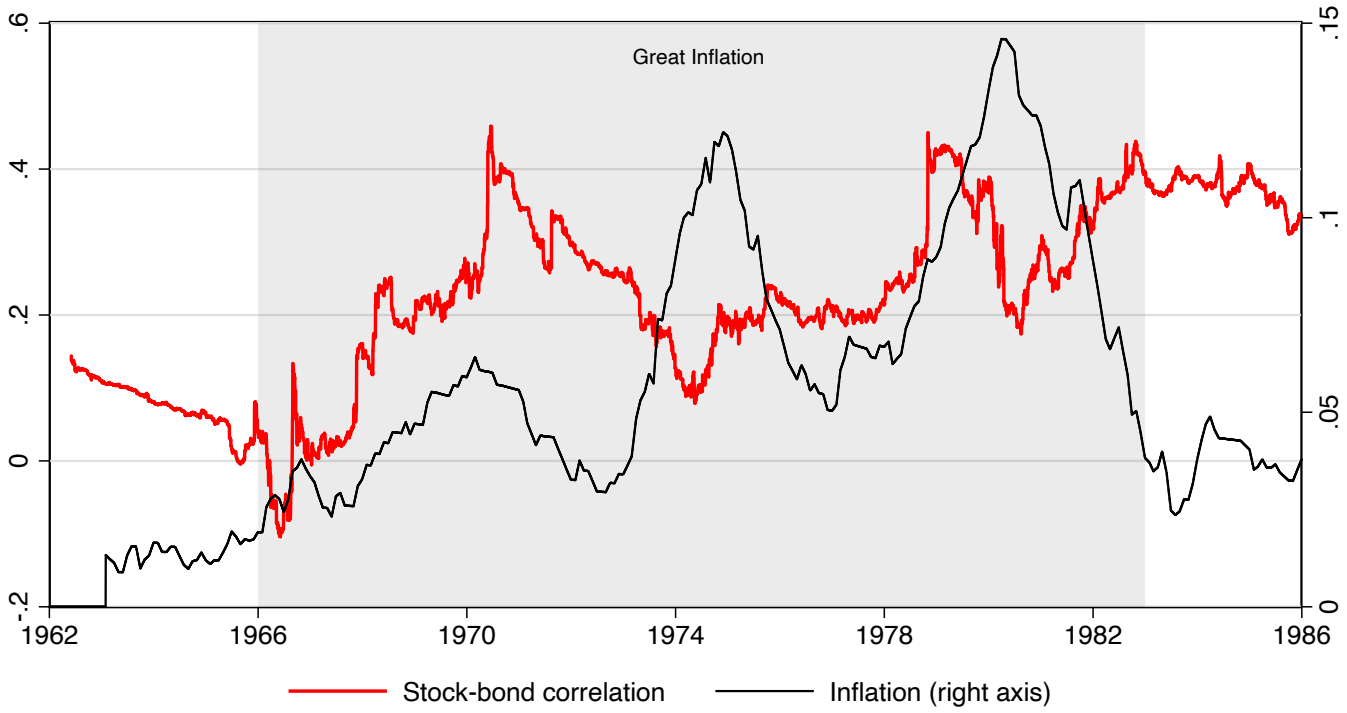
- no sign of a credit crunch
- further supply shocks a key risk (e.g., Ukraine war)
- compared to this point in the Great Inflation, stocks have done significantly better

Part 2:
Inflation and the Fed Put

The Fed Put

1. Since the late 1990s, a prominent feature of markets has been the “Fed put”
    - Fed put: the idea that the Fed cut rates when the stock market falls
2. The Fed put induces a negative correlation between stocks and bonds
    - when stocks fall, the Fed cuts rates and hence bond prices rise
    - led to the popularity of investment strategies like the 60/40 stock/bond portfolio
3. We show that the Fed put appears when inflation concerns are low
    - when inflation concerns rise, the Fed instead prioritizes fighting inflation
    - recently, this has weakened the Fed put and led the stock-bond correlation to rise → stocks become riskier as inflation rises

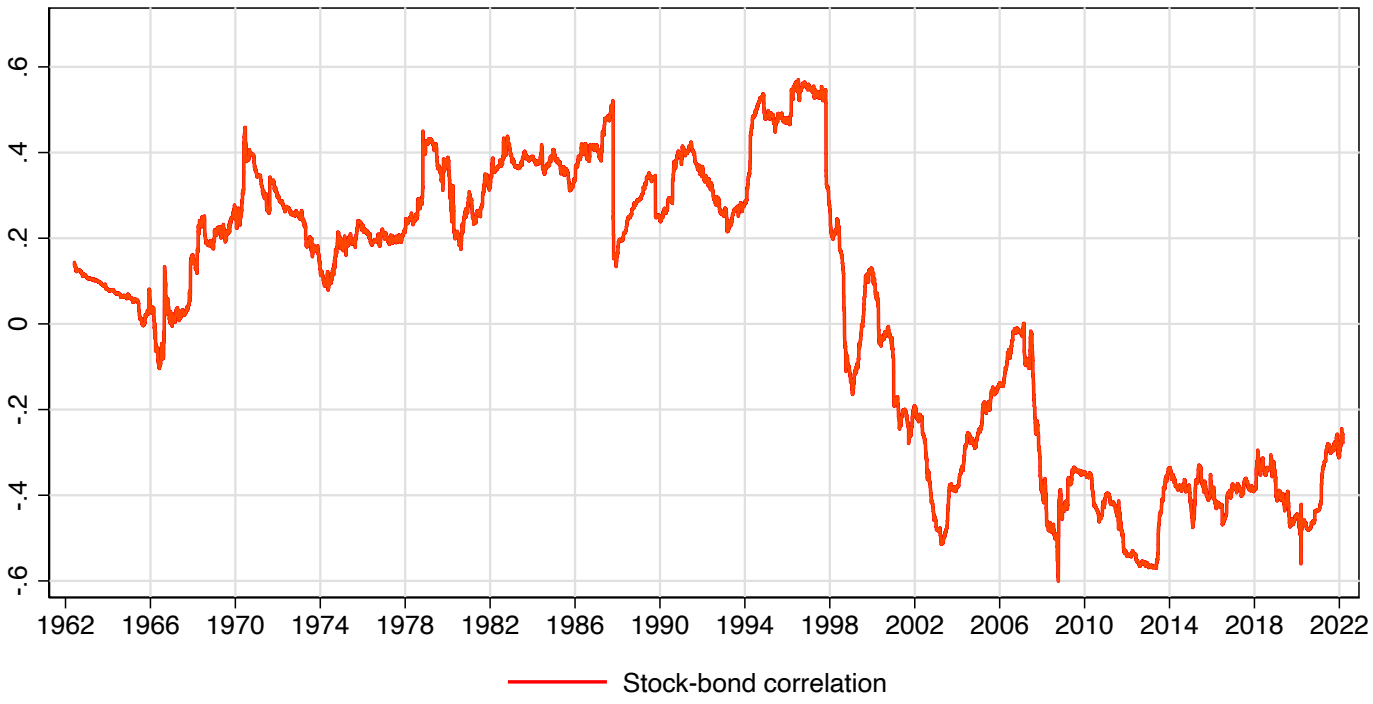
Stock-bond correlation during the Great Inflation



1. Prior to the Great Inflation, stock and bond returns were relatively uncorrelated
2. As inflation rose, the stock-bond correlation turned positive and rose steadily
   - as explained above, higher inflation was very bad news for stocks (as it is for bonds)

⇒ Stocks and bonds were poor hedges for each other during the Great Inflation

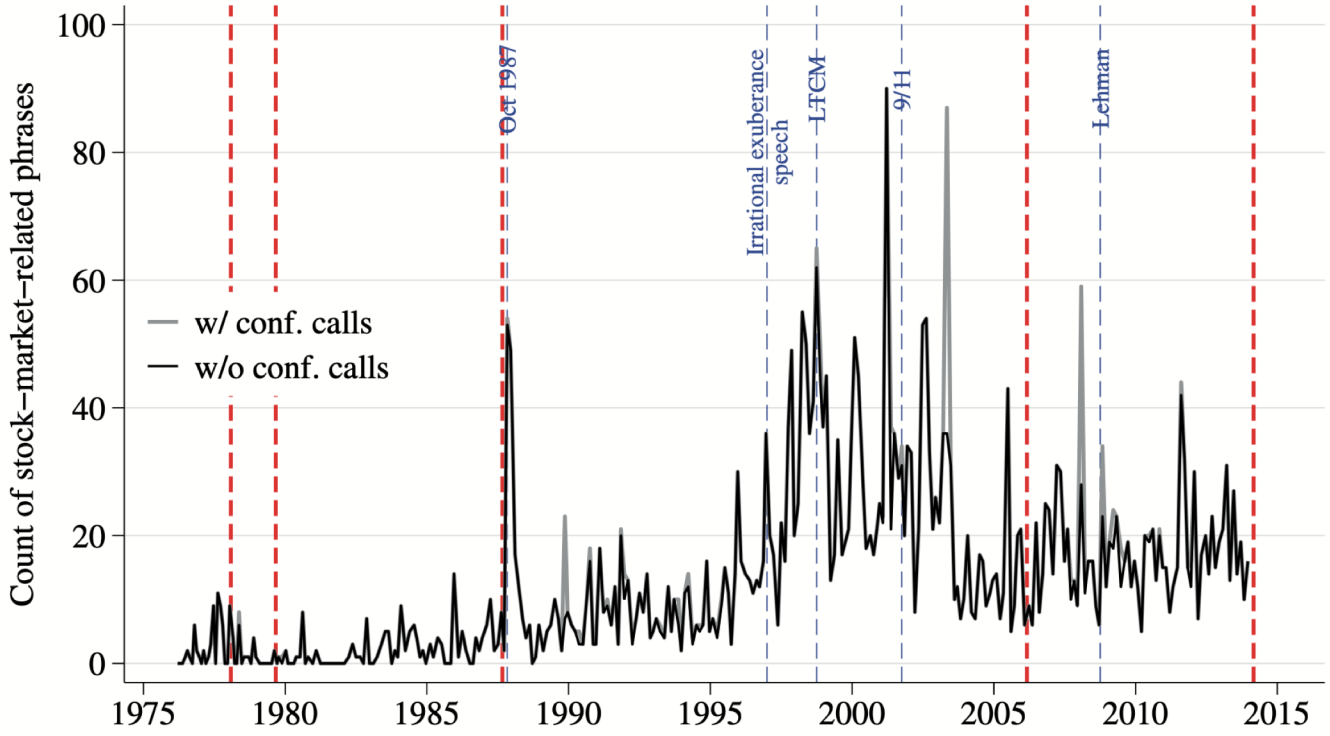
Stock-bond correlation since the Great Inflation



1. Stocks and bonds remained very positively correlated in the 1980s and early 1990s
   - inflation concerns remained top of mind in the aftermath of the Great Inflation
   - Fed responded aggressively to any sign of inflation
2. Starting in the late 1990s the stock-bond correlation drops sharply and turns negative
   - Campbell, Sunderam, Viceira (2017), Campbell, Pflueger, Viceira (2020)
   - Inflation concerns recede as inflation stays low despite high growth and low unemployment

The Fed Put

1. As concern about inflation recedes, the Fed pays more attention to the stock market
   - attention is shifted from inflation to growth and financial stability



2. Cieslak and Vissing-Jorgensen (2021) find that mentions of the stock market in Fed transcripts increase rapidly after Greenspan's "Irrational Exuberance" speech in 1996
   - an earlier spike in 1987 was short-lived

Why does the correlation change sign?

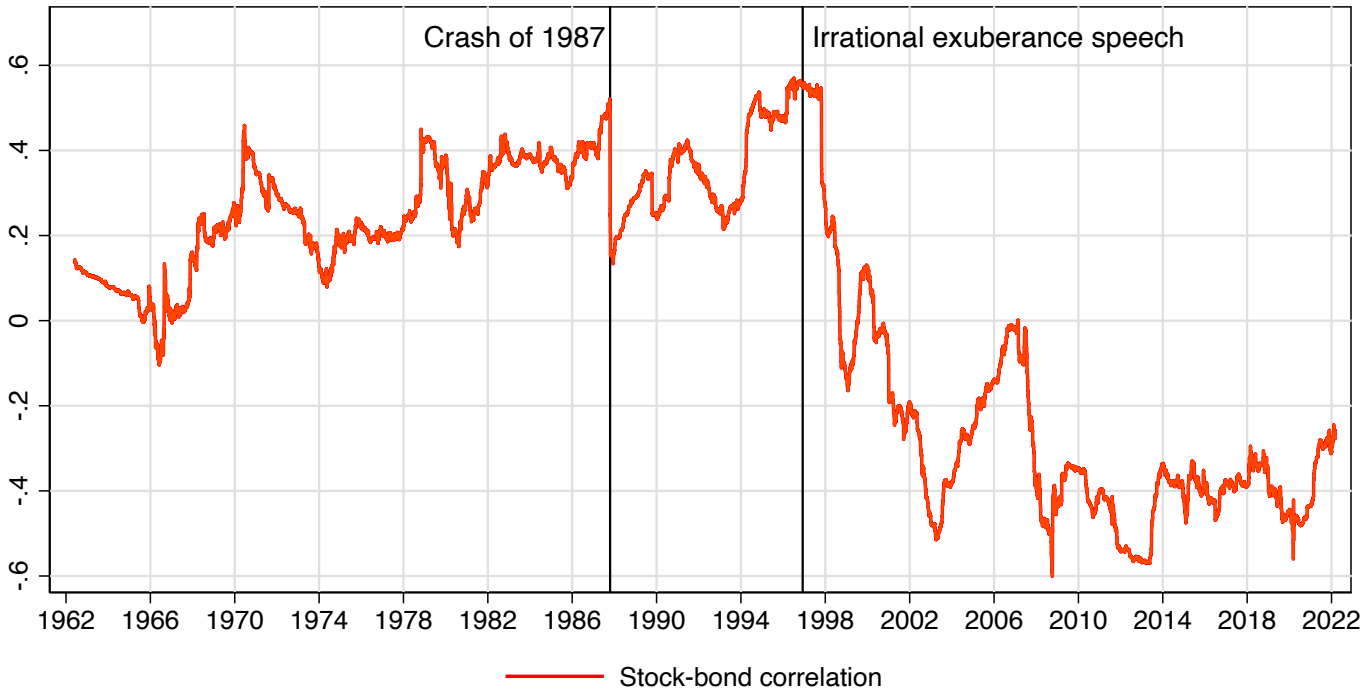
1. When inflation concerns are high, changes in inflation are the main driver of changes in interest rates
   - Fed raises real rates aggressively in response to high inflation

   ⇒ higher real rates cause bond and stock prices to fall → positive stock- bond correlation

2. When inflation concerns are low, changes in growth are the main drivers of changes in interest rates.
   - stock market declines are strongly associated with lower growth and financial instability

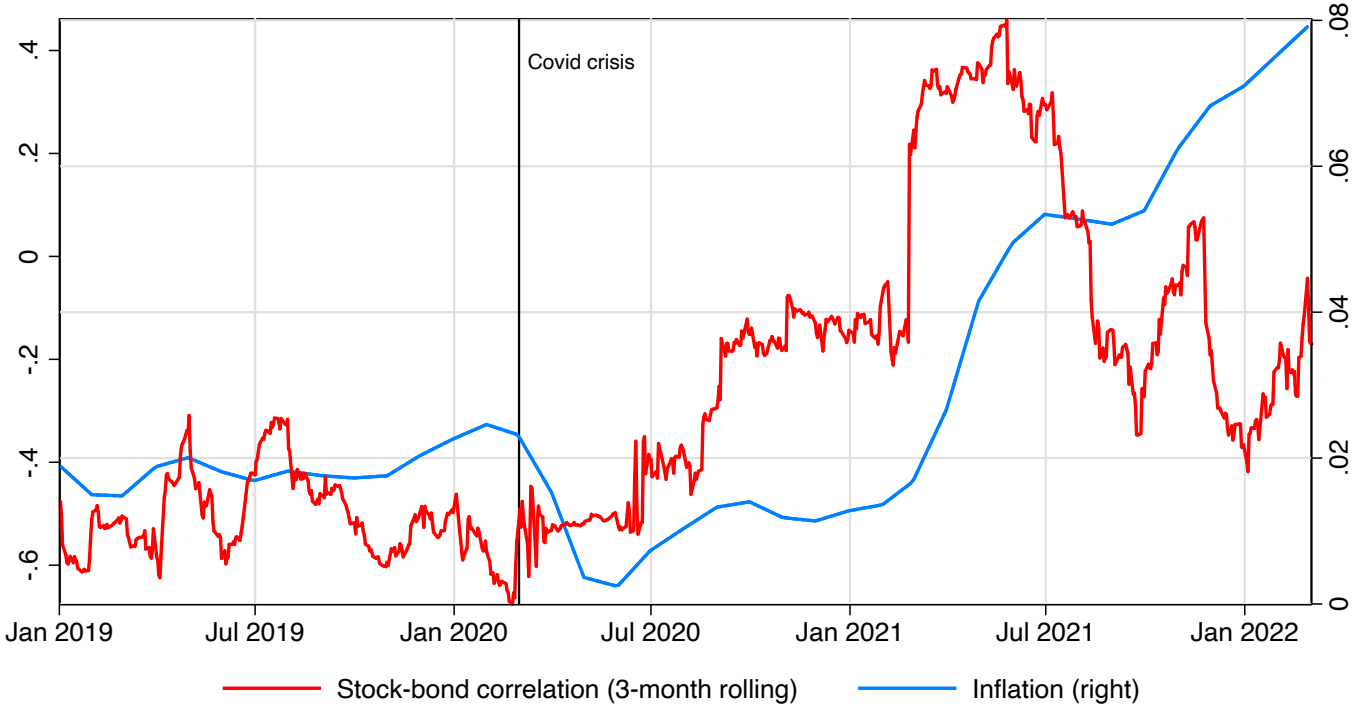
   ⇒ Fed cuts rates in response to stock market declines → negative stock-bond correlation

Stock-bond Correlation and the Fed Put



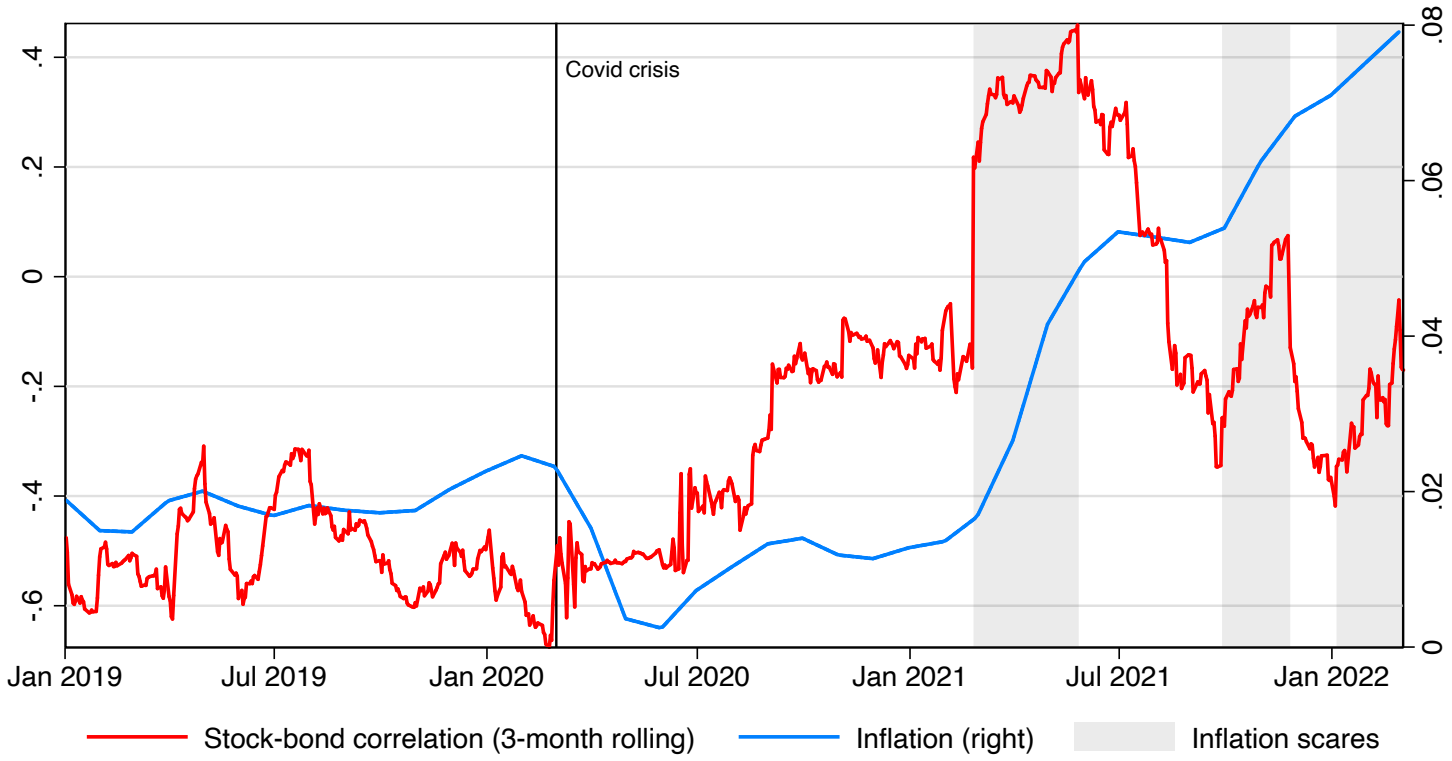
1. Turning point soon after Greenspan's "Irrational Exuberance" Speech
   - signaled that Fed would not raise rates despite high valuations because inflation remained low
   - would instead "mop up" after
2. As the Fed put became more entrenched, the stock-bond correlation kept falling
   - stocks and bonds have become great hedges → rise of the 60/40 stock/bond portfolio

Stock-bond correlation since Covid



1. The stock-bond correlation stayed low during the initial Covid period
   - as the stock market fell sharply, the Fed cut rates and focused on supporting markets and the economy

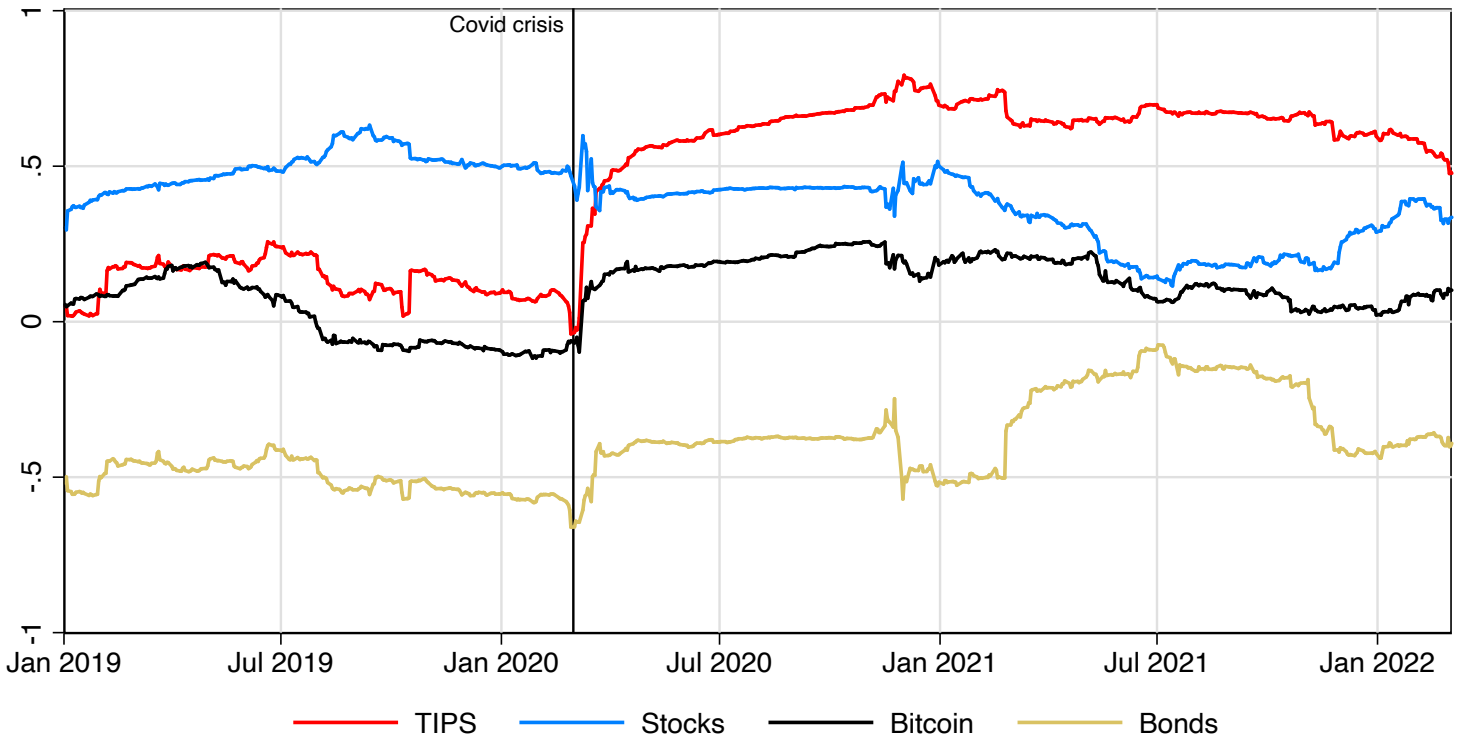
Stock-bond correlation since Covid



1. 2021 saw the return of high inflation (supply-chain disruptions, labor shortage)
2. Caused the Fed to re-prioritize fighting inflation, at the expense of growth
   - ⇒ this has caused the stock-bond correlation to rise, especially when inflation accelerated in Feb-May 2021, Oct-Nov 2021, and Jan 2022-now
   - ⇒ over the past year, stocks and bonds have become worse hedges
   - ⇒ as the Fed put has decreased, volatility has risen

What about other asset classes?

1. Rolling correlations with the 5-year breakeven inflation rate:



2. TIPS have been the best hedge for inflation
   - TIPS prices actually rise when breakeven inflation rises because the real rate tends to fall
3. After TIPS, stocks provide the second-best hedge
   - Bitcoin not a good hedge
4. Unsurprisingly, nominal bonds are most negatively exposed