

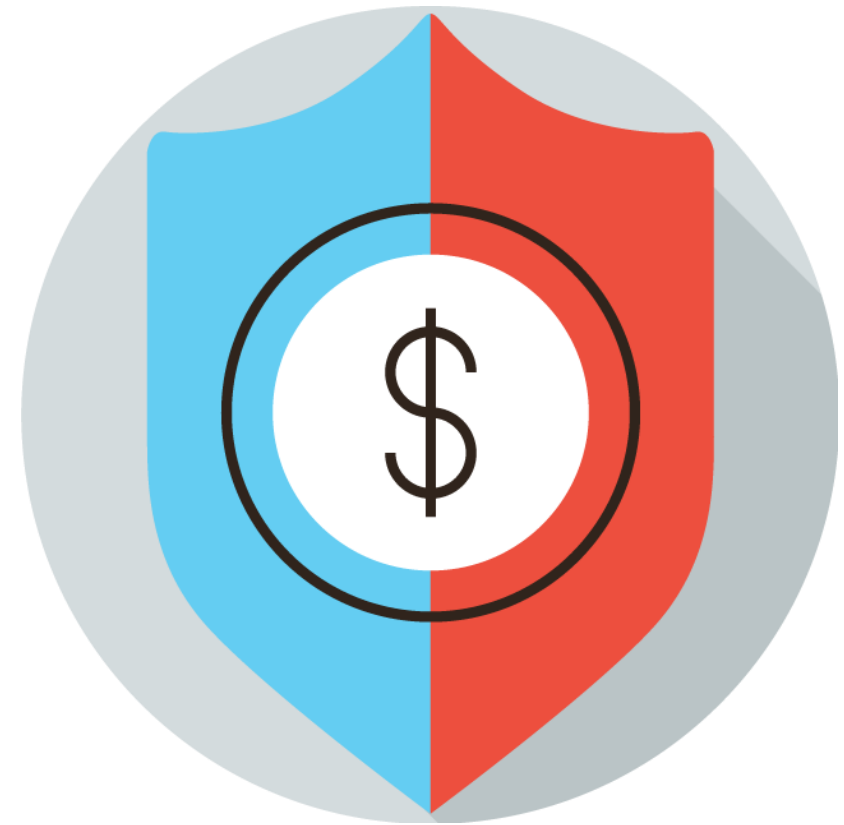


## Inflation Roundup

March 4, 2021

Benjamin Breitholtz and Peter Forbes

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The Arbor logo consists of a stylized line graph showing an upward trend, followed by the word "Arbor" in a sans-serif font.



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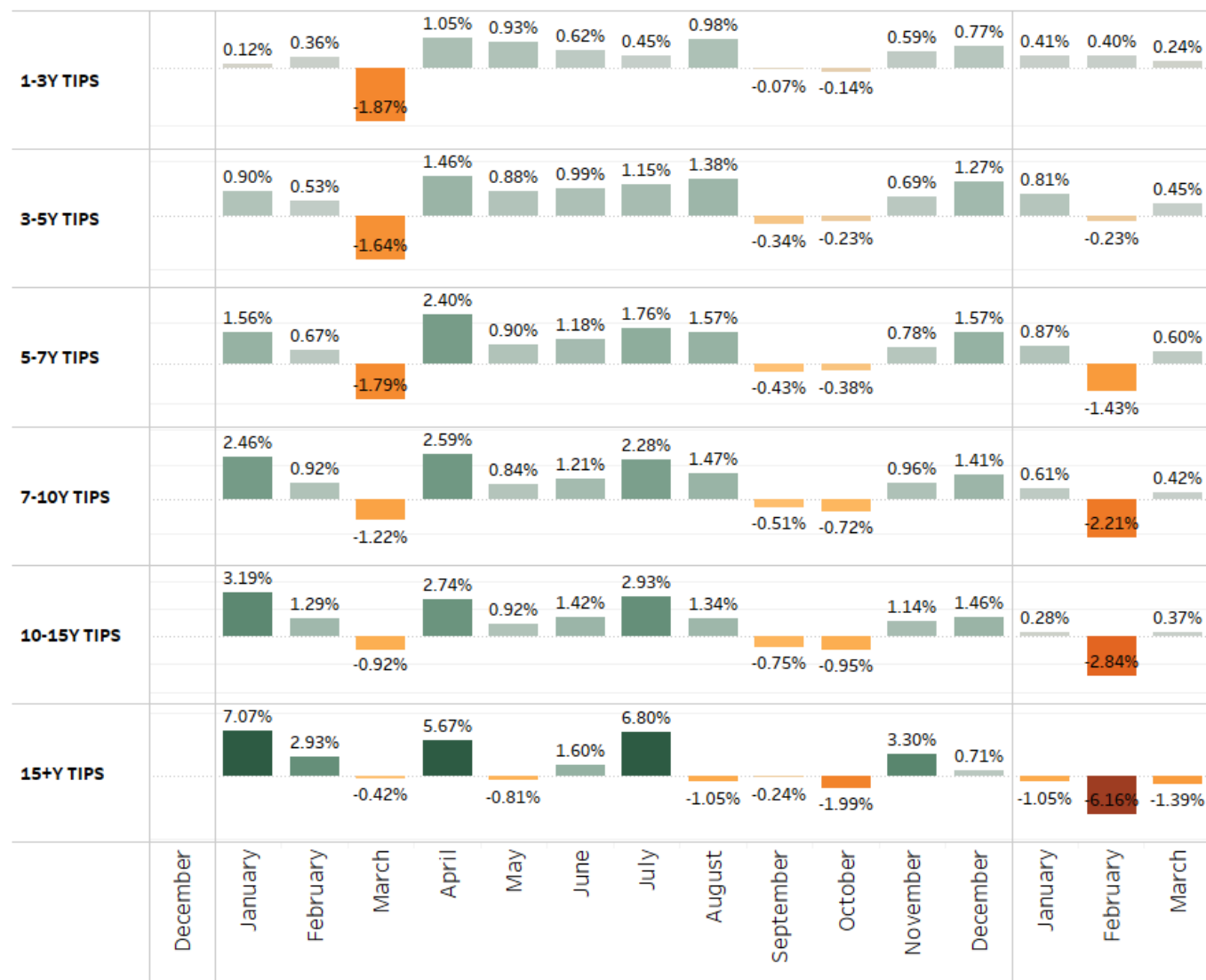
- Total Returns
- 'Inflation is Coming' Narrative Slows
- Nominal Yields Detach From Inflation Expectations
- Real Yields Won't Move Until Fed Gets Hawkish
- *Reasons for optimism inflation will rise:*
  - U.S. Consumers See Inflation (search activity)
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  - Global Synchronized Growth is Here
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  - Owners Equivalent Remains a HEAVY Weight on Inflation

	Conditions Fueling an Inflation Premium	Aug '20	Sep '20	Oct '20	Nov '20	Dec '20	Jan '21	Feb '21	Notes
Wider TIPS Breakevens	Commodities ex-energy and gold: 50+% produce + YOY return	Y	Y	Y	Y	Y	Y	Y	82% of commodities soaring YOY led by grains and industrial metals
	Global econ data releases: 50+% economies growing above one-year trend	N	Y	Y	Y	Y	Y	Y	81% of economies growing above trend led by Asia Pacific and U.S.
	Investors pricing in 2+% YOY headline CPI next 10 years	N	N	N	Y	Y	Y	Y	Inflation swap caps/floor place firm floor in for TIPS breakevens at 200 bps
	TIPS breakeven curve inversion confirms committal to AIT	N	N	N	N	Y	Y	Y	Allowing short-run inflation to run hot expected with Fed officials comfortable (for now). Very different than past instances when inversions signaled then end of widening.
	Fed purchases diminishing liquidity premium	Y	Y	Y	Y	Y	Y	Y	Fed purchases added 70 and 30 bps to 2 and 10-year TIPS breakevens over the past year, respectively. Must continue to avoid damaging TIPS.
	Search activity forecasts rising OER YOY	N	N	N	N	N	N	N	Rising rents will very likely be THE game changer for inflation. Currently, search activity shows a paltry 17% probability rent price growth YOY rises.
Impairs Risk Assets	VIX and US 10 year TIPS breakeven positively correlated	N	N	N	N	Y	N	N	Brief push positive in December 2020, but since retreated (45-day = -0.35). Positive correlations have marked setbacks by risk assets.
	Short-end swaption volatility shows tightening fears	N	N	N	N	N	Y	Y	Swaption vol for 2 year rates looking ahead to 2024 has jumped above pre-pandemic levels. Need 2023 (2 year outlook) to follow-suit for tapering / rate hike fears to become a big factor.
	TIPS breakevens reach fair value implied by risk assets	N	N	N	N	N	N	N	10-year TIPS breakevens placed at 250 bps according to risk assets. Above here, inflation expectations would become too hot.
	Investors pricing in 2.5% YOY headline CPI next 10 years	N	N	N	N	N	N	N	Inflation swap caps/floors yet to show 50+% probabilities headline CPI will run hot above 2.5% YOY. Remember core on average runs 50 bps below headline CPI.

# TIPS TOTAL RETURNS:

U.S. TIPS: Monthly Returns

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# TIPS BREAK-EVENS TOTAL RETURNS:

U.S. Inflation Expectations (duration weighted): Monthly Returns

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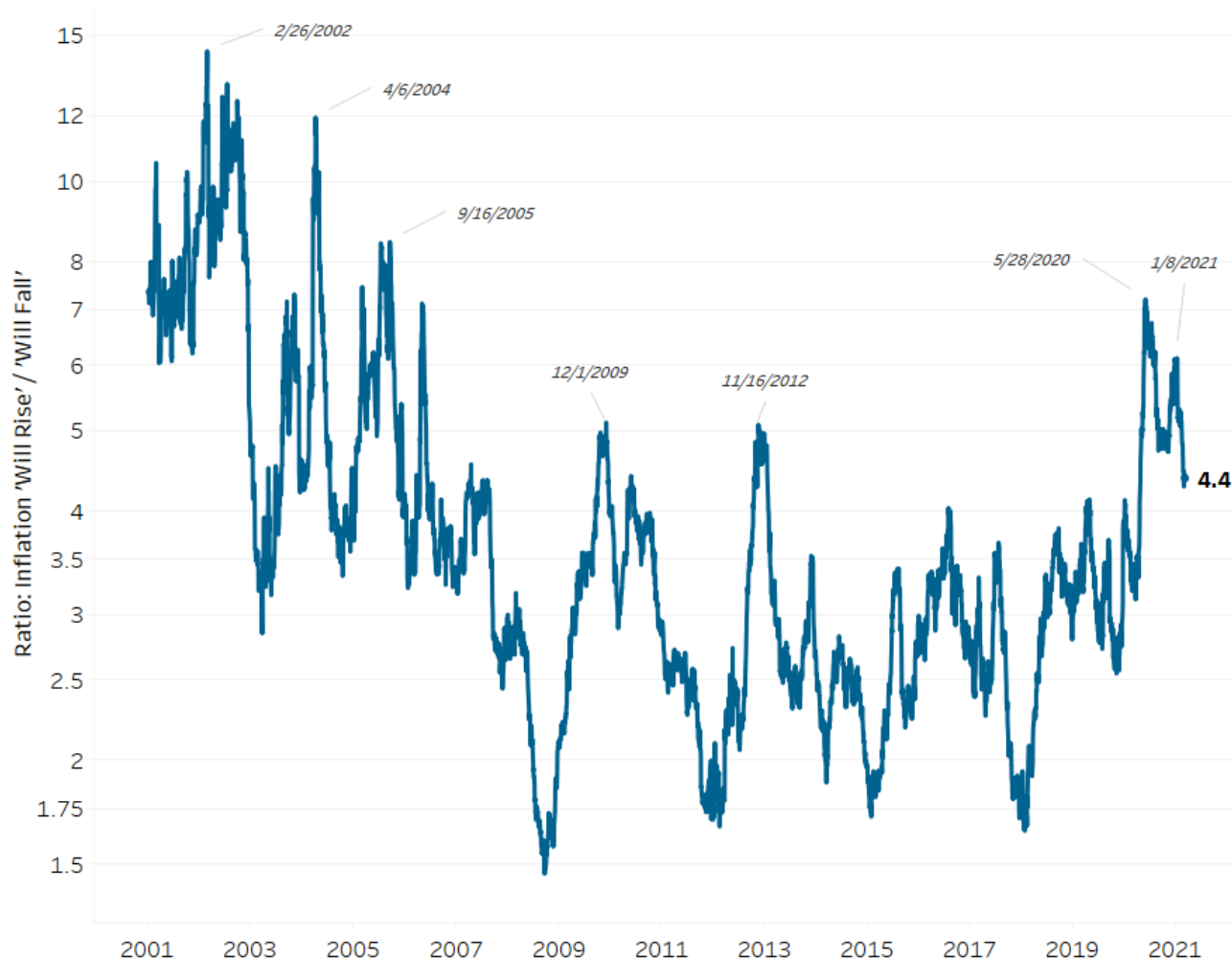
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## 'Inflation is Coming!' News Trends Rolling Over

Ratio between rolling three-month count of articles discussing inflation will 'rise' versus 'fall'

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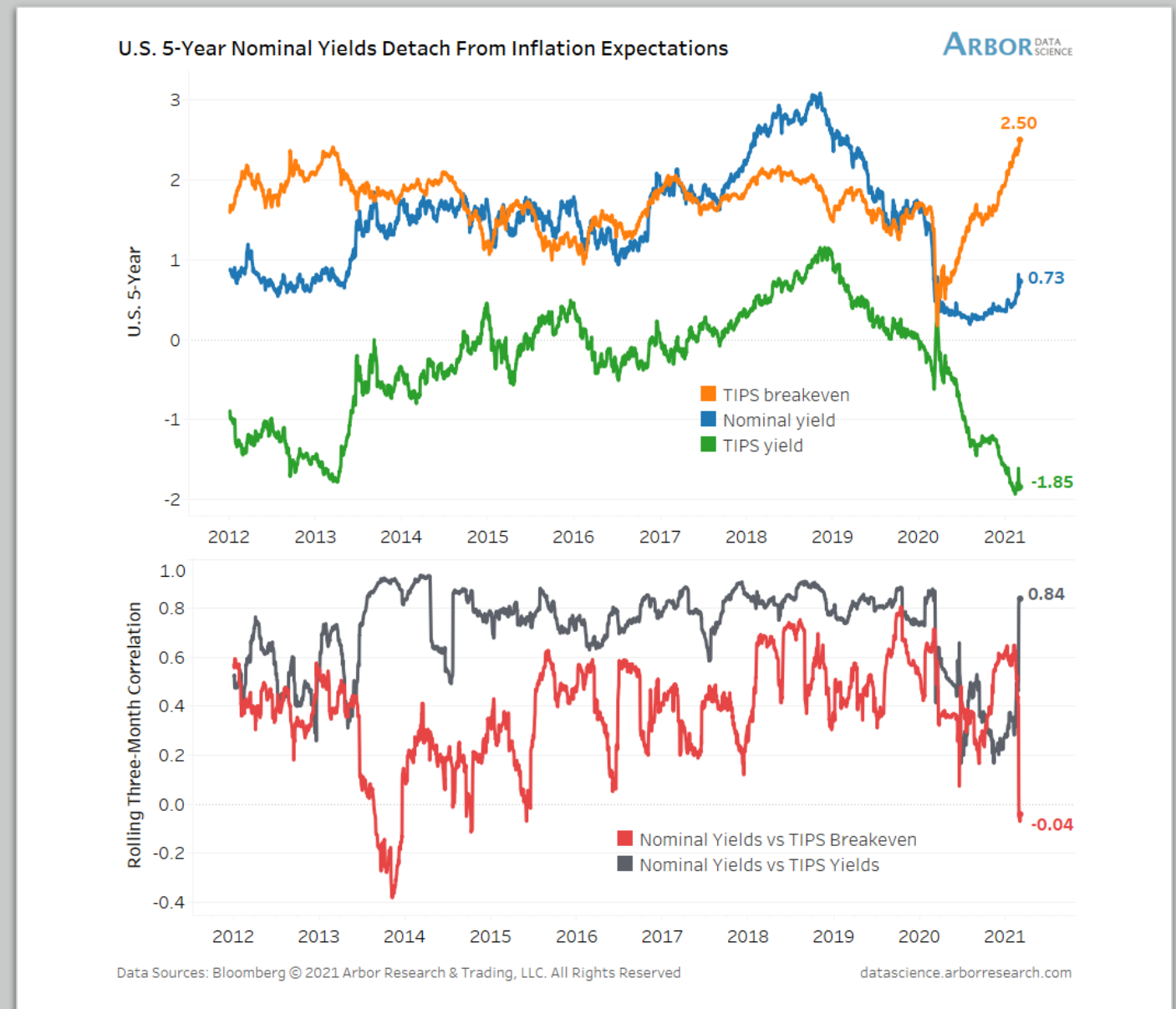
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## 'Inflation is Coming' Narrative Slows

- Loudest into May 2020 and January 2021.
- Financial media still discussing rising versus falling inflation expectations at over a 4-to-1 ratio.

# Nominal Yields Detach From Inflation Expectations

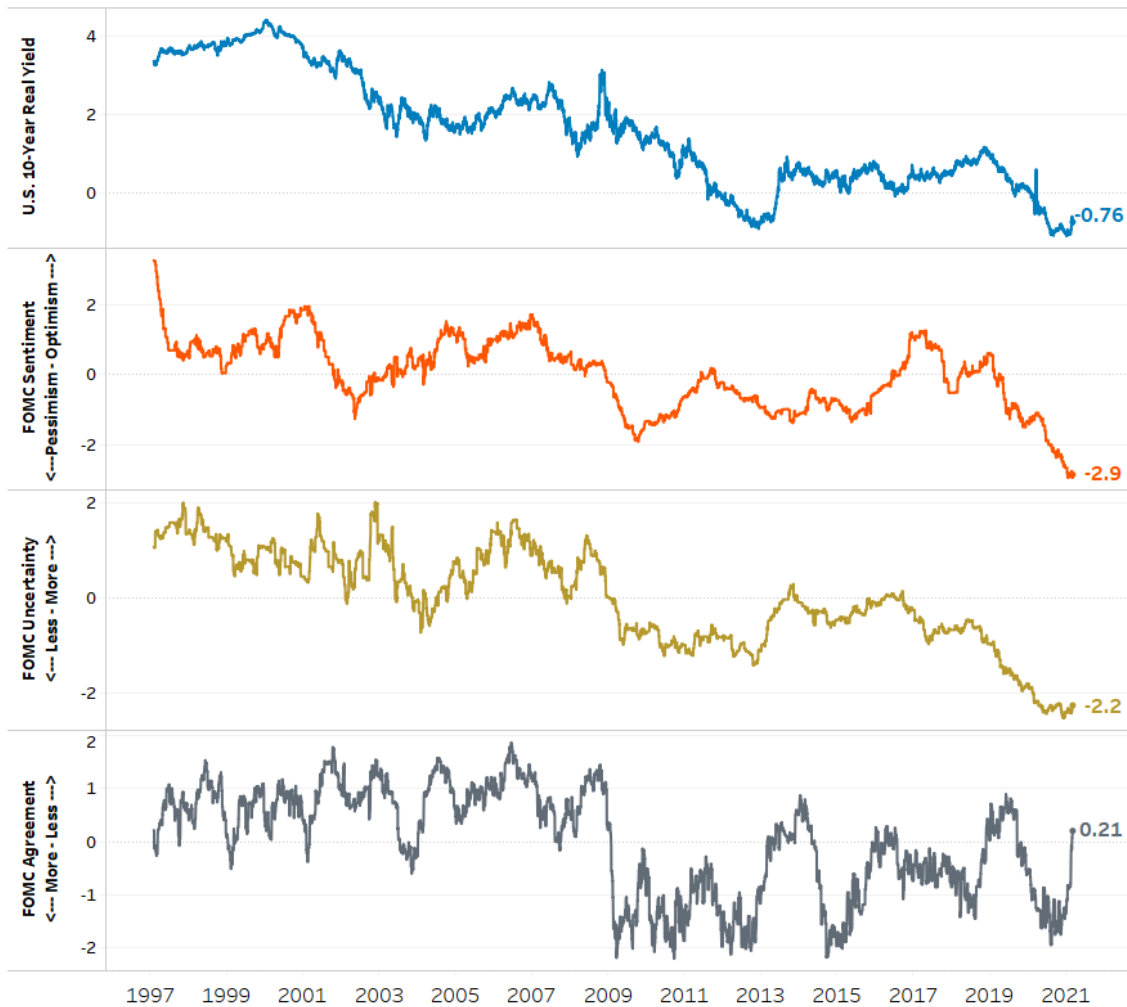
- Nominal 5-year yields are seemingly no longer driven by inflation expectations with a rolling three-month correlation of -0.04.
- Conversely, yields have suddenly re-attached to real (TIPS) yields with a rolling three-month correlation of +0.84.
- Investors are watching Fed policy more closely than inflation overshooting expectations over the years to come.



## U.S. 10-Year Real Yields Steered by Fed Policy

Sentiment and uncertainty via NLP of official communications (speeches, statements, testimonies, or more)

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## Real Yields Won't Move Until Fed Gets Hawkish

- We can explain over 70% of the variation in U.S. 10-year real yields using exclusively Federal Reserve sentiment, uncertainty, and agreement.
- Our natural language processing produces the indices shown to the right from speeches, statements, testimonies, pressers, and more.
- Agreement has been falling, raising red flags uncertainty may soon rise as well. In this event, real yields would finally climb.



## Reasons for optimism

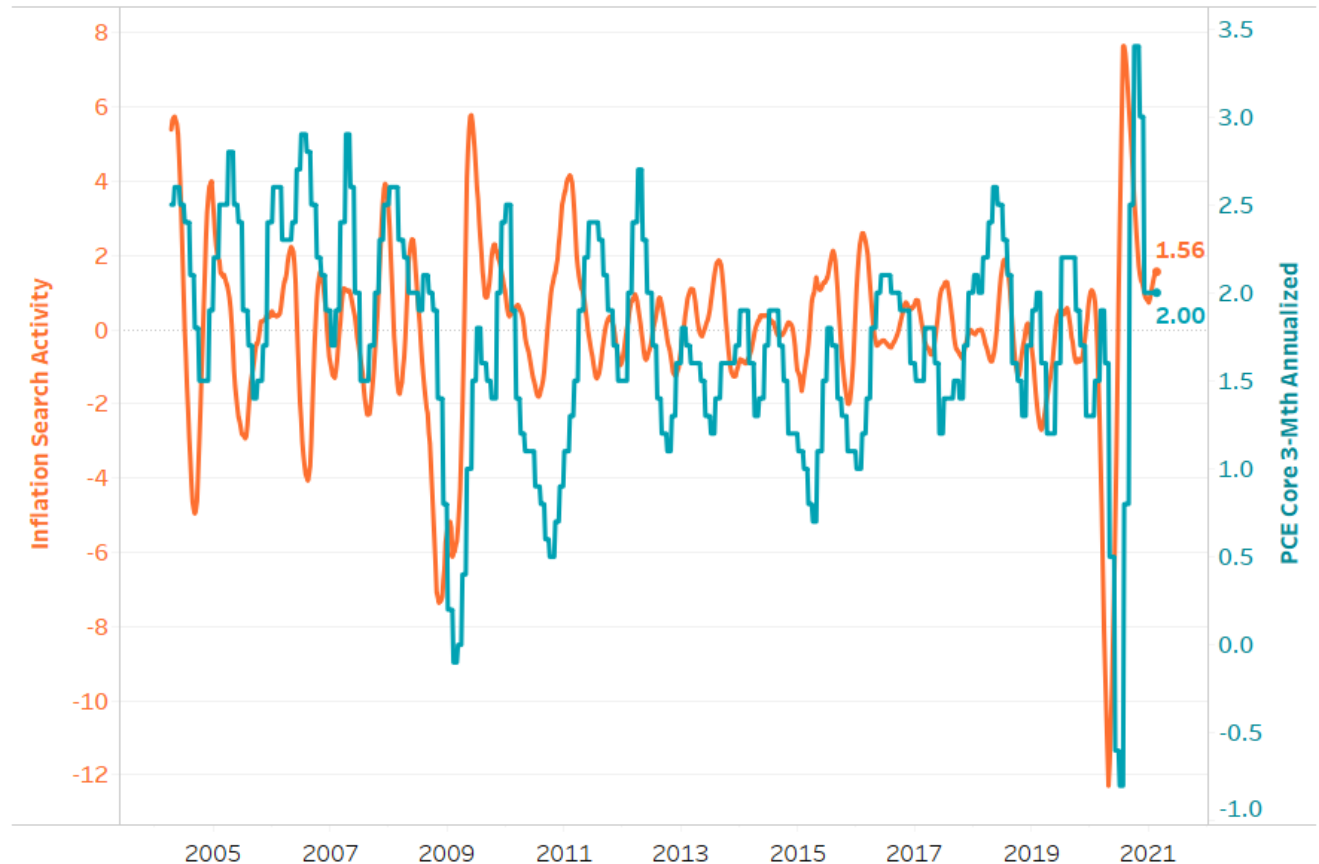
# U.S. Consumers See Inflation

- We use Google search activity to measure the public's views on inflation:
  - **Higher inflation** = hyperinflation, inflation, wage, full-time job, commodities, apartment, and more
  - **Lower inflation** = deflation, savings account, layoff, and more
- The chart shows the spread between higher and lower inflation search topics for comparison to core inflation (PCE). Impressively, the public's views on consumer prices habitually led realized core inflation by one to three months.
- The public's interest in higher inflation has rebounded in recent weeks, suggesting core inflation remains at or above 2.0% on a three-month annualized basis heading into the spring months.

## U.S. Inflation Search Activity Failing to Retreat

*Spread between Google search topics denoting hot versus cold inflation*

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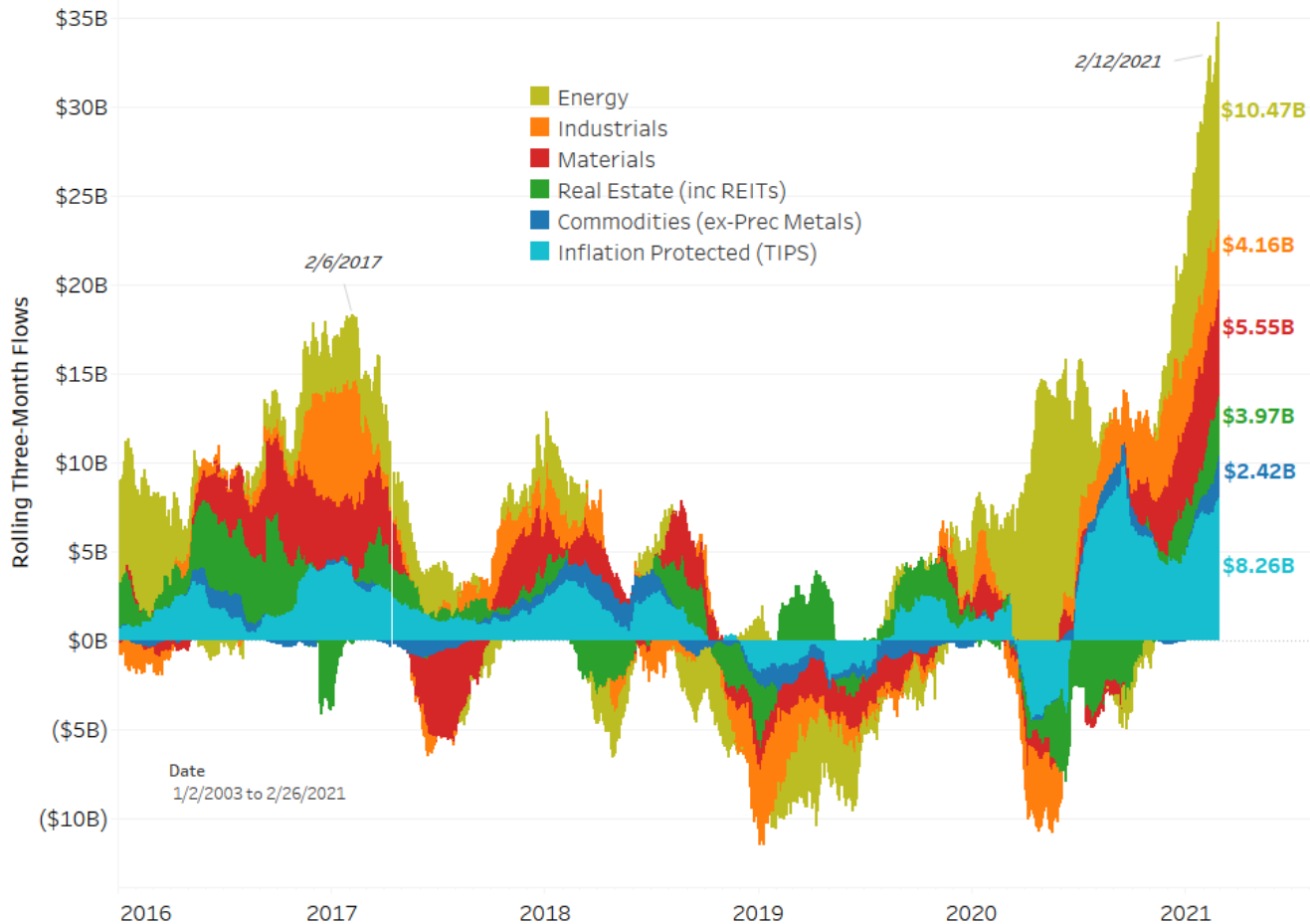


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## ETF Flows: Record Surge Into Inflation-Friendly Assets

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## Reasons for optimism

# Investors Infatuated with Inflation-Friendly Assets

- Flows into TIPS-focused ETFs on a rolling three-month basis remain a very healthy of \$8.3 billion.
- As an aside, these same ETFs suffered \$-744 million in out-flows on Tuesday. We never put weight into one-day flows, but worth watching.
- The commodities revival has investors chasing energy and materials, bringing the total flows into inflation-friendly assets to an **eye-popping \$35 billion**.

Reasons for optimism

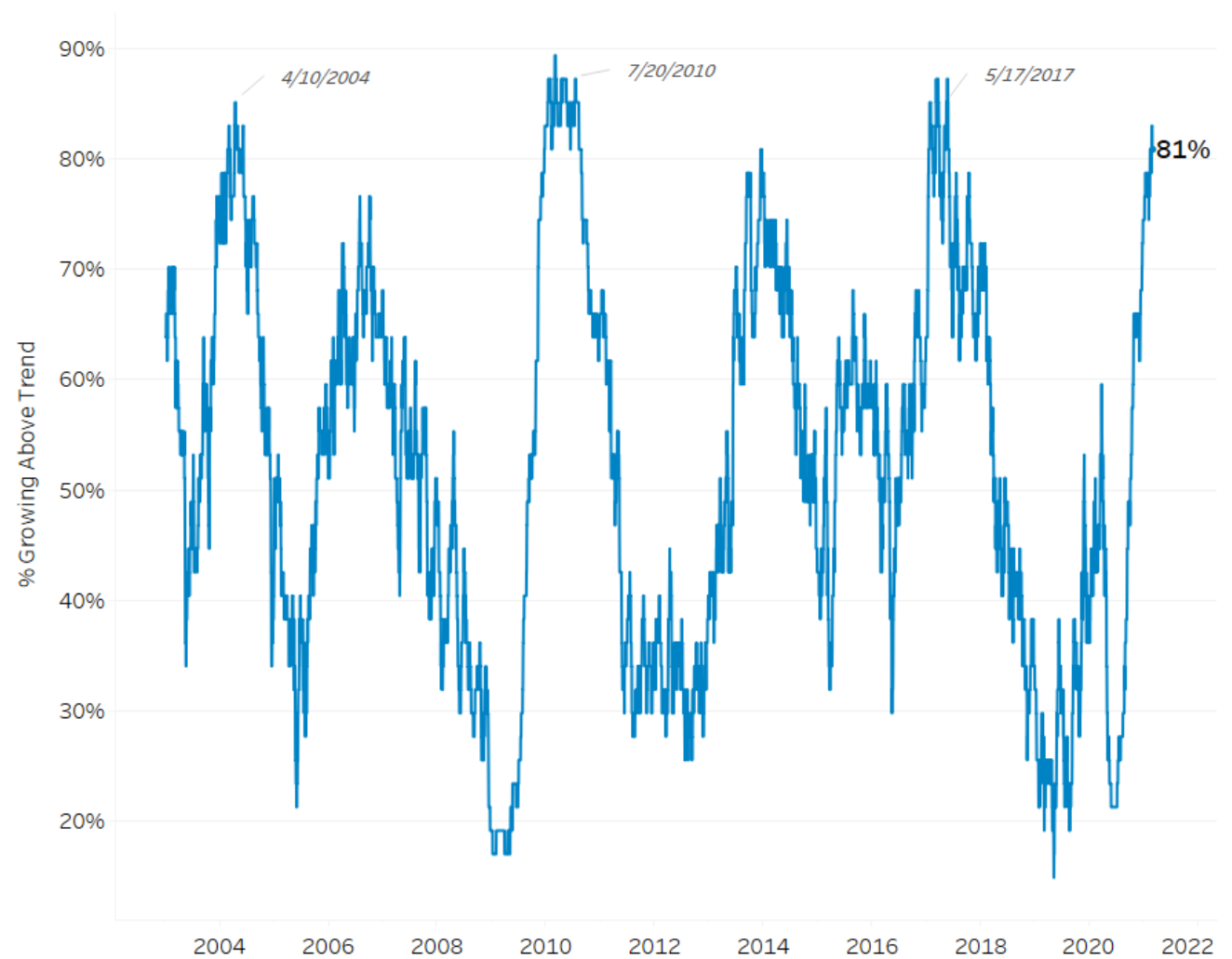
# Global Synchronized Growth is Here

- 81% of the world's economies have been producing data releases above one-year average growth rates.
- Such strong, ubiquitous growth tends to last less than one year. Will the rebound from COVID-19 be any different?!

## Percentage of Economies Producing Data Releases Above One-Year Averages Soars

*Economic Strength Indices measure incoming data releases relative one-year averages*

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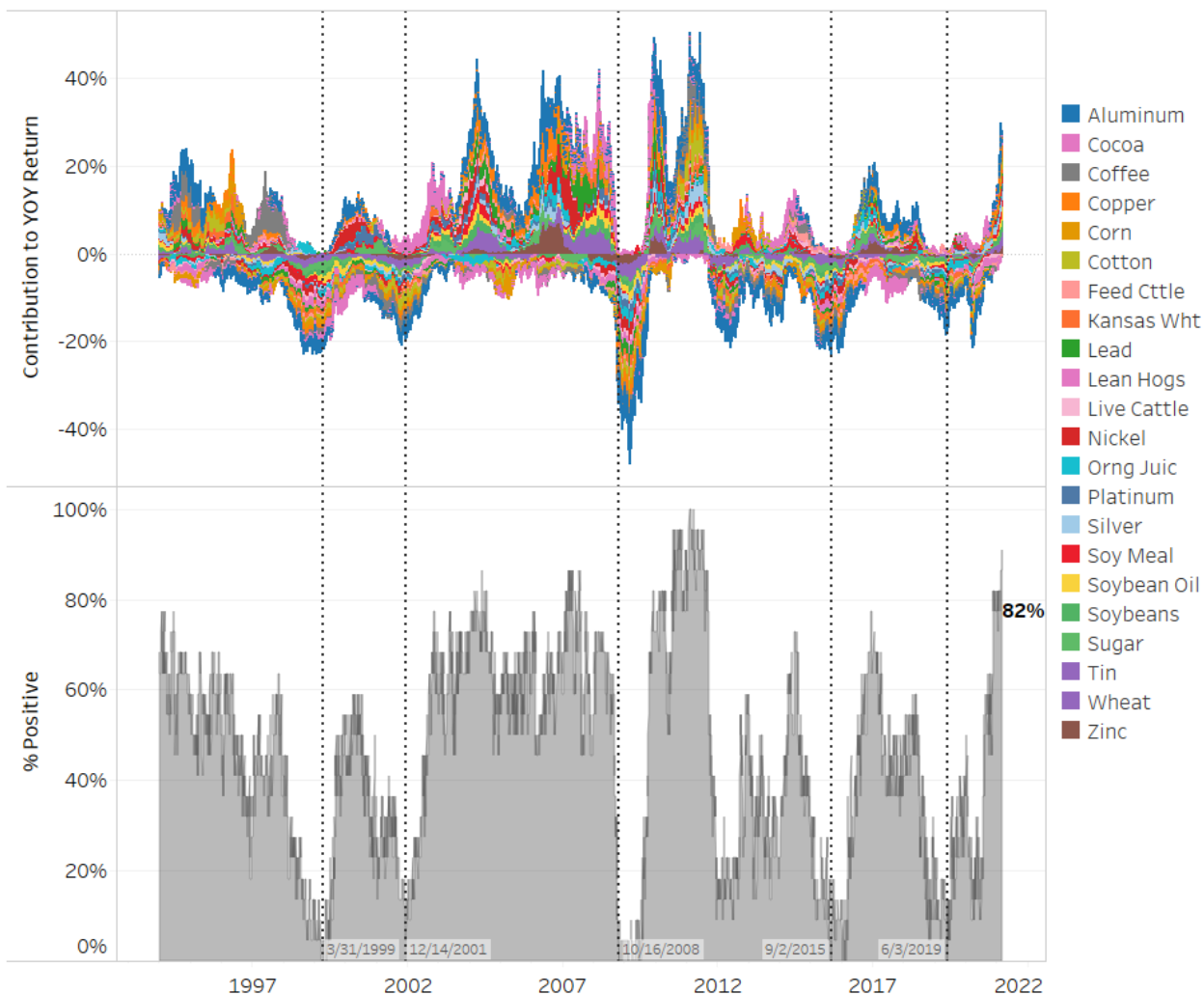
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## Commodities (ex-energy and gold) Entering the Next Supercycle?!

% of commodities producing positive YOY return

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## Reasons for optimism

# Commodities Roaring Higher

- 82% of the world's commodities (ex-energy and gold) are producing positive YOY gains, the highest since September 2011.
- Commodities ex-energy are +19.2% since the start of 2020.
- Energy and some softs (e.g. cocoa) remain the few laggards.

Reasons for optimism

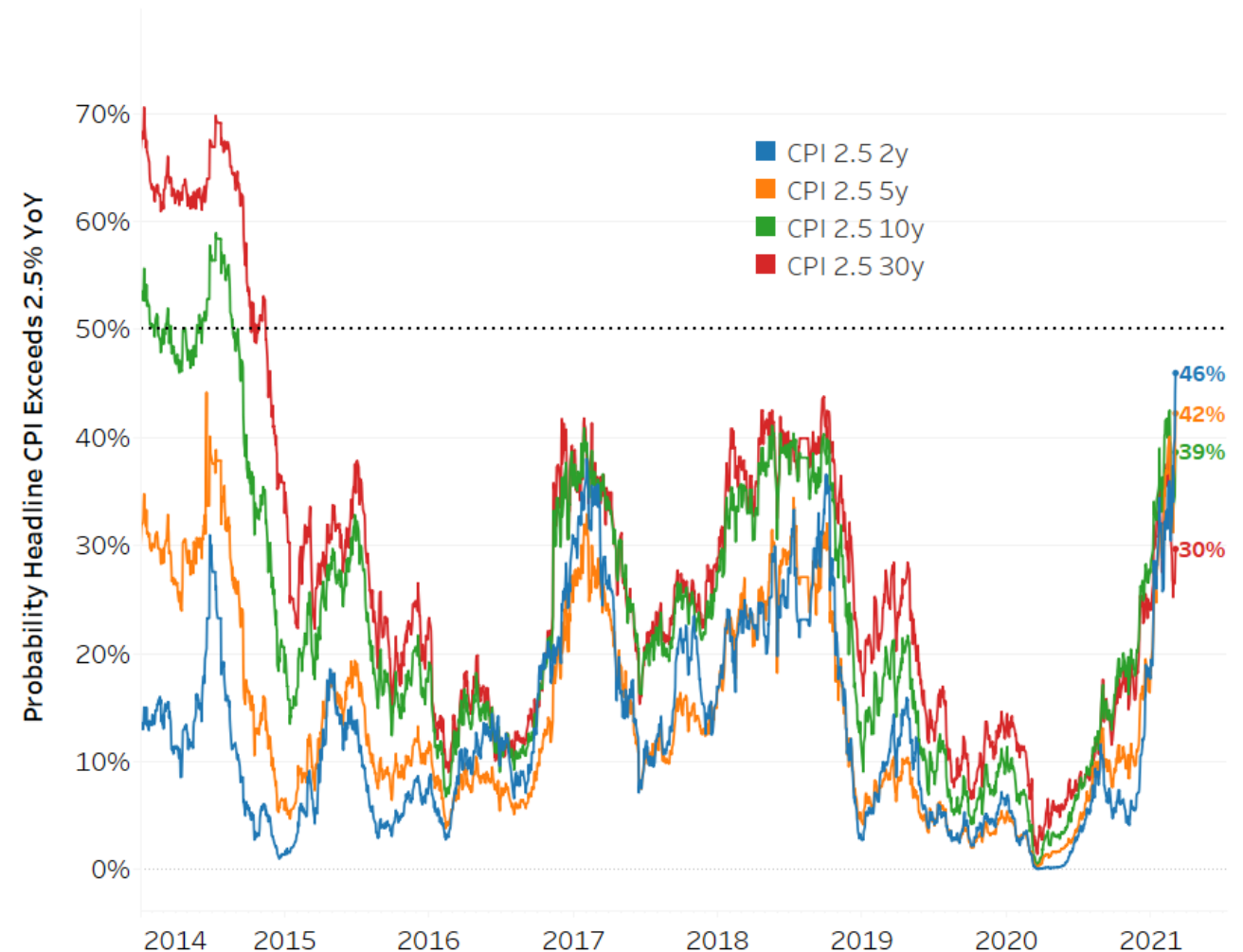
## Investors Pricing in 2.5+% YOY Critical

- Probabilities are breaking to the best levels since in early 2017 and 2018.
- Officials (e.g. Bostic, Brainard, and Evans) have suggested 2.5% inflation is needed to fulfill new AIT framework.
- **Ultimately, 50+% probabilities will be needed to signal a lasting rise in core and headline inflation.**

### Expectations for 2.5+% Headline CPI

*Implied probabilities using inflation swap caps and floors with a strike CPI of 2.5% YoY*

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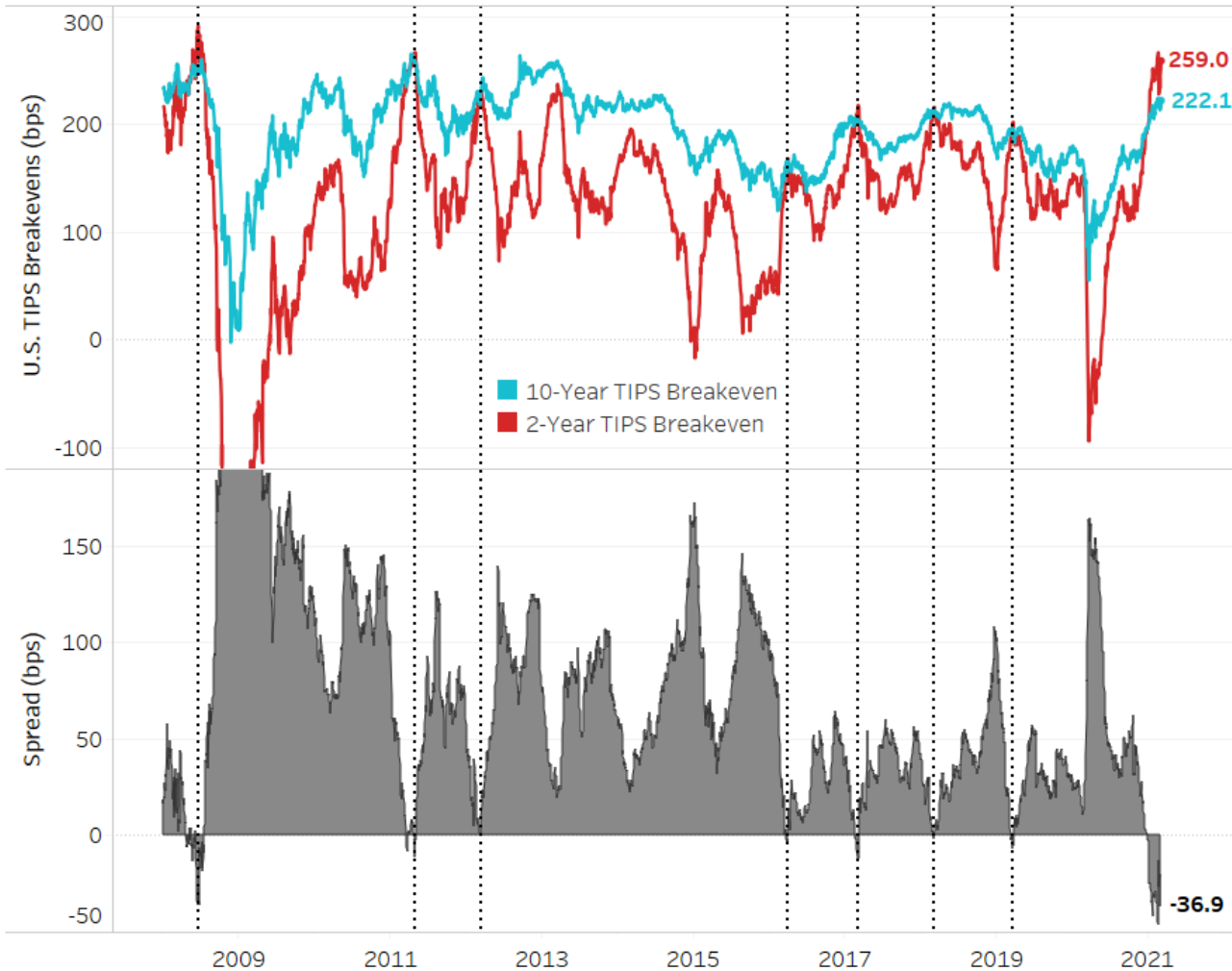
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## U.S. 2-Year 10-Year TIPS Breakeven Curve Inverted

1/1/2008 to 3/3/2021

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Dashed lines mark troughs at or below zero basis points



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### Reasons for optimism

## TIPS Breakeven Curve Inverted as Expected Under AIT

- U.S. TIPS breakeven curve inversions have habitually marked the peak in inflation expectations.
- This is the big test for the Federal Reserve's new AIT framework. Will they react or not to rising short-term inflation expectations? **So far, the answer appears an emphatic 'NO!'**
- Our baseline has been lasting, deeper inversion than any seen since the financial crisis.

### Reasons for optimism

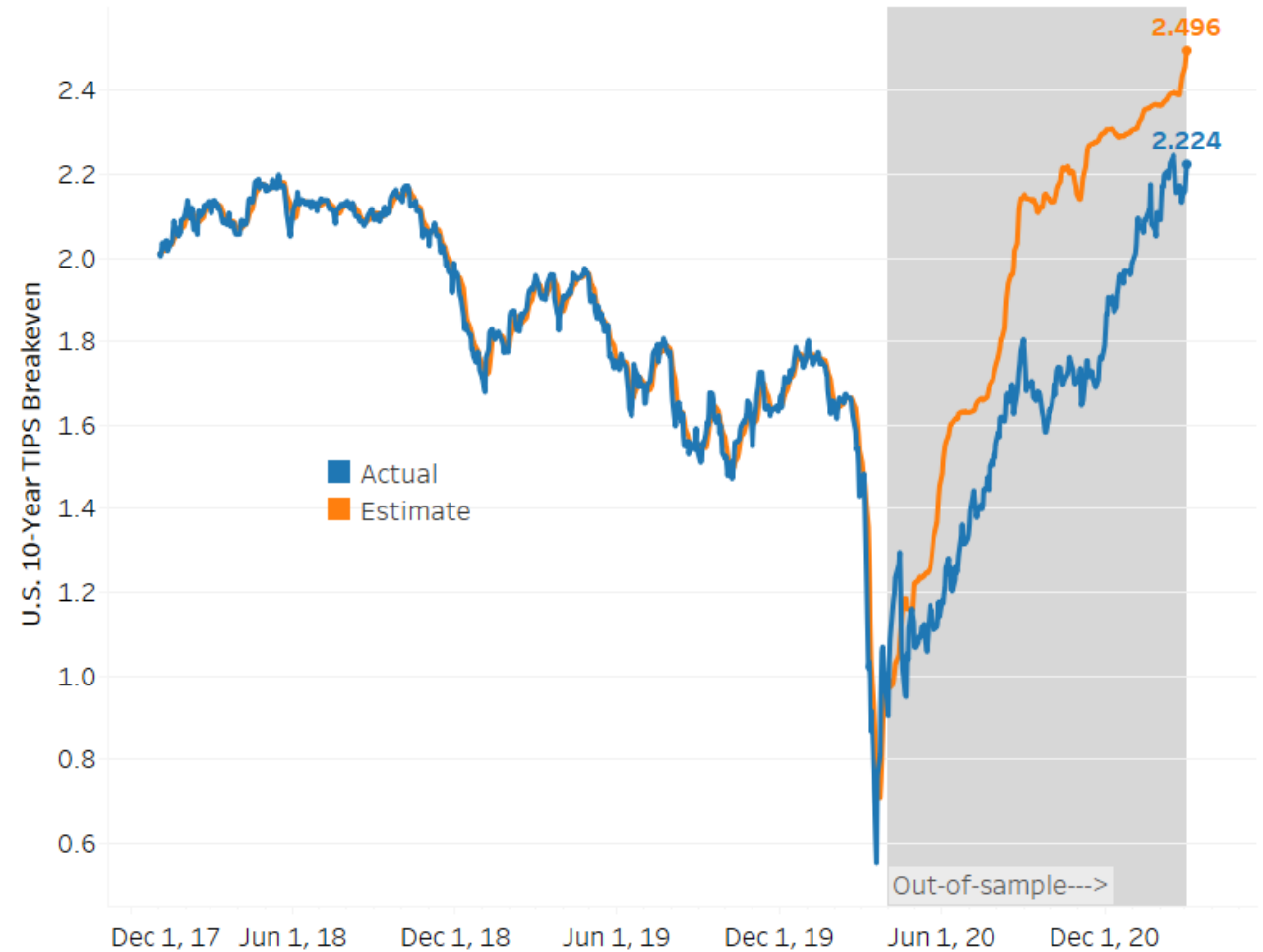
## TIPS Breakevens Still Underperforming Where Risk Assets Suggest They Should Reside

- Model (QRF) explaining U.S. 10-year TIPS breakevens places fair value higher and higher near 249.6 bps.
- Model uses WTI crude oil, copper, global implied volatility, liquidity, materials, USD, and FOMC rate timing.
- **Are risk assets overdone or TIPS breakevens still cheap?!**

### Where Do Risk Markets Say TIPS Breakevens Should Reside?

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Model trained Jan 2001-Mar 2020 using WTI, copper, global vol and liquidity, materials, USD, and FOMC rate timing

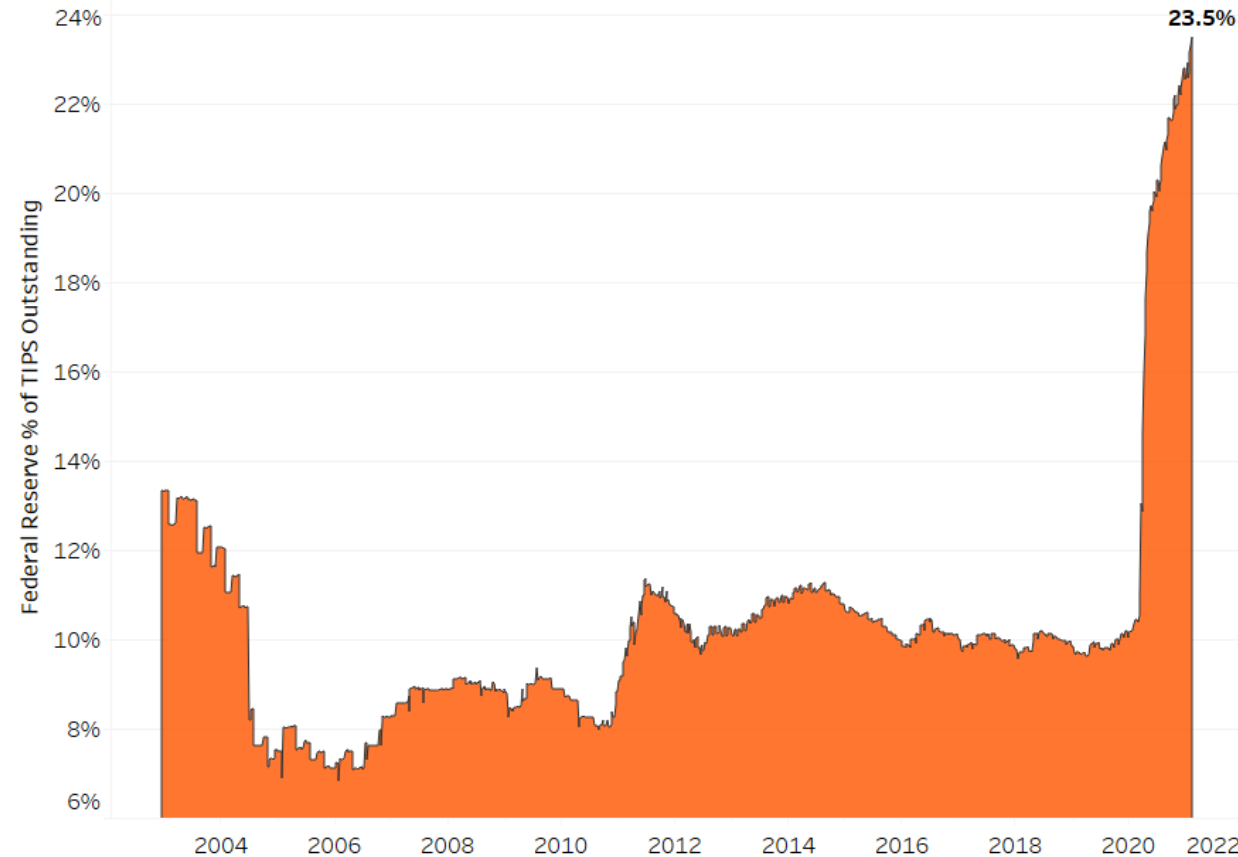


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### Federal Reserve Quickly Gobbling Up TIPS

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### Reasons for caution:

## Fed a Dominant Force Within TIPS Market

- The Federal Reserve's holdings of TIPS jumped from ~10% before the pandemic to a whopping 24% of total outstanding through last week.
- The Federal Reserve has become a dominant force behind the drop in liquidity premiums as well as real yields.



### Reasons for caution:

## Liquidity Premiums and Fed Purchases Distorting TIPS Breakevens

- We assembled a model determining the impact of liquidity and Federal Reserve purchases on TIPS breakevens. This generalized additive model trained since 2004 employs the following variables to estimate the rolling year-over-year change by TIPS breakevens:

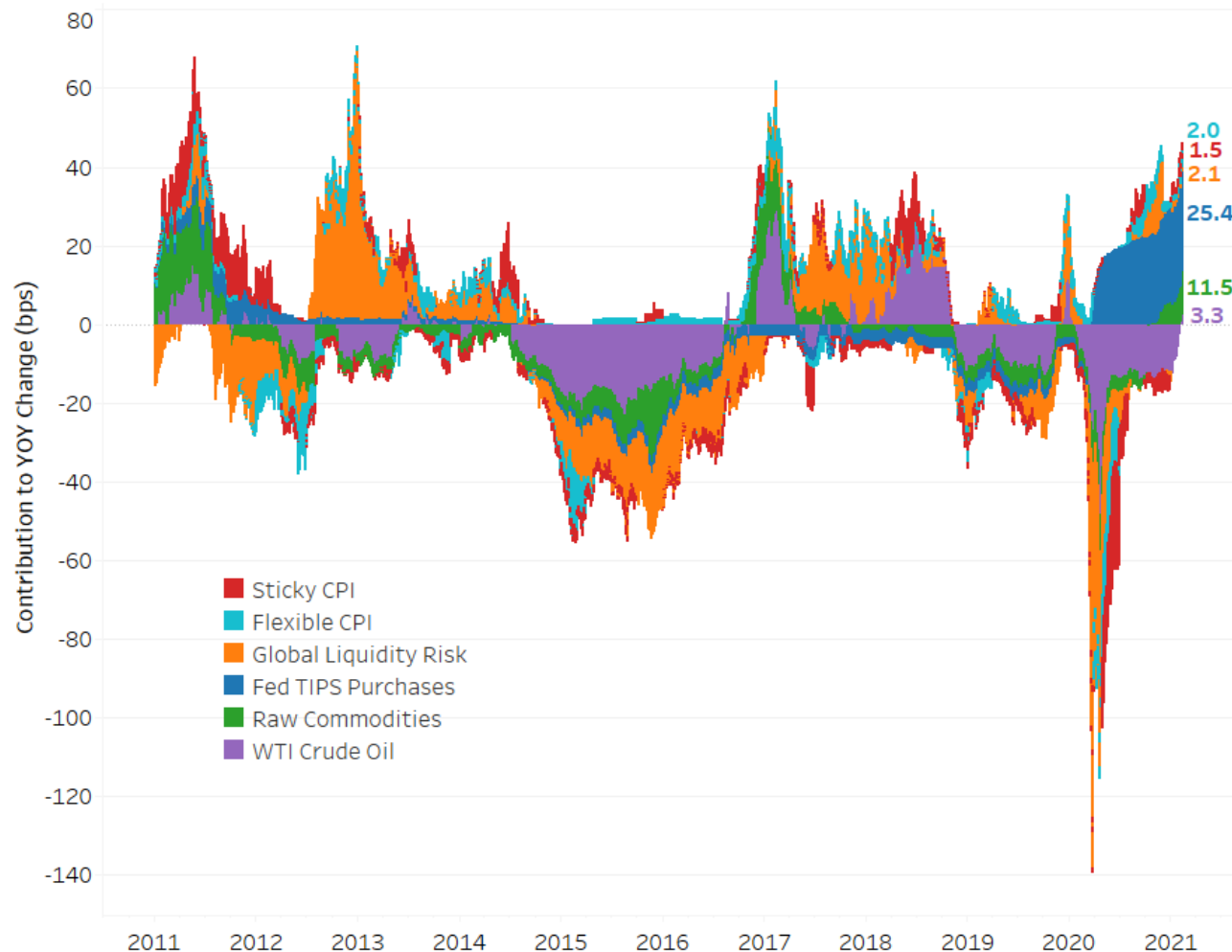
- Flexible CPI
- Sticky CPI
- Global liquidity risk
- Federal Reserve TIPS purchases
- Raw industrial commodities
- WTI crude oil

- **We estimate over 27 basis points of widening has been tacked on to U.S. 10-year TIPS breakevens** thanks to improved liquidity and Federal Reserve purchases (blue and orange areas).

### U.S. 10-Year TIPS Breakeven: Explaining Rolling YOY Changes

using generalized additive model trained since 2004

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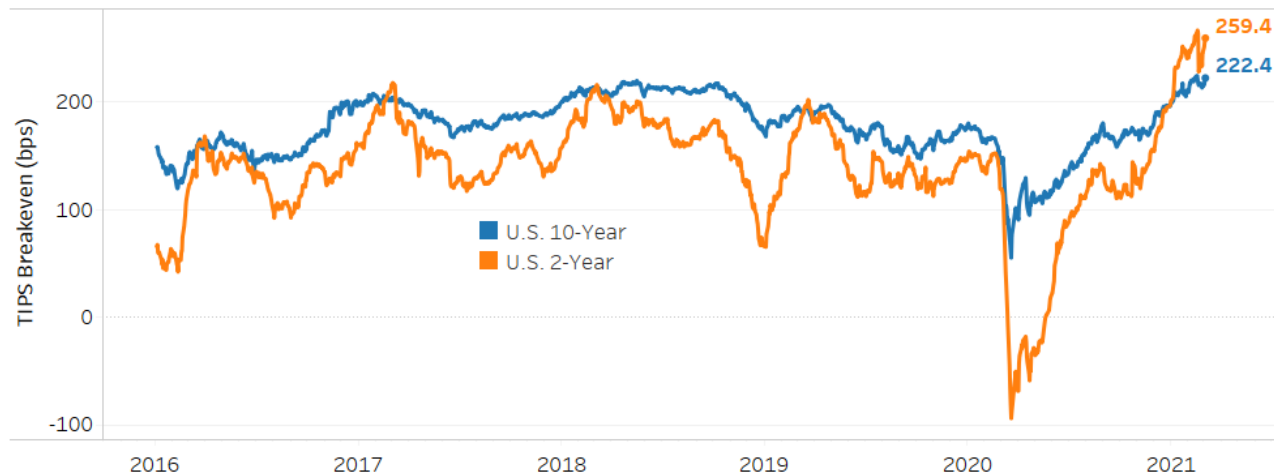
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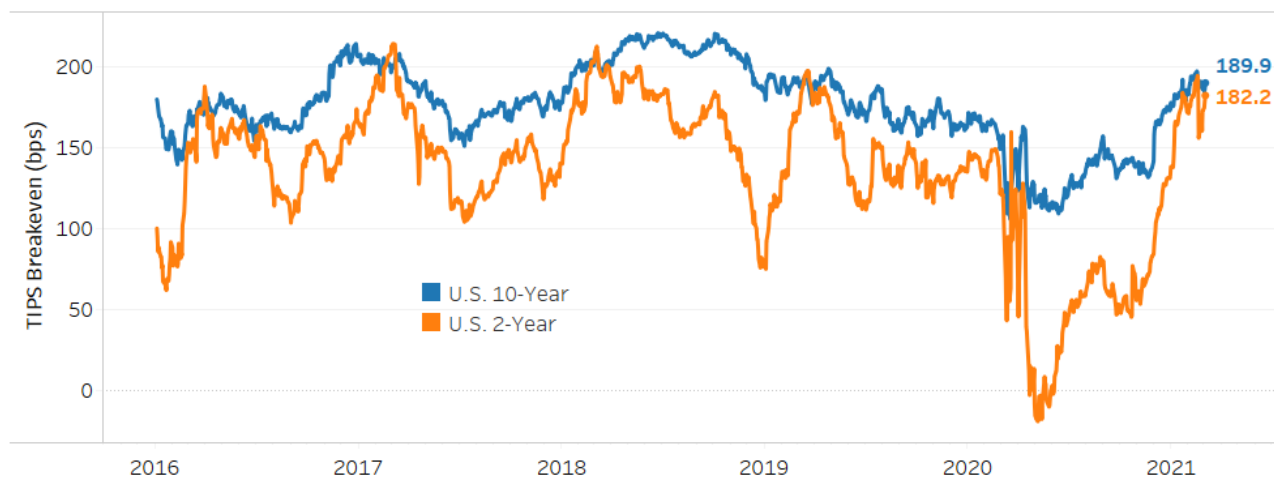
## U.S. 2 and 10-Year TIPS Breakevens: Do Fed Purchases and Liquidity Matter? YES!

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Actual Levels



Adjusted for Fed Purchases and Liquidity Risk



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Reasons for caution:

Inflation Expectations  
Closer to 180-190 Bps  
Across the Curve

**Reasons for caution:**

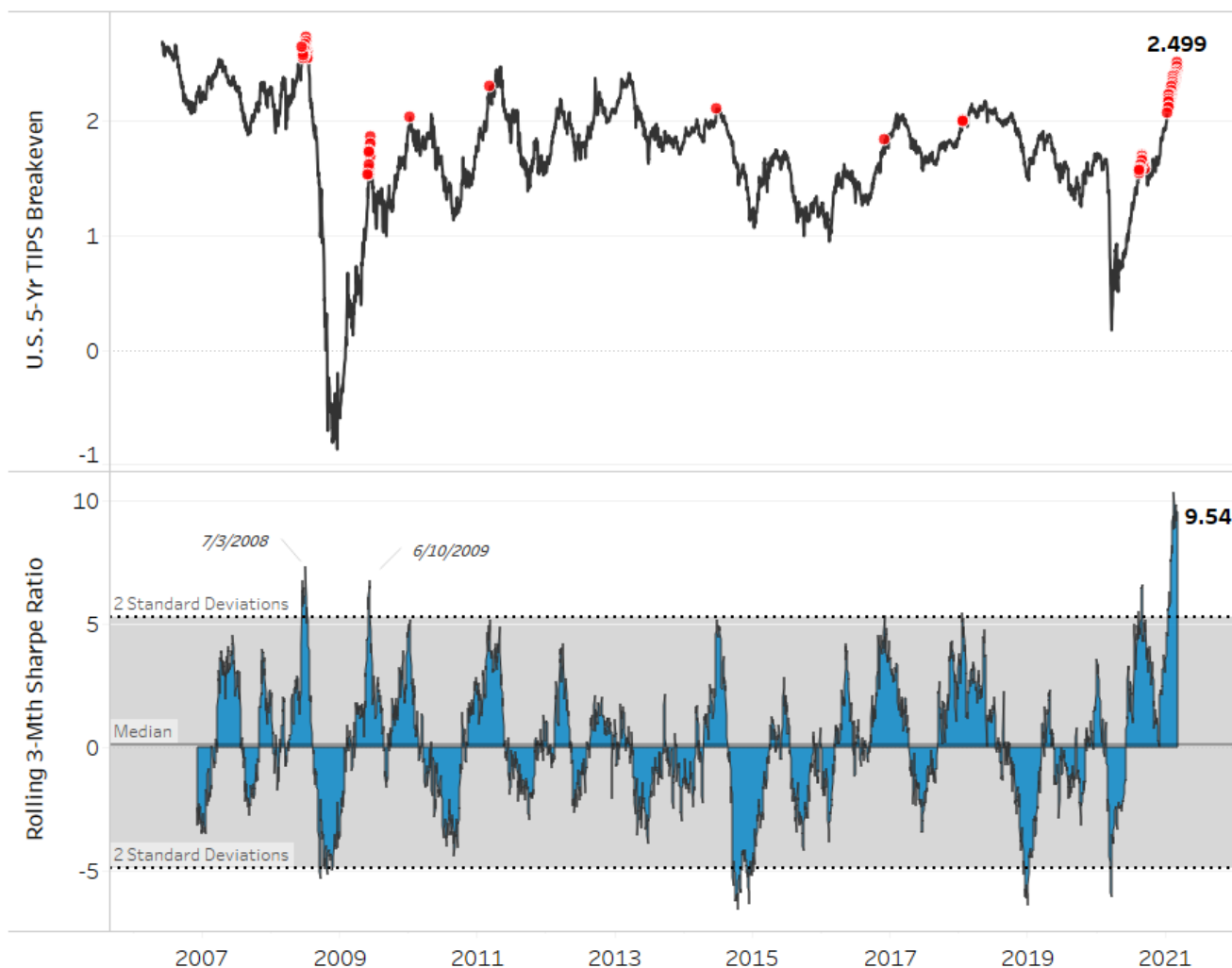
## U.S. TIPS Breakevens Producing Rock Star Risk-Adjusted Returns

- U.S. 5-year TIPS breakevens over the past 3 mths have a Sharpe ratio near 10!
- Red dots highlight past episodes when this Sharpe ratio exceeded 2+ st devs (5.08).
- Again, we need to see a right-side tail emerge (2.5+% CPI) to warrant such tremendous performance.

### U.S. 5-Year TIPS Breakevens Produces Record-High Sharpe Ratio

Rolling 3-mth Sharpe ratio (avg daily return - bills return) / st dev daily returns

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## Global 10-Year Inflation Breakevens: Rolling 3-Mth Changes Reach Extreme

includes 14 economies from Australia to the U.S.

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### Reasons for caution:

## 10-year Inflation Expectations Across the Globe Reach Extremes

- The average three-month change across 10-year inflation expectations has rocketed higher to 42.8 bps, the highest since June 2009.
- 100% of 10-year inflation expectations across the globe have advanced over these past three months.
- History suggests investors should temper inflation expectations going forward, but maybe this time will be different?!

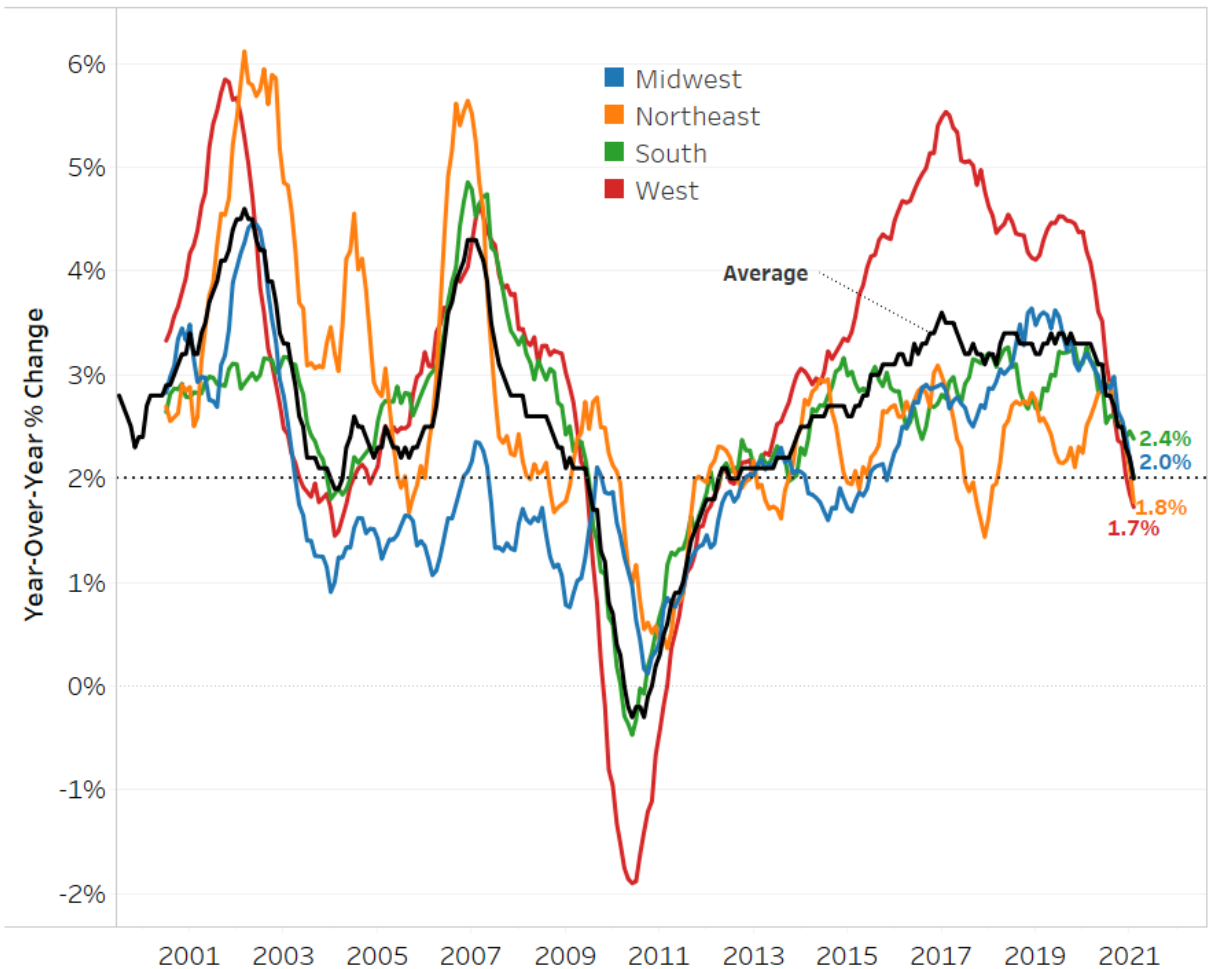
**Reasons for caution:**

Owners Equivalent  
Remains a **HEAVY** Weight  
on Inflation

Owners equivalent rent (OER)  
remains the 800-pound gorilla  
weighing heavily on headline and  
core inflation. Remember OER  
comprises 24% of headline CPI.

Owners Equivalent Rent of Residences Nearing Drop Into the Danger Zone

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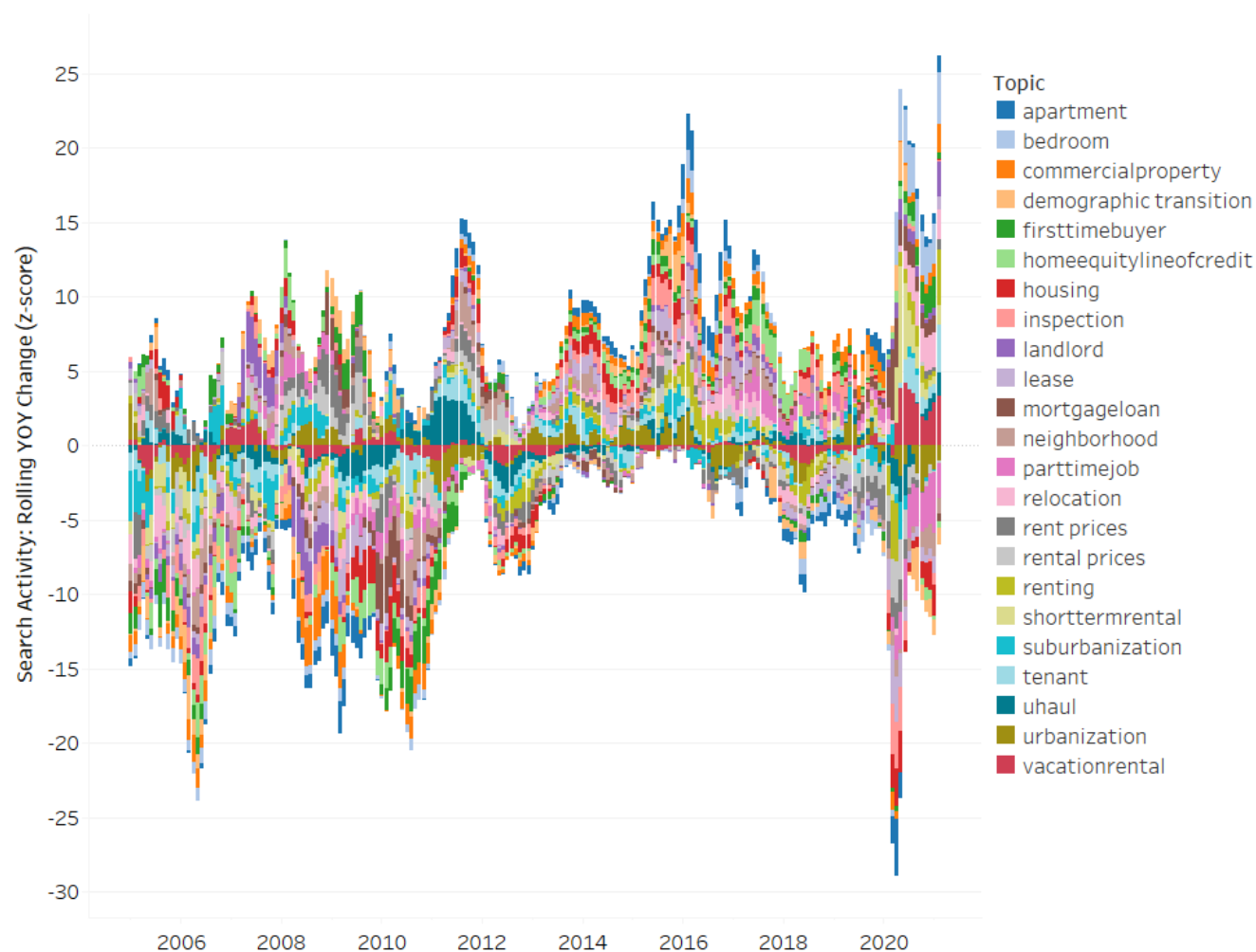
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## Rent-Related Search Activity POSITIVELY Correlated to Owners Equivalent Rent

Year-over-year changes as z-scores of Google search activity by topic

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### Reasons for caution:

## Rent-Related Searches Jump

- Rent-favorable searches from one-bedroom apartments to vacation rentals rebounded sharply in February.
- A continued surge in rent-related search activity would bode well for rising rents into year-end.

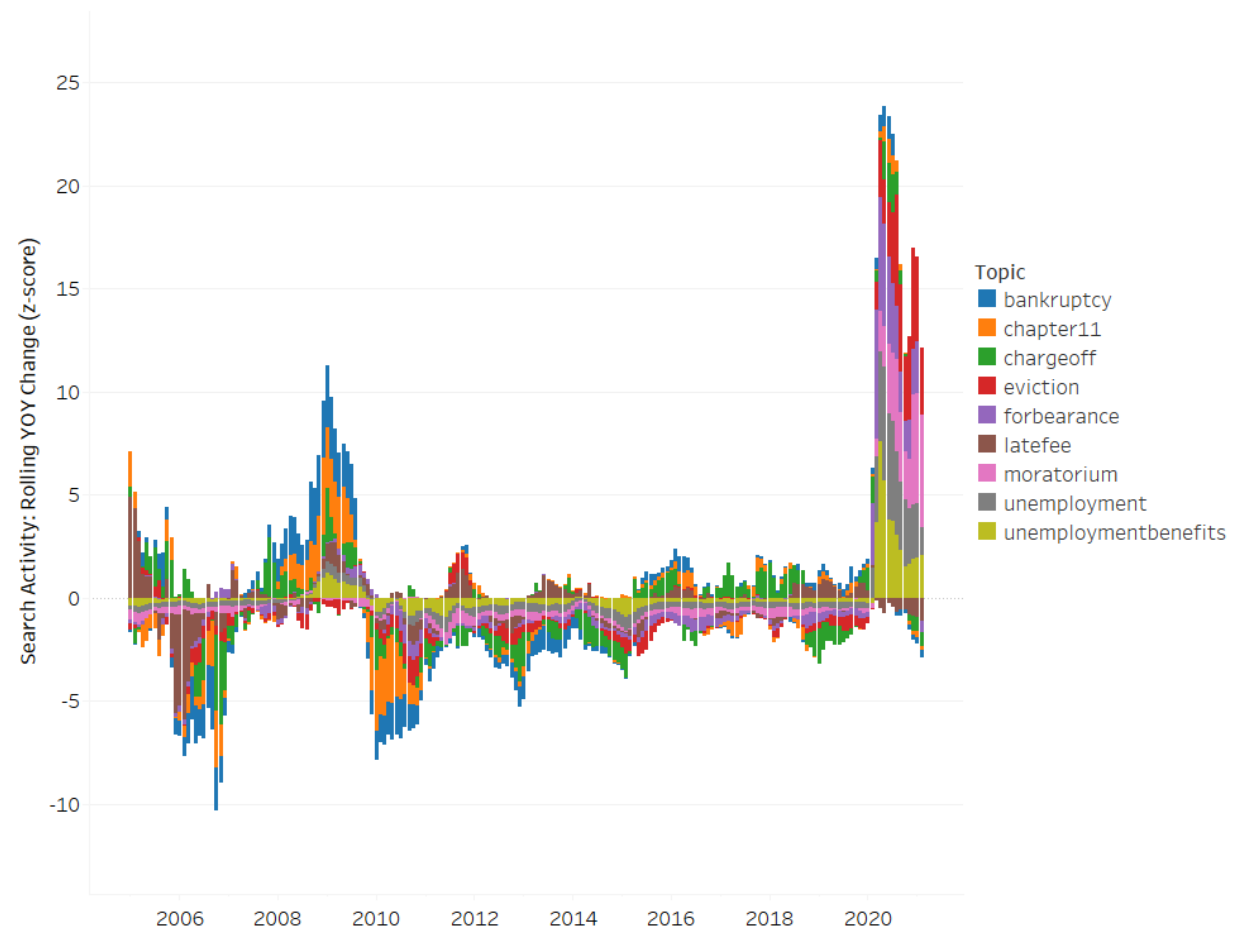
**Reasons for caution:**

## Financial Stress Searches Yet to Fully Abate

- Searches for bankruptcy to unemployment benefits diminished in February, but remains awfully elevated.
- Ultimately, we need to see financial stress for lower to middle-income workers abate to believe a lasting rebound in rents will be underway.

**Rent-Related Search Activity NEGATIVELY Correlated to Owners Equivalent Rent**  
*Year-over-year changes as z-scores of Google search activity by topic*

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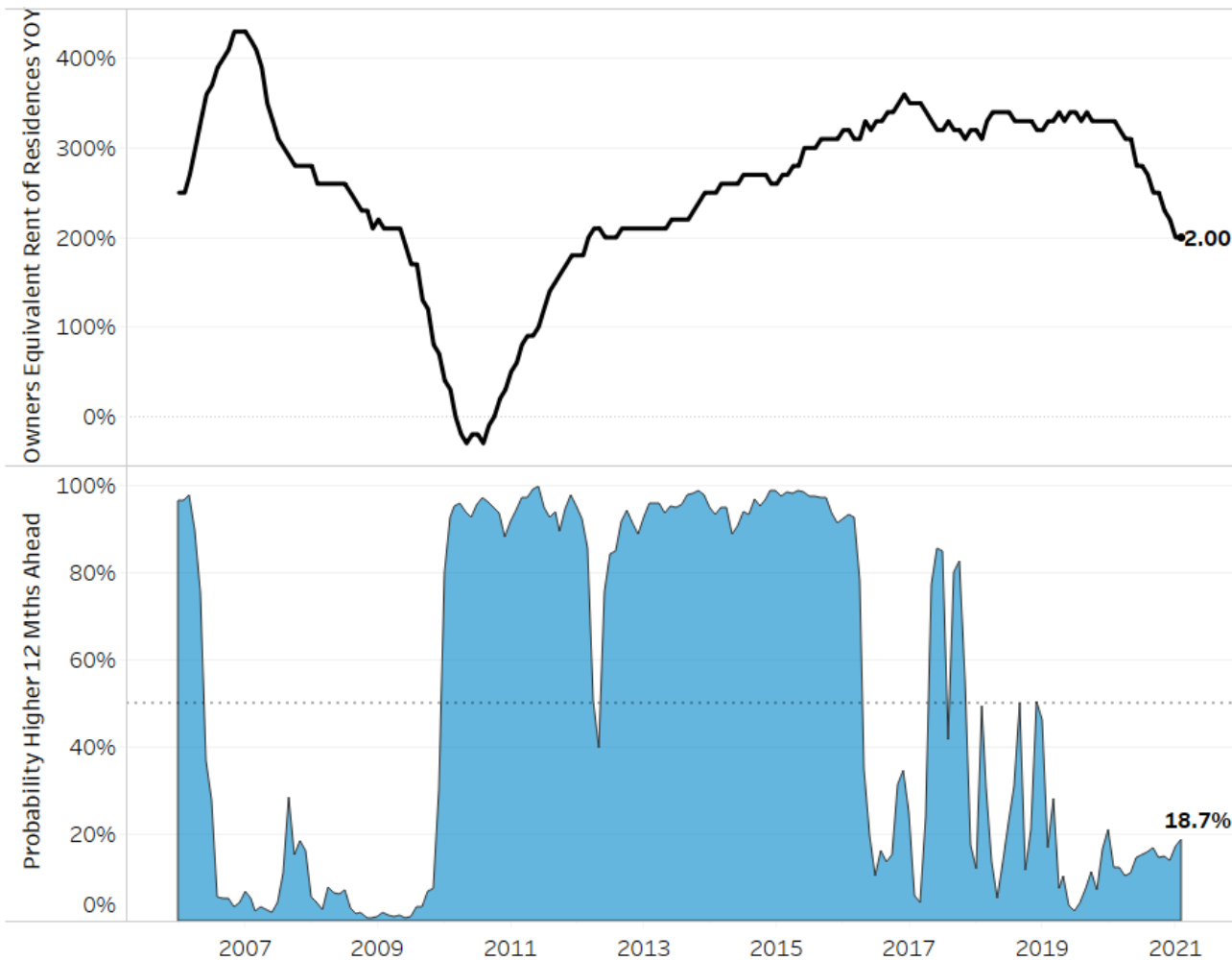
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## Probability OER (YOY) Will Rise One Year Ahead

Ensemble model trained since 2004 using rent-related search activity and apartment vacancies

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### Reasons for caution:

## Awaiting High Probabilities OER Will Rise

- The 35 rent-related search topics are fed into a model (random forest) to produce probabilities OER year-over-year will be higher 12 months ahead.
- **As of March 2021 rent-related search activity is at a paltry 18.7% probability OER's year-over-year growth rate will be higher next January 2022.**
- Note we updated this model for recent amendments to Google search activity for December 2020 and January 2021. In addition, we have included additional variables to improve performance.



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