ARBOR DATA SCIENCE

Inflation Roundup

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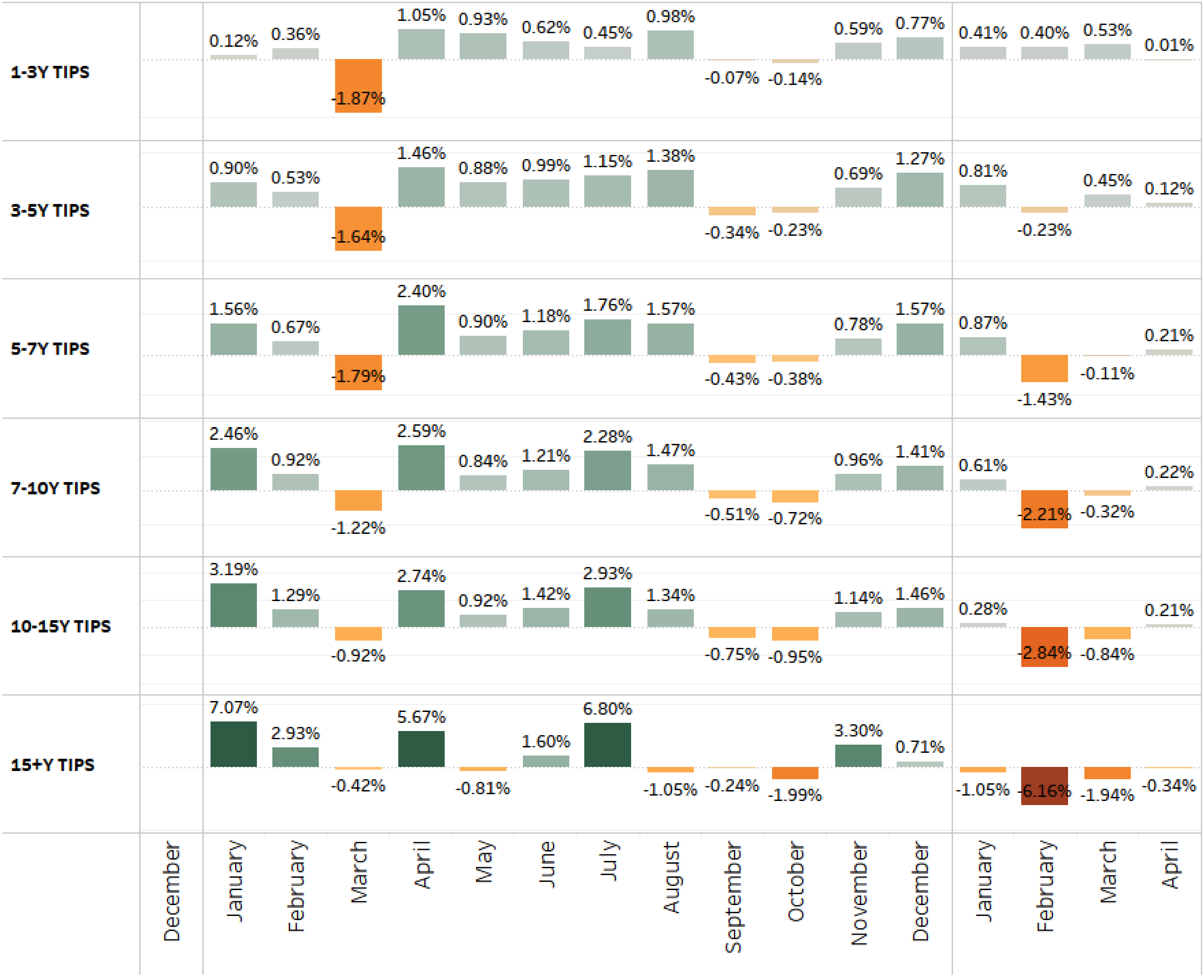
Contents

	Conditions Fueling an Inflation Premium	Aug '20	Sep '20	Oct '20	Nov '20	Dec '20	Jan '21	Feb '21	Mar '21	Apr '21	Notes
Wider TIPS Breakevens	Commodities ex-energy and gold: 50+% produce + YOY return	Y	Y	Y	Y	Y	Y	Y	Y	Y	*91% of commodities rallying YOY, but a diminished 68% on a QOQ basis. Worth watching short-term breadth of participation during the rally, which is seemingly shifting.*
	Global econ data releases: 50+% economies growing above one-year trend	N	Y	Y	Y	Y	Y	Y	Y	Y	*80+% of economies growing above trend led by Asia Pacific and the U.S.*
	Investors pricing in 2+% YOY headline CPI next 10 years	N	N	N	Y	Y	Y	Y	Y	Y	*Inflation swap caps/floor place a very firm floor in for TIPS breakevens at 200 bps*
	TIPS breakeven curve inversion confirms committal to AIT	N	N	N	N	Y	Y	Y	Y	Y	*Curve inversion confirms Federal Reserve's FAIT is in action.*
	Fed purchases diminishing liquidity premium	Y	Y	Y	Y	Y	Y	Y	Y	Y	*Fed purchases (24% of total outstanding) have added nearly 80 bps to10-year TIPS breakevens' YOY change.*
	Search activity forecasts rising OER YOY	N	N	N	N	N	N	N	Y	Y	*Search activity synonymous w/ higher rents swung higher in Feb and Mar. Probabilities now 56% OER YOY will be higher one year ahead into March 2022.*
Impairs Risk Assets	VIX and US 10 year TIPS breakeven positively correlated	N	N	N	N	Y	N	N	N	N	*Brief push positive in December 2020, but since retreated (45-day = -0.43). Risk assets not yet fearing inflation.*
	Short-end swaption volatility shows tightening fears	N	N	N	N	N	Y	Y	Y	Y	*Swaption vol for 2-year rates into 2023 finally pushing above pre-pandemic levels. Eurodollar curve prices in 100+ bps of tightening through Dec 2023. Rate hike fears percolating.*
	TIPS breakevens reach fair value implied by risk assets	N	N	N	N	N	N	N	Y	Y	*10-year TIPS breakevens have finally caught up to fair value at 239 bps as implied by risk assets. Above here, inflation expectations likely become too hot to handle.*
	Investors pricing in 2.5% YOY headline CPI next 10 years	N	N	N	N	N	N	N	N	N	*Inflation swap caps/floors producing 50+% probabilities headline CPI will run hot above 2.5% YOY for the next 2-5 years. Investors hesitant to price in right-side tail for CPI for the long haul.*

TIPS
TOTAL RETURNS:

U.S. TIPS: Monthly Returns



Data Source: Bloomberg LP

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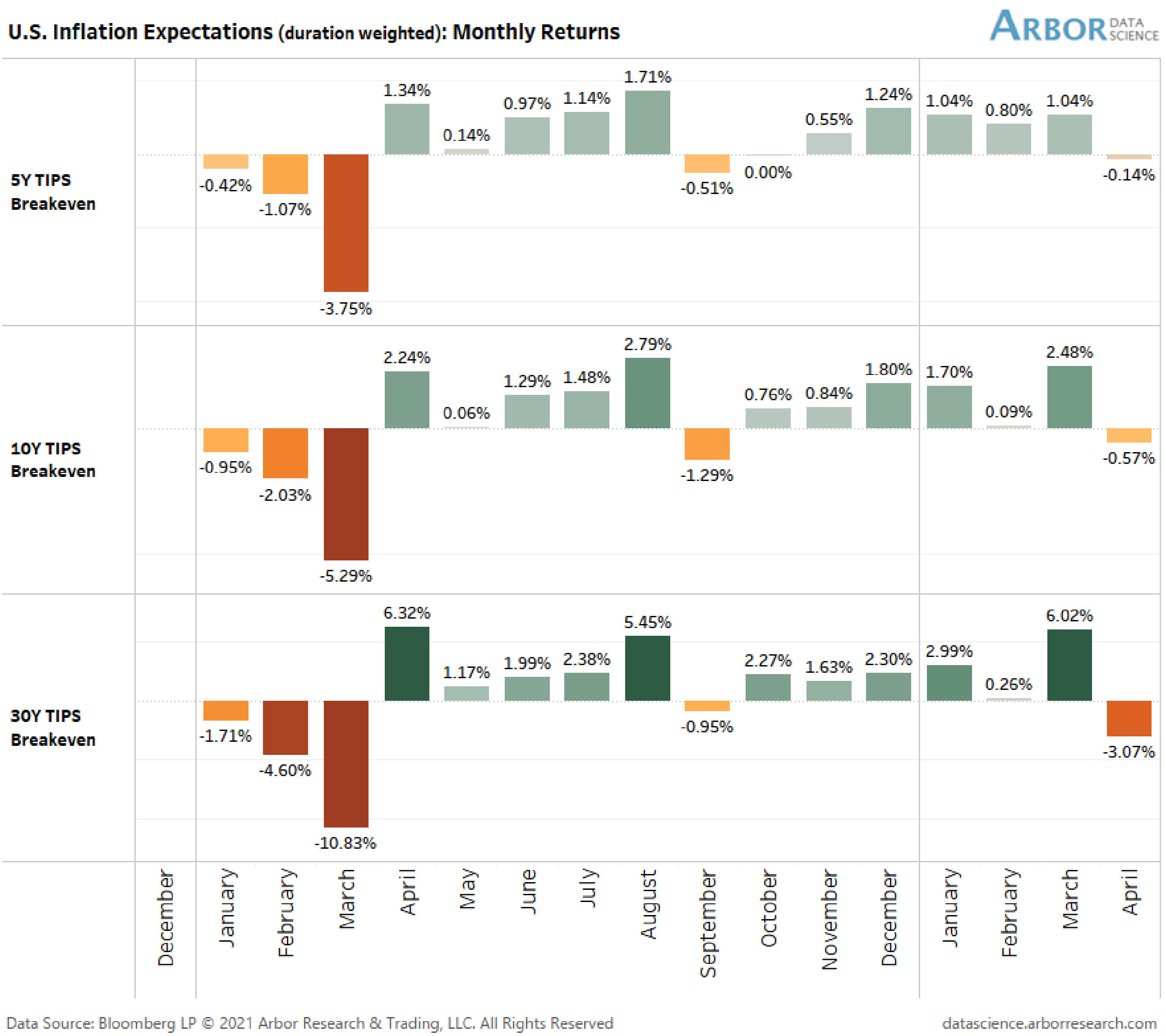
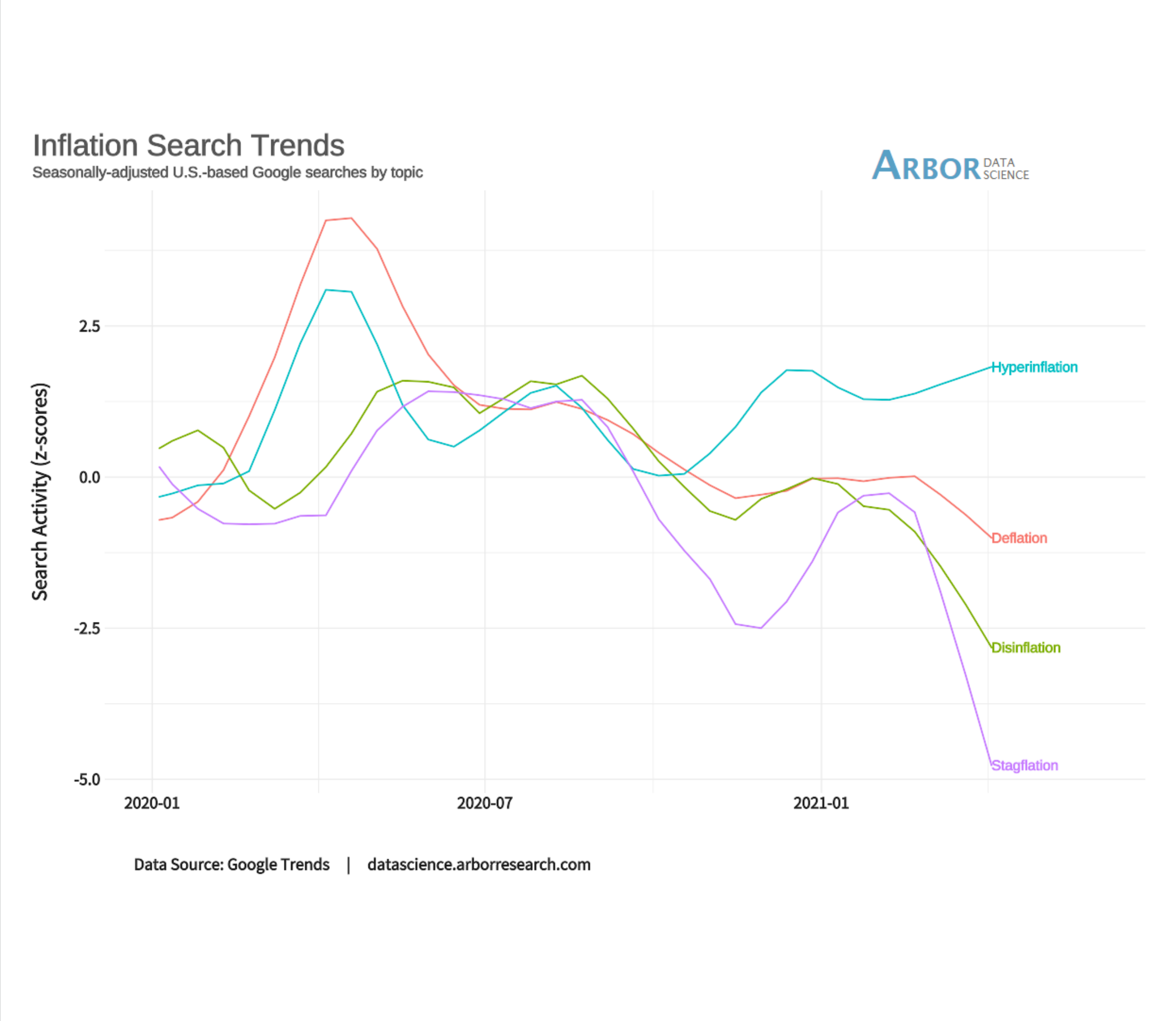
TIPS BREAKEVENS TOTAL RETURNS:



Public all-in on inflation!

- Google search activity over the past few months has left inflation as the clear winning narrative.

- Meanwhile, searches for stagflation along with hopes of deflation have plummeted.

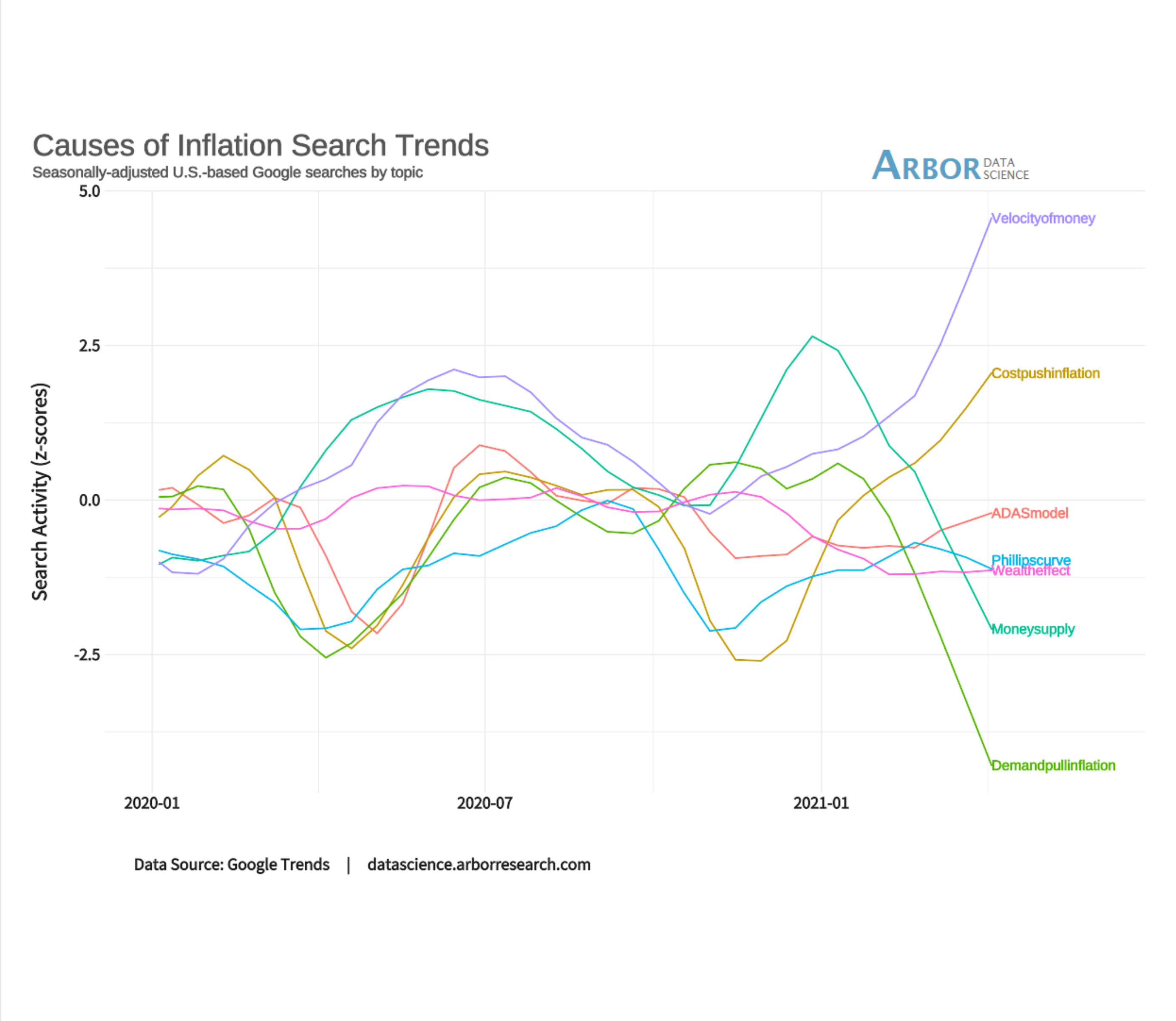


Wage growth expected to be driver of inflation.

- Searches for Cost Push Inflation, inflation caused by wage growth, have been way up. One explanation here.

- Velocity of money remains ever-prominent in the public mind.

- The Money Supply explanation has fallen out of favor even as large-scale government spending continues with stimulus and proposed infrastructure plan.



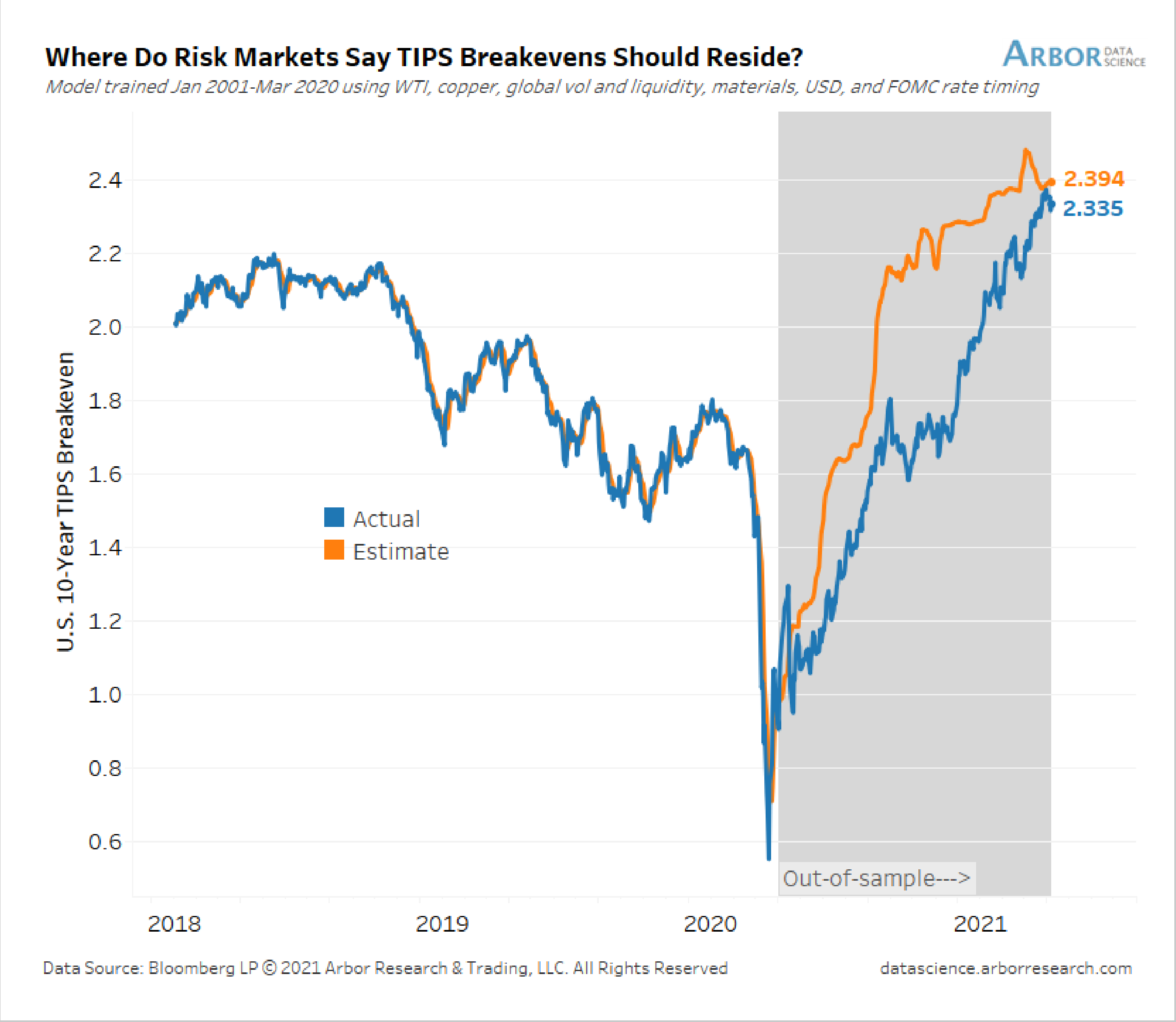
Reasons for caution

TIPS Breakevens Reach Levels Where Risk Assets Suggest They Should Reside

- Model (QRF) explaining U.S. 10-year TIPS breakevens places fair value at 239.4 bps.

- Model uses WTI crude oil, copper, global implied volatility, liquidity, materials, USD, and FOMC rate timing.

- **Widening above this fair value of sorts would suggest inflation expectations have become too hot.**

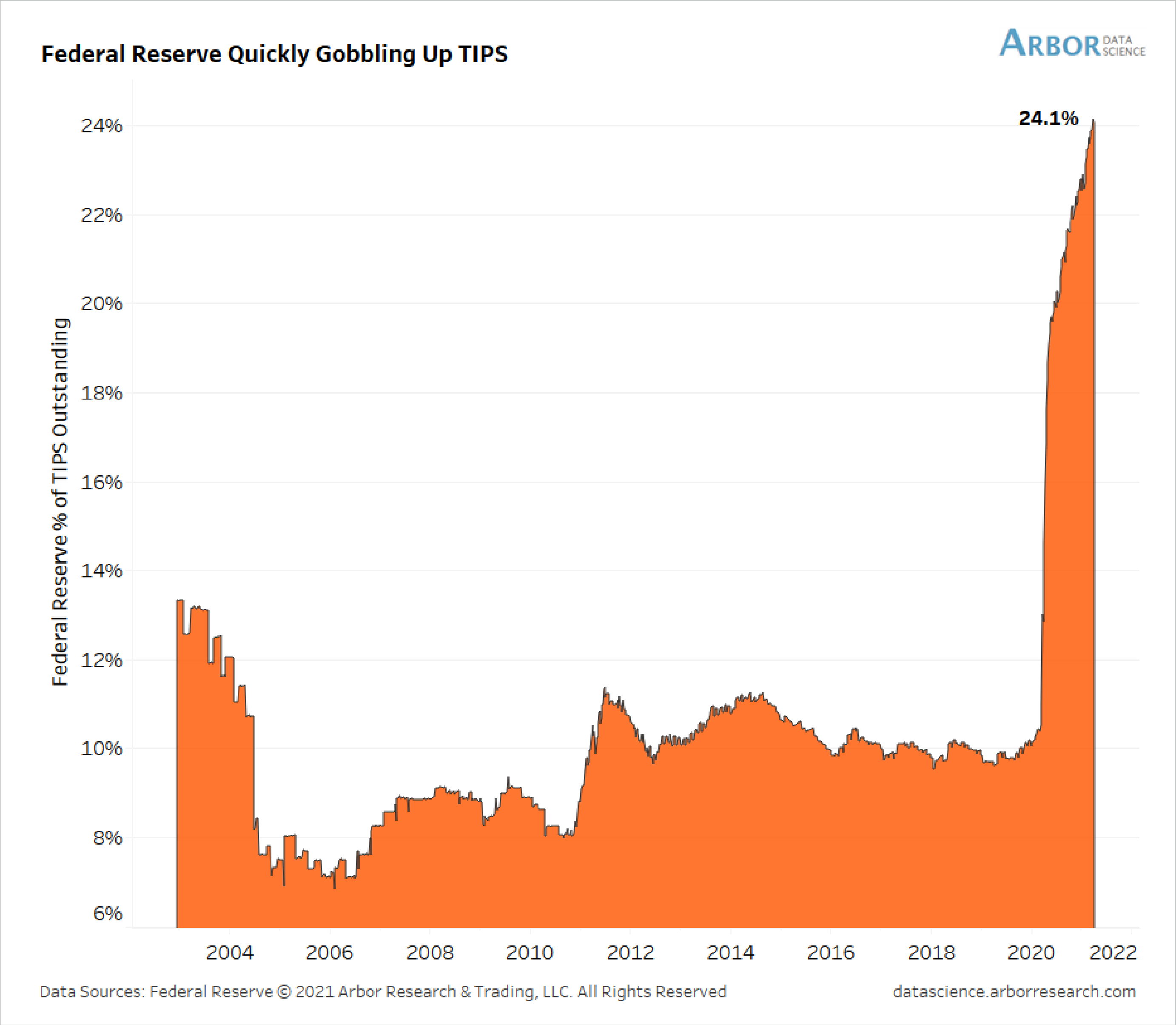


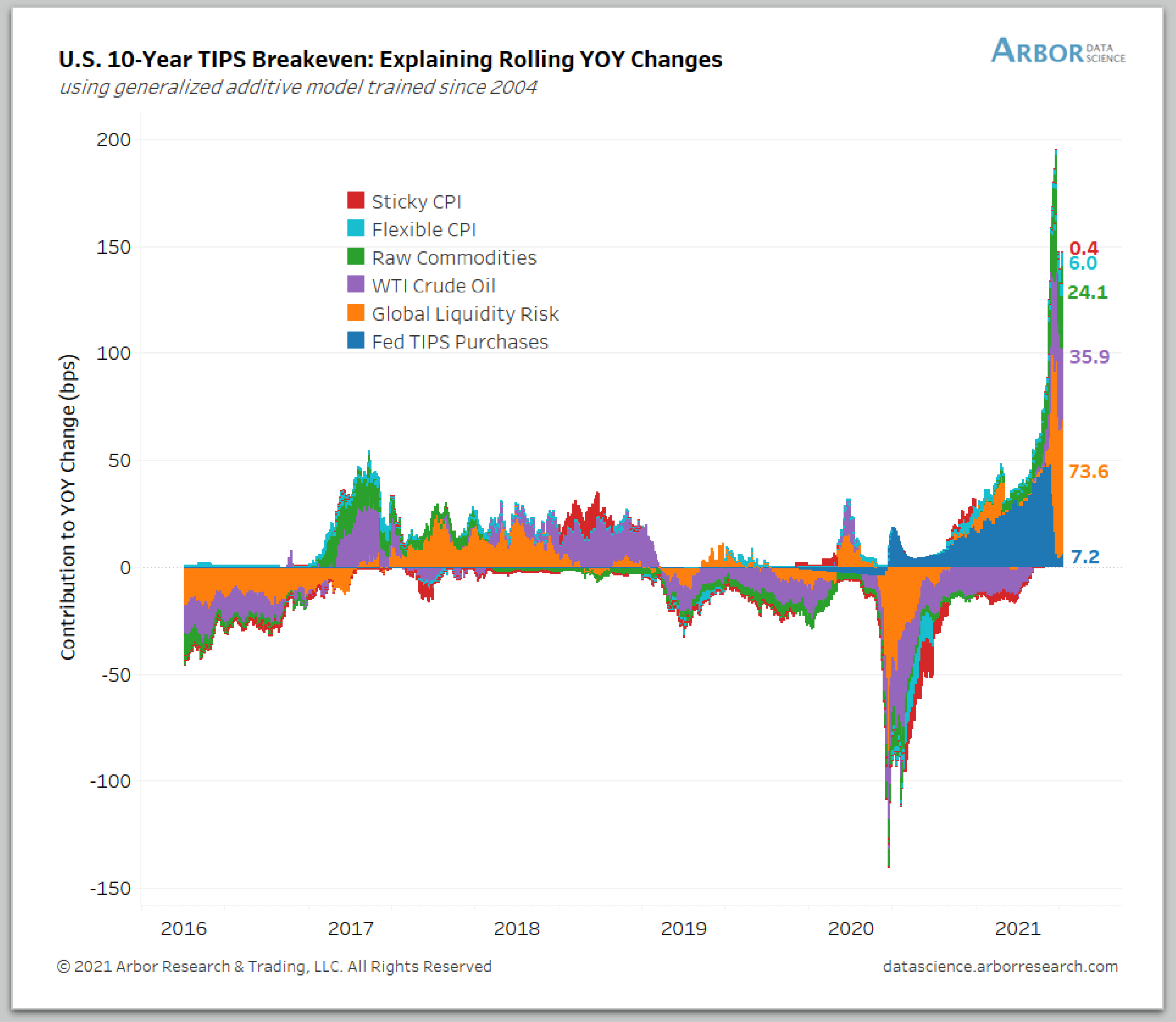
Reasons for caution

Fed a Dominant Force Within TIPS Market

- The Federal Reserve's holdings of TIPS jumped from ~10% before the pandemic to a whopping 24.1% 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.



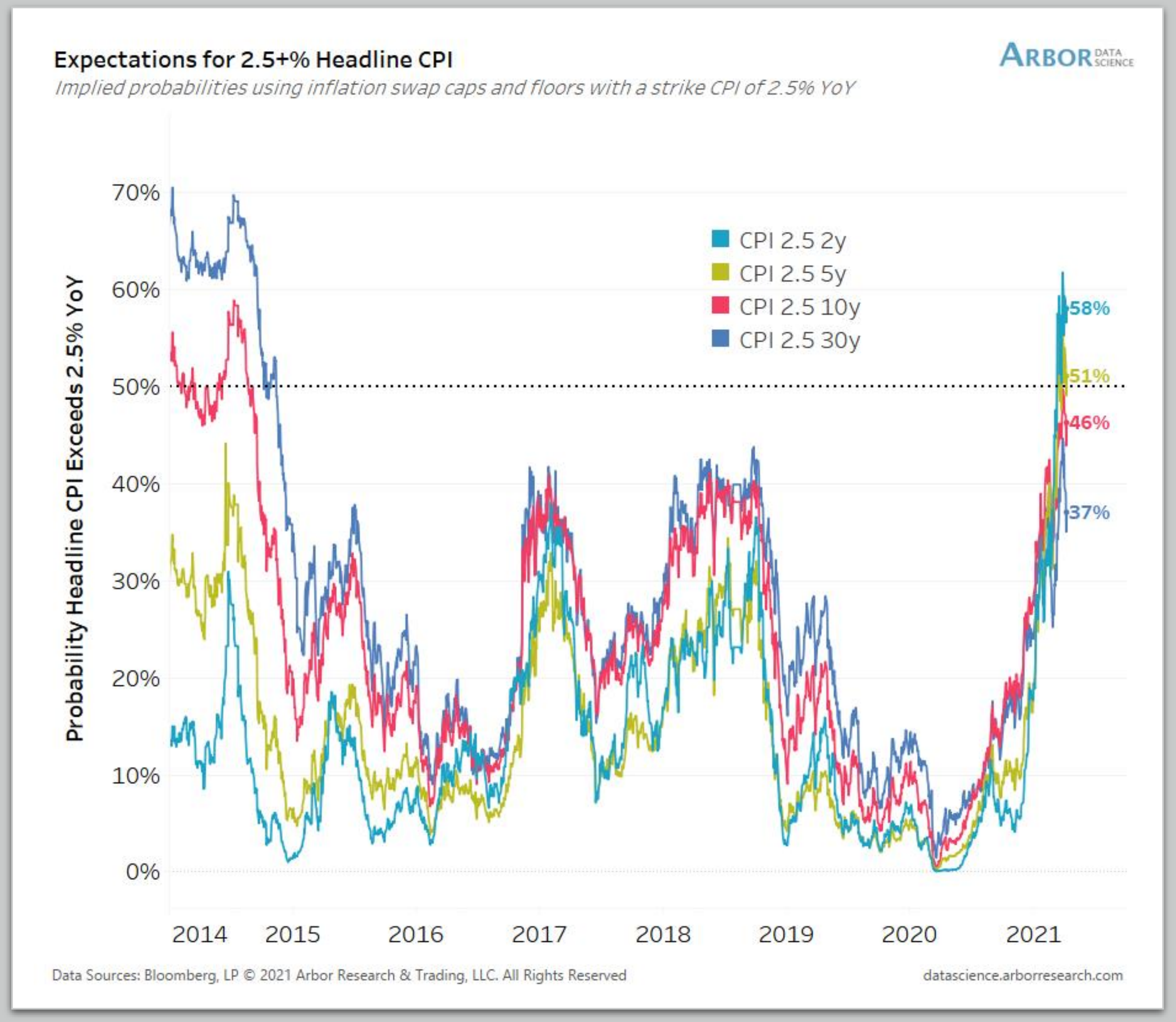


Reasons for caution

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 nearly 80 bps of widening over the past year has been tacked on to U.S. 10-year TIPS breakevens** thanks to improved liquidity and Federal Reserve purchases (blue and orange areas).



Reasons for optimism

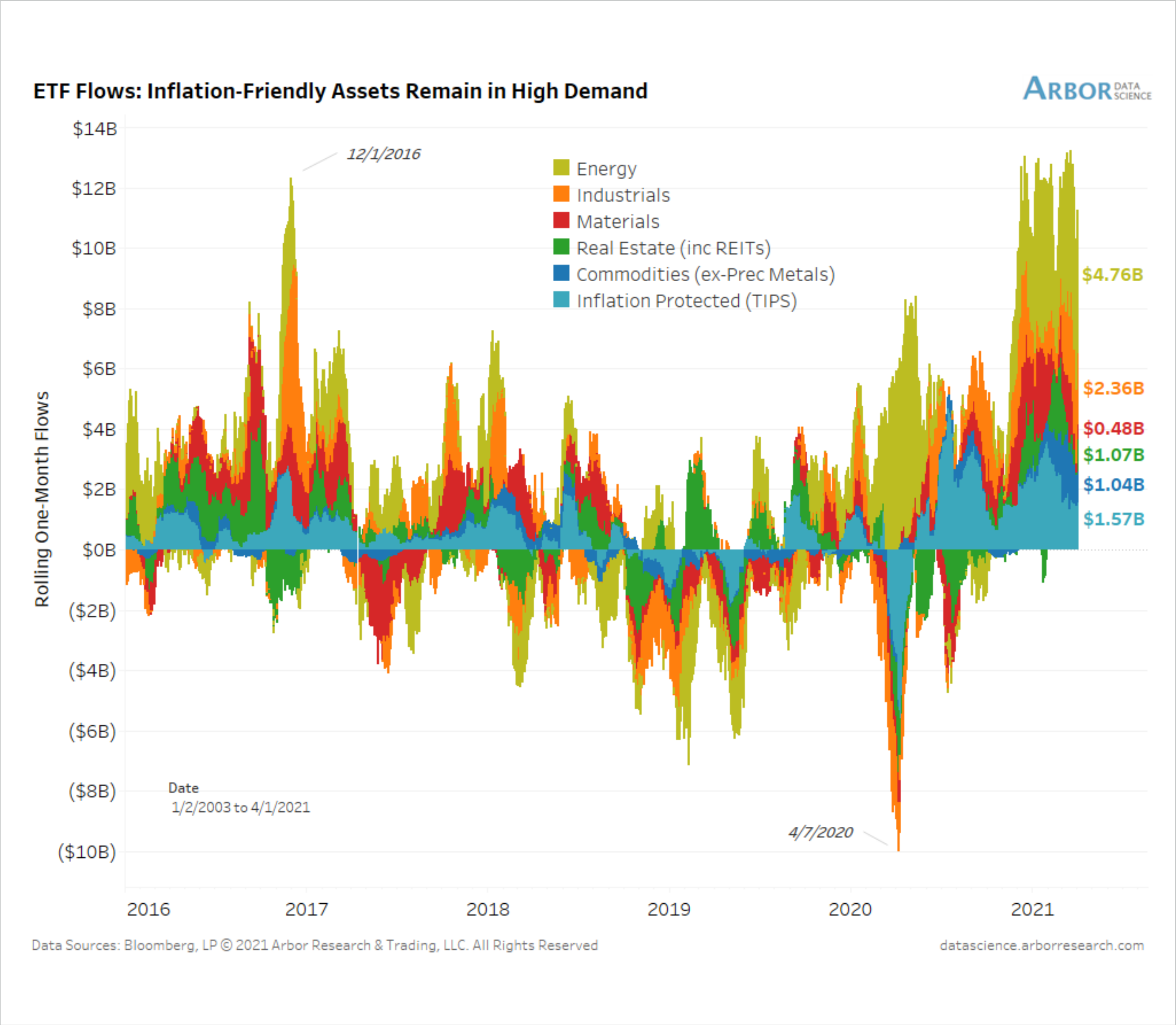
Investors Warming up to Headline CPI Above 2.5% YOY

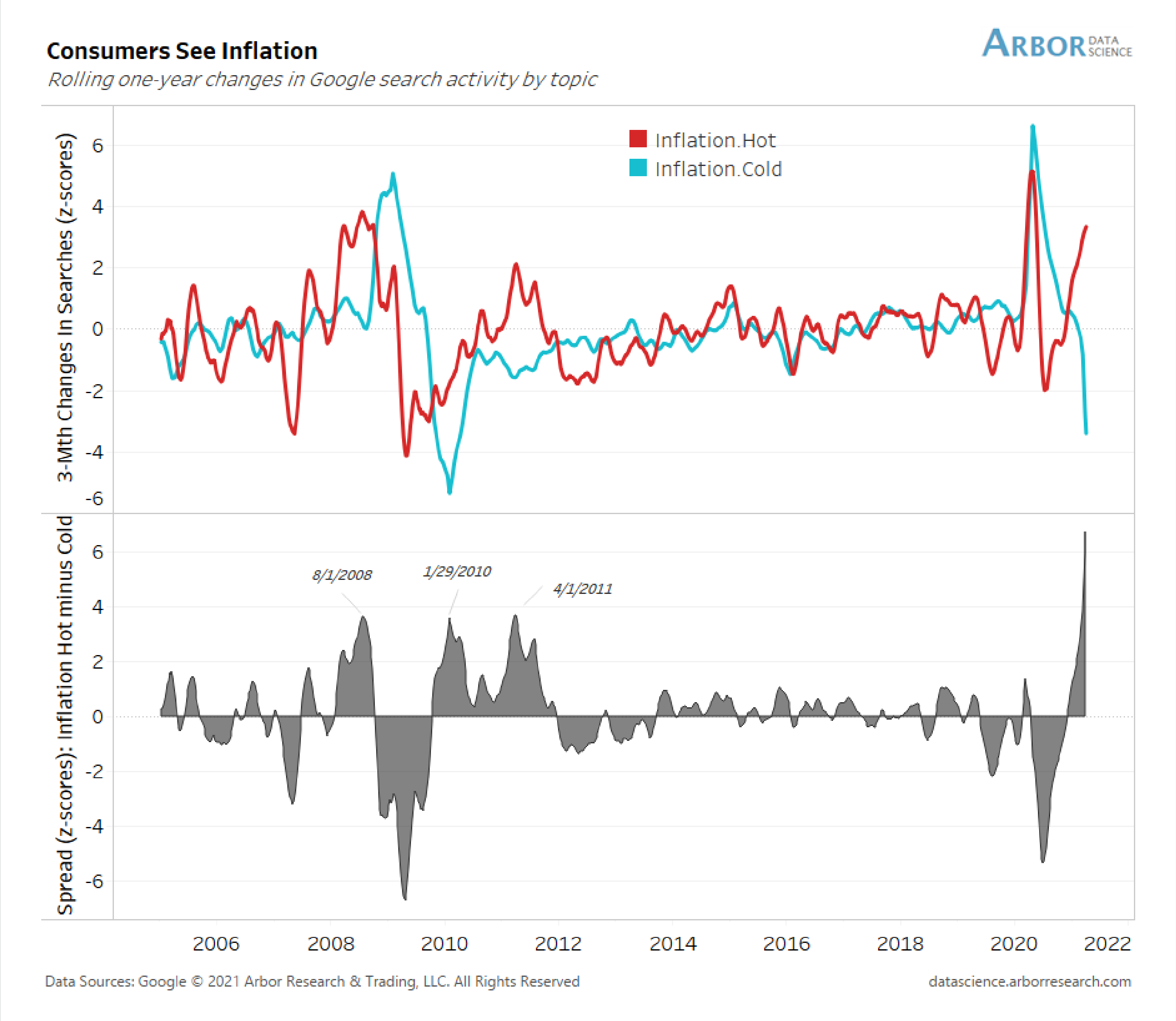
- 2 and 5-year outlooks are producing 50+% probabilities CPI runs above 2.5% YOY.
- Seeing the entire curve price in 2.5+% YOY could trigger another leg of TIPS breakeven widening.

Reasons for optimism

Investors Remain Committed to Inflation-Friendly Assets

- Flows into TIPS-focused ETFs on a rolling one-month basis have modestly slowed to $1.57 billion.
- Flows Commodity ETFs away from energy and precious metals remain healthy at $1.04 billion.





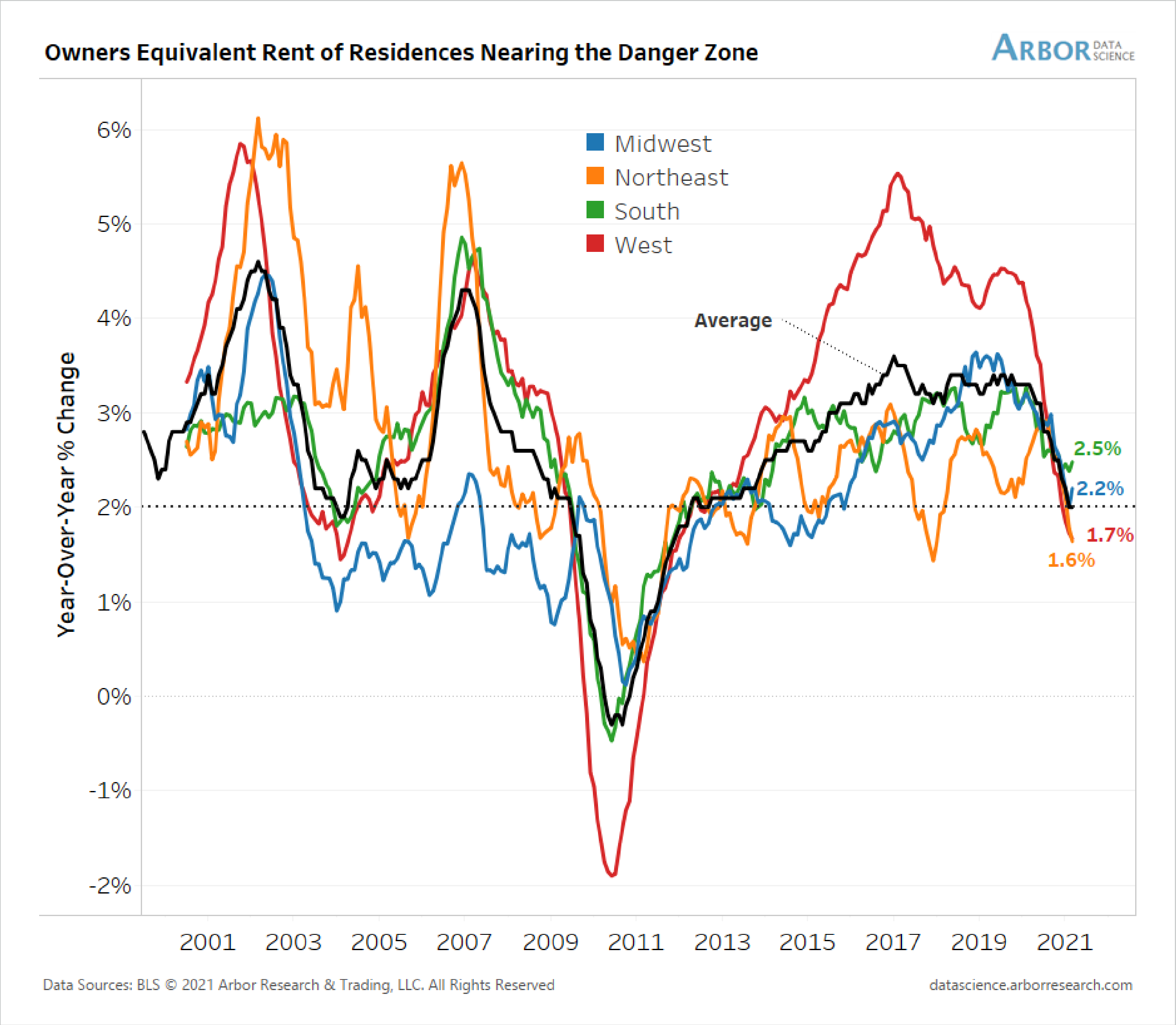
U.S. Consumers See Inflation

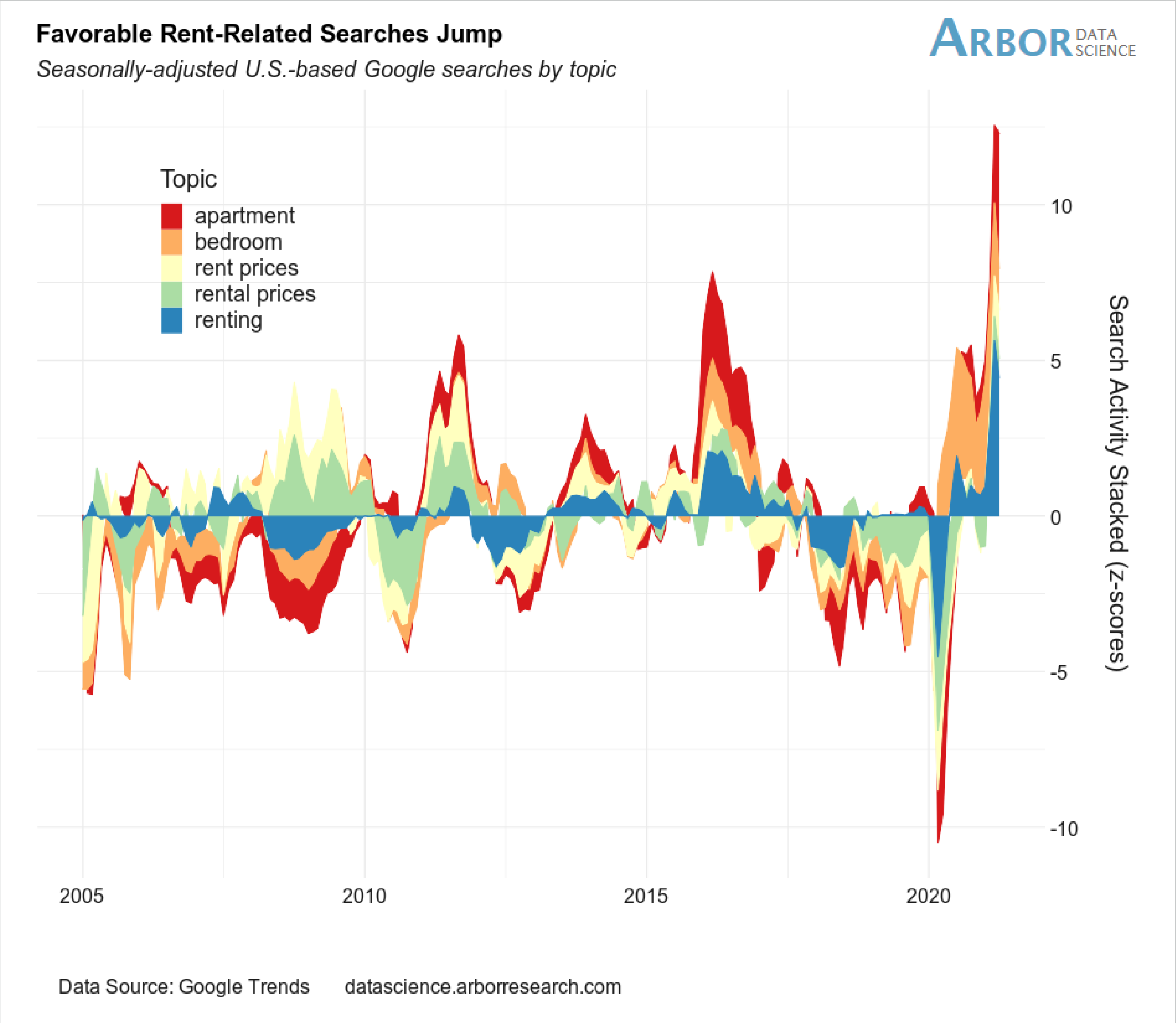
- Increased spending while supply constraints persist have small investors looking for higher inflation. The spread between search topics focused on hot versus cold inflation has spiked to the highest on record. Note headline CPI went on to reach 3.9% year-over-year after the March 2011 scenario.

- 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

Owners Equivalent Remains a HEAVY Weight on Inflation, But…

- Owners equivalent rent (OER) remains the 800-pound gorilla weighing heavily on headline and core inflation. Remember OER comprises 24% of headline CPI.
- However MOM jumped to 0.27%, back in line with the average in place since 2015.
- The extension of moratoriums is likely a headwind over the short-term.
- Remember asking rents surged 18.4% into Q4 2020. Convergence between asking and collected rents is likely on the horizon.





Reasons for optimism

Rent-Related Searches Surge

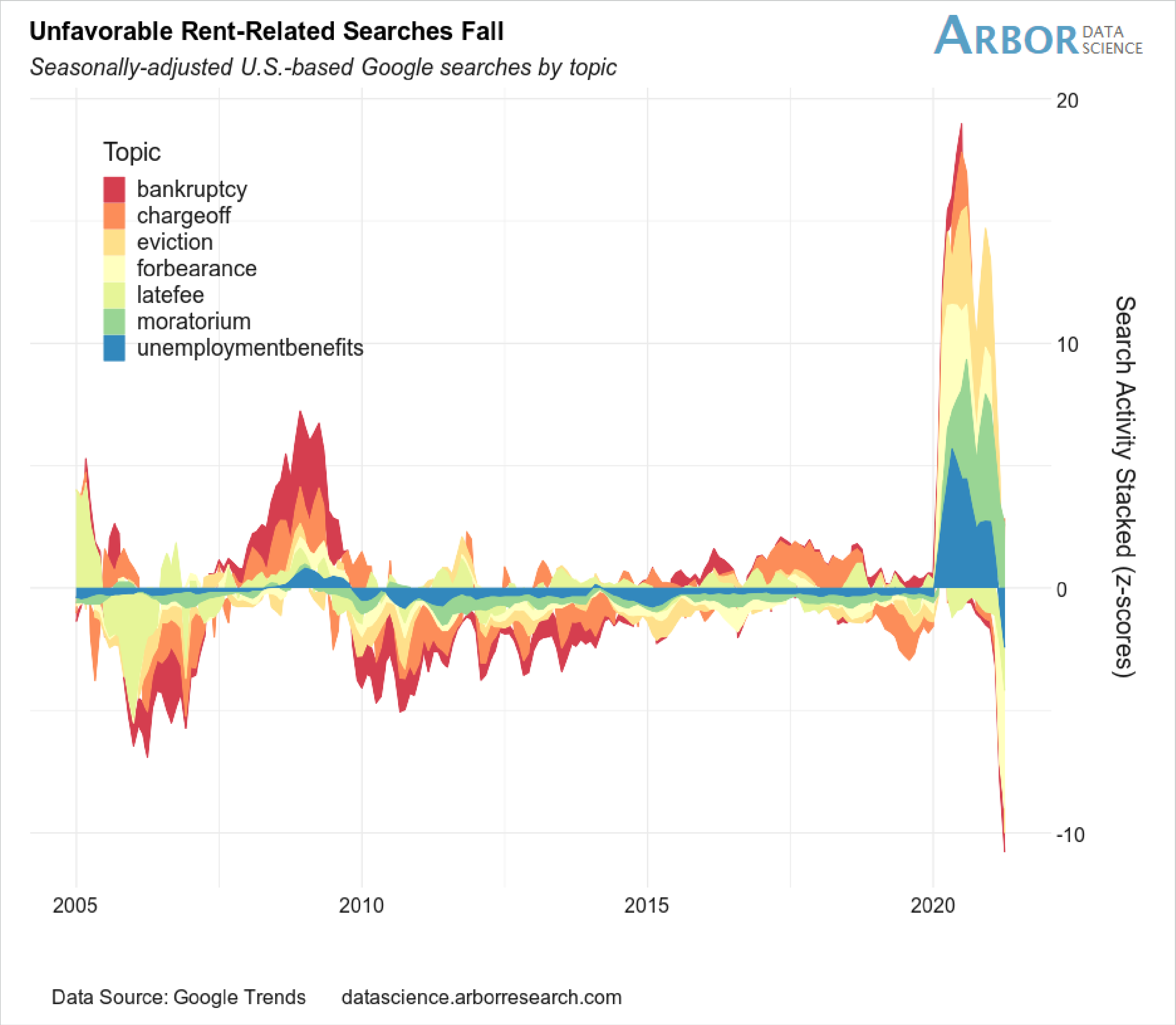
- Rent-favorable searches from one-bedroom apartments to vacation rentals rebounded sharply in February and continued into March.

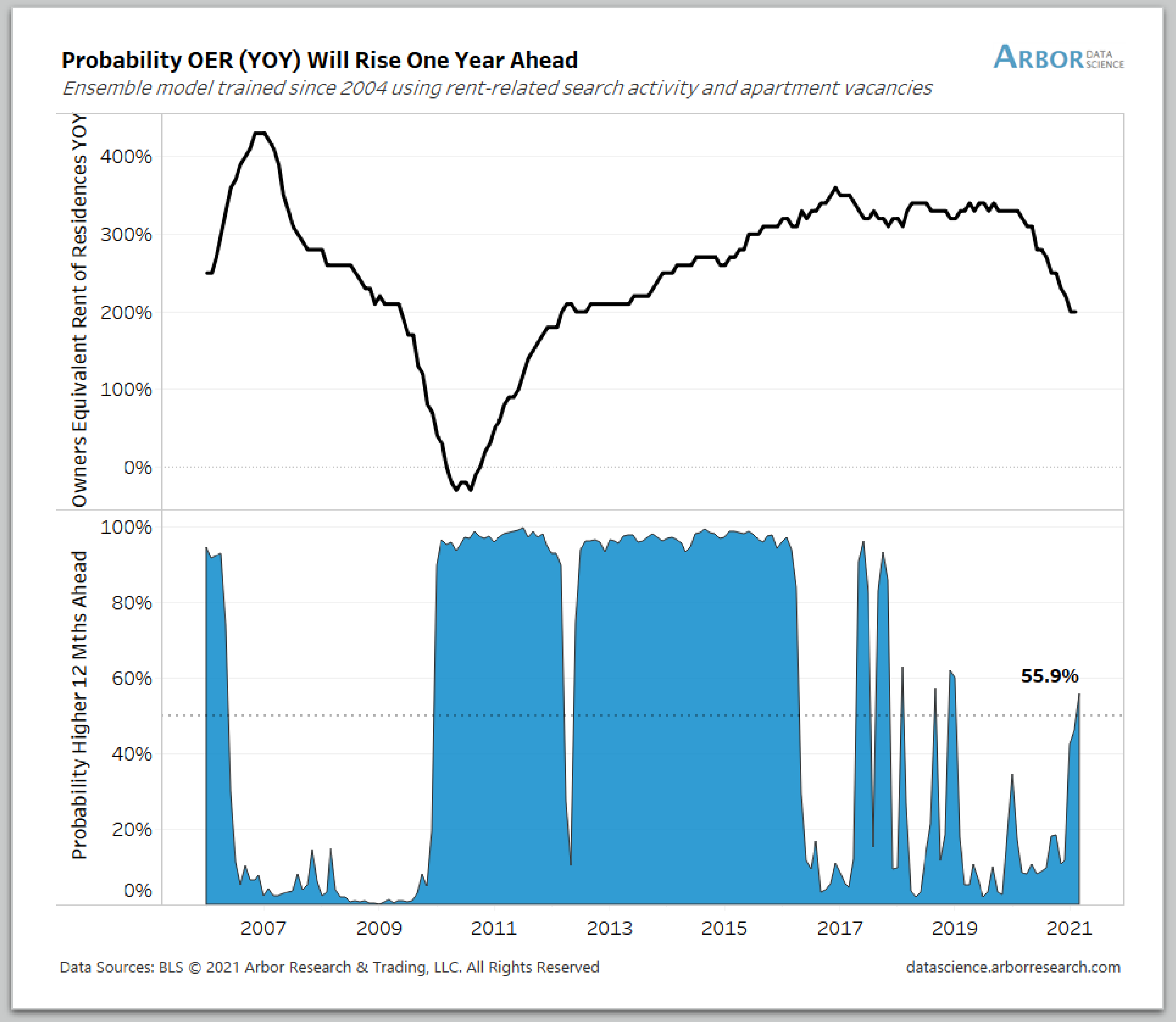
- A continued surge in rent-related search activity will bode well for rising rents into year-end.

Reasons for optimism

Financial Stress Searches Yet to Fully Abate

- Searches for bankruptcy to unemployment benefits diminished in February, and again in March.
- All topics except 'moratorium' are now well-below average.





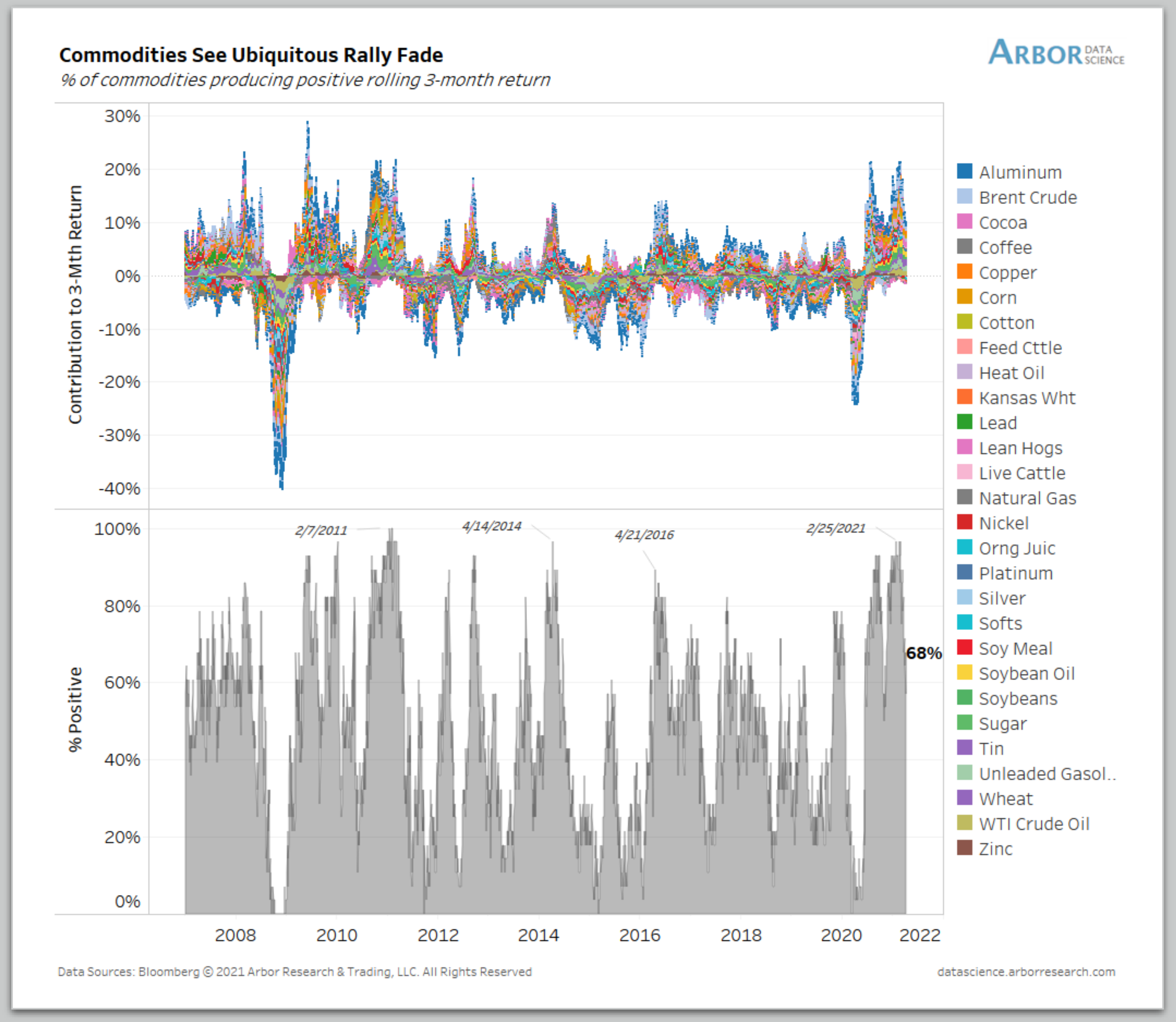
Reasons for optimism

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 indicates a 56% probability OER's year-over-year growth rate will be higher next March 2022**.

- This model consistently producing probabilities above 50% would be a game changer for the inflation outlook!



Commodities Keep Chugging Along

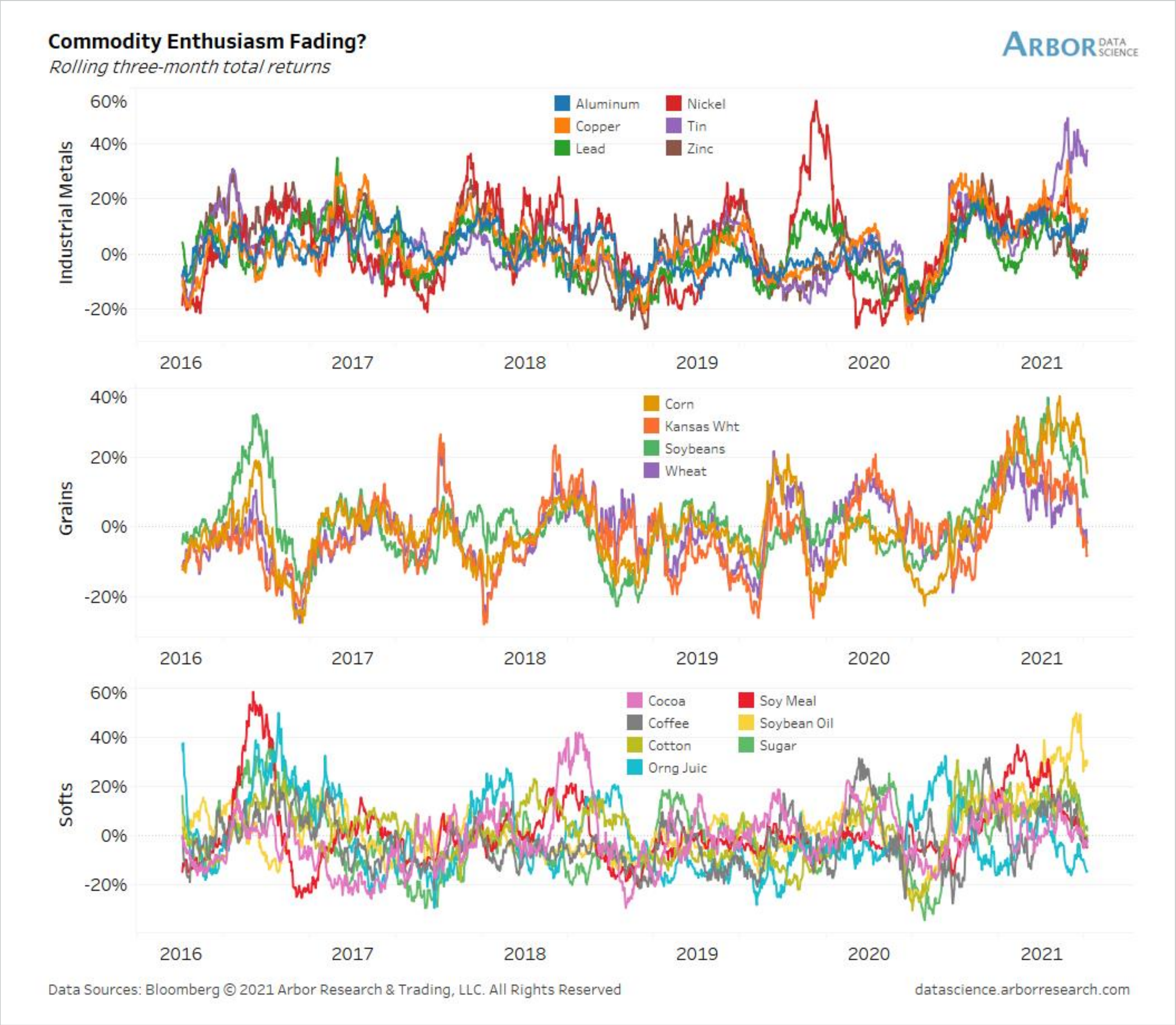
- 91% of the world's commodities are producing positive YOY gains, the highest since March 2011. Base effects are clearly at play.

- We are shifting focus to rolling three-month returns. Only 68% are producing positive returns, well-off the peak at 96% seen in February 2021.

- We would become concerned about commodity strength in the event less than 50% were producing positive gains on a rolling three-month basis.

Commodity Momentum Finally Slows

- Rolling three-month returns for gains have rolled over along with most industrial metals.
- Implied volatility across commodities has also peaked, suggesting exuberance may be waning.



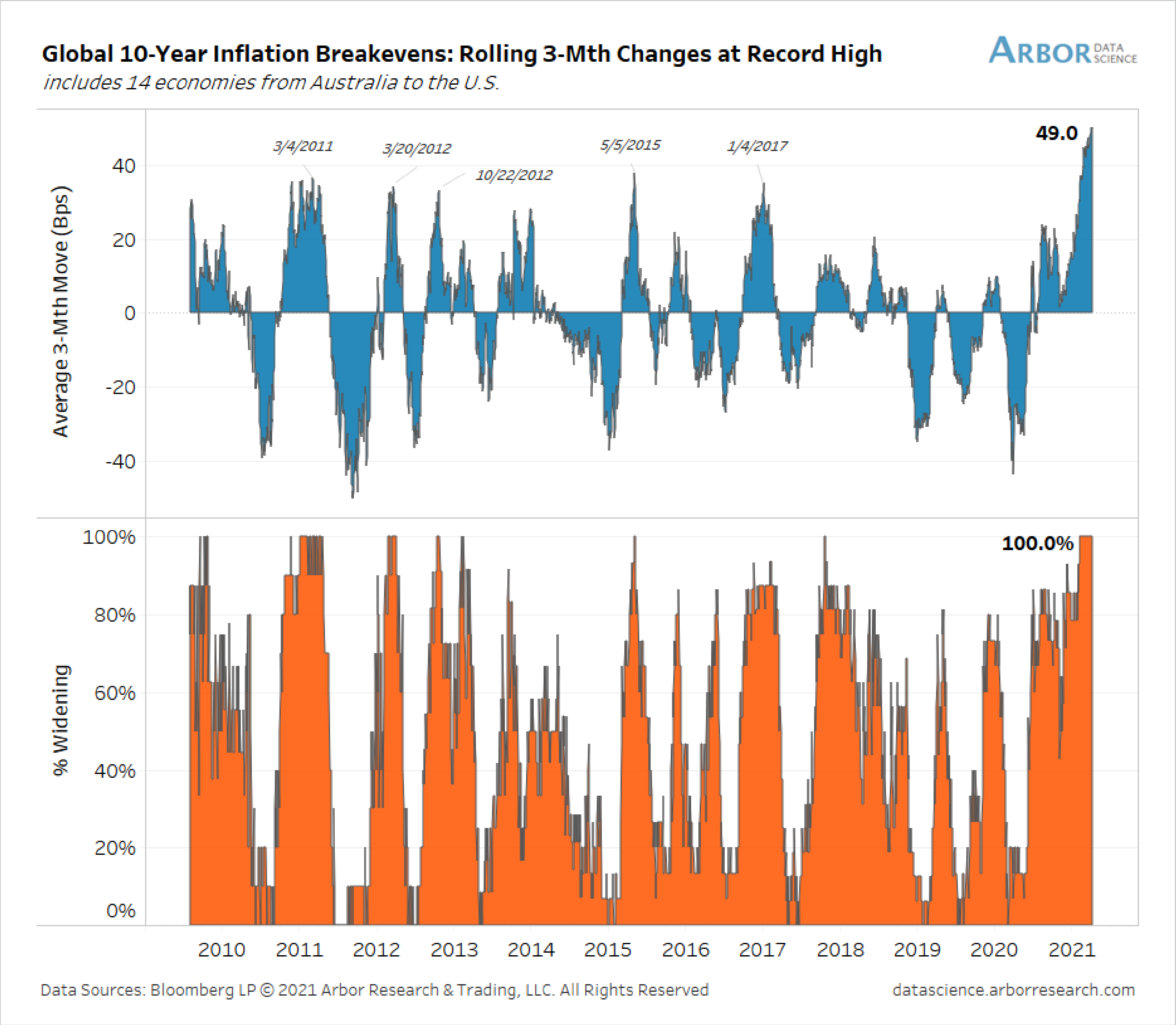
Reasons for caution

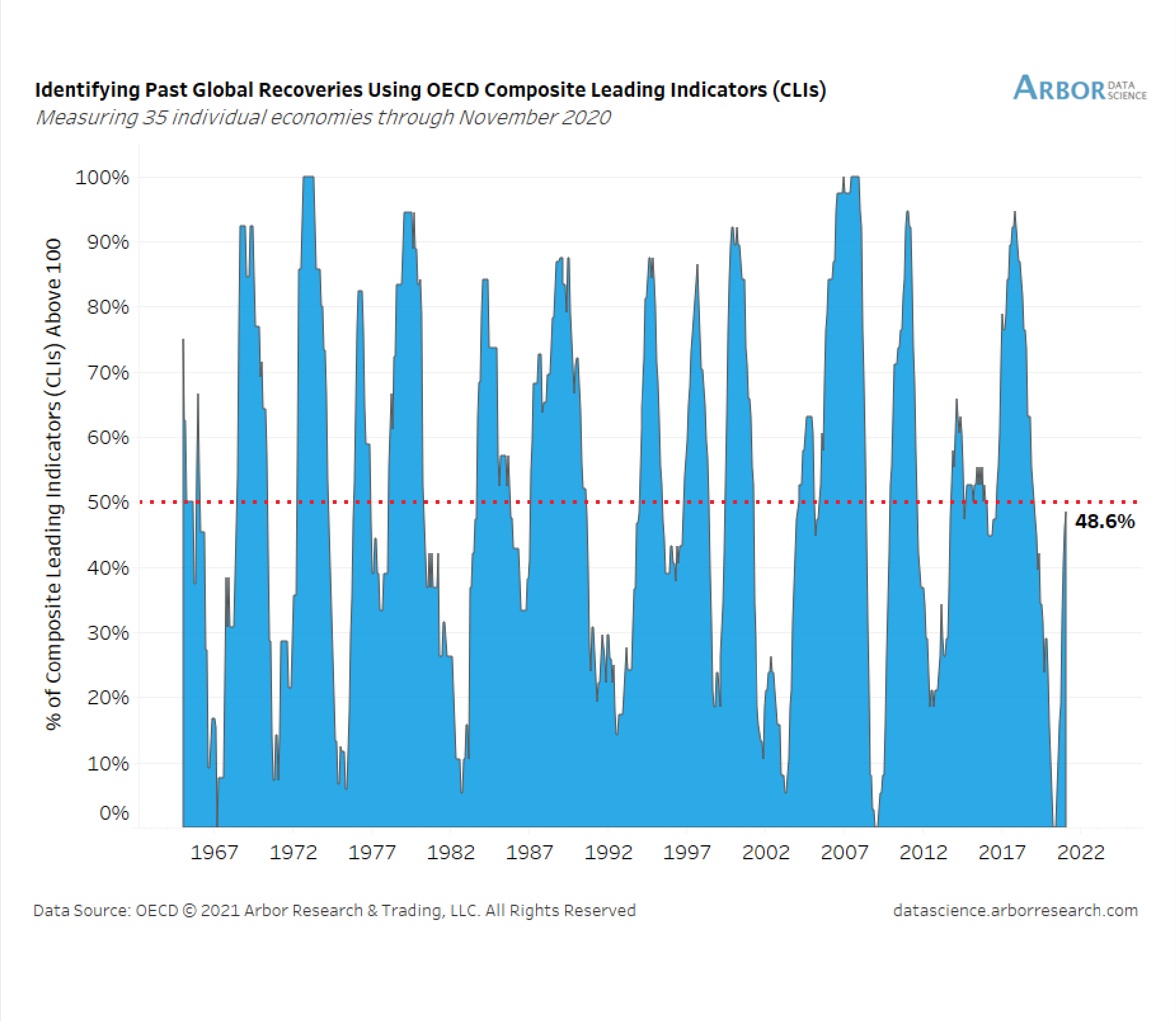
10-year Inflation Expectations Across the Globe Reach Extremes

- The average three-month change across 10-year inflation expectations has rocketed higher to 49.0 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?!





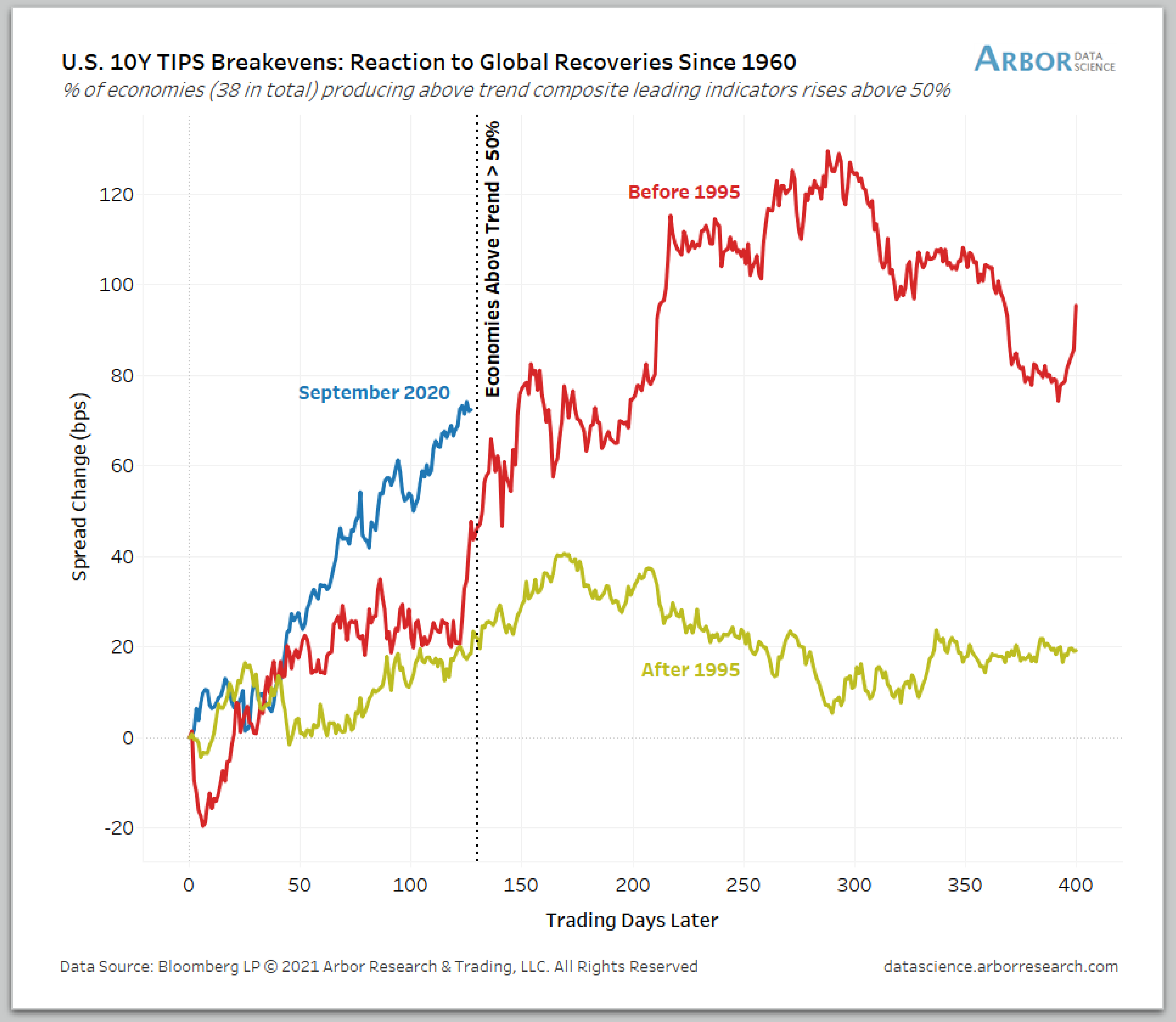
Reasons for optimism

Leading Economic Indicators About to Confirm the Global Revival

- A global recovery remains well underway with 48.6% of economies producing above trend leading economic indicators through February 2021.

- We have routinely used the percentage of economies with OECD composite leading indicators (CLIs) above 100 to define global slowdowns and eventual recoveries.

- We anticipate a break to 50+% of economies growing above trend this month, the highest since December 2018.



Reasons for optimism

Investors Looking to Pre-1995 Relationship Between Global Growth and Inflation

- Whether or not inflation persistently runs above expectations (i.e. 2% year-over-year) will be the clincher. The chart shows past changes in U.S. 10-year TIPS breakevens during these global recoveries since 1960.

- Thus far U.S. 10-year TIPS breakevens have been exceeding average widening seen both pre and post-1995 after more than 50% of economies began growing above trend.

- **Inflation expectations before 1995 on average added another 60+ basis points**. On the flip side, inflation expectations after 1995 tended to stalled and quickly lose momentum. Are investors finally pricing in potential for a return to pre-1995 inflation dynamics?

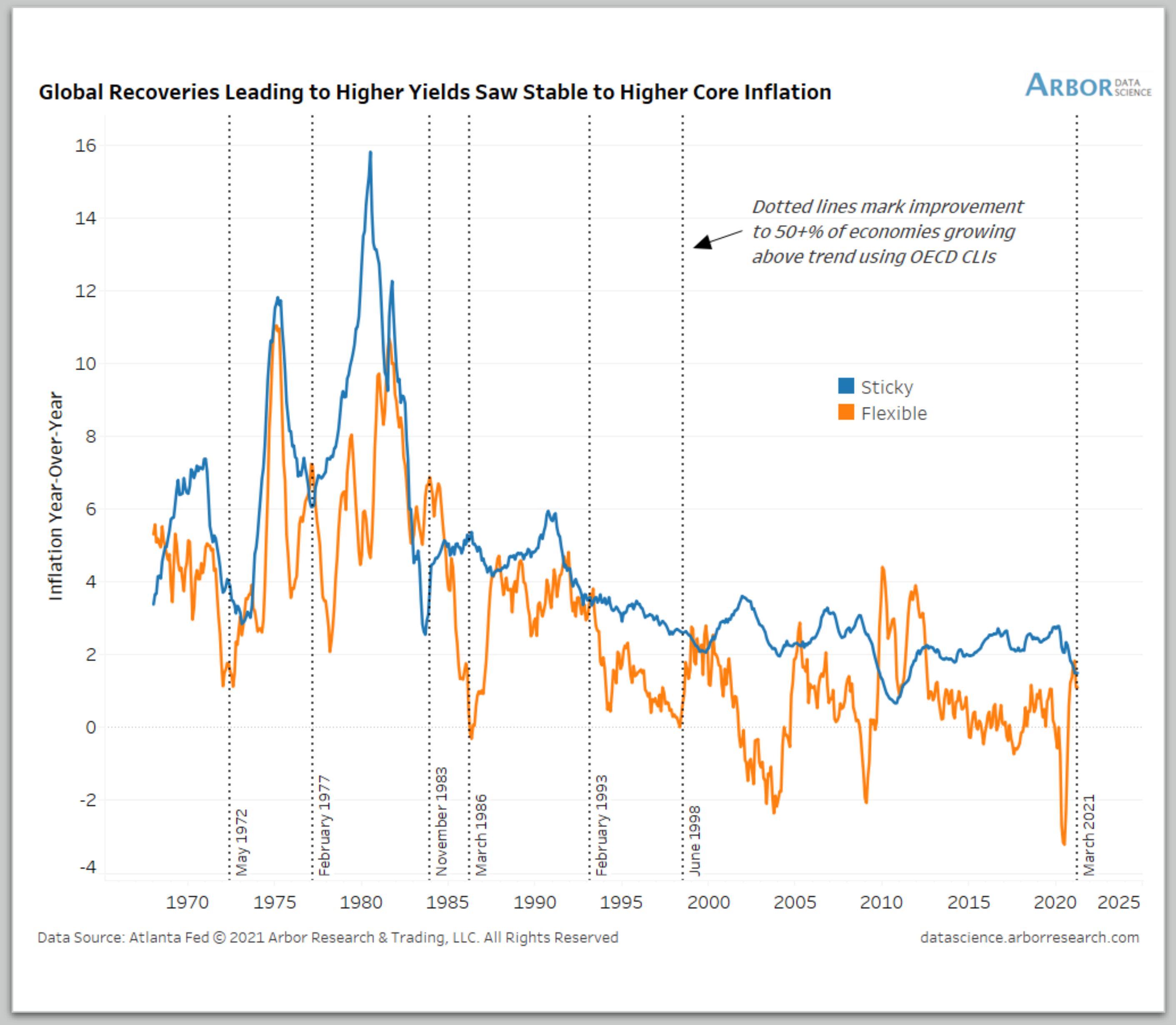
Reasons for optimism

CPI Looks Set to Recommence Pre-1995 Relationships

- The chart shows the flexible and sticky components of core inflation (CPI) within the U.S. since 1968.

- The vertical dotted lines mark the global growth instances leading to appreciably higher U.S. 10-year yields. Note how nearly all occurred during significant bottoms in flexible and/or sticky core inflation.

- Given the swift shift higher across nominal yields and inflation expectations, investors are seemingly pricing for this exact scenario. Only time will tell if sticky core inflation will see a sizable rebound on par with pre-1995 instances.

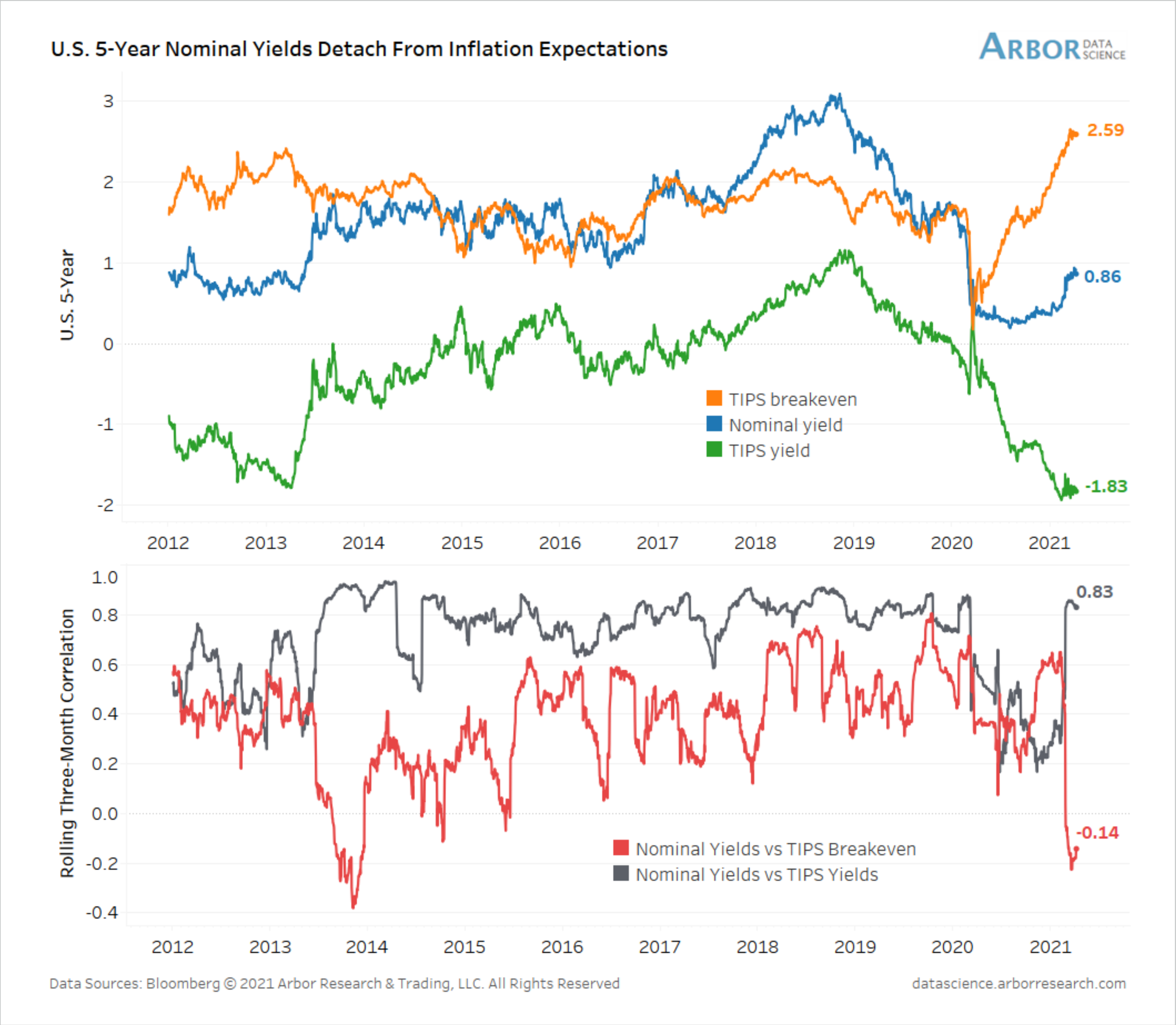


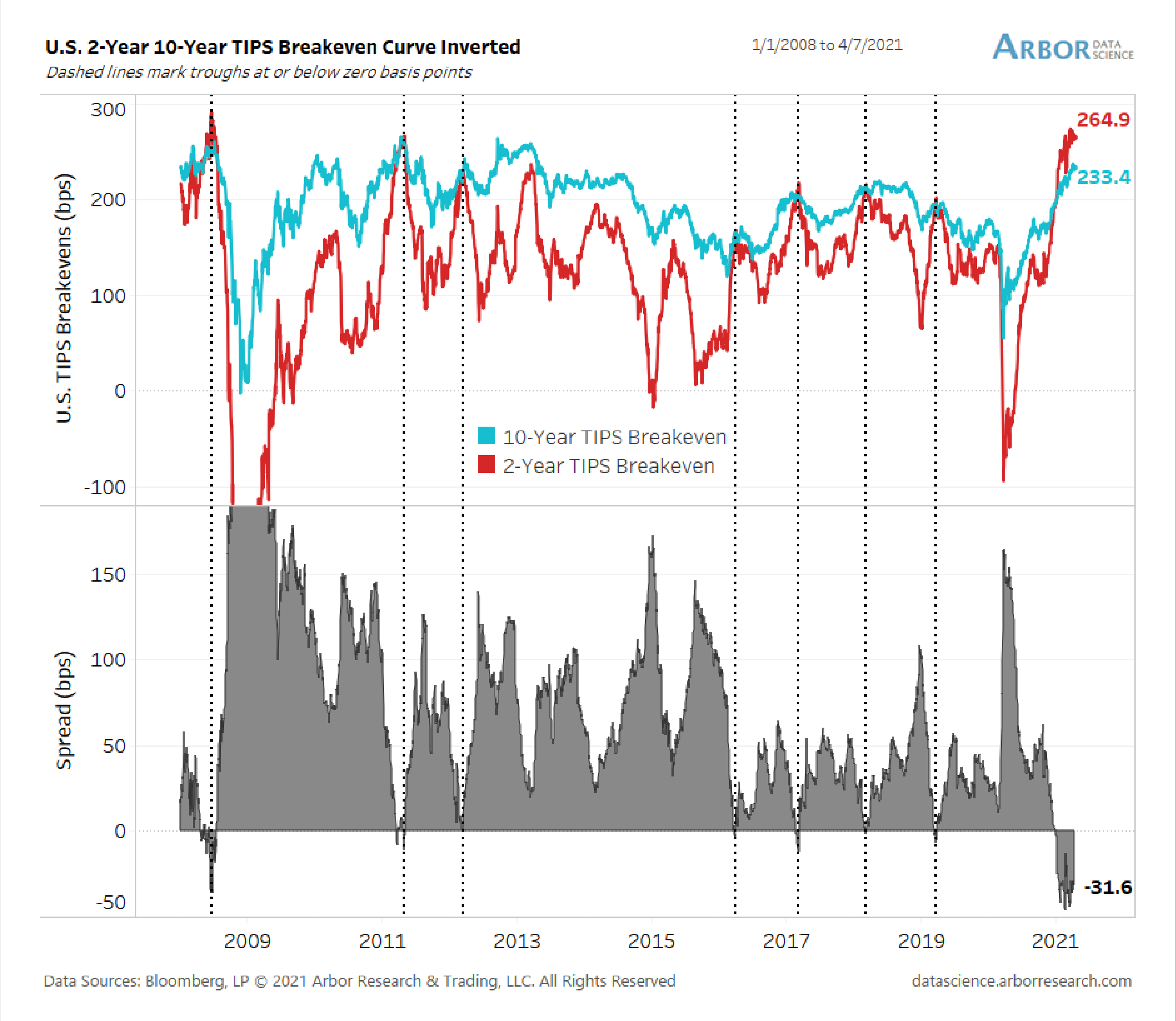
Nominal Yields Detached From Inflation Expectations

- Nominal 5-year yields are no longer driven by inflation expectations with a rolling three-month correlation of -0.19.

- Conversely, yields have suddenly re-attached to real (TIPS) yields with a rolling three-month correlation of +0.83.

- Investors will likely transition back to watching inflation more closely than Fed rate timing. Real yields would struggle to rise thanks to grounded Fed policy.

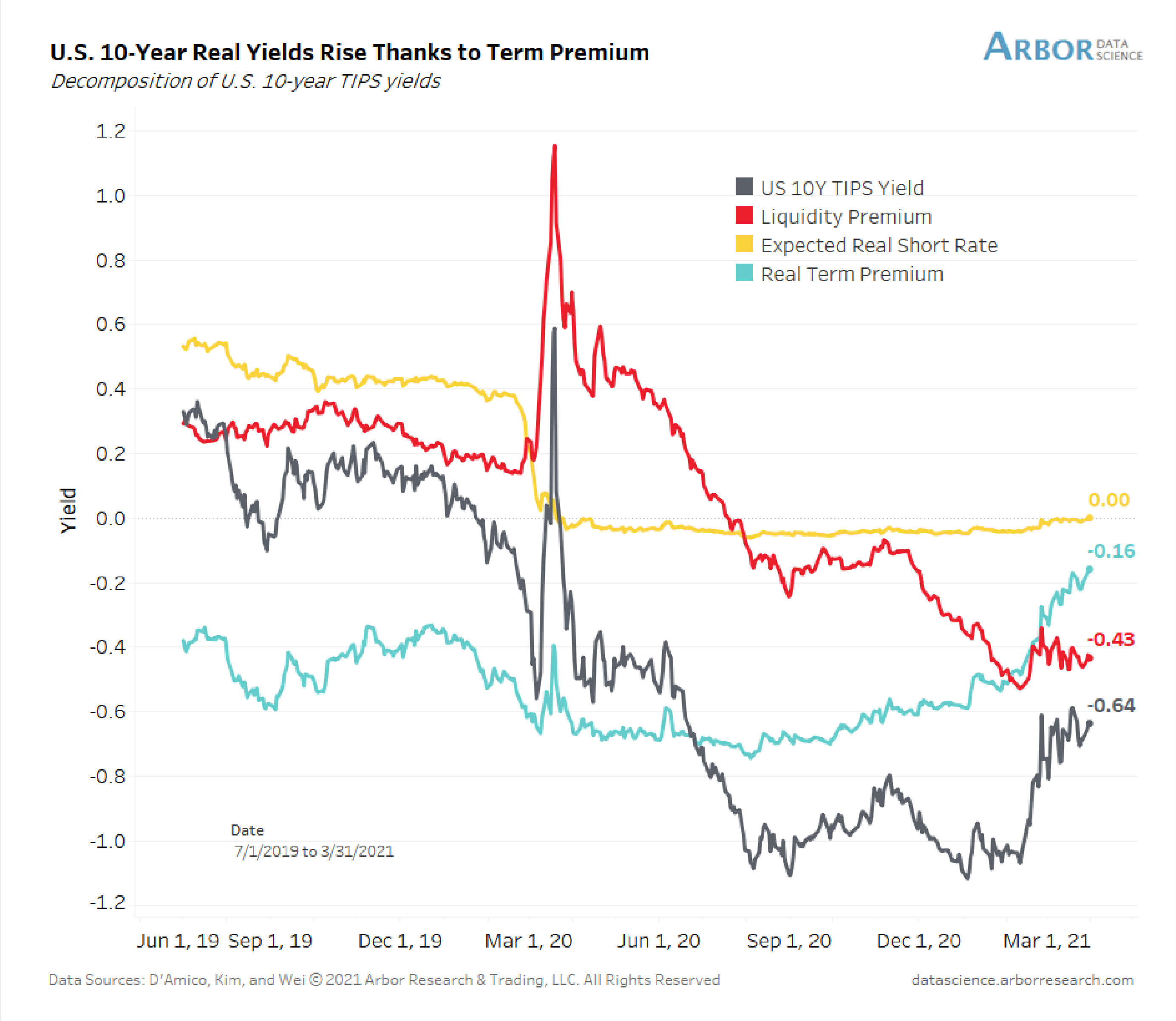




Reasons for optimism

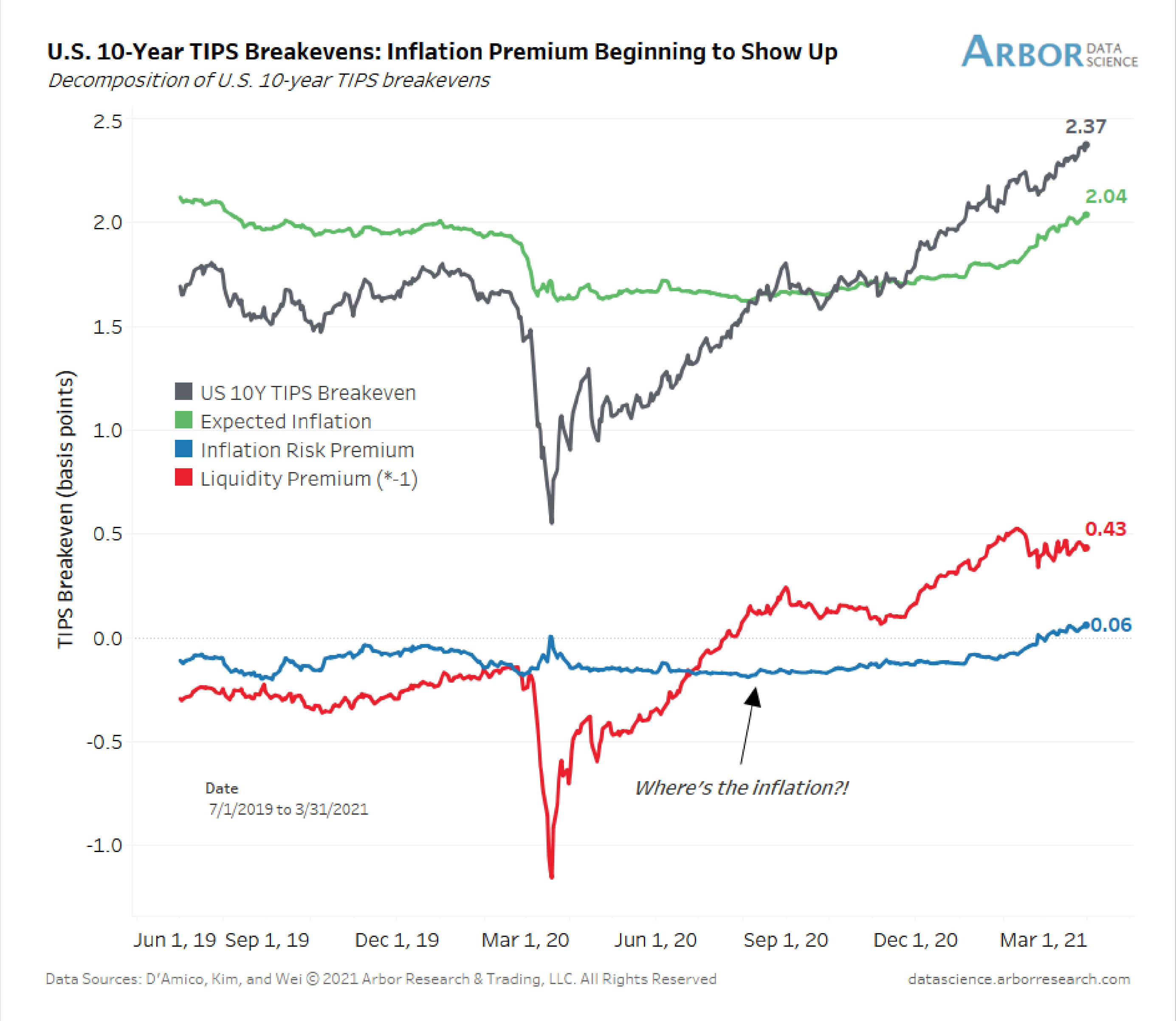
TIPS Breakeven Curve Inverted as Expected Under AIT

- 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

Real Yields Latest Rise Thanks to Term Premium

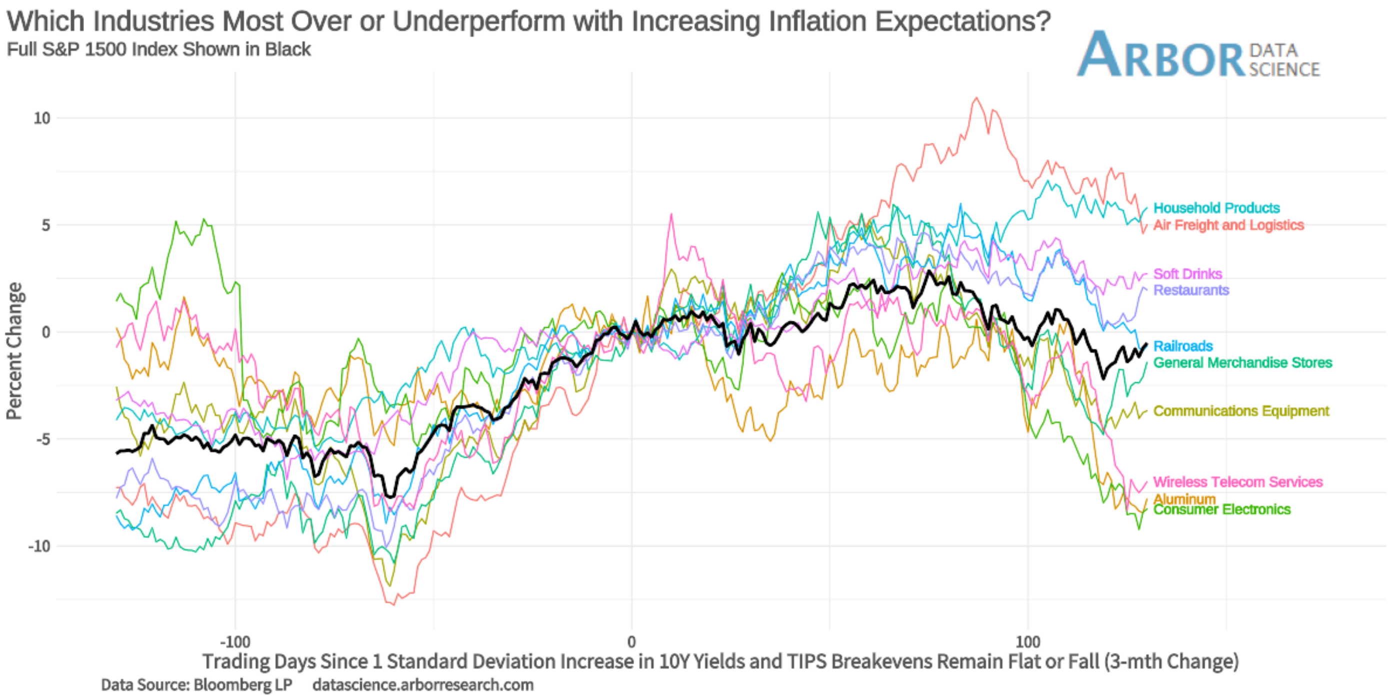


Reasons for optimism

TIPS Breakevens Begin to See an Inflation Premium

Alternative Strategy

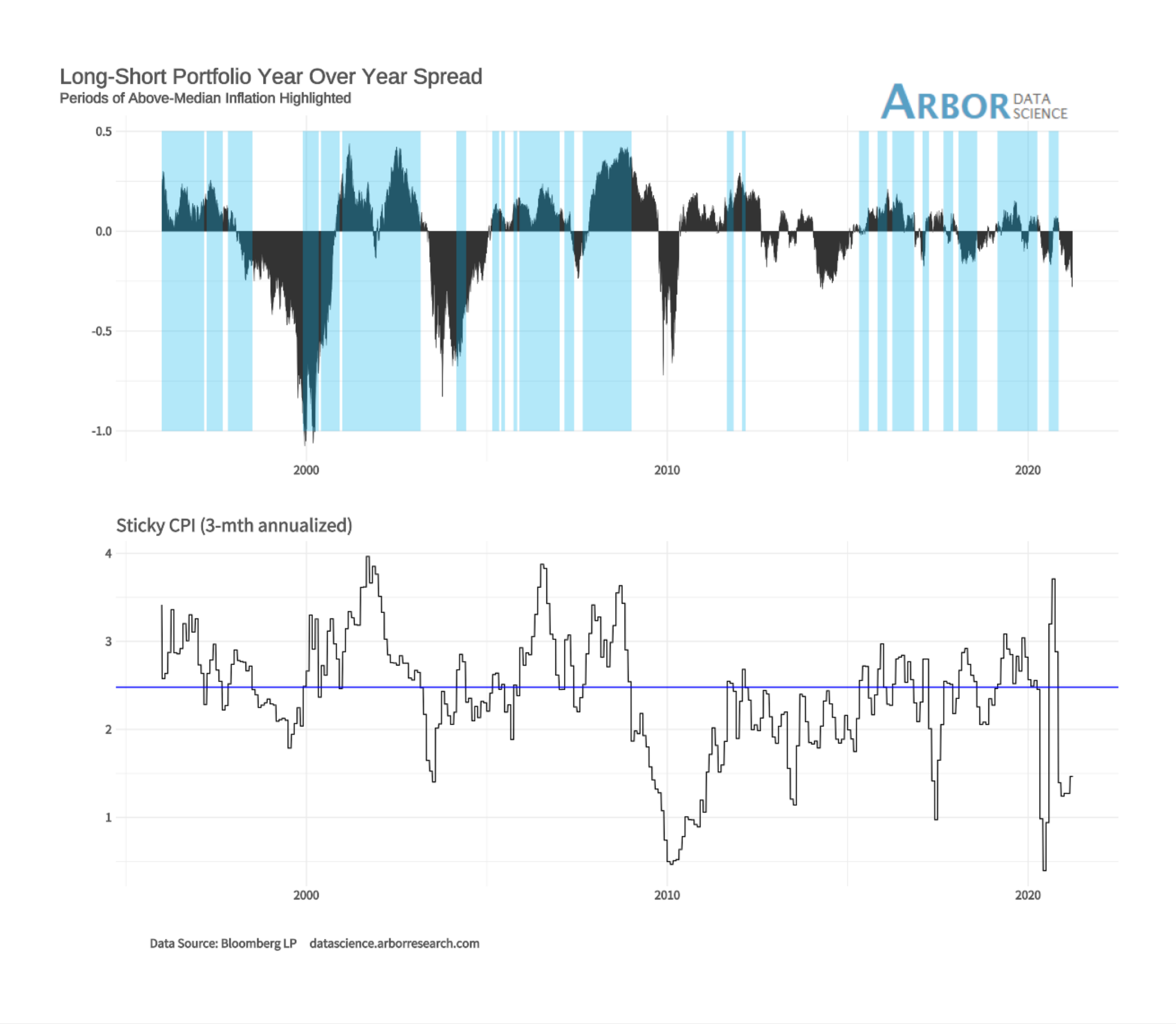
For Rising Inflation



- A potential scenario under-discussed is nominal yields continuing to rise, while TIPS breakevens are stable to narrower.
- The chart below measures the average performance of the top five overperformers and underperformers for six months before and after a one standard deviation rise in 10-year yields AND TIPS Breakevens either remain flat or decrease.
- The average is calculated using a 3-month change of nine historical instances between 1996 and 2021.

Alternative Strategy
For Rising Inflation

- A simple strategy based on long positions in overperformers and short positions in underperformers could potentially hedge against inflation. Alternative options are increasingly becoming attractive for those thinking that TIPS breakevens have run their course.
- Given this information, we measured the performance of a portfolio equally weighted long in each overperforming sector and short in each underperforming. The following chart shows the year-over-year spread of this portfolio (top) and the three-month annualized sticky CPI (bottom). The highlighted regions indicate periods of above-median inflation.
- This spread does appear to perform quite well under periods of rising sticky inflation. The fact this long/short spread has done quite poorly while sticky inflation has fallen may indicate an attractive oversold condition.
- As an aside, Air Freight and Logistics will be interesting to watch in the coming weeks following the recent blockage of the Suez Canal by the cargo ship Ever Given. Perhaps this hiccup in a competing industry will aid overperformance.



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Give us a call for more information about our services and products

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