



# SESSION 11: INTEREST RATES

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# Interest Rates: The Basics

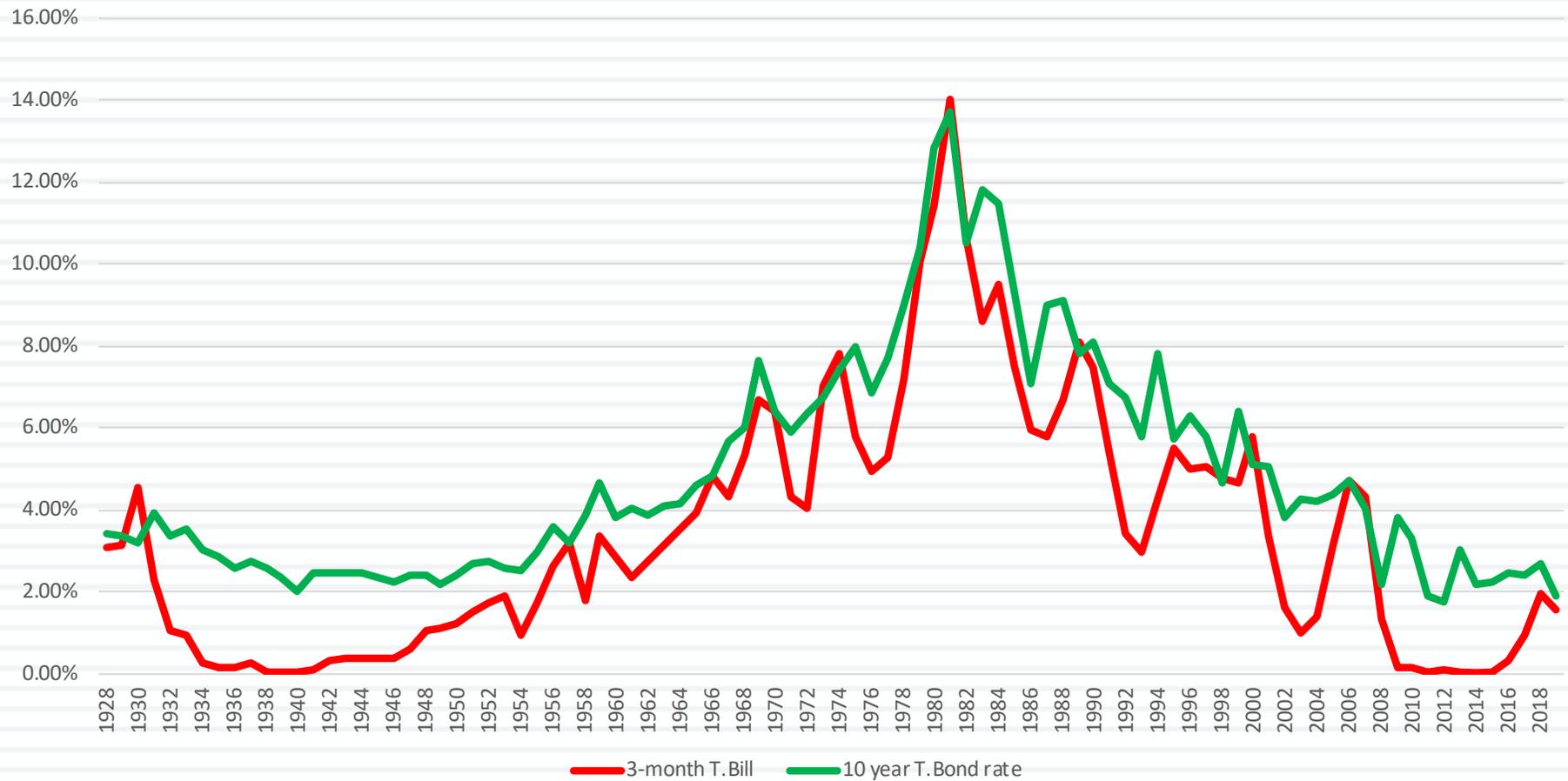
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- An interest rate is what you pay as a borrower, when you borrow money, and what you earn, when you are the lender of this money.
- While we run into a multitude of interest rates during the course of our lives, from fixed deposit rates on our bank savings to mortgage rates when we borrow money to buy houses and credit card rates, when we fail to make our credit card payments in full, these rates can broadly be classified into the following groups:
  - ▣ Market-determined rates, where the rate is set by demand and supply
  - ▣ Market-influenced rates, where the rate is based upon a market-determined value
  - ▣ Entity-set rates, where an entity (bank, credit card company) sets the rates
  - ▣ Negotiated rates, where rates are based upon negotiating power and need.
- Those market determined rates are driven by demand and supply and the question of what causes these rates to change over time, and be higher in some periods than others, has been a source of endless debate.

# US Treasury Rates: 1928 - 2019

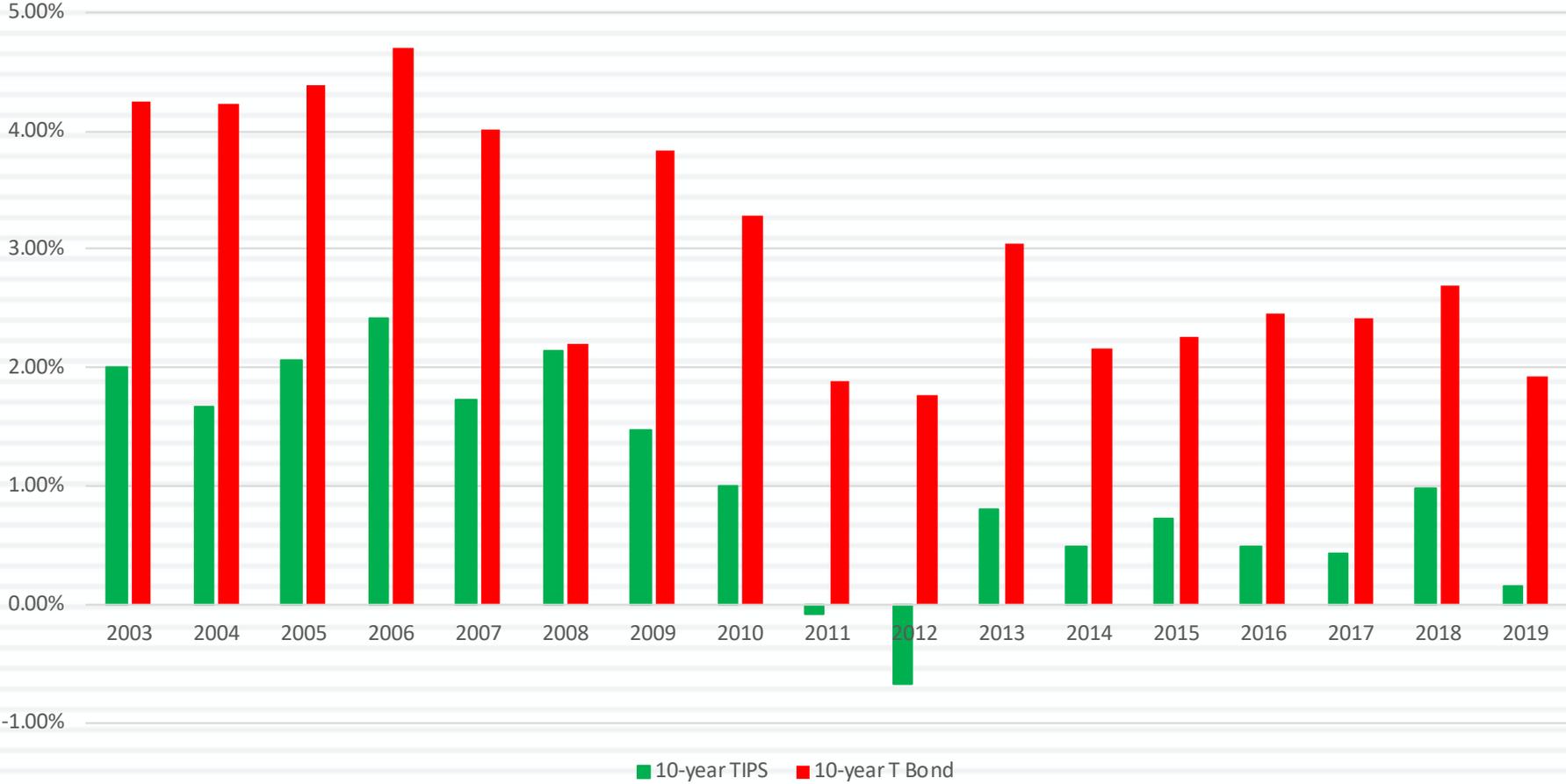
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US Treasuries: 3-month and 10-year from 1928 - 2019



# A Measure of Real Interest Rates: TIPS

US TIPS versus 10-year US T Bond



# The Fisher Equation

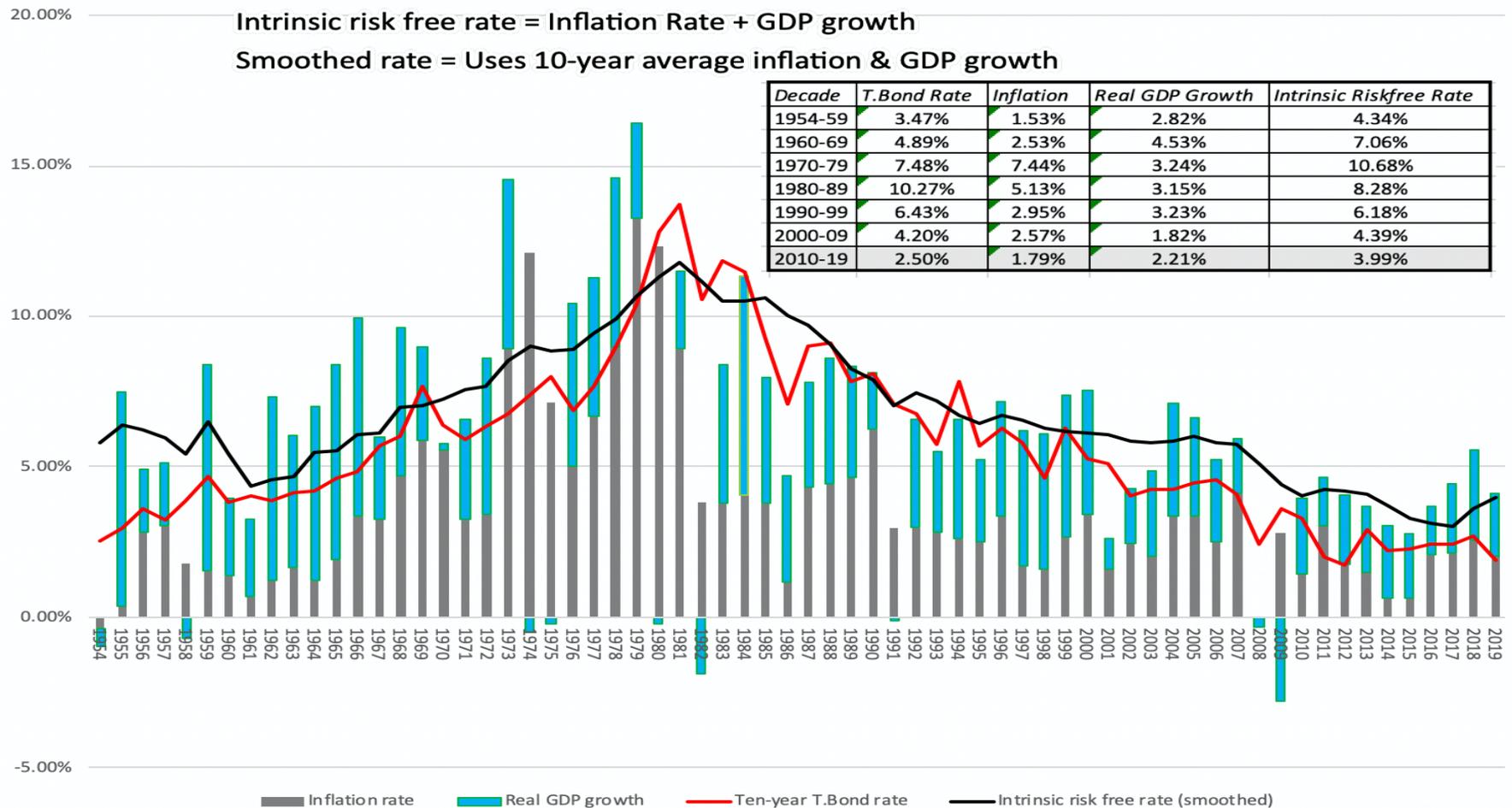
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- While there are many forces that move interest rates, there is one simple equation that lies at the core, the Fisher equation:
  - ▣ Nominal Interest Rate = Real Interest Rate + Expected Inflation
  - ▣ The real interest rate is a function of investor preferences for current consumption, but it tends to also be a proxy for real growth, with higher growth going with higher real interest rates.
- In the Fisher equation, it is worth noting that on an expected basis:
  - ▣ The nominal interest rate will generally be higher, as expected inflation rises.
  - ▣ In a world with deflation and really low or negative real growth, the nominal interest rate can be negative.

# An Intrinsic Riskfree Rate

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US Ten-Year T.Bond versus Intrinsic Riskfree Rate



# The Role of Central Banks

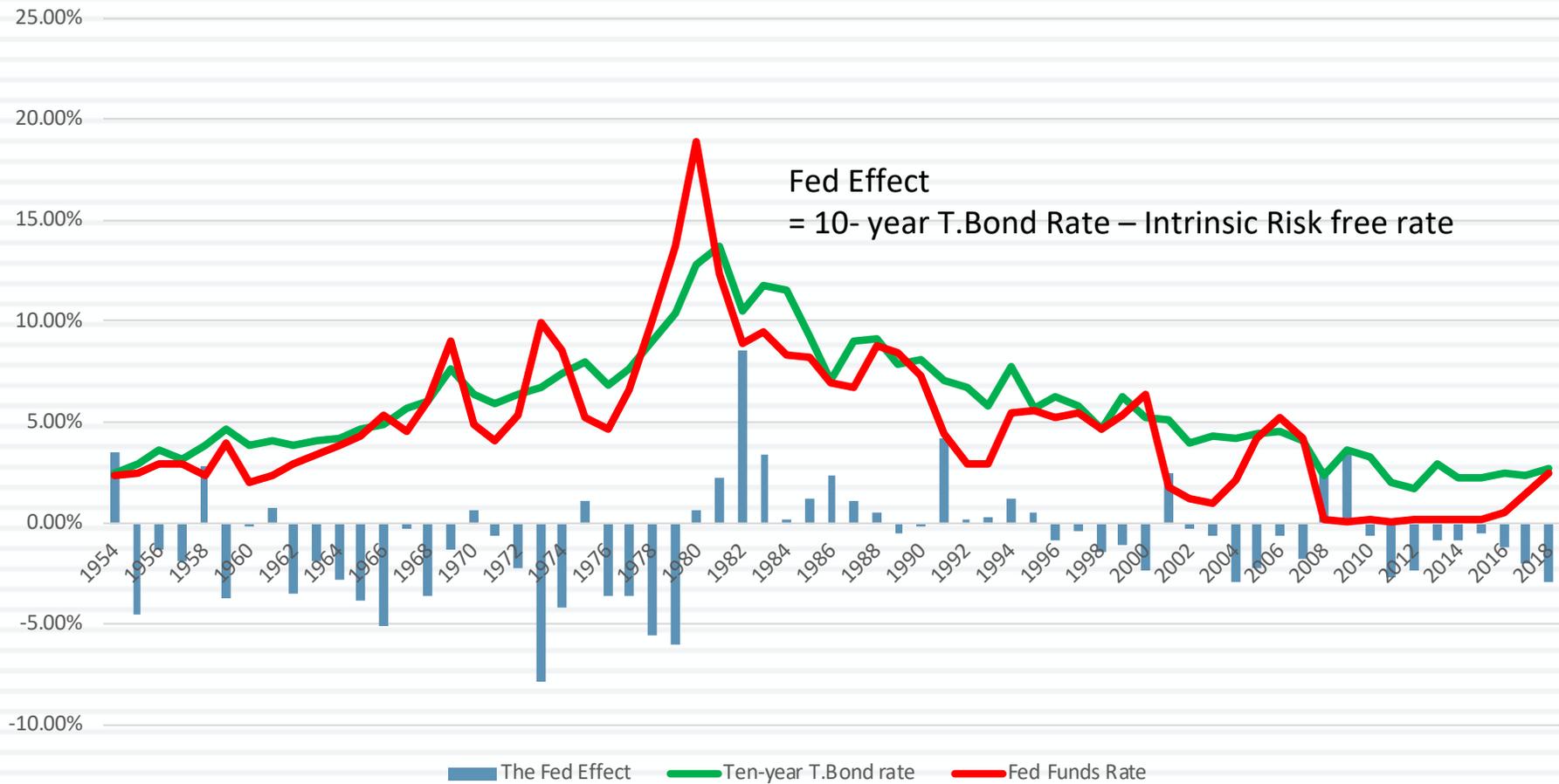
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- Over the last century, central banks have taken a bigger role in the interest rate market, and in the eyes of some investors, they set rates.
- That said, there are only a few rates that central banks set, and their influence on the rest of the rate market comes from the perception of central banking power.
- Put simply, a central bank that is perceived as powerful can affect rates through actions it takes on rates that, by themselves, have little consequence.

# The Fed Effect?

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### The Fed Effect: T Bond and Fed Funds Rate



# Quantitative Easing

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- After the 2008 crisis, central banks have become much more activist in trying to influence interest rates, markets and stock prices.
  - ▣ Quantitative Easing primarily captures the role that central banks took in buying government bonds to keep rates low.
  - ▣ Central banks have even been willing to provide backstops in corporate bond and lending markets, allowing distressed firms lifelines to borrow more money during market crisis.
- Critics argue that central banking activism rewards risk takers, by protecting them from their mistakes, and increases the chances of inflation in the future.

# The Yield Curve

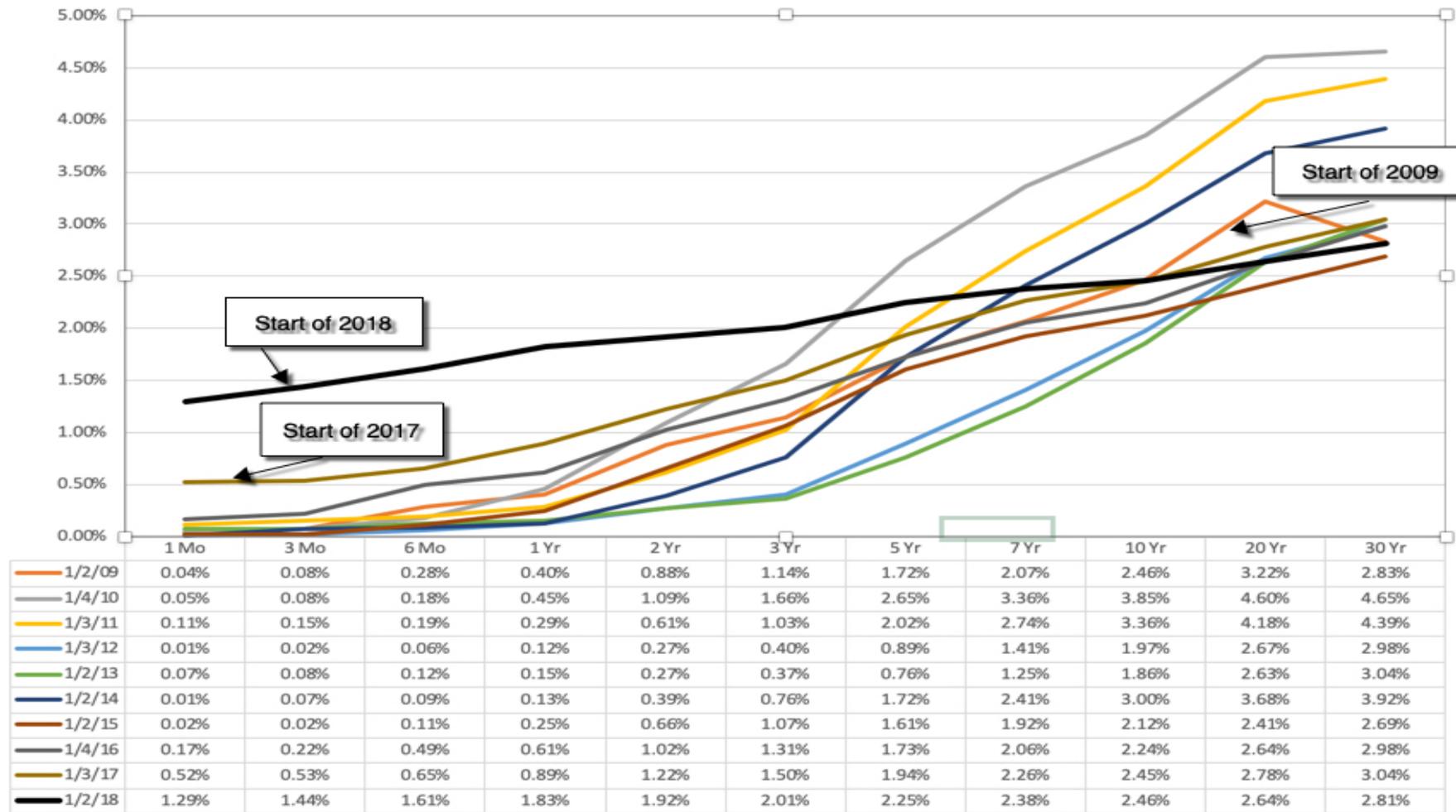
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- The yield curve is a graph of market interest rates on bonds issued by a given entity (government or corporate) against bond maturities.
- Thus, it looks at the rate on short term borrowings against long term borrowings, and the slope of the curve can be:
  - Upward sloping, if long term rates are higher than short term rates
  - Flat, if the rates are similar across maturities
  - Downward sloping, if long term rates are lower than short term rates

# US Treasury Yield Curves over time

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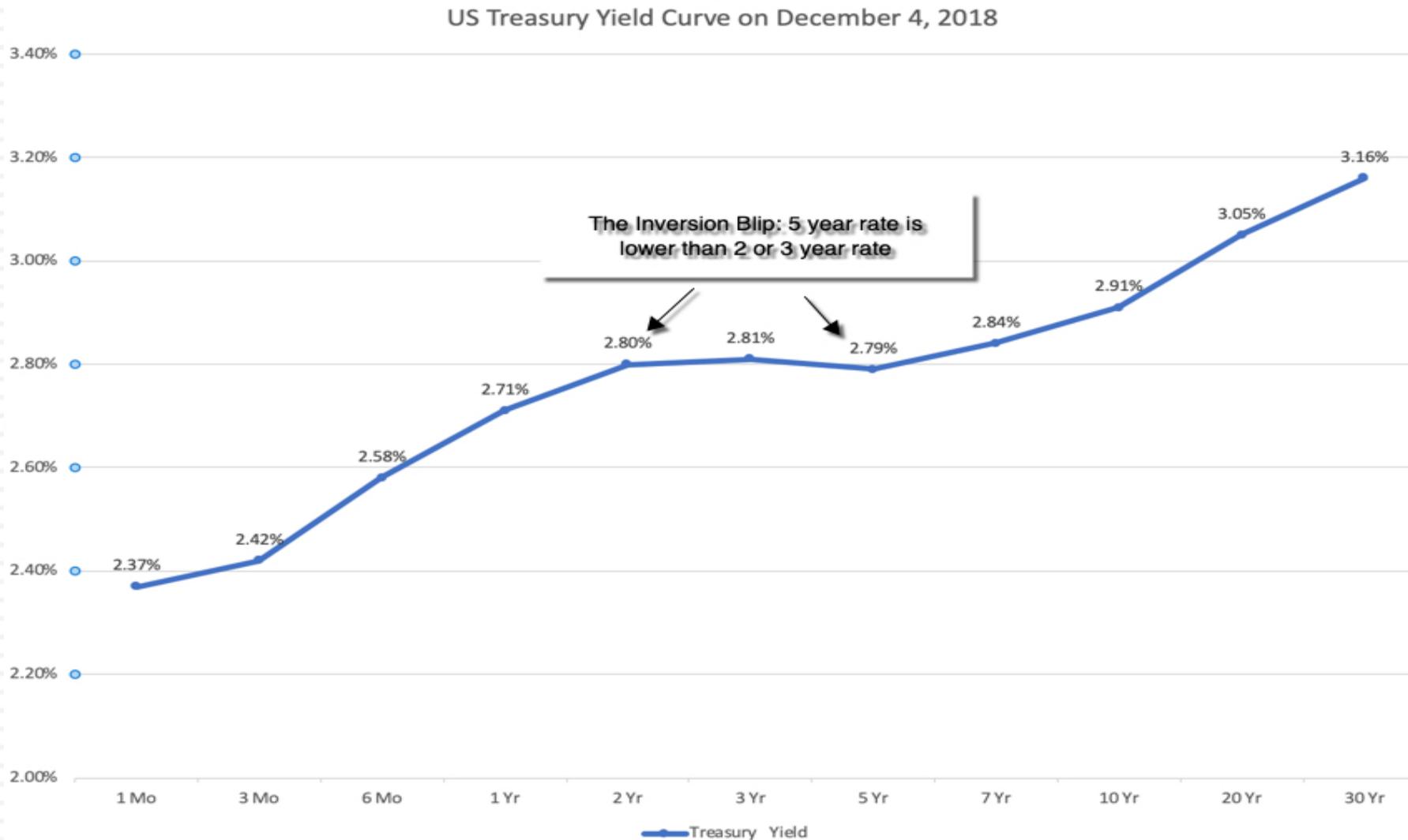
US Treasury Yield Curves: 2009 - 2018 (Start of each year)



# Yield Curve: A Rationale for Upward Sloping Curves

- To understand yield curves, let's start with a simple economic proposition. Embedded in every treasury rate are expectations of expected inflation and expected real interest rates, and the latter
  - $\text{Interest Rate} = \text{Expected Inflation Rate} + \text{Expected Real Interest Rate}$
- Over much of the last century, the US treasury yield curve has been upward sloping, and the standard economic rationalization for it is a simple one.
- In a market where expectations of inflation are similar for the short term and the long term, investors will demand a "maturity premium" (or a higher real interest rate) for buying longer term bonds, thus causing the upward tilt in the yield curve.
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# Yield Curve on December 4, 2018

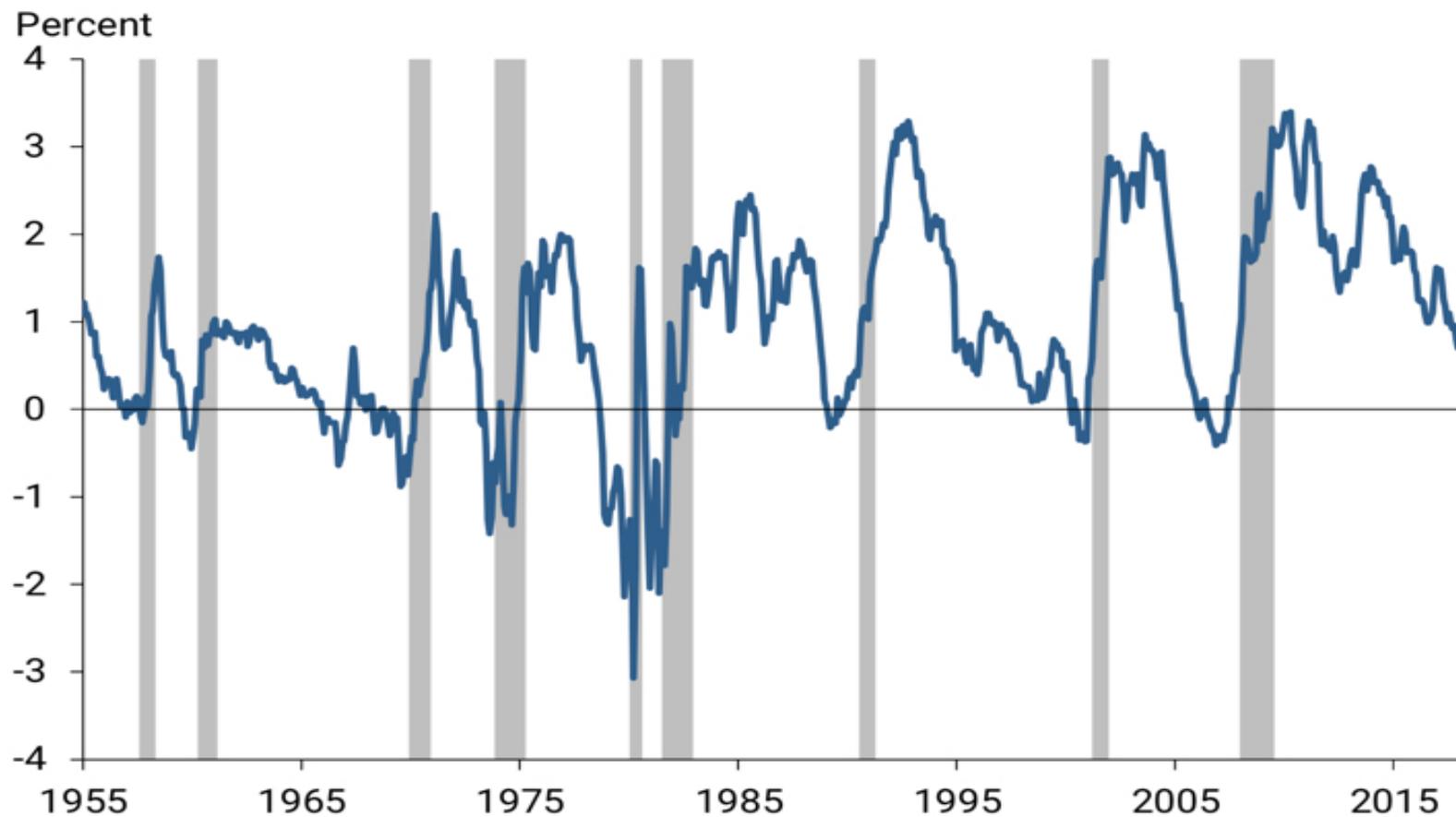


# Inverted Yield Curves: A Fed Effect?

- The rises in short term rates that give rise to each of the inverted yield curve episodes are accompanied by increases in the Fed Funds rate.
- To the extent that the Fed's monetary policy action (of raising the Fed funds rate) accomplishes its objective of slowing down growth, the yield slope metric becomes a stand-in for the Fed effect on the economy, with a more positive slope associated with easier monetary policy.

# Inverted Yield Curves: The Perfect Predictor of Recessions?

## The term spread and recessions

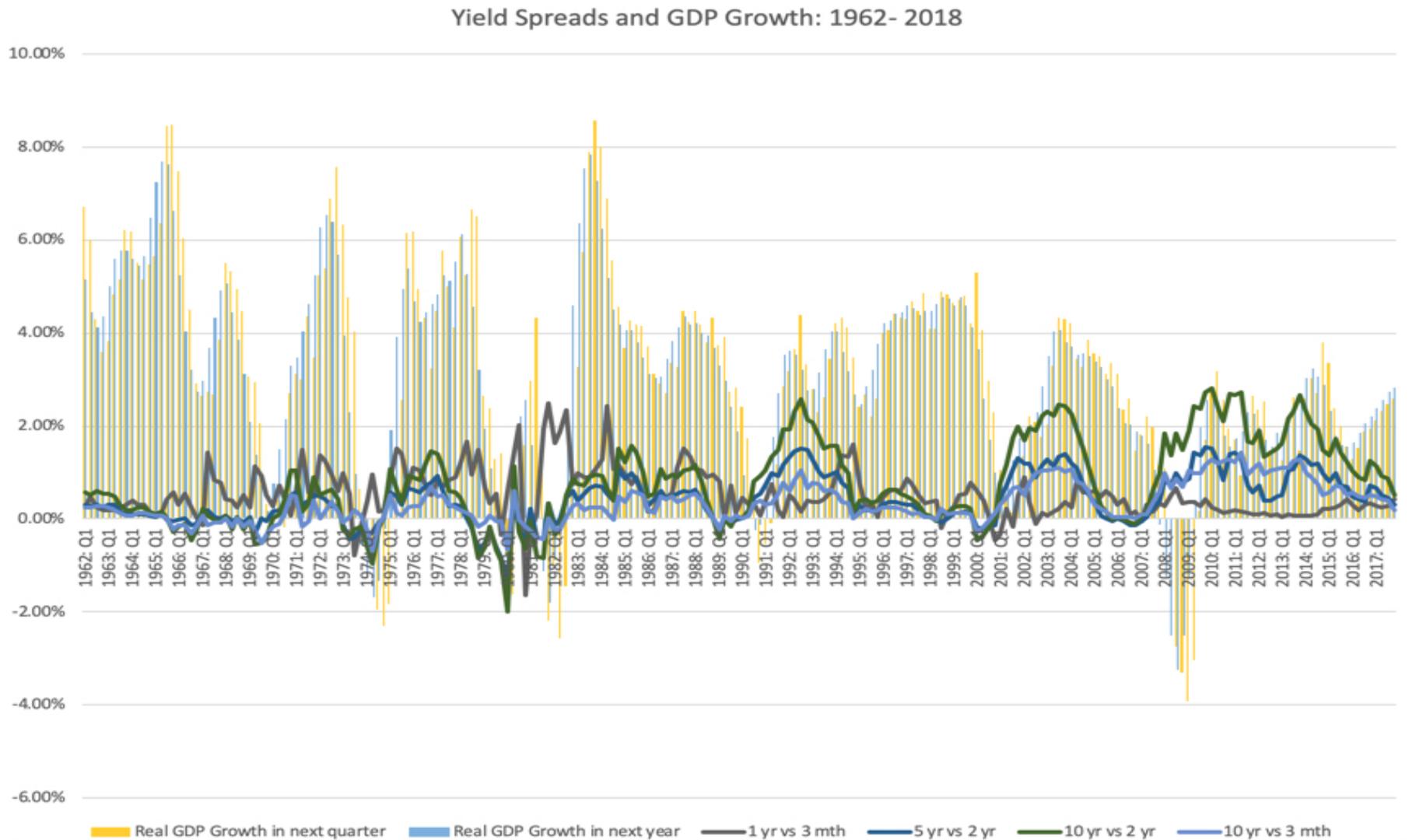


Note: Gray bars indicate NBER recession dates.

# Yield Curves and Economic Growth: A fuller analysis?

- The fact that every inversion in the last few decades has been followed by a recession will strike fear into the hearts of investors, but is it that fool proof a predictor?
- Perhaps, but given that the yield curve slope metrics and economic growth are continuous, not discrete, variables, a more complete assessment of the yield curve's predictive power for the economy would require that we look at the strength of the link between the slope of the yield curve (and not just whether it is inverted or not) and the level of economic growth (and not just whether it is positive or negative).

# Yield Spreads and GDP Growth



# Looking past the picture..

<i>1962 through 2018</i>					
	<i>1 yr vs 3 mth</i>	<i>2 yr vs 1 yr</i>	<i>5 yr vs 2 yr</i>	<i>10 yr vs 2 yr</i>	<i>10 yr vs 3 mth</i>
Real GDP Growth in next quarter	0.0821	0.0884	-0.1176	-0.1554	-0.1884
Real GDP Growth in next year	0.1577	0.2897	0.0432	-0.0147	-0.0839
<i>2008 through 2018</i>					
Real GDP Growth in next quarter	-0.4939	-0.1228	-0.0974	-0.1044	-0.0891
Real GDP Growth in next year	-0.5332	0.0112	0.0314	-0.0074	-0.0512

The sign on the correlation measures how GDP growth is linked to the slope of the yield curve; a positive correlation is supportive of the base hypothesis, which is that flatter or more negatively sloped are associated with lower or negative economic growth. The strength of the relationship is captured in the how close the correlation number is to one.