

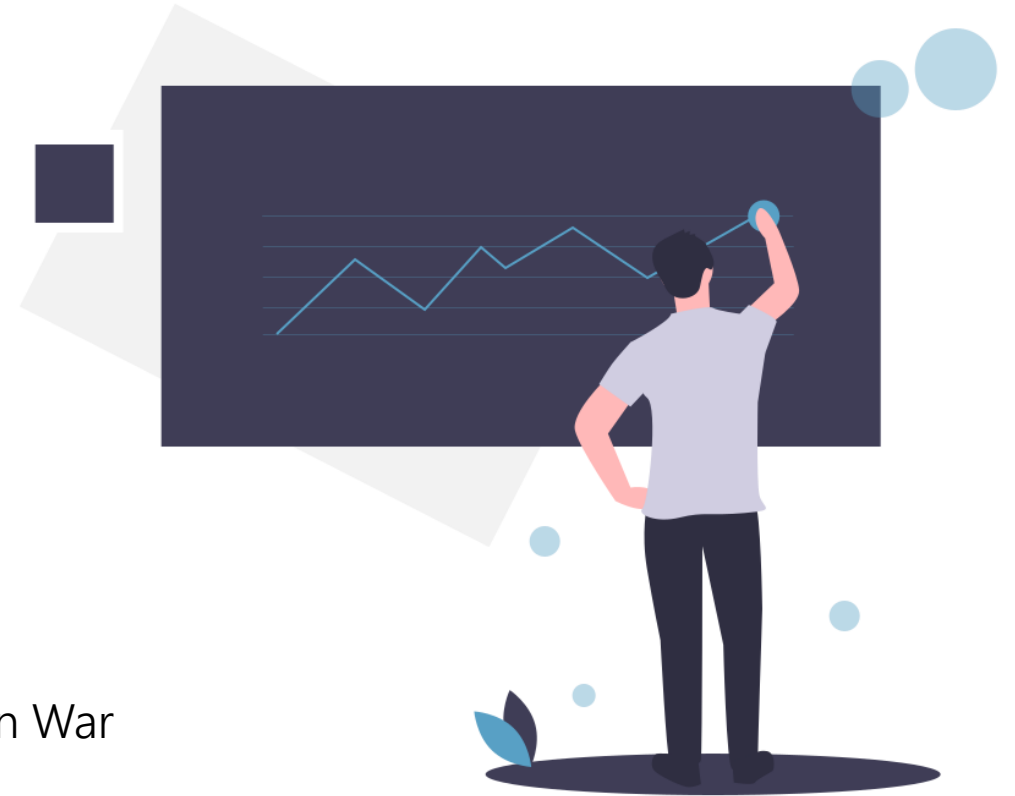
Inflation Roundup

September 2, 2021

- Inflation Expectation Returns and Seasonality
- The State of Market-Based Inflation Expectations
- Stagflation?! Nah
- Team Transitory Has Won the Battle, but Not the Inflation War
- Rents Getting Spicy
- Commodities and Yields Destined to Enter Trading Ranges
- Consumer Spending Expectations Mildly Recede
- Central Banks Primed to Get Less Passive

Benjamin Breitholtz, Anthony Rizzo, and Sergio Pineda

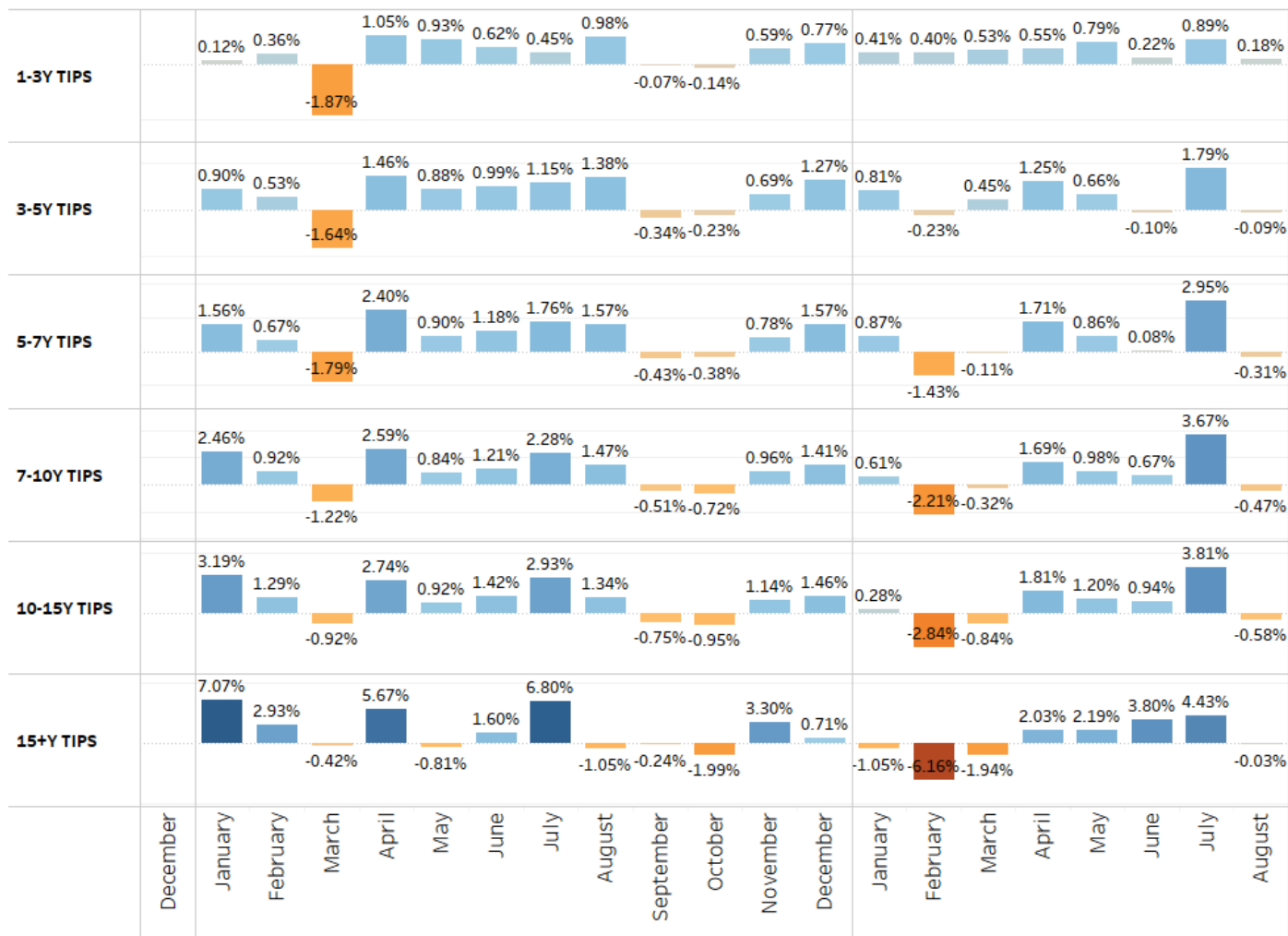
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	Conditions Fueling an Inflation Premium	Oct '20	Nov '20	Dec '20	Jan '21	Feb '21	Mar '21	Apr '21	May '21	Jun '21	Jul '21	Aug '21	Notes
Wider TIPS Breakevens	Commodities ex-energy and gold: 50+% produce + YOY return	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	80+% of commodities rallying YOY. But! Correlations are relaxing and dispersion rising. IOW, not all ships rising at the same time.
	Global econ data releases: 50+% economies growing above one-year trend	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	80+% of economies growing above trend led by Asia Pacific and the US.
	Investors pricing in 2+% YOY headline CPI next 10 years	N	Y	Y	Y	Y	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	Y	Y	Y	Y	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	Y	Y	Fed purchases remain above 25% of total outstanding.
	Search activity forecasts rising OER YOY	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Search activity synonymous w/ higher rents. Apartment List and Zillow suggest OER could reach as much as ~7% YoY by EOY.
Impairs Risk Assets	VIX and US 10 year TIPS breakeven positively correlated	N	N	Y	N	N	N	N	Y	N	N	N	45-day rolling correlation at -0.49, indicating inflation fears have moved far into the backseat.
	Short-end swaption volatility shows tightening fears	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Swaption vol for 2-year rates into 2023 remains elevated with Eurodollars maintaining 70+ bps of tightening into Dec 2023.
	TIPS breakevens near fair value implied by risk assets	N	N	N	N	N	Y	Y	Y	Y	Y	N	10y TIPS breakevens have fallen away from fair value at 254 bps.
	Investors pricing in 2.5% YOY headline CPI next 10 years	N	N	N	N	N	N	Y	N	N	N	?	Inflation swap caps/floors pricing in headline CPI above 2.5% YOY for the next 10 years remains stuck just above 50%.

TIPS TOTAL RETURNS:

U.S. TIPS: Monthly Returns



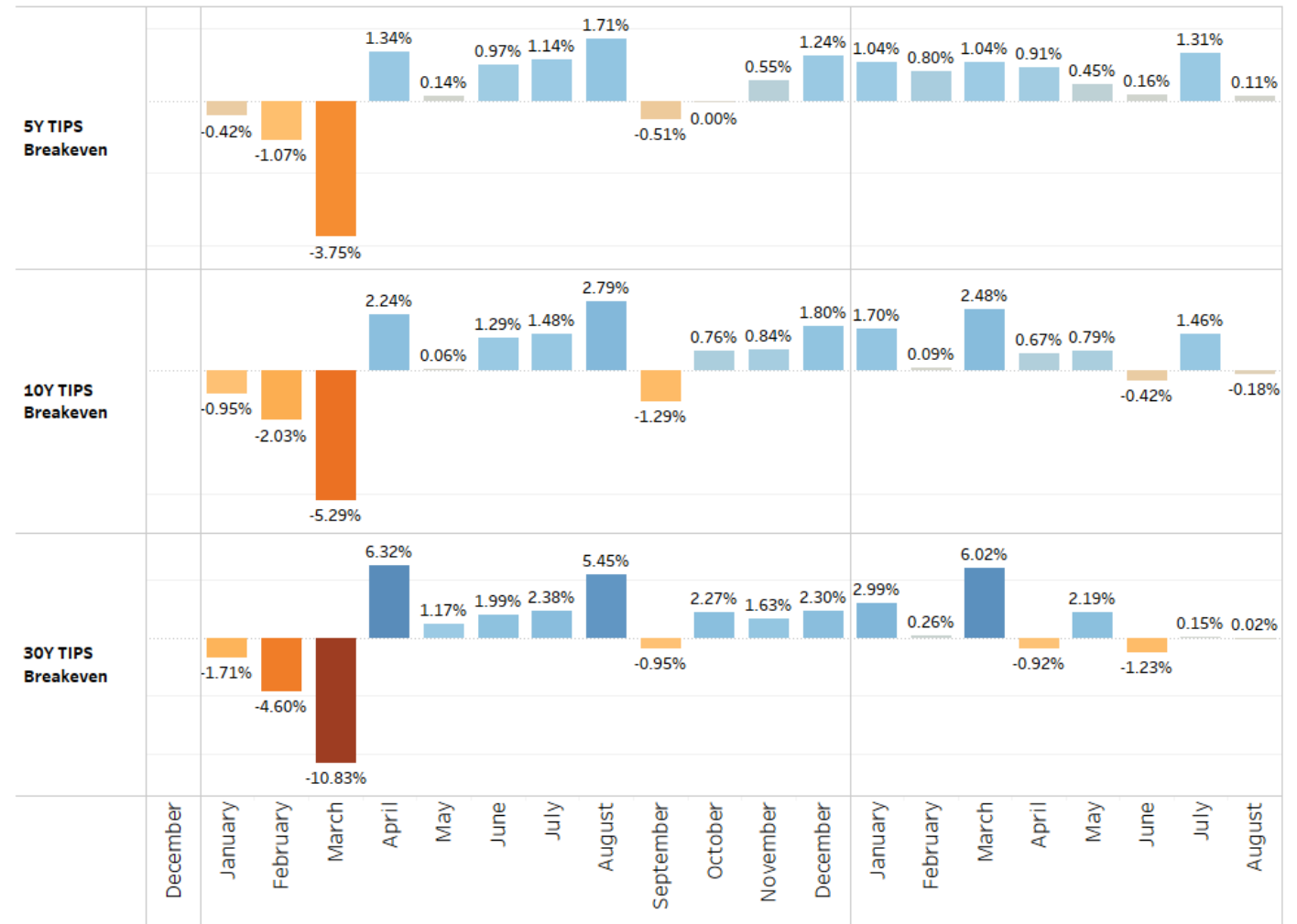
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TIPS BREAKEVENS TOTAL RETURNS:

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

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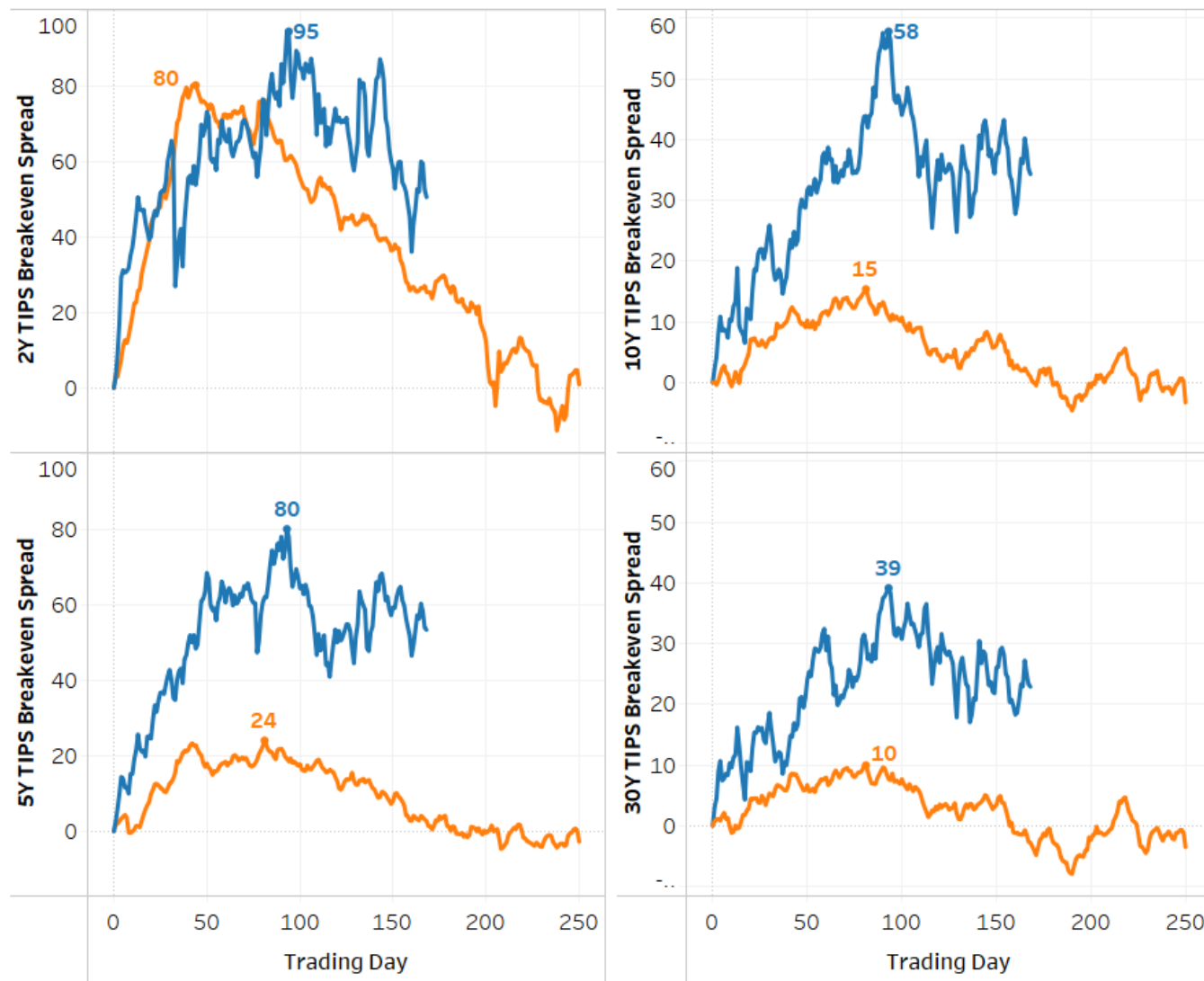


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TIPS BREAKEVENS SEASONALITY: *Narrowing Favored*

TIPS Breakevens Seasonality



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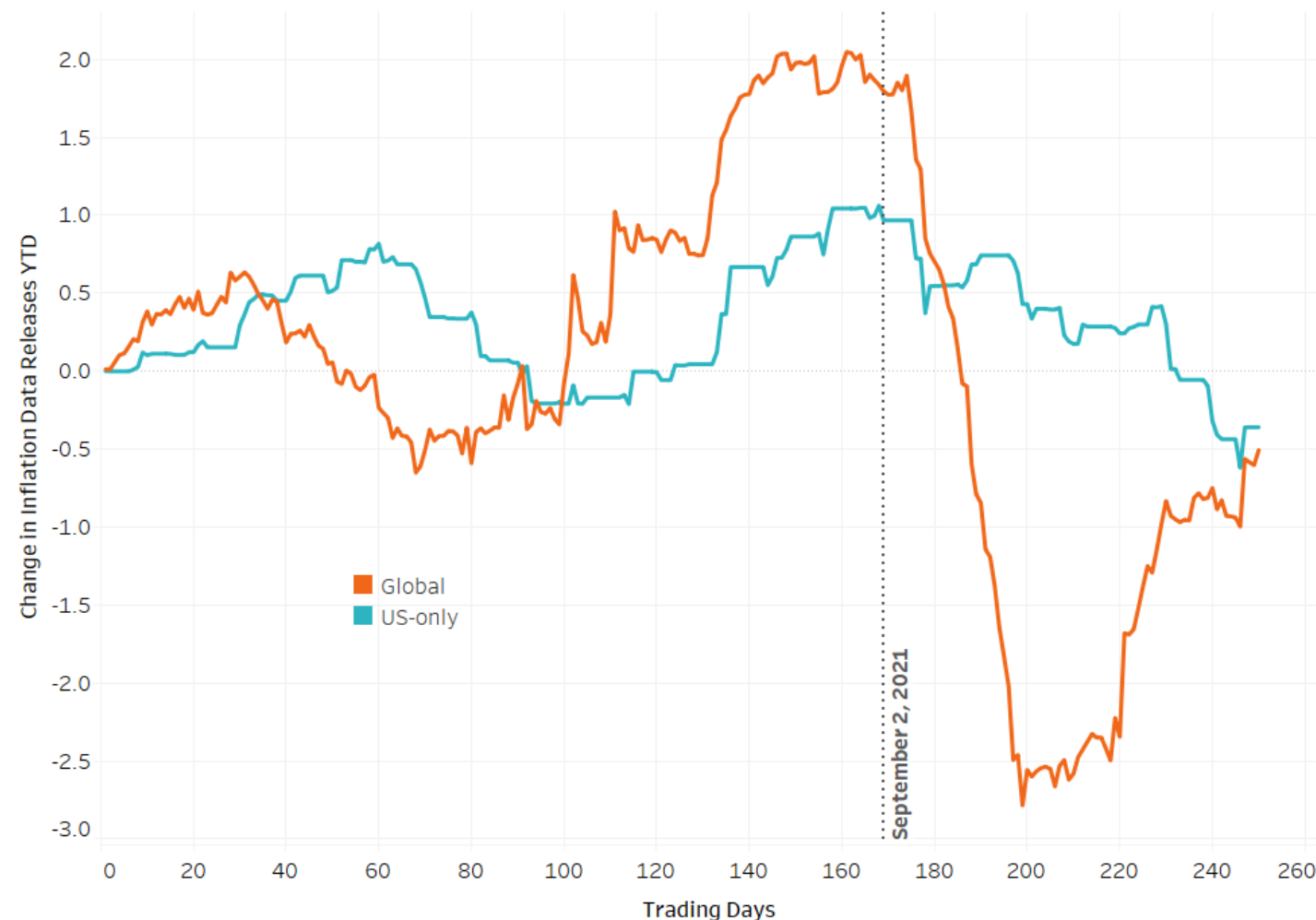
INFLATION SEASONALITY:

*Data Releases Have Routinely
Peaked in August/September*

Inflation Data Releases Often Lose Steam as Summer Ends

Median YTD change since 2003 in official inflation releases (e.g. CPI and PPI)

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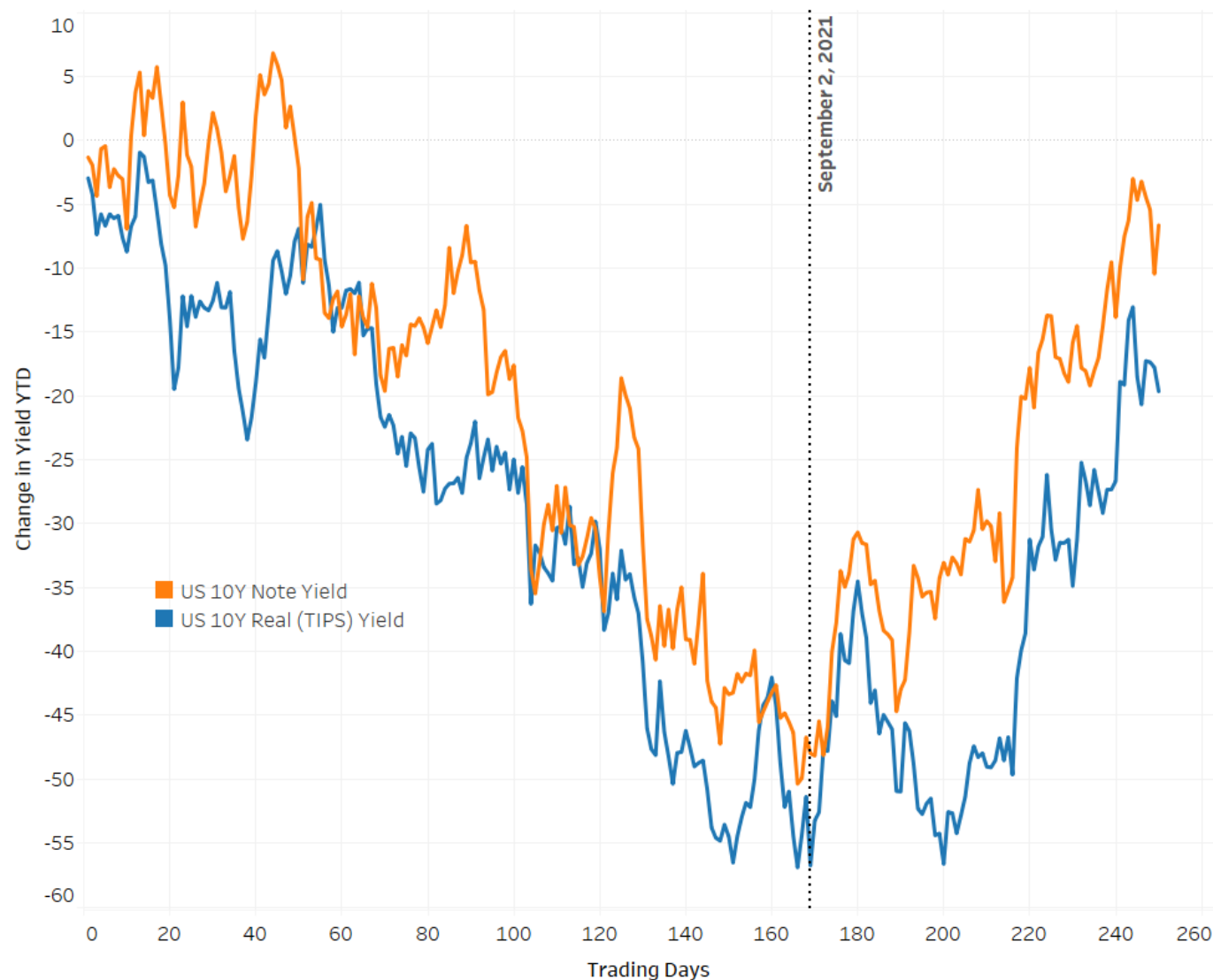
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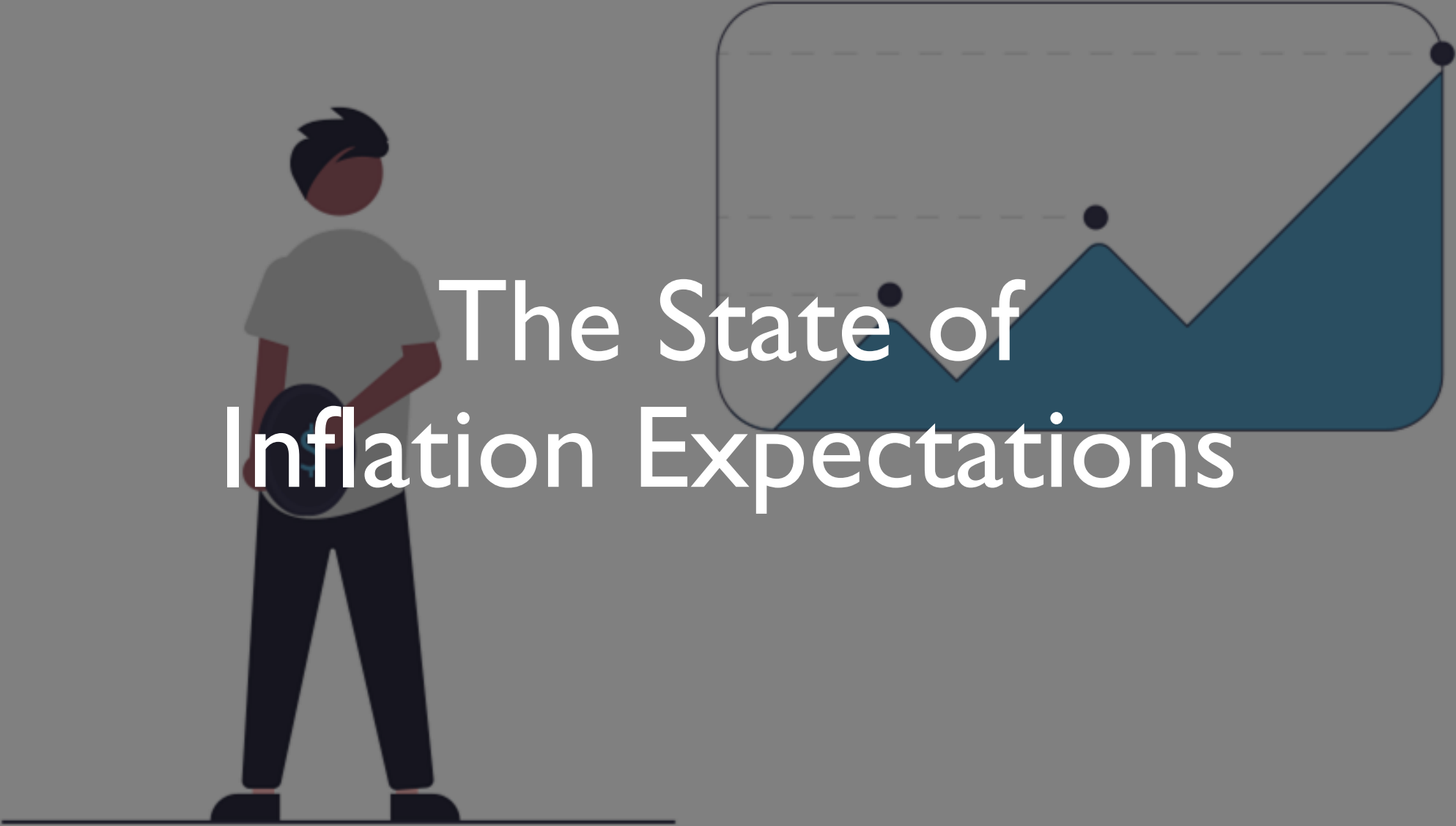
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US 10-YEAR YIELDS SEASONALITY: Nominal and Real Yields Lose Bullish Bias

US 10-Year Nominal and Real Yields Often Reversed Course in Early August Since GFC

Median YTD change since 2011



An illustration of a person with dark skin, wearing a grey t-shirt and dark pants, standing and looking at a large line graph. The graph is displayed on a screen or board and features a blue area under a line that fluctuates and then rises sharply. There are three black dots marking specific points on the line. The background is a solid grey color.

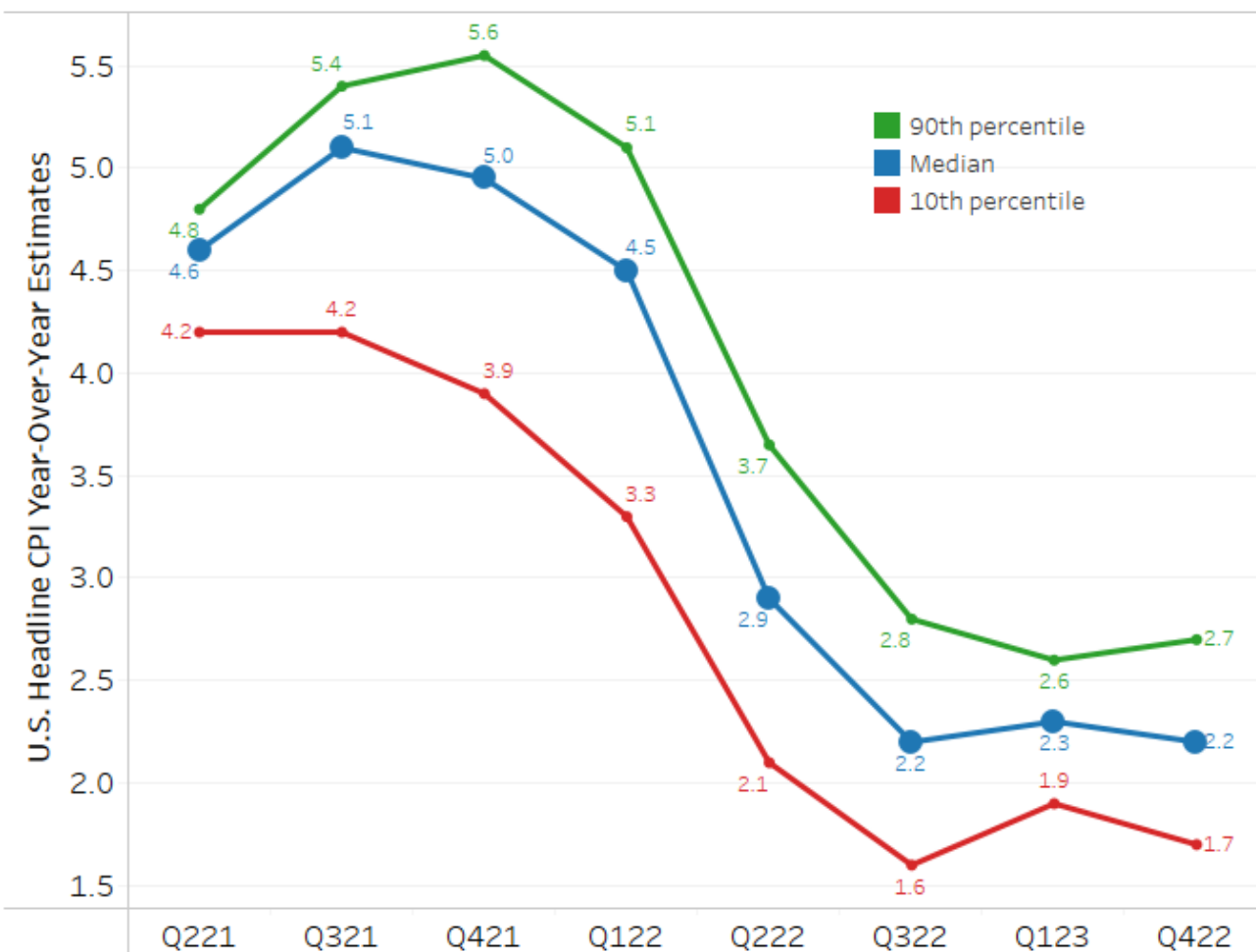
The State of Inflation Expectations

Economist Expectations

- Economists are bracing for ~5% YoY inflation through Q4 2021.
- Be aware the right-side tail is minimal with the 90th percentile at 5.6% YoY for Q4 2021.
- Headline CPI is not expected to drop back below 2.5% YoY until Q3 2022.

Economists Forecasting CPI >= 5% YoY Thru Q4 2021

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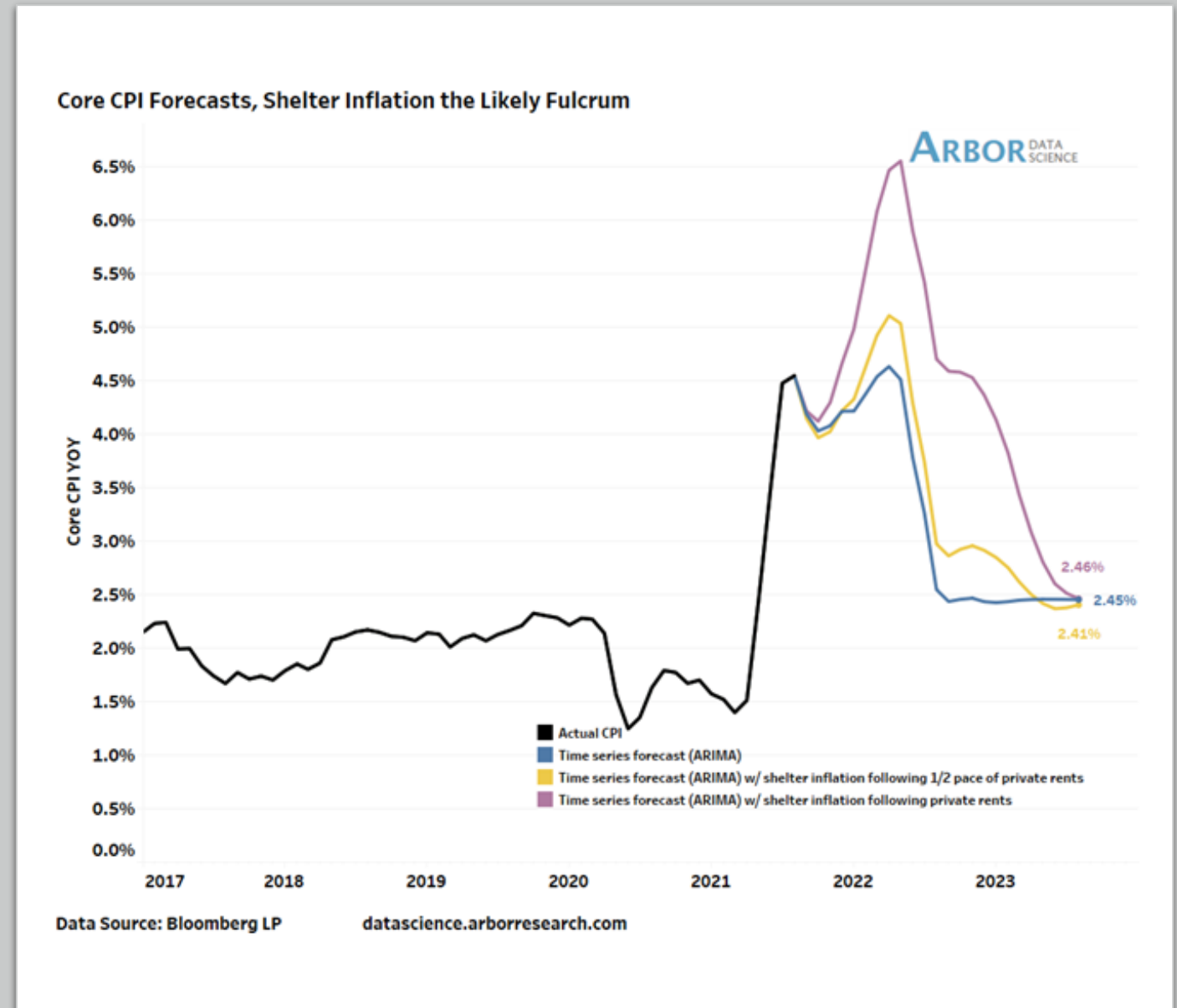


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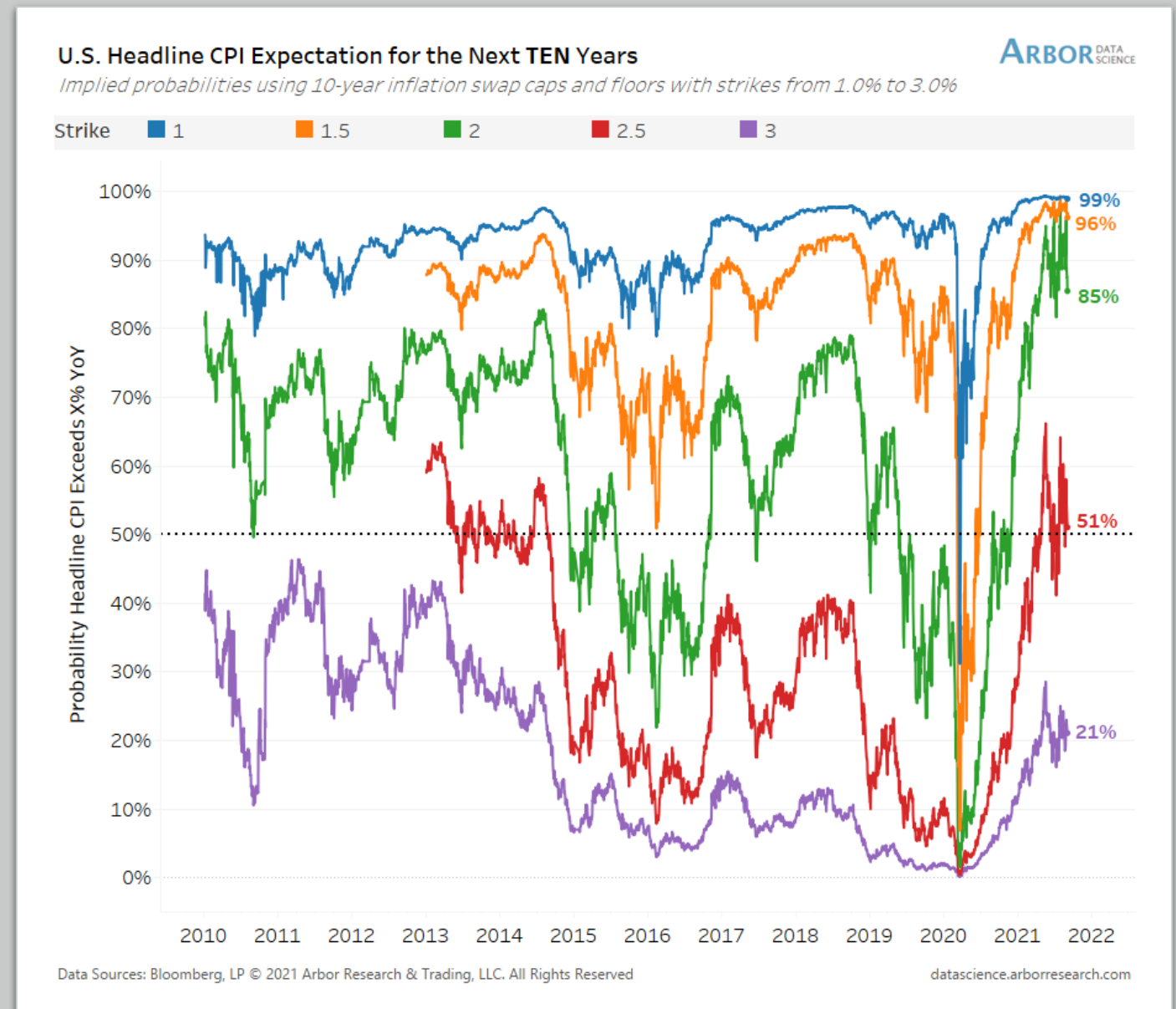
Shelter Inflation the Fulcrum

- We used plain-vanilla time series forecasts (ARIMA) for the major components of **core** CPI over the next 12 months as a baseline.
- In addition, we incorporate the growth of private rents (see Apartment List and Zillow on slide #32) to determine the potential path of **core** CPI. One series uses the full growth in private rents over the past six months, while the other runs at half speed. We allow private rent growth to recede beginning in January 2022.
- Assuming private rents show up one-for-one in CPI, then **core** inflation could run as high as 6.5% YoY in early 2022 and persist above economist expectations through late 2022.



US Inflation Expectations

- USD inflation swap caps and floors show investors remaining on the fence (50/50 chance) over 2.5+% YoY headline CPI.
- The 3.0% YoY strike remains a small concern further out the curve at a 21% probability. Investors are NOT emphatically pricing in a right-side tail, instead siding with team 'transitory.'
- Investors have seemingly created a narrow band for headline CPI between 2.0% and 3.0% YoY. All in all, certainty over this range is running oddly high!



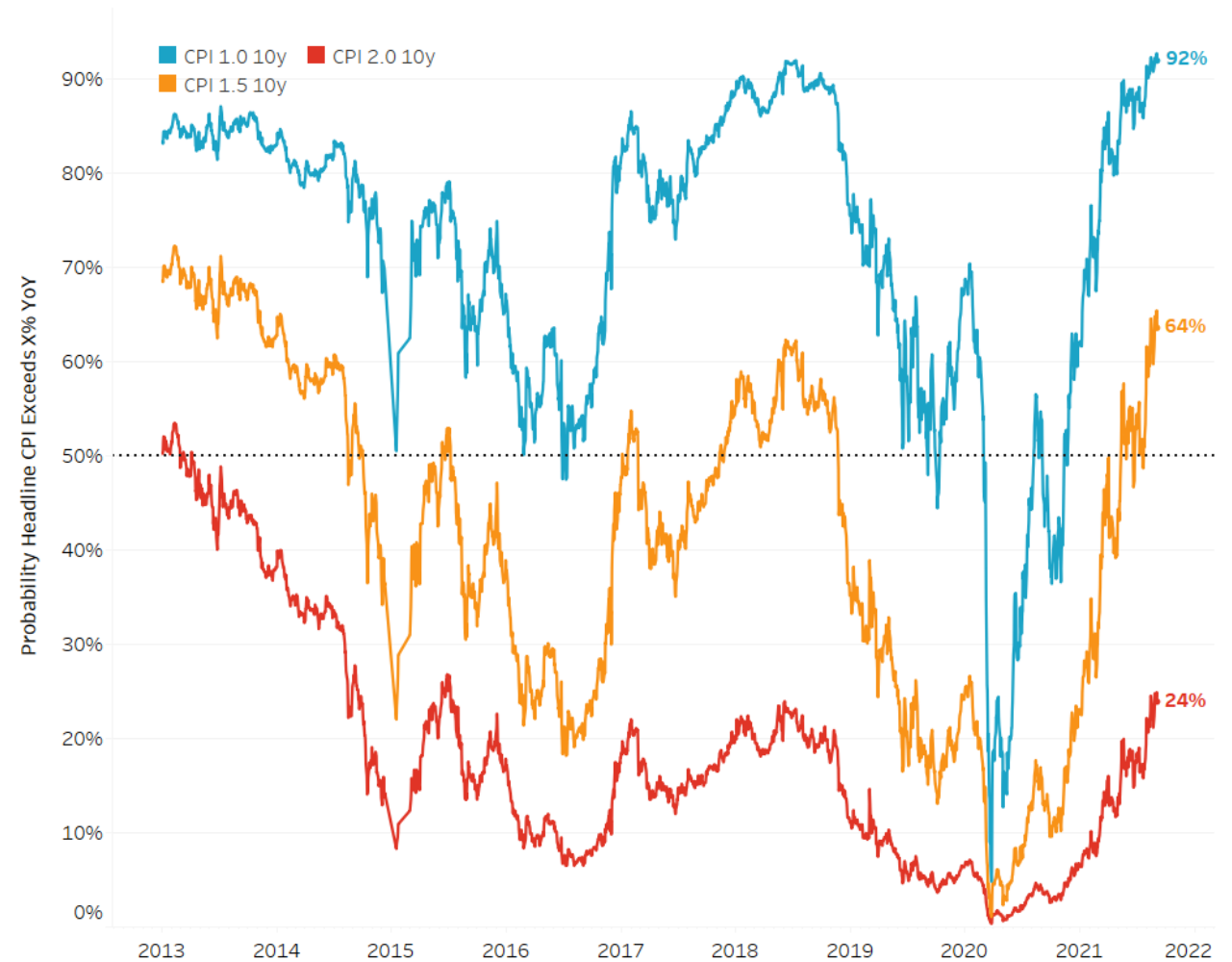
Eurozone Inflation Expectations

- EUR inflation swap caps and floors reveal improving expectations headline CPI can run at or above 1.5% YoY for the next five-plus years.
- The US / German 5-year inflation breakeven spread has been range bound since February (115-150 bps), but has potential to narrow with Germany playing catch-up. Remember this spread has averaged 85 bps since the financial crisis.

Eurozone Headline CPI Expectation for the Next TEN Years

Implied probabilities using 5-year inflation swap caps and floors with strikes from 1.0% to 2.0%

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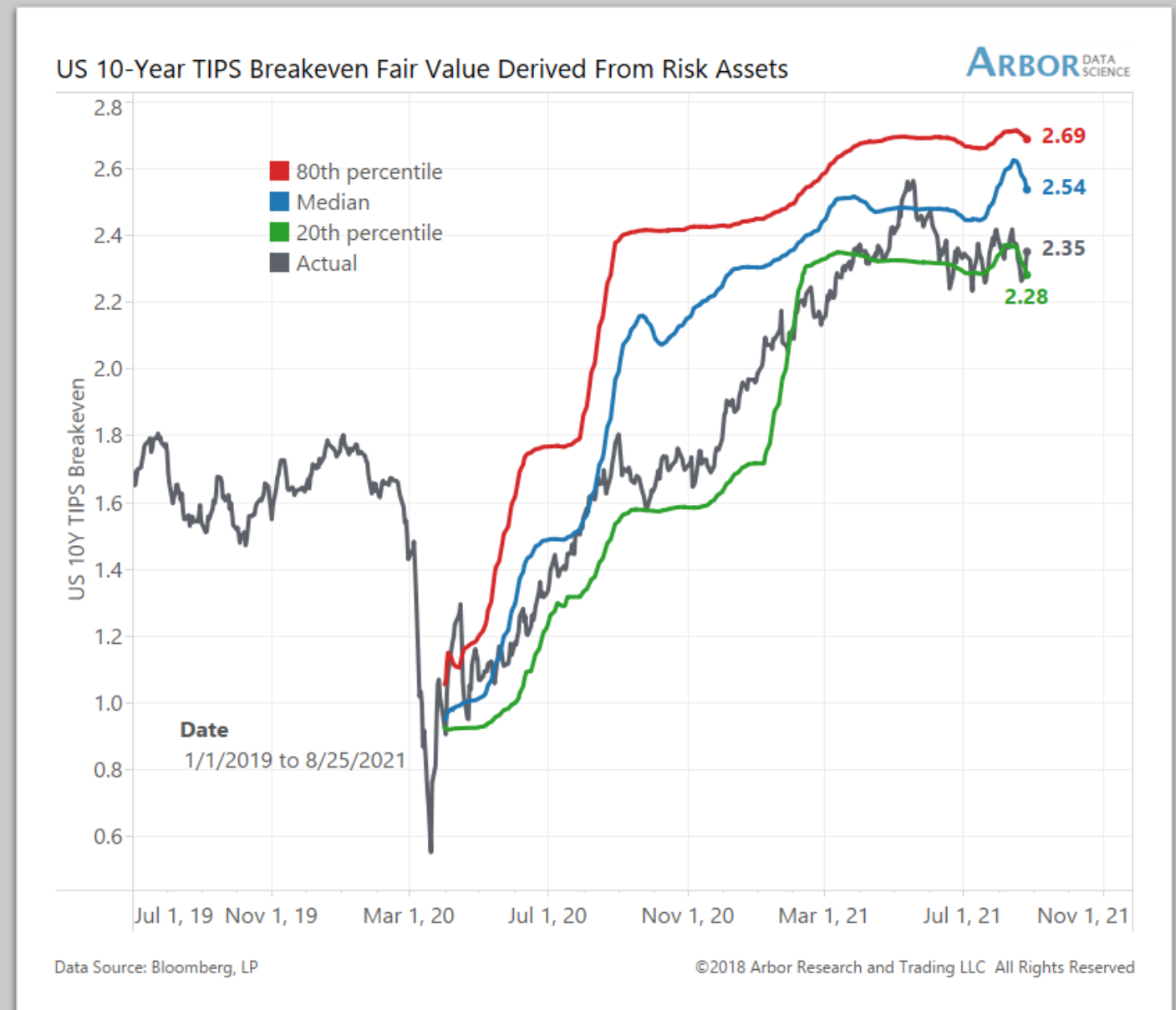


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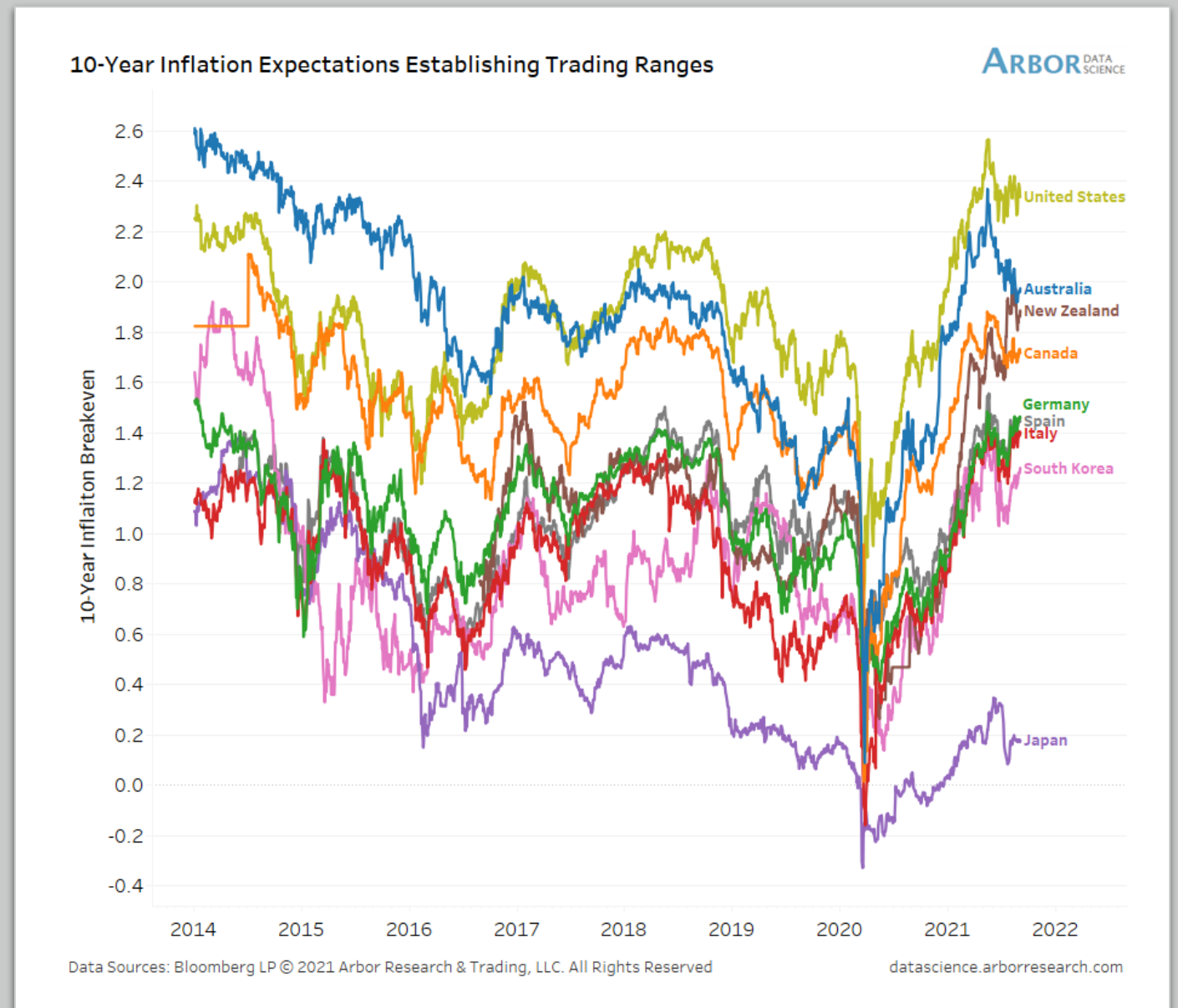
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TIPS Breakevens Deviating From Risk Asset-Based Fair Value

- Quantile regression forests (QRF) are used to estimate the median and 20th / 80th percentiles for each maturity.
- Inputs include WTI crude oil, industrial commodities, implied vol, liquidity, USD, rate hike timing, cyclicals vs non-cyclicals performance.
- US 10-year TIPS breakevens have fallen below the 20th percentile estimate at 228 bps with the median wider at 254 bps.



10Y Inflation Breakevens Establish Trading Range



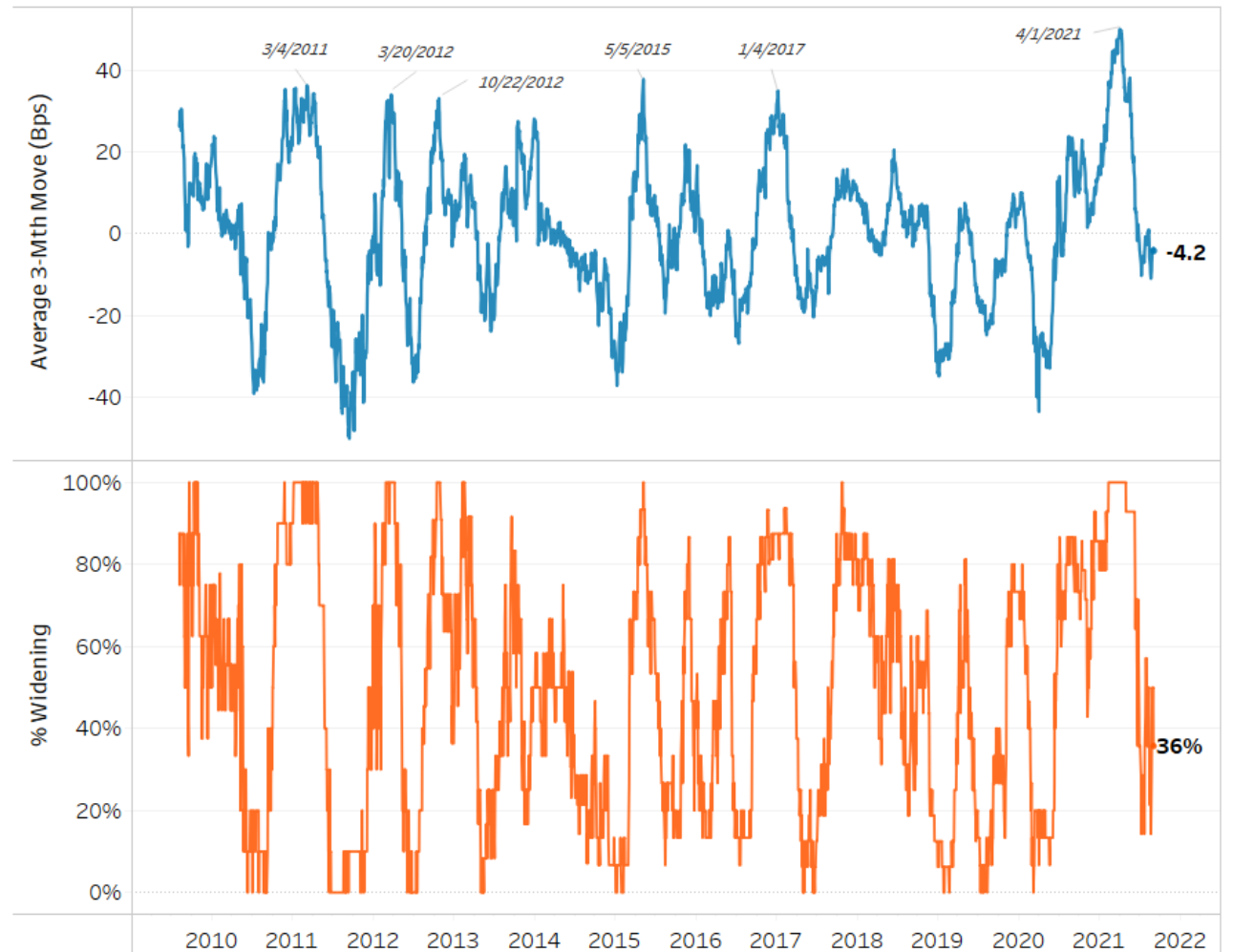
10Y Inflation Breakevens Again Lose Breadth

- The chart shows the rolling 3-month change in 10-year inflation breakevens for 14 economies has fallen by an average of -4.2 bps.
- Breadth is again faltering with only 36% of inflation expectations widening. Needless to say, the wind has come out of the inflation sails.

Global 10-Year Inflation Breakevens Again Lose Breadth

includes 14 economies from Australia to the U.S.

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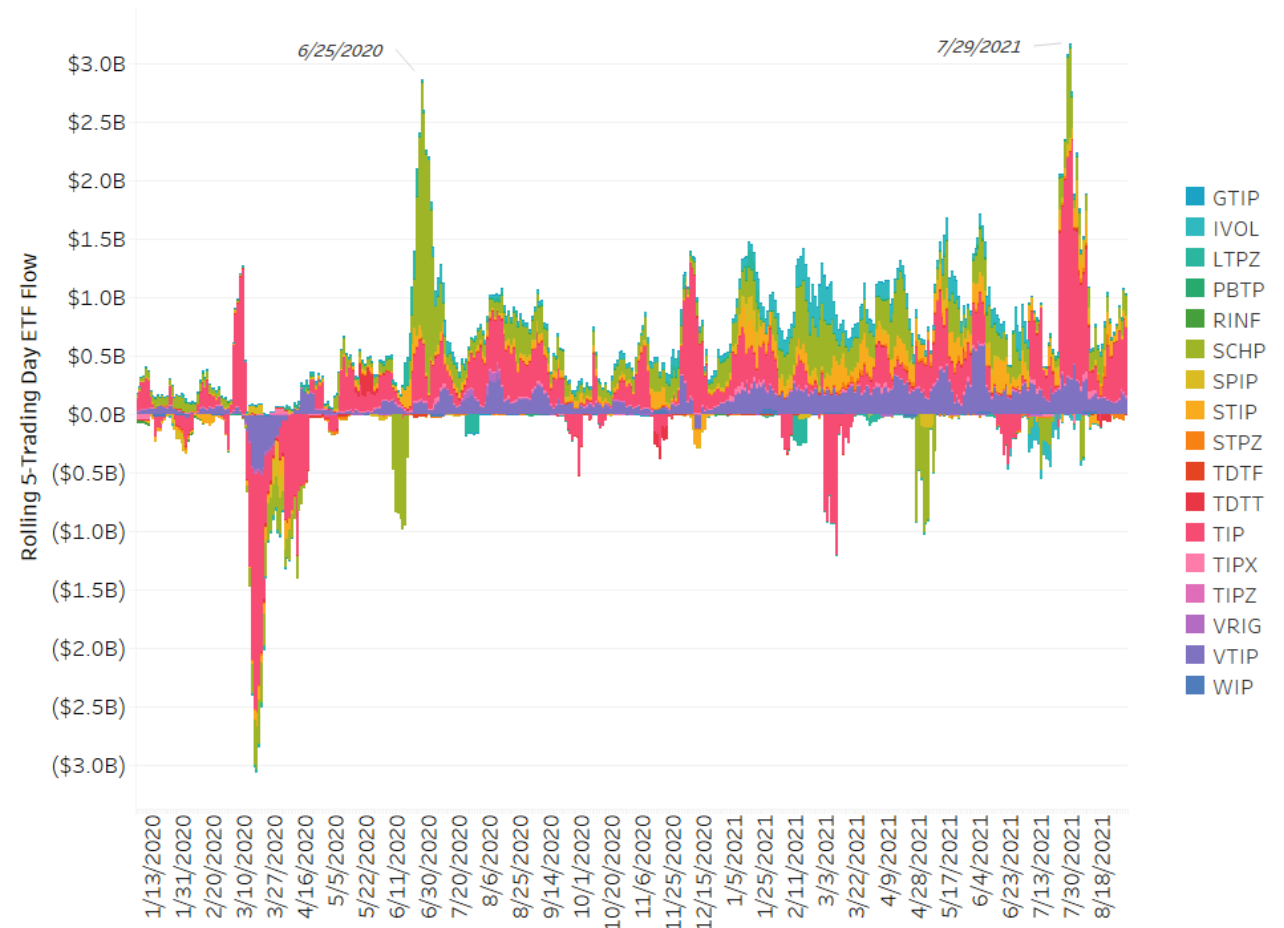
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TIPS ETF Demand Rises

- TIPS ETFs have seen rolling five-day in-flows build yet again, reaching a pace near \$1 billion.
- Nonetheless, flows are not being matched by a continued drop in real yields.

Investors Remain Committed to Inflation Protection

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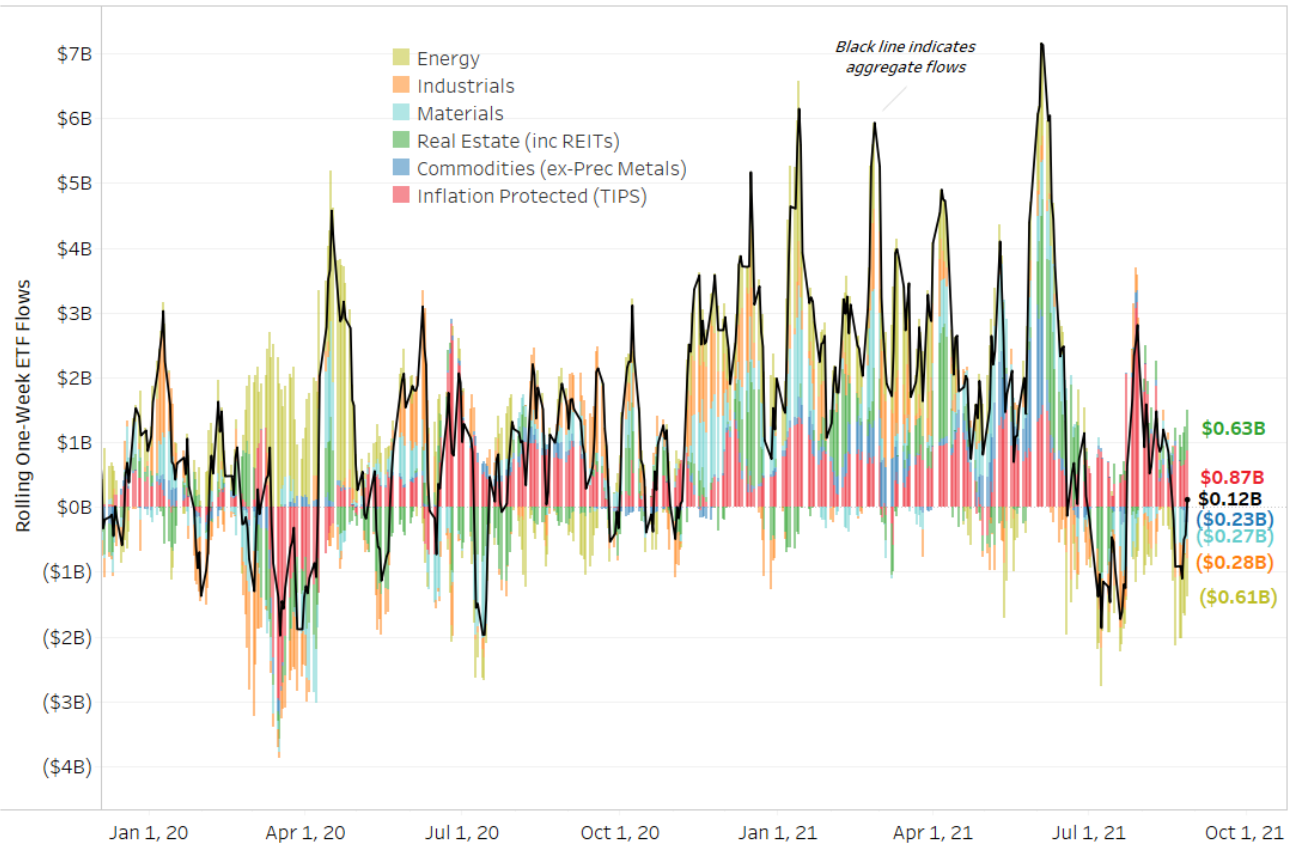
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Energy, Materials, and
Industrial Lose Ground,
While TIPS Demand Remains

Inflation-Friendly ETF Flows Lose Breadth

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Stagflation?! Nah



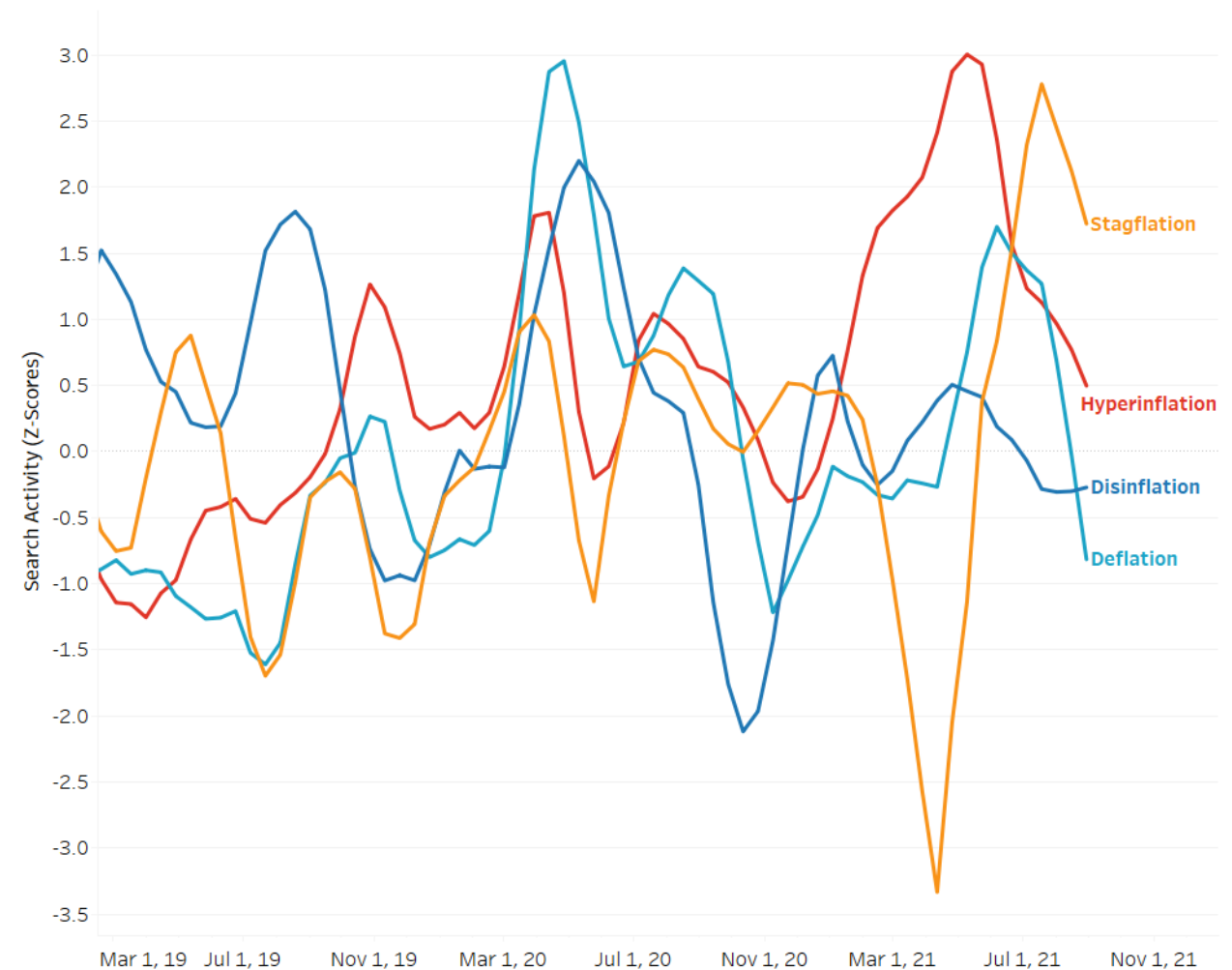
Stagflation Gaining Interest

- Fortunately, calls for stagflation have been limited among financial media. However some corners, namely so-called perma-bears, have brewed fears of slow growth and persistently high inflation (what's new right?!).
- Consumers' search activity reveals the concern may be real with the 'stagflation' topic frequent relative to the tails, deflation and hyperinflation. Shoppers have been quick to acknowledge apprehension over the prices of housing, large household durables, and vehicles.

What Type of Inflation is Coming?

U.S. seasonally-adjusted search activity by topic represented as z-scores for easier comparison

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Stagflation-Friendly Assets Bound to Lose Flows

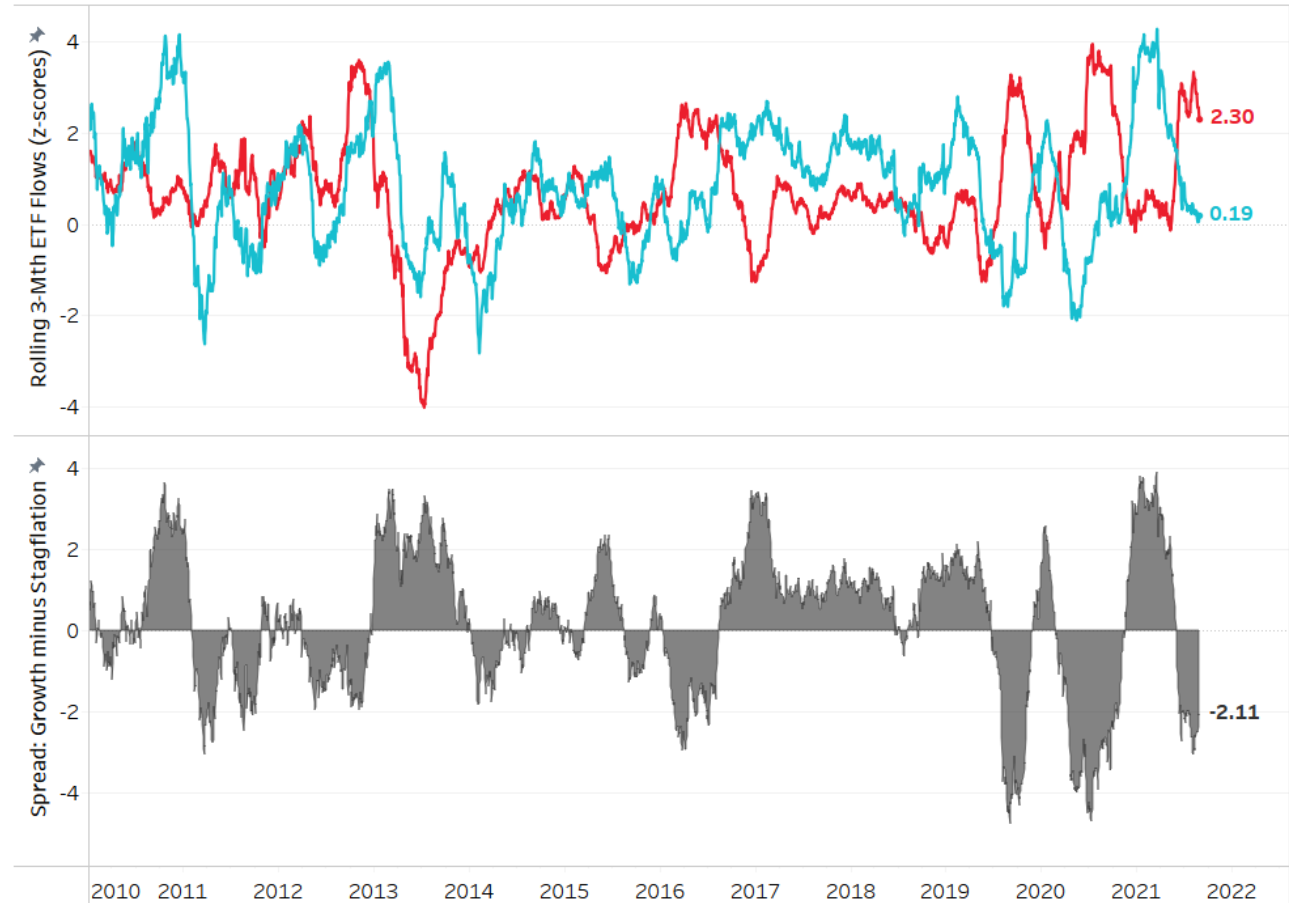
- Further signs of low growth and high inflation fears are present in investor flows. We created baskets of assets commonly referred to when discussing outlooks for strong economic growth versus stagflation. Stagflation assets include commodities, consumer staples, precious metals, real estate, and TIPS.
- Investors have sent sizable flows into these stagflation preferred assets, while avoiding the fringe of growth (e.g. small caps and emerging markets). Do note this gap favoring stagflation has reached an extreme, suggesting mean reversion and return to growth may not be that far down the road. In a similar vein, cyclicals are finally gaining flows relative to defensives in recent weeks.

Stagflation-Friendly Assets Gaining Flows Over Growth

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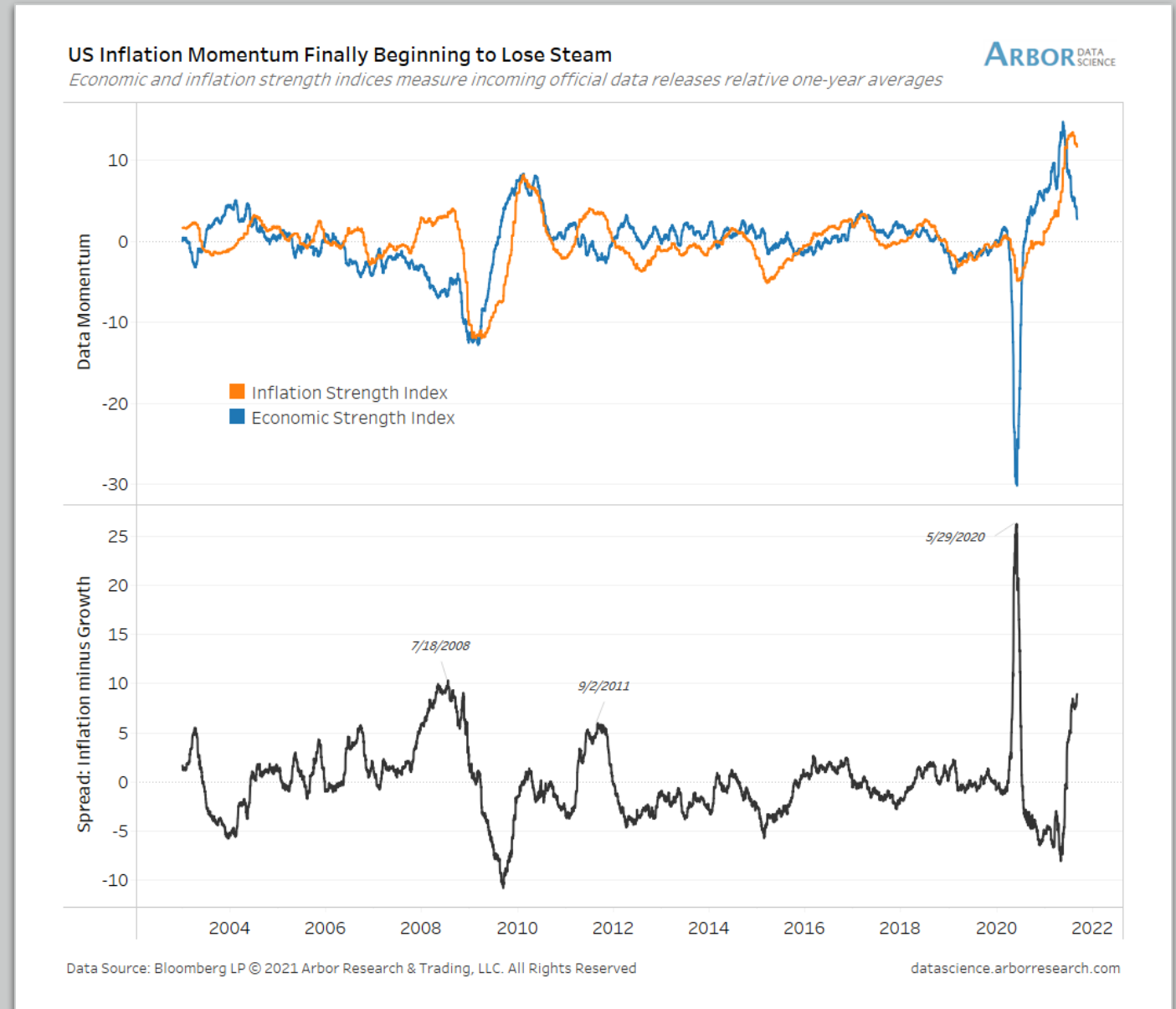
Stagflation = commodities, consumer staples, precious metals, real estate, TIPS

Growth = consumer discretionary, small caps and emerging market equities



Inflation Momentum to Cool

- The chart below shows the momentum behind US economic and inflation data releases as they come in relative to one-year average growth rates.
- The mere fact inflation is lingering just long enough while economic growth decelerates from its breakneck pace offers room for fearmongering. However the momentum behind inflation is now also rolling over.
- Remember jobs and inflation habitually lag other economic data including confidence, manufacturing, and more.



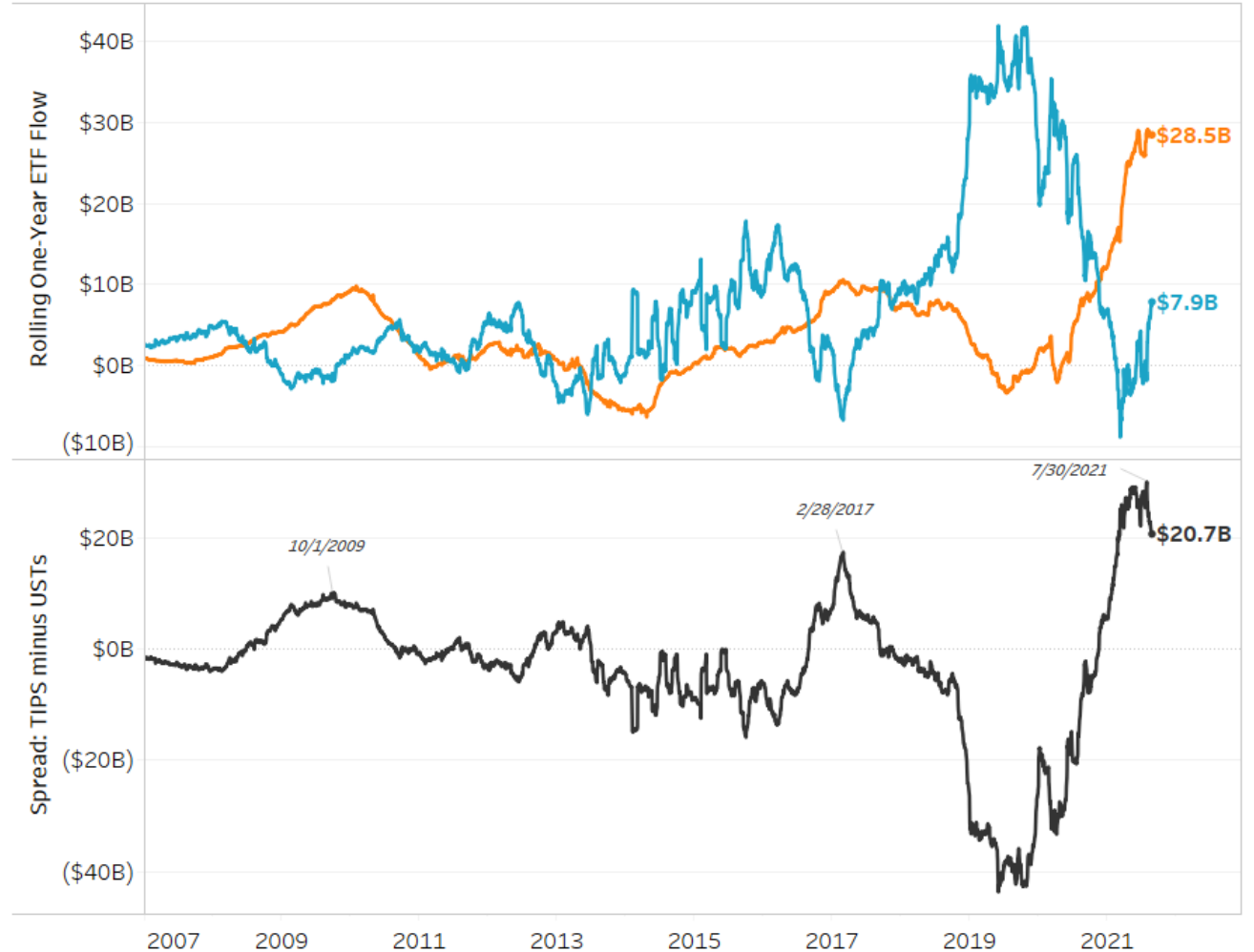
Peak TIPS Dominance?

- TIPS have been making waves with record in-flows despite confusing inflation releases (e.g. CPI vs PPI) and ultra-low real yields. We can mostly thank the hefty accrual during what has been quite low volatility.
- However when assessing the demand for TIPS relative to US Treasuries outside the ultra-short-end of the curve, we find signs inflation fears are again tempering. The chart below shows the spread between rolling one-year flows into TIPS minus nominal US Treasury ETFs. Plain-vanilla nominals have finally gained some demand relative to hot-hot TIPS.

TIPS Dominance Over Nominal USTs Coming to an End?

Rolling one-year ETF flows for maturities > 2 years

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A stylized background illustration featuring a dark blue ship with a yellow sun in the upper left and a small bird in the upper center. The ship has a red, blue, and green striped section on its upper deck. The water is represented by blue waves at the bottom.

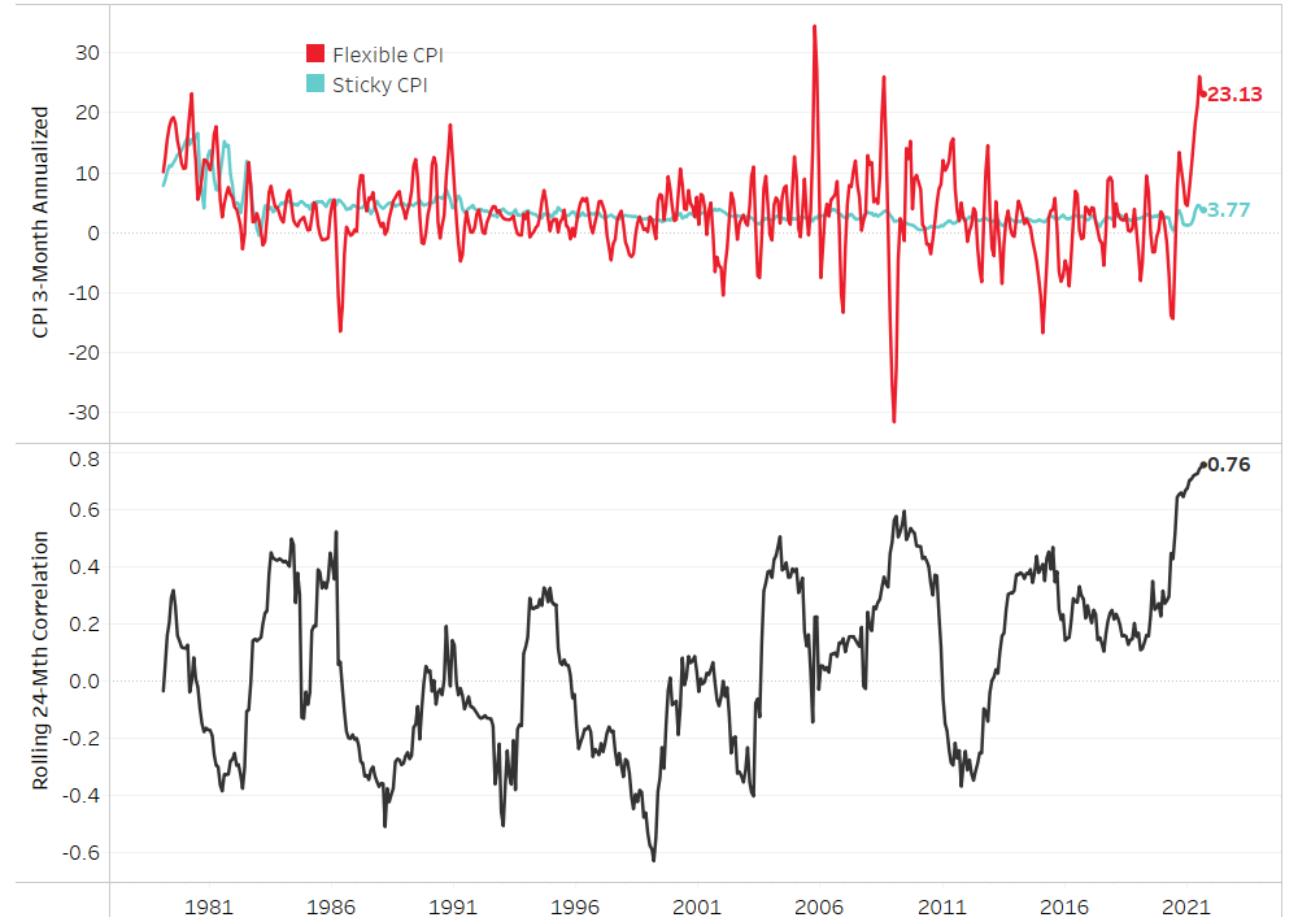
Team Transitory Has Won the Battle, but Not the Inflation War

Flexible and Sticky CPI Oddly Align

- Flexible CPI is set to recede over the months to come. However sticky CPI have been exceptionally positively correlated with flexible CPI through the pandemic.
- High correlation between flexible and sticky prices suggests the pandemic is not creating one-off jumps in inflation.
- We need to see this correlation quickly abate to keep #teamtransitory in control of the debate.

Flexible and Sticky CPI Seeing Record High Correlation

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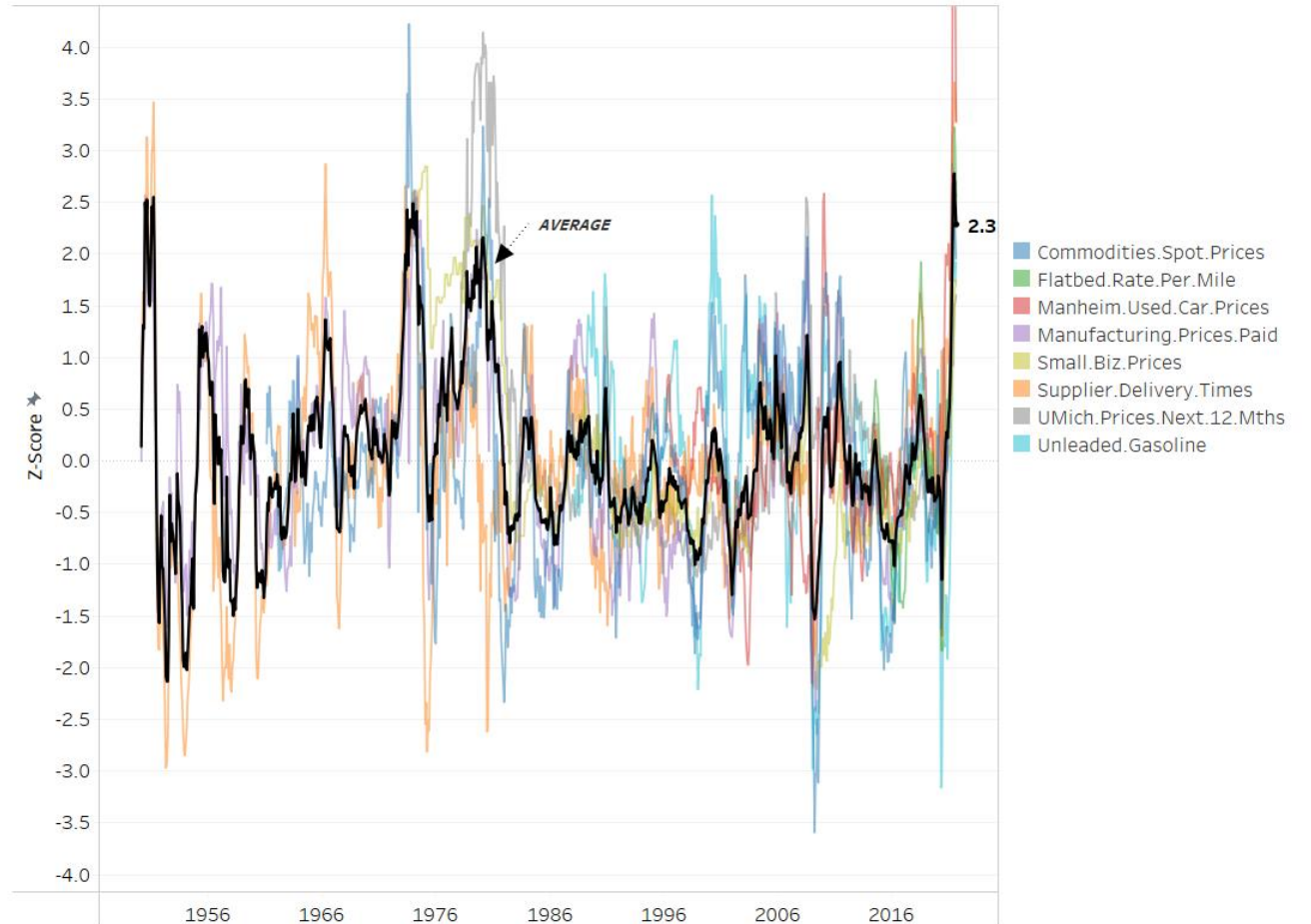
Nearly All of the Most Watched Inflation Measures Peaked Between May and July

- The chart shows the average z-score across these measures peaking at the highest level on record looking back to the 1960.
- Supplier deliver times and prices paid are retreating, along with the costs of delivering goods via flatbed within the US.
- We fully expect these measures to recede, while rents and wages build. As we have been saying, let the confusion continue!

US Prices Peaked Between May and July 2021

Aggregate of most heavily watched markets and surveys surrounding the transitory debate

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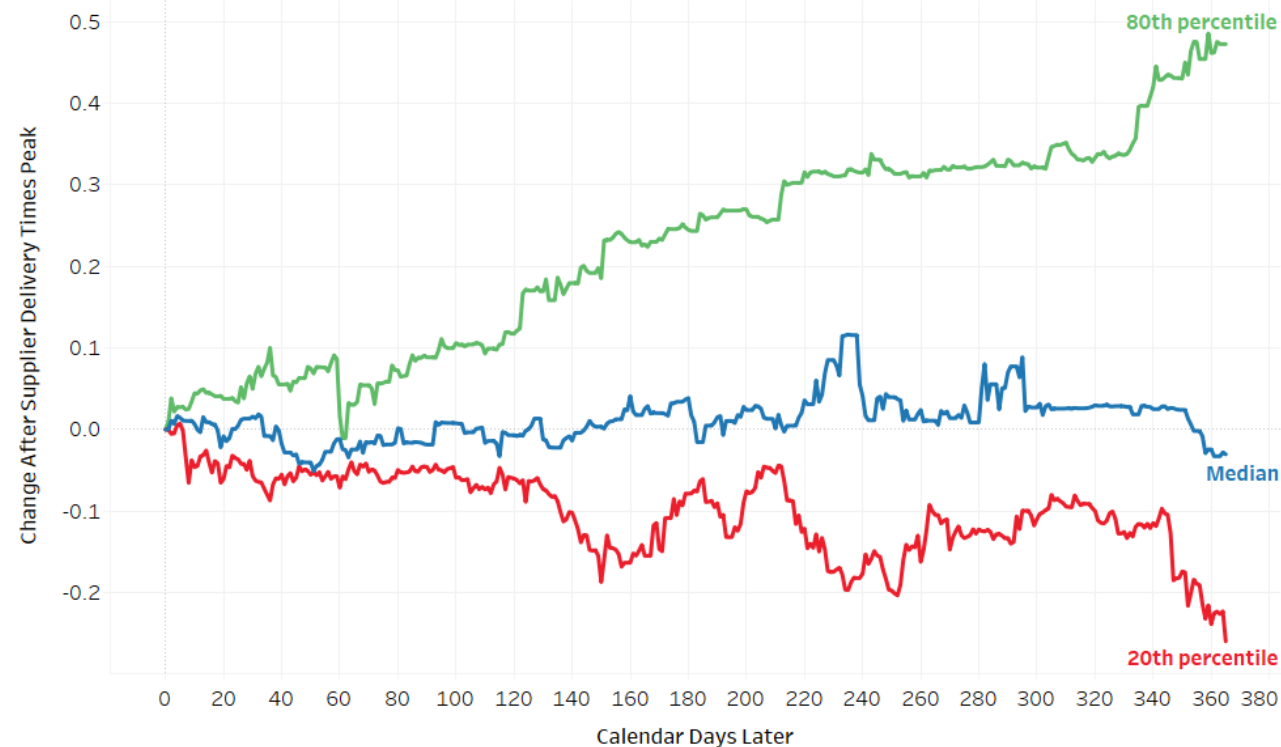
Delivery Times Peaking Suggests Range-Bound Inflation Expectations

- We ran a query for market reactions after supplier delivery times peaked at least one standard deviation above average. Six instances were found since 1960, helping produce the data to the right. The overwhelming conclusion is investors should prepare for range-bound trading across risk and safe assets.
- US 10-year TIPS breakevens (i.e. inflation expectations) saw sideways action and a moderate right-side tail. Note we simulate TIPS breakeven prior to 2000 using gold, silver, headline inflation, nominal yields, and more.

US 10Y TIPS Breakeven Changes After Supplier Delivery Times Peak

Peaks in supplier delivery time surveys +1 st dev above average since 1960

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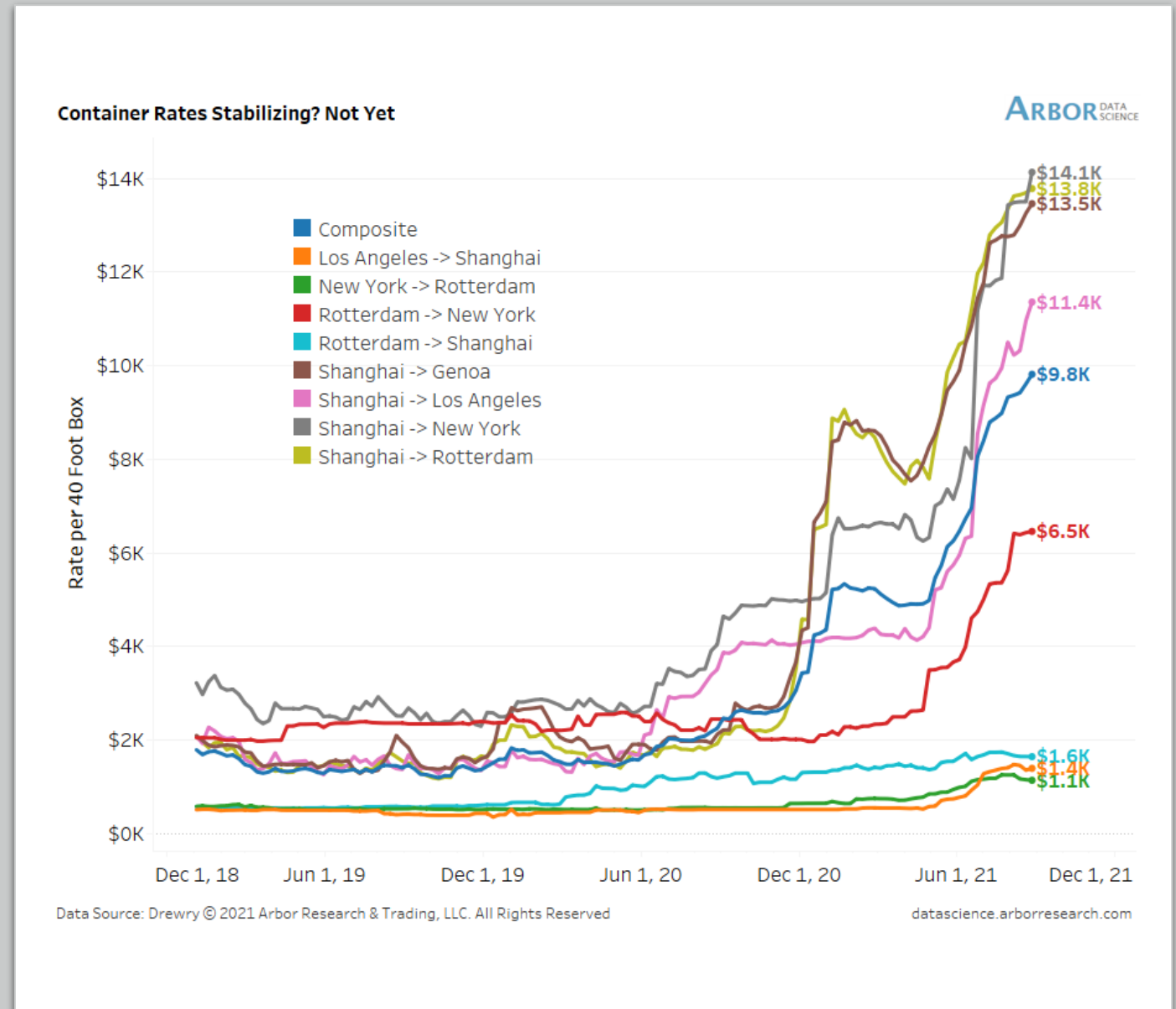


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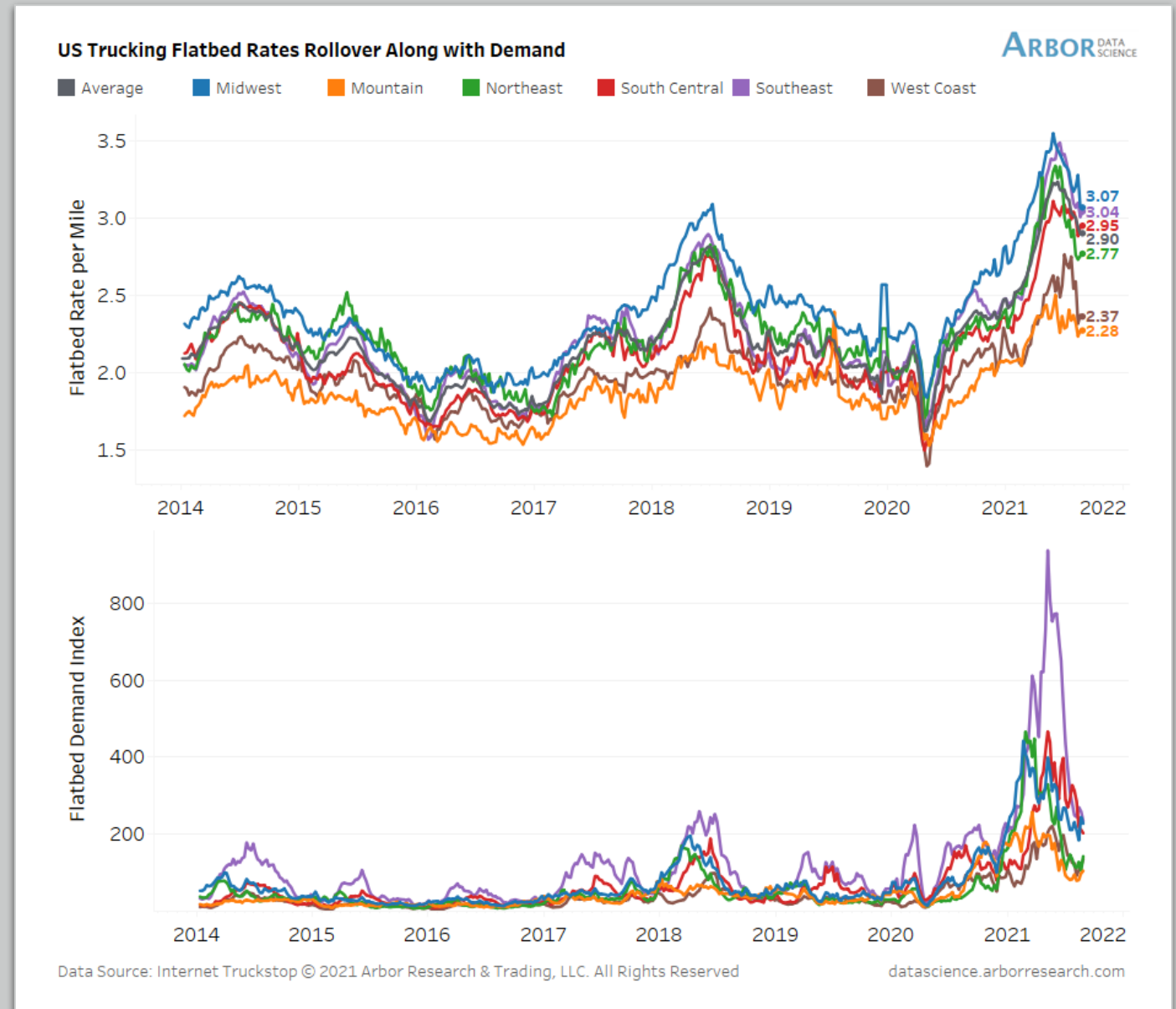
Container Rates Set to Lose Steam?!

- Getting goods from China to Europe and the US remains exceptionally expensive.
- The Meishan terminal at the Ningbo port has reopened, meaning delays would persist only through early September.
- We continue to believe container rates will be a coincidental or lagging indicator.



Trucking Rates Cool Along With Demand

- Drivers remain difficult to find, but the cost of shipping goods within the US via flatbed trucks has also moderated since early June.
- Truckstop.com indicates market demand for these flatbeds has also receded from incredibly lofty heights.
- The average rate per mile has dropped to \$2.90 from the peak at \$3.24 with much further to go assuming mean reversion.



An illustration of a city street scene. In the background, there are several grey buildings of varying heights. In the foreground, there are two large, stylized green trees with dark trunks. Between the trees, two people are walking on a dark path. The person on the left is wearing a blue shirt and dark pants. The person on the right is wearing a dark jacket and dark pants. Above the people, there are two blue squares, each with a green checkmark inside. The title "Rents Just Beginning to Get Spicy" is written in white text across the center of the image.

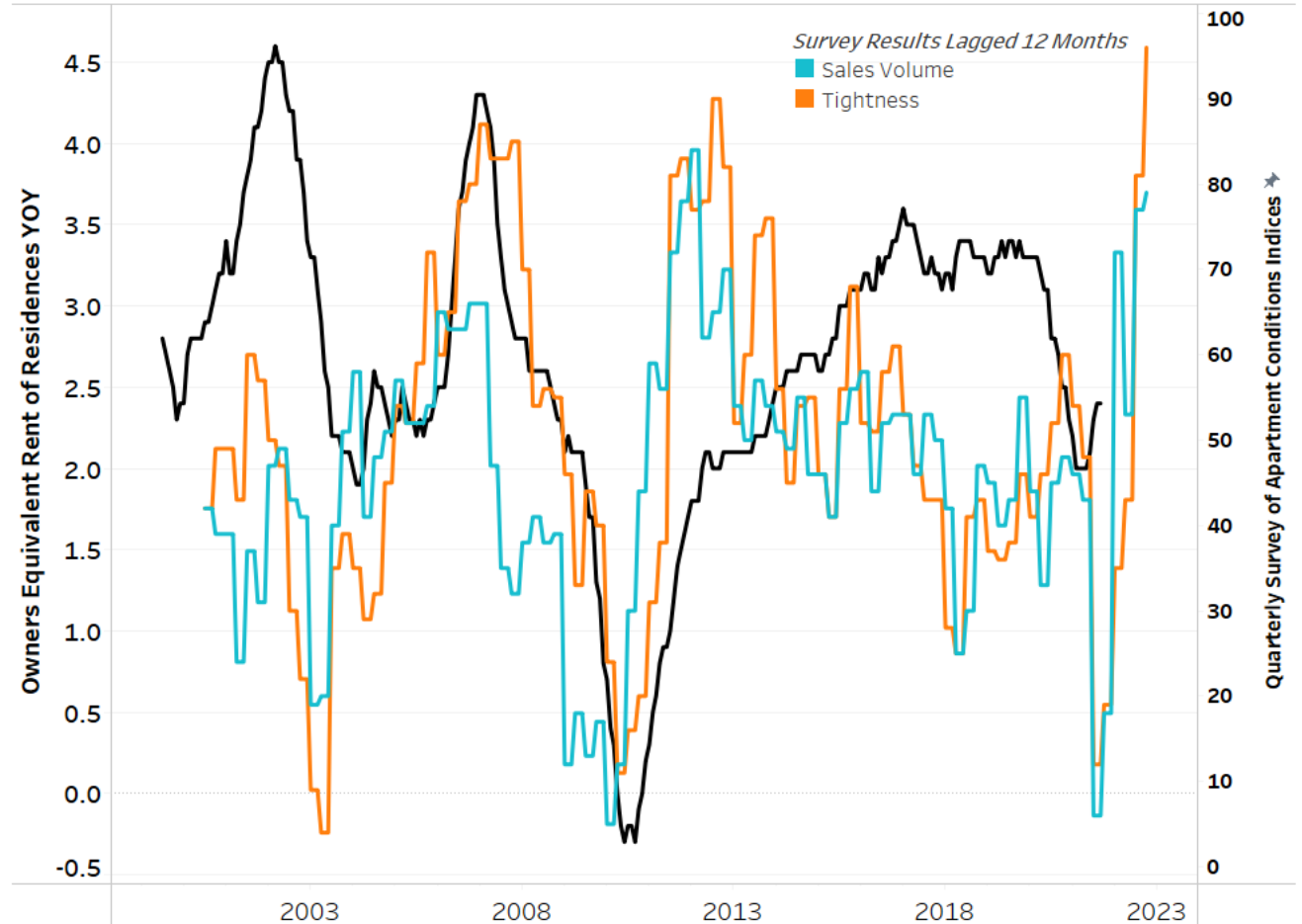
Rents Just Beginning to Get Spicy

Apartment Rentals Heat Up According to Surveys

- The National Multifamily Housing Council's (NMHC) survey revealed greatly accelerating paces of sales and tightness through Q2 2021.
- Both surveys have habitually led the owners equivalent rent (OER) by roughly 12 months, suggesting 3.5+% YoY gains should persist well into 2022.

U.S. Apartment Market Rebounding From Extremely Loose Conditions

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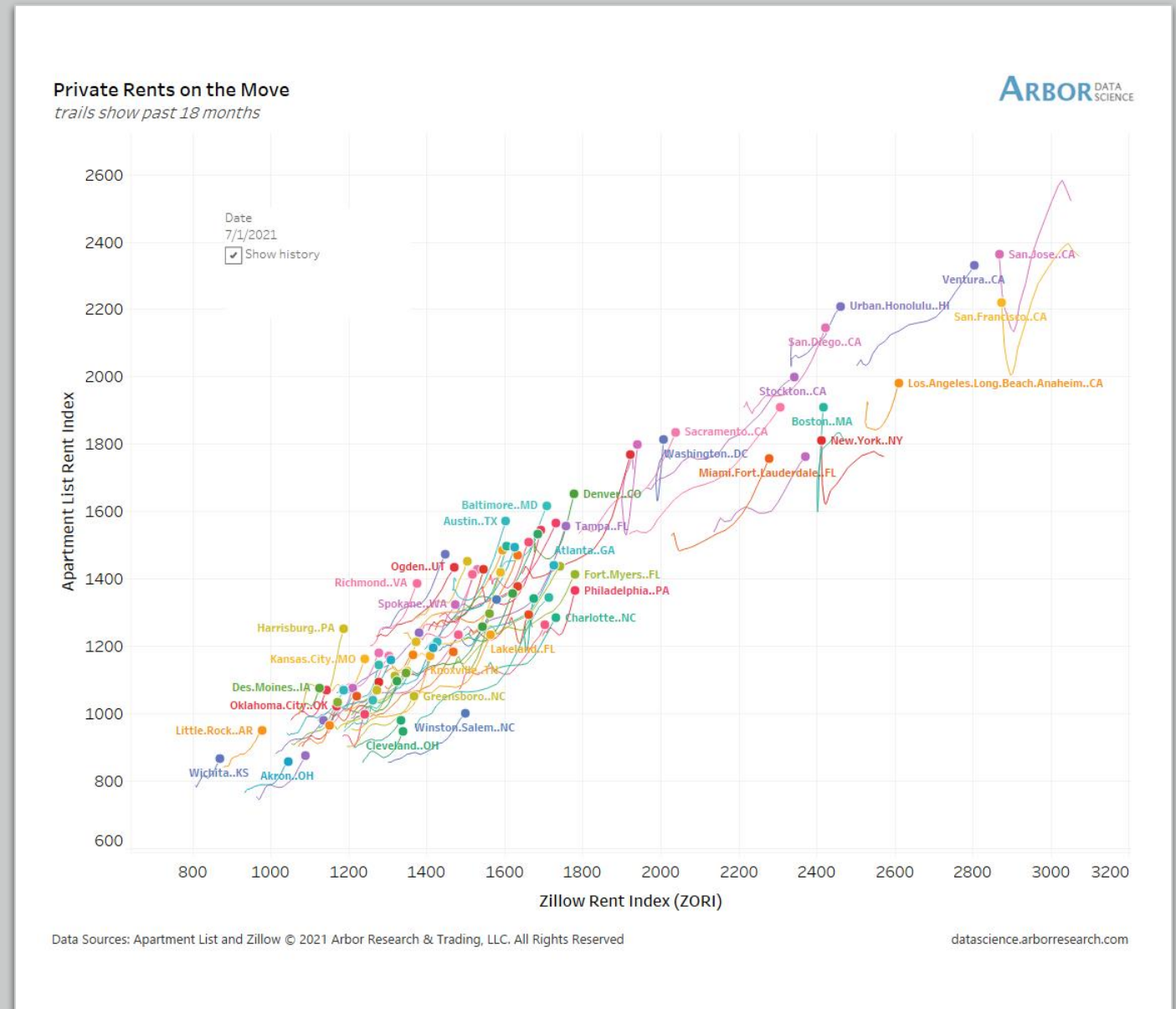


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Rising Rents Ubiquitous Across Metros

- The chart compares YoY changes in Zillow and Apartment List rent estimates through July 2021.
- All metros have accelerated in recent months with behemoths like Chicago, NYC, and San Francisco greatly rounding the corner.
- Shelter inflation is clearly here, the question is for how long.



Apartment List and Zillow Rent Estimates Imply Big Rent Growth

- Rent estimates have a limit history from Apartment List and Zillow, which also have very different methods (e.g. collected vs asking rents).
- Nonetheless, lagging the six-month average of both data sets seemingly matches the slower moving OER.
- Private rents indicate OER could reside between 6.0% to 7.6% YoY by early 2022.

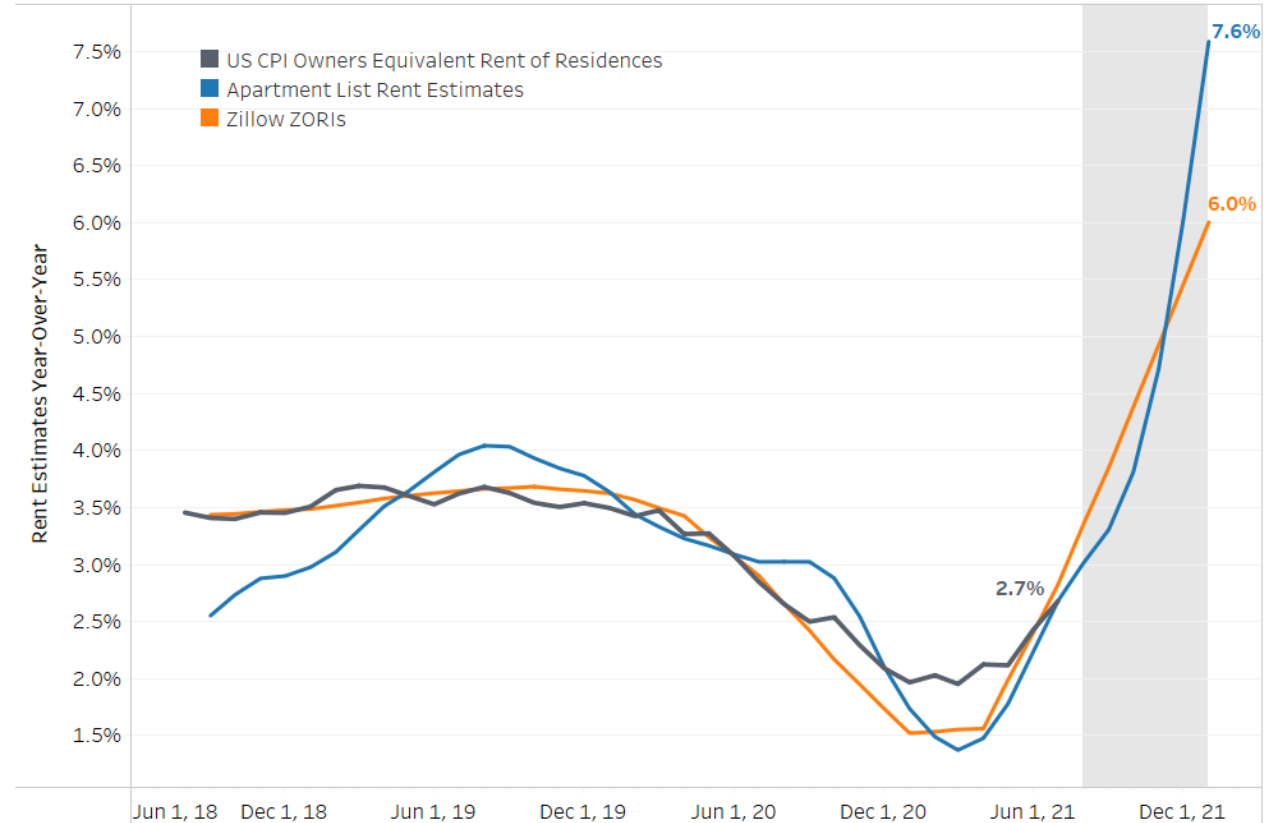
Owners Equivalent Rent of Residences Set to Jump Into Year-End

US CPI OER = mean across core 23 metros

Apartment List = mean of 40th-60th percentile estimates across core 23 metros, lagged 6 months

Zillow = mean across core 23 metros, lagged 6 months

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Data Sources: Apartment List, BLS, and Zillow © 2021 Arbor Research & Trading, LLC. All Rights Reserved

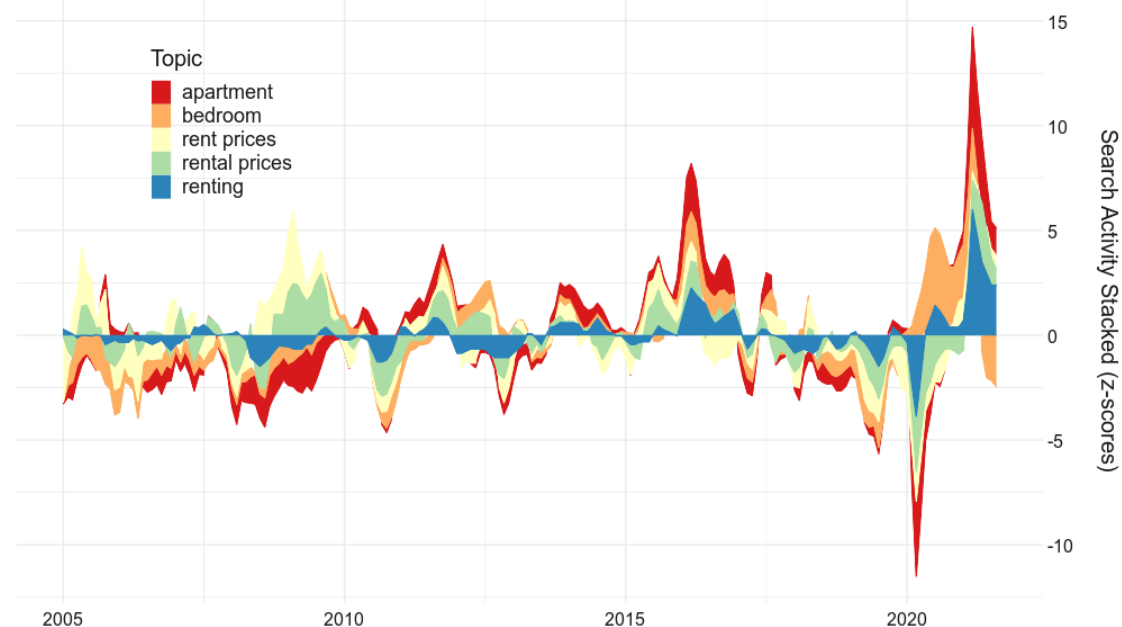
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Rent Searches Slow, but Outlook Remains Optimistic

- Rent-favorable Google searches subsided for the third month in August, but remain quite healthy.
- Searches for bankruptcy to unemployment benefits have consistently diminished.
- We are watching favorable searches very closely as they tend to lead private rents by one to three months. Falling search activity (sub-zero z-score) would suggest shelter inflation (OER) would peak approximately 7 to 10 months ahead.

Favorable Rent-Related Searches Subside, but Remain Strong

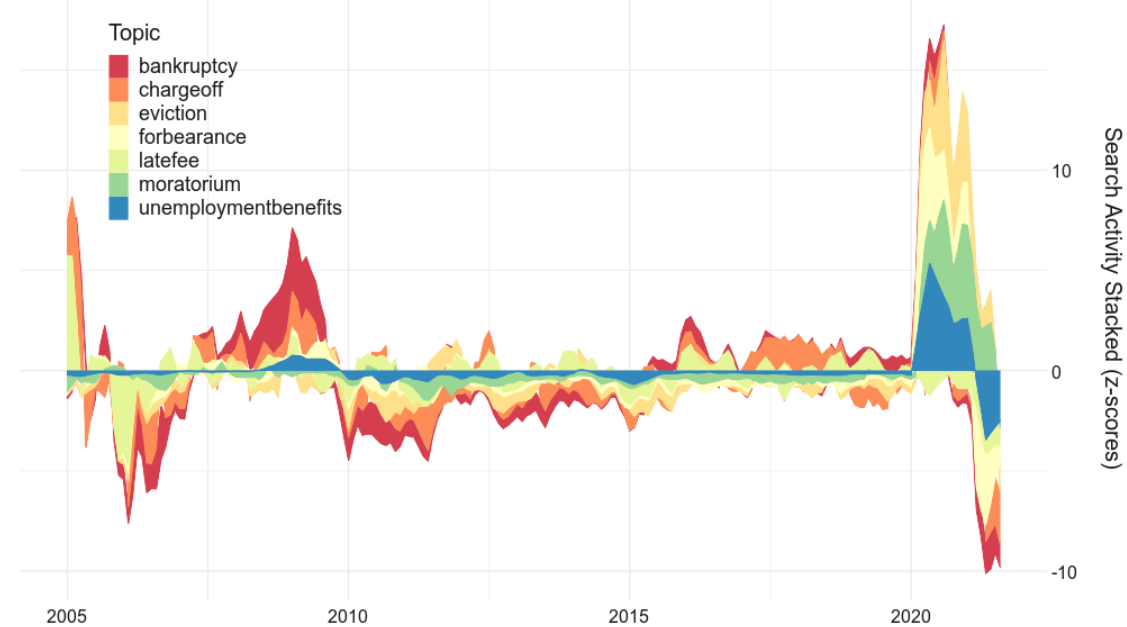
Seasonally-adjusted U.S.-based Google searches by topic



Data Source: Google Trends datascience.arborresearch.com

Unfavorable Rent-Related Searches Remain Scant

Seasonally-adjusted U.S.-based Google searches by topic



Data Source: Google Trends datascience.arborresearch.com

Commodities and Yields Were Destined to Enter Trading Ranges



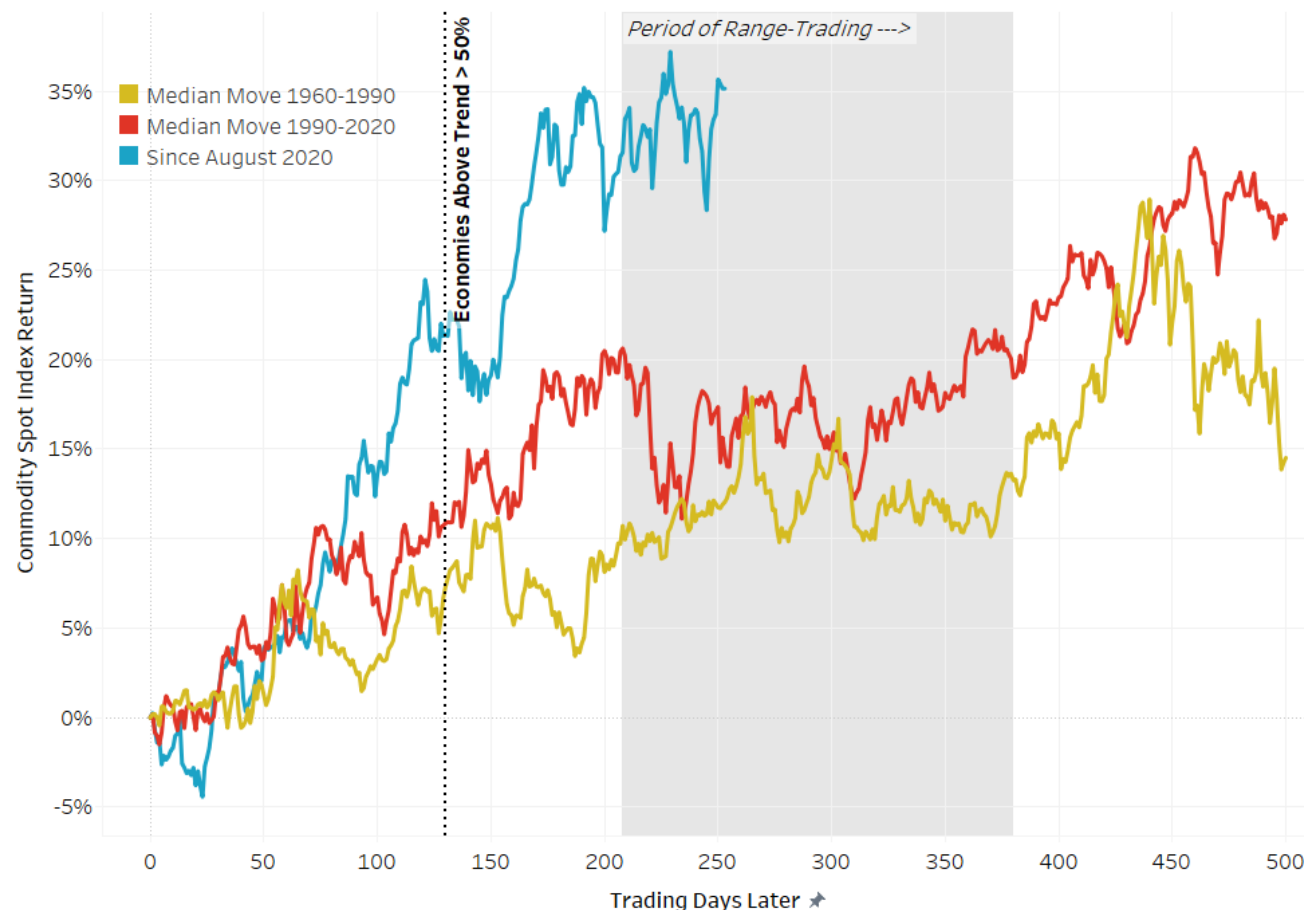
Commodities to Enter the Chop

- The chart shows spot commodity prices' average returns for two periods: 1960-1990 and 1990-2020.
- Commodities habitually enter trading ranges over the ensuing six months before recommencing bull trends.
- Again, the phase of a ubiquitous commodity rally is likely behind us. Past inflation regimes of strong, widespread commodity growth likely will not occur this time around.

Commodities as a Whole Enter a Trading Range at This Point in Recovery

% of economies (38 in total) producing above trend composite leading indicators rises above 50%

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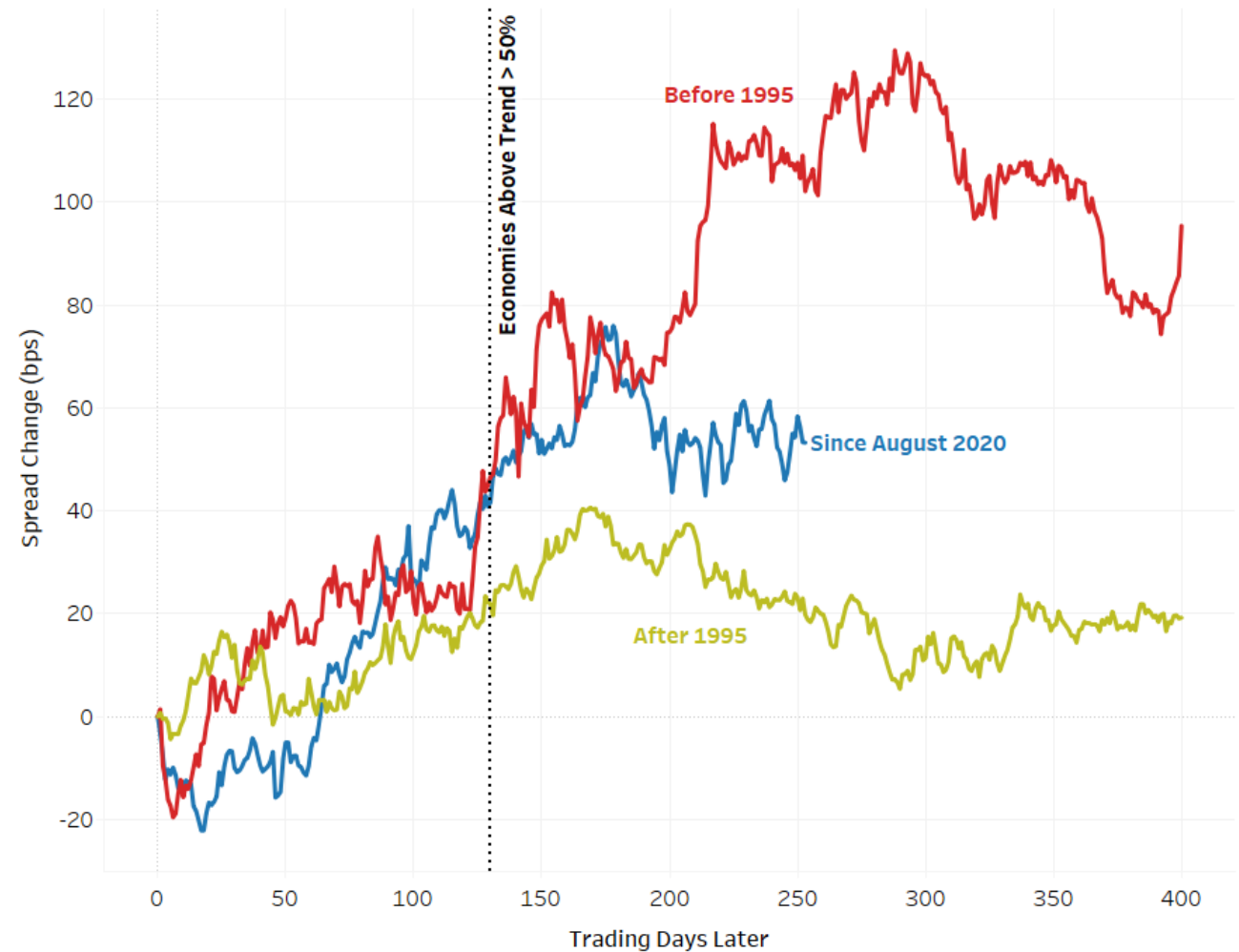
Which Path Will Inflation Expectations Follow?!

- The next chart breaks apart past global recoveries into the pre and post-1995 periods.
- US 10-year TIPS breakevens have recently deviated from the average widening seen pre-1995. Nonetheless, both periods saw trading ranges to moderate narrowing over the months ahead.

U.S. 10Y TIPS Breakevens: Reaction to Global Recoveries Since 1960

% of economies (38 in total) producing above trend composite leading indicators rises above 50%

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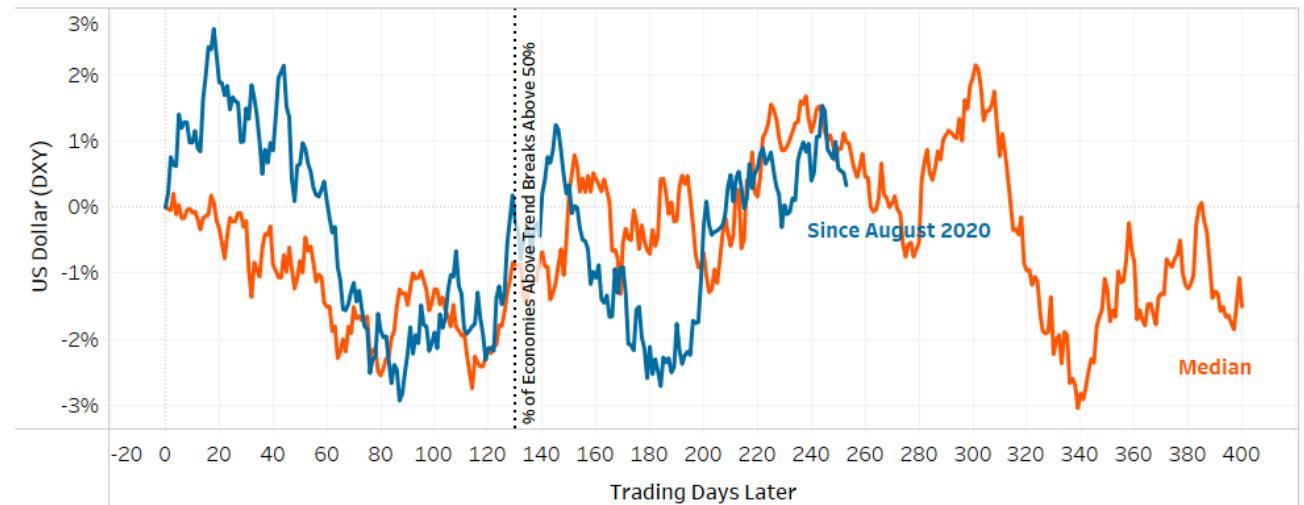
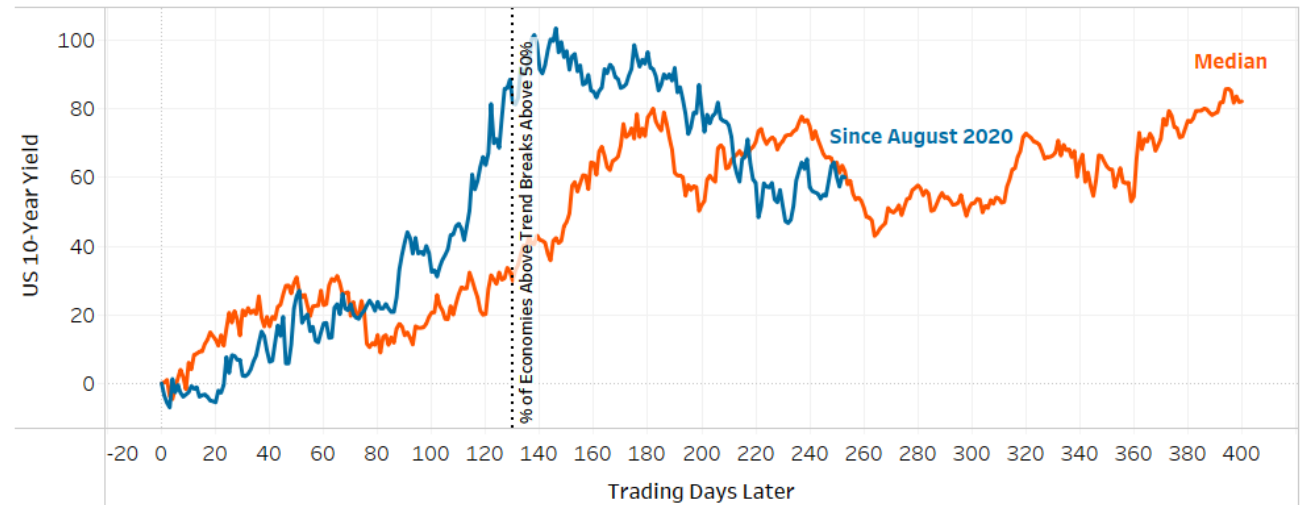
US 10-Year Yields and US Dollar Tracking Past Global Recoveries

- The chart shows the average changes in US 10-year nominal yields and US dollar into and after global recoveries since 1960. Again, we use the month the % of economies growing above trend exceeds 50%.
- This historical playbook suggests range-bound activity over the months to come. Let the confusion continue for investors!!!

US 10-Year Yields and US Dollar: Reaction to Global Recoveries Since 1970


% of economies (38 in total) producing above trend composite leading indicators rises above 50%

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The background features a stylized illustration of a storefront. It has a dark blue awning with horizontal stripes. A person in a grey shirt and dark pants stands to the right. A large, semi-transparent blue circle with a white dollar sign is on the left. The title text is centered over the illustration.

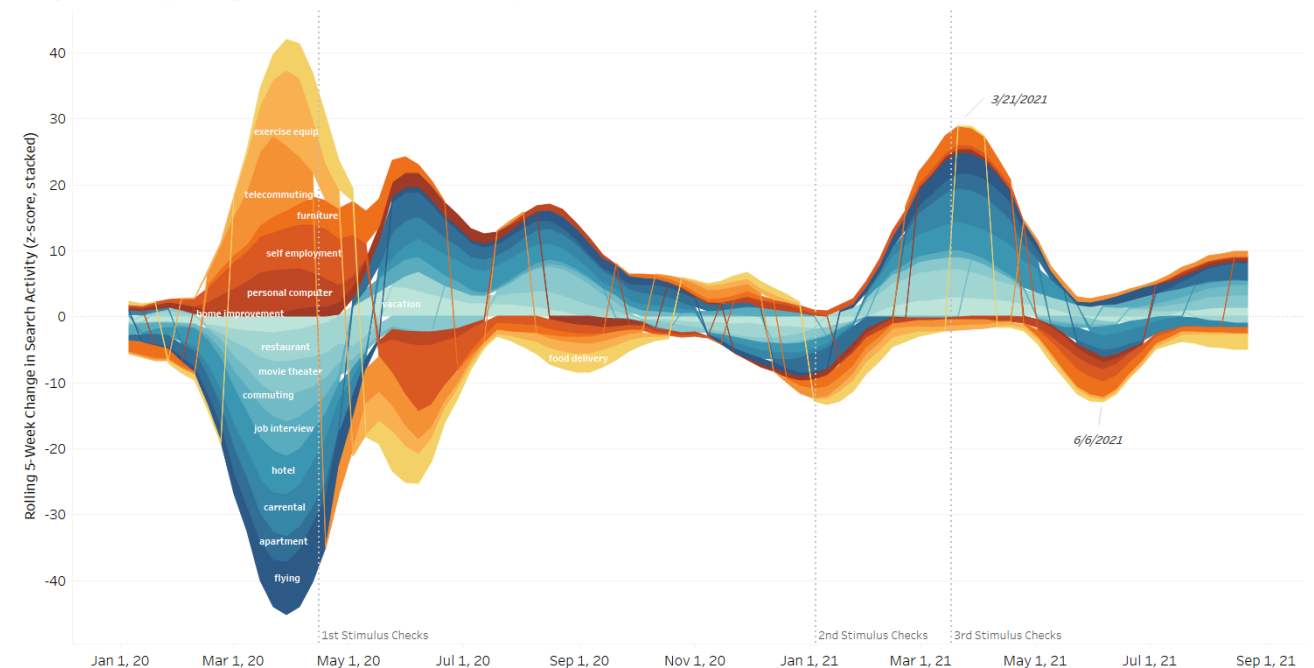
Consumer Spending Expectations Improving After Summer Swoon

Consumer' Enthusiasm to Spend Rebounding

- US consumer search activity for both staying-in and going-out topics had receded from late March 2021 through early June. Fortunately, intentions have begun to rebound in August.
- A global average of these same search topics has tracked quite well for long-end sovereign yields, helping explain lower sovereign yields.
- We need to see search activity remain near average (z-score = 0) or better to keep the 'good times rolling.'

U.S. Consumers: Intentions to Spend Mildly Improve Heading Toward Summer End
Rolling five-week changes in Google search trends with noise and seasonality removed

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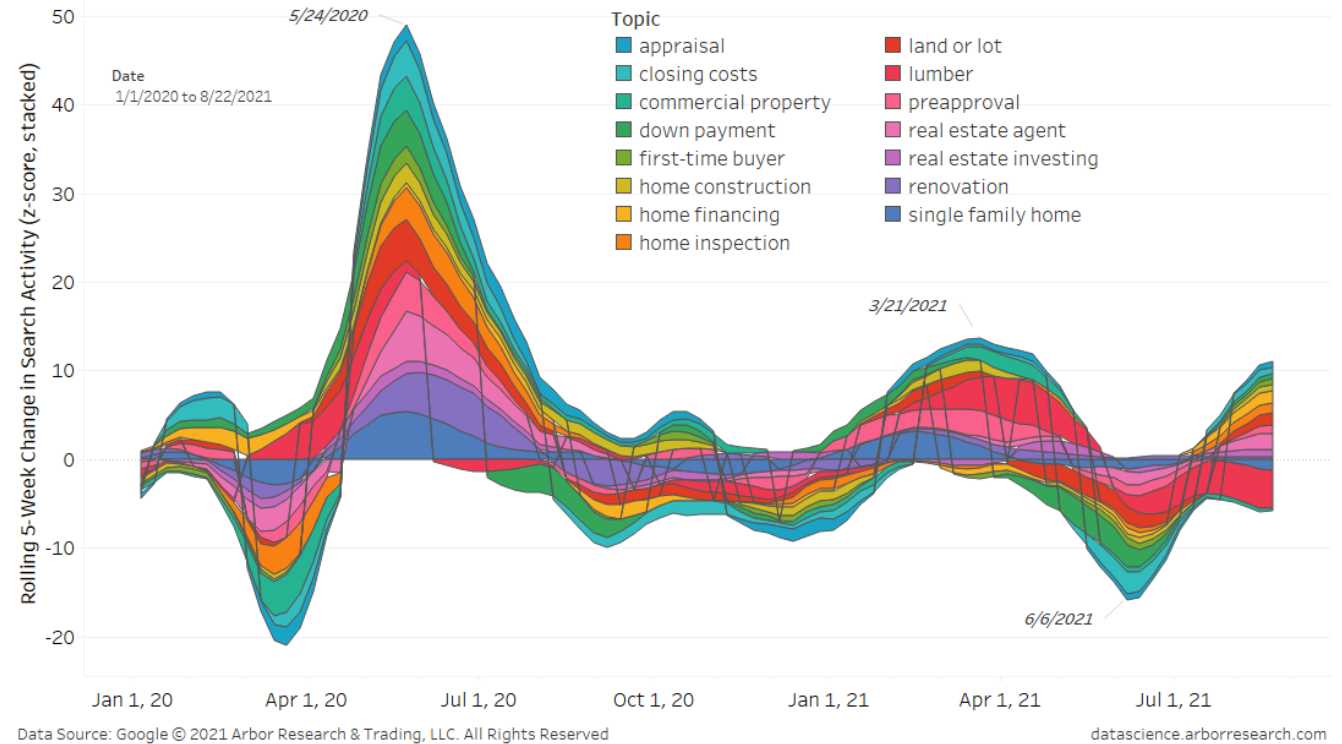
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Housing Market Attempts to Rebound

- US consumer search activity for all aspects of the home search and buying process quickly fell from mid-May through early June, hence continued weakness in housing data releases.
- Searches have troughed, suggesting housing demand remains and may revive ahead of the fall months.

U.S. Consumers: Housing Market Search Activity Attempting to Rebound
Rolling five-week changes in Google search trends with noise and seasonality removed

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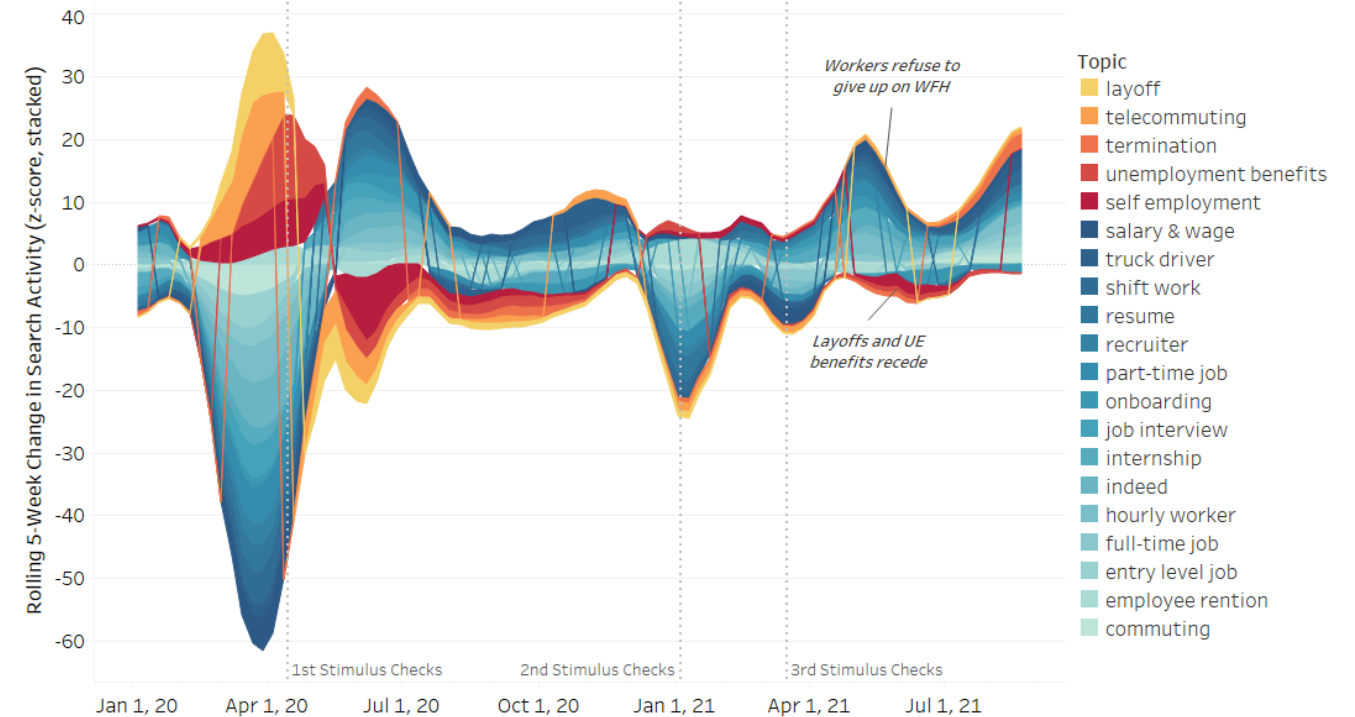


Job Market Improves Into August

- US consumer search activity for nearly all aspects of the job seeking process have rebounded.
- However telecommuting continues to gain interest with many companies delaying the return to the office.

U.S. Job Market Stays Optimistic According to Searches

Rolling five-week changes in Google search trends with noise and seasonality removed



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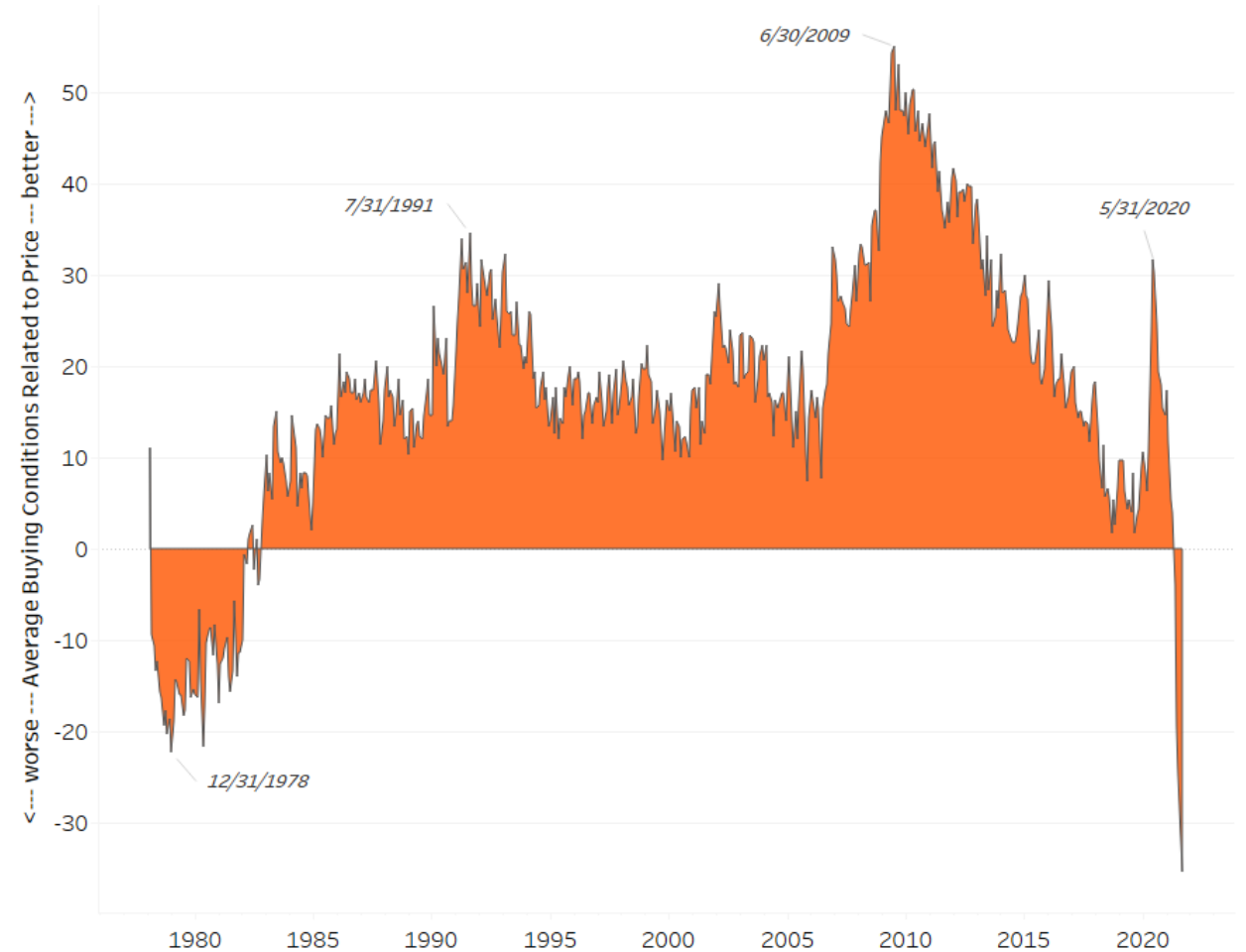
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Consumers Fear High Prices

- Consumers suddenly became VERY agitated by rising prices across houses, large household durables, and vehicles.
- The bottom fell out in April for UMich surveys measuring buying conditions related to price. Quite the dramatic turn of events!

Consumer Buying Conditions Related to Price Worst on Record
average across household durables, houses, and vehicles

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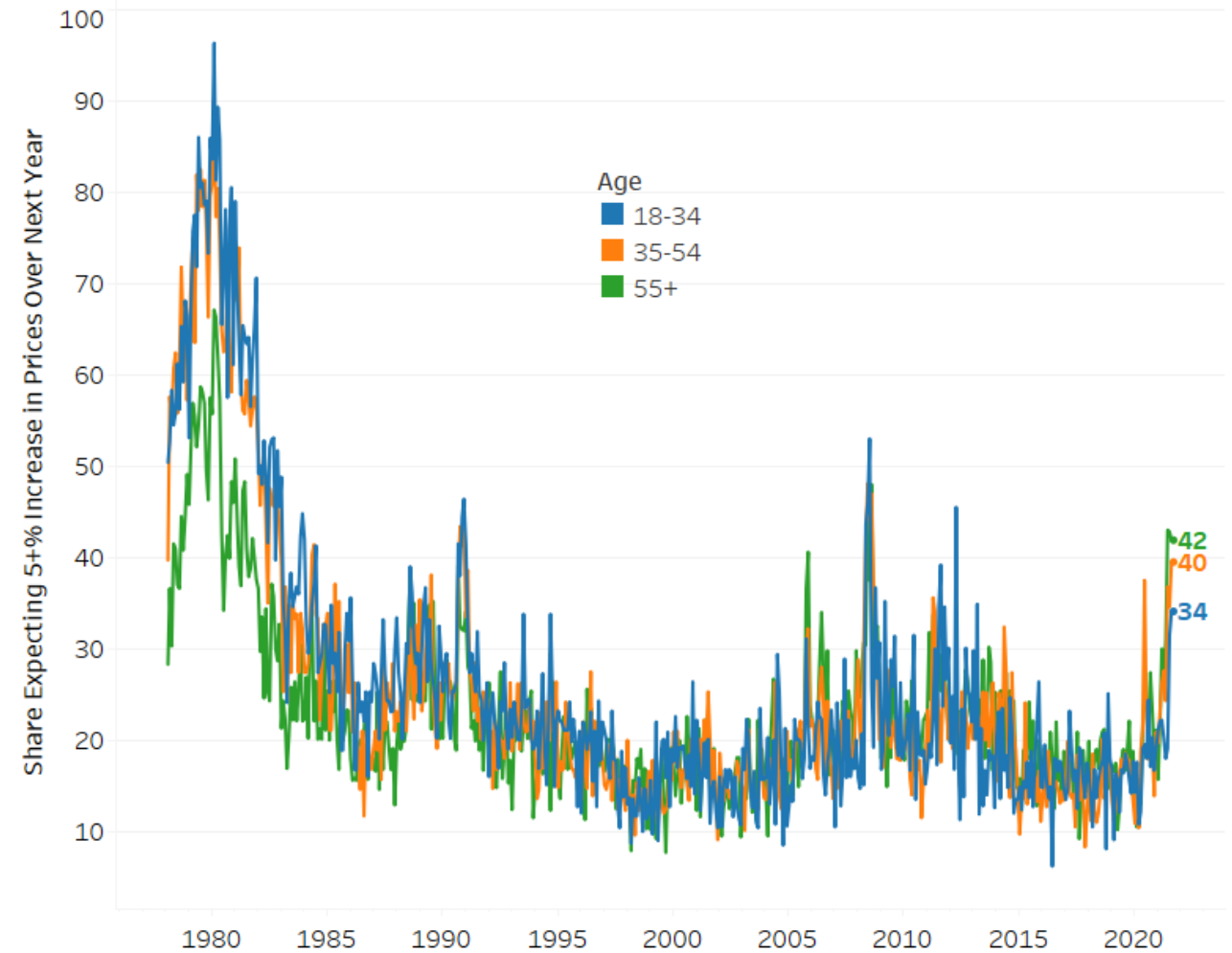
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Consumers Fear High Prices

- Consumers of all age groups are forecasting a larger right-side tail, even while financial markets move in the opposite direction.
- Do note this burst in potential for 5+% headline inflation is very similar to that seen directly after the financial crisis. Consumers have habitually offered more noise than signal.

Expectations for 5+% Headline Inflation Over the Next Year

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Central Banks Primed to Get Less Passive



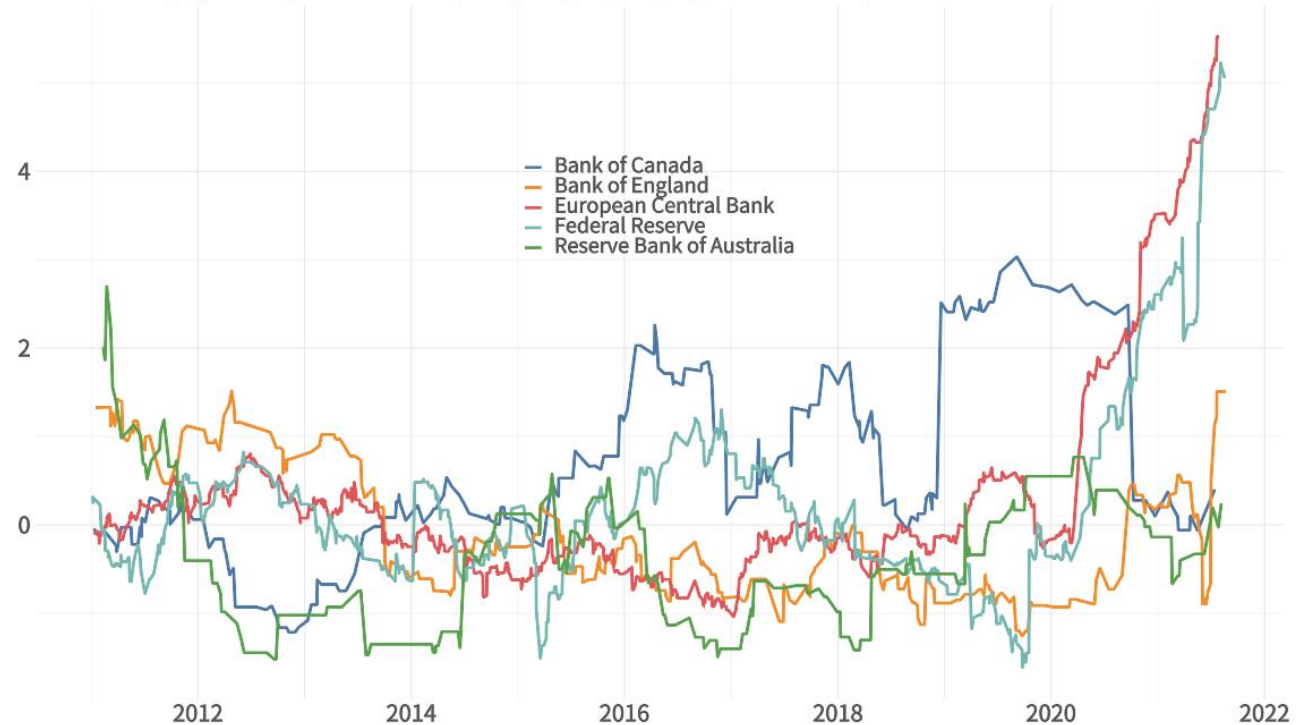
Fed Remains Committed to the 'Transitory' Mantra

- Central banks' use of temporary or transitory inflation within speeches has yet to abate.
- Both the ECB and Federal Reserve lead this charge, despite intensifying inflation across the eurozone.

Central Banks Sticking to Transitory Narrative

Z-Scored Rolling 1-year Average Ratio of Transitory to High Frequency Language in Central Bank Speeches

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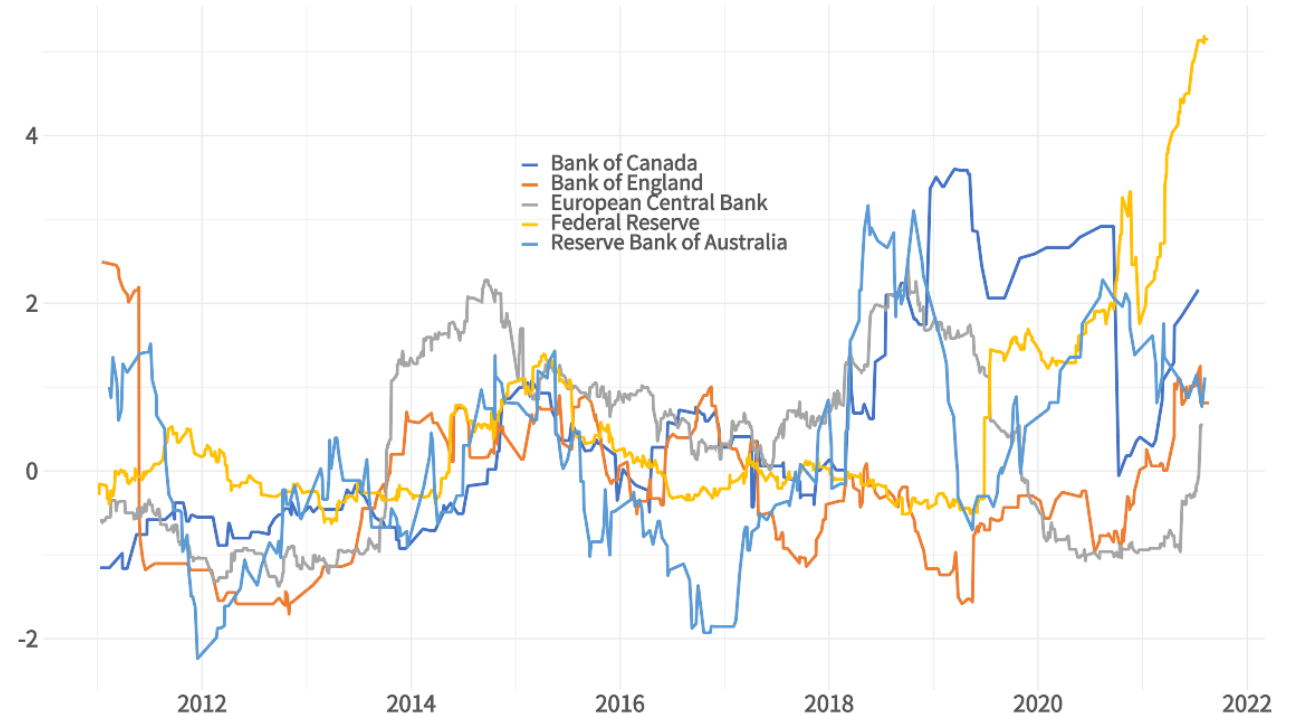
Fed Has Yet to Lose Passive Perspective

- The Federal Reserve is uniquely passive relative to history (more than 5 standard deviations above average!).
- A few other banks are also being cautious, but none rival the Fed.
- We expect this trend will reverse if the Fed truly begins seeing a worthy foe in inflation as they begin discussing clear timeframes.

Fed Still Ultra-Passive Compared to Peers

Z-Scored Rolling 1-year Average Ratio of Passive to High Frequency Language in Central Bank Speeches

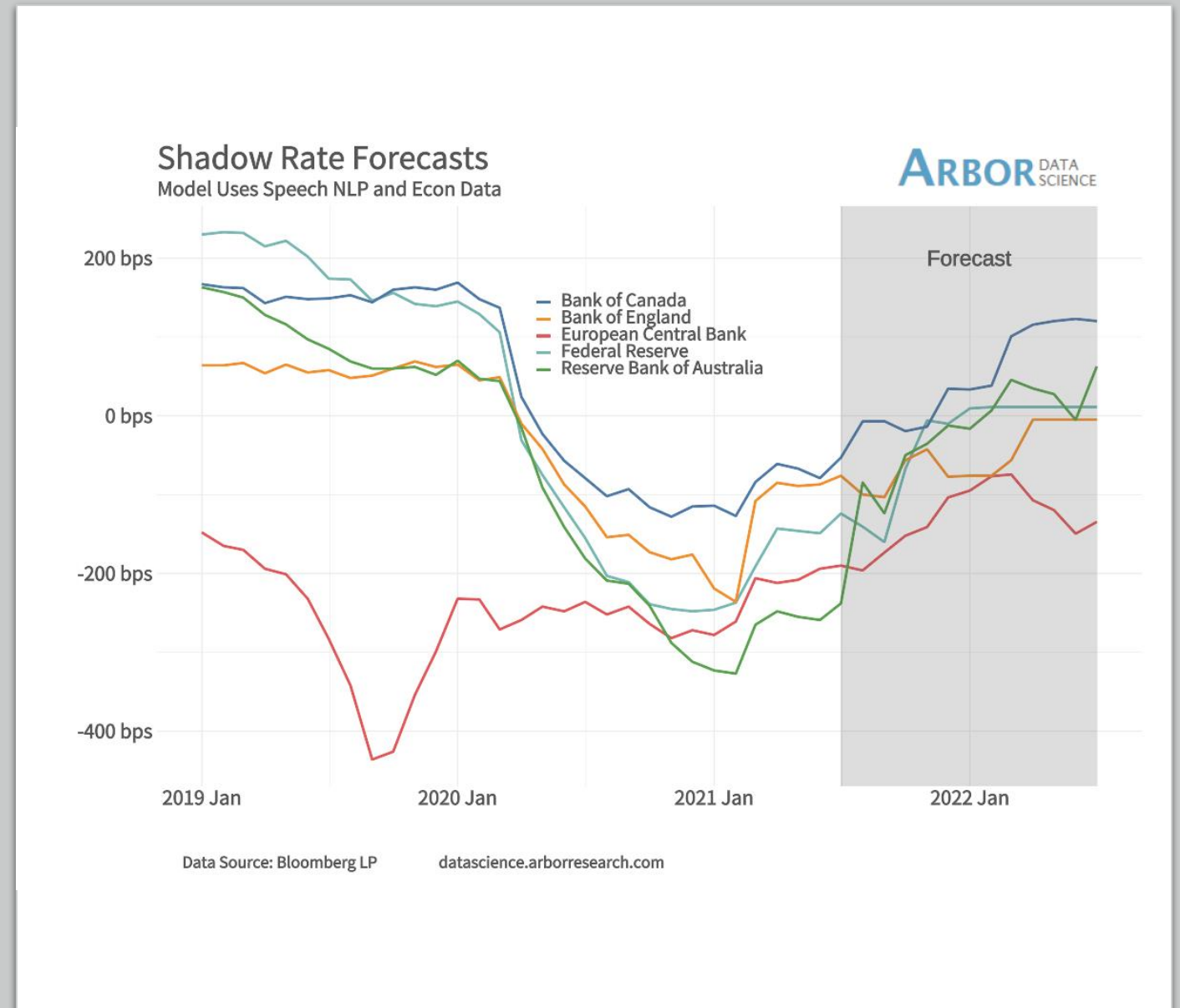
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Central Bank Shadow Rates Set to Climb

- We employ a model (support vector machine) to forecast the shadow rates as determined by the Reserve Bank of New for five major central banks using only natural language processing of speeches by bankers.
- The latest forecasts suggest a rise across the board over the next year with the RBA's rate the most dramatic in the next few months. This tracks well with their plan to taper starting in September.
- Rising shadow rates may be a big concern for TIPS investors thanks to easy policy having tremendous downward pressure on liquidity premiums.

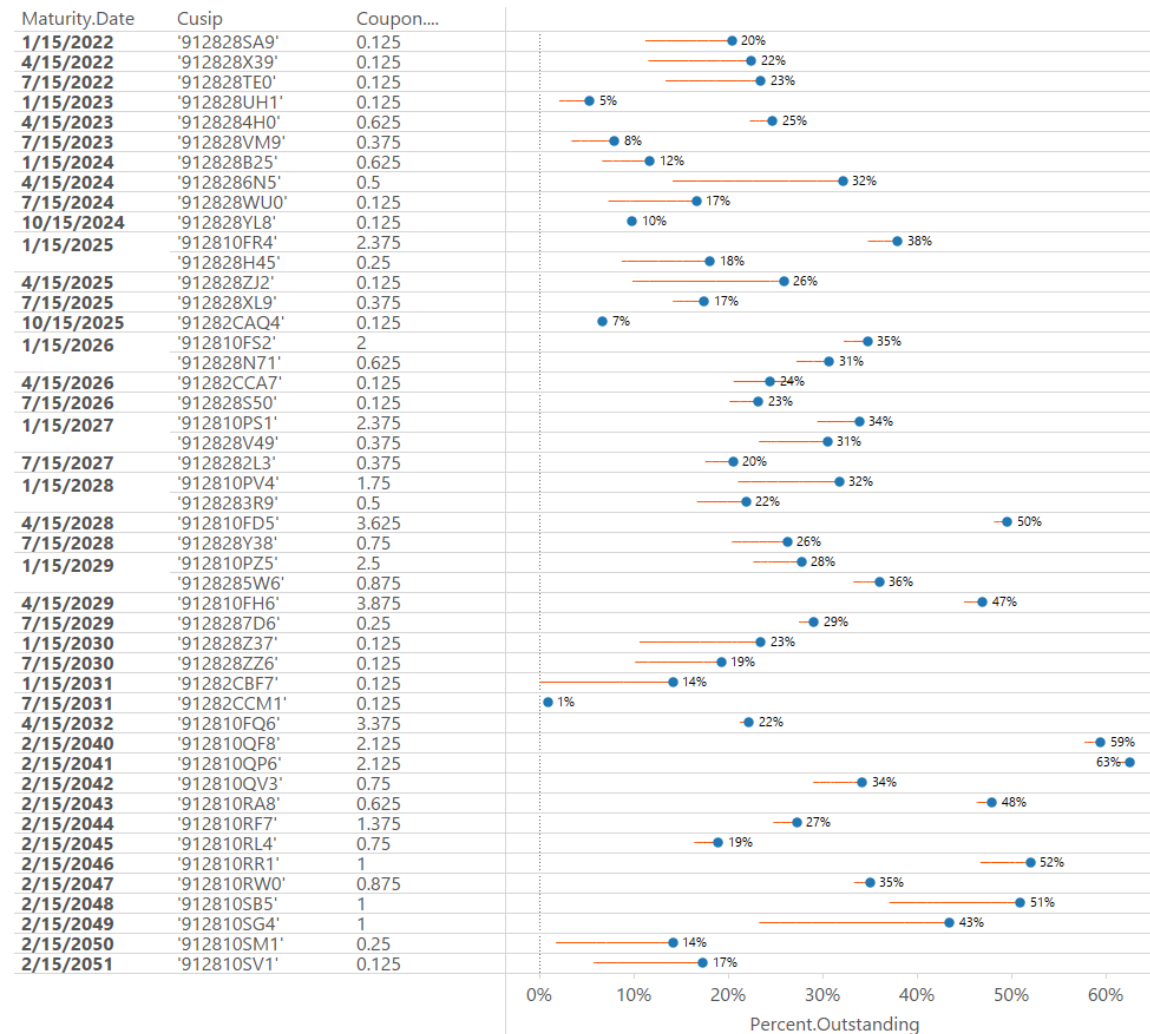


Fed Ownership of TIPS Extremely High at Longer-Maturities

TIPS SOMA Holdings by Issue - 8/25/2021

Lines show past 12 month range

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Data Source: Federal Reserve

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