STRATEGAS

A Macro View on Modeling HY Spreads

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See Appendix for Important Disclosures

Strategas Uses 3 Models to Estimate Trend & Fair Value of HY Spreads

Bottom Up Distance to Default for Barclays HY Index Members (NTM Valuation Model)

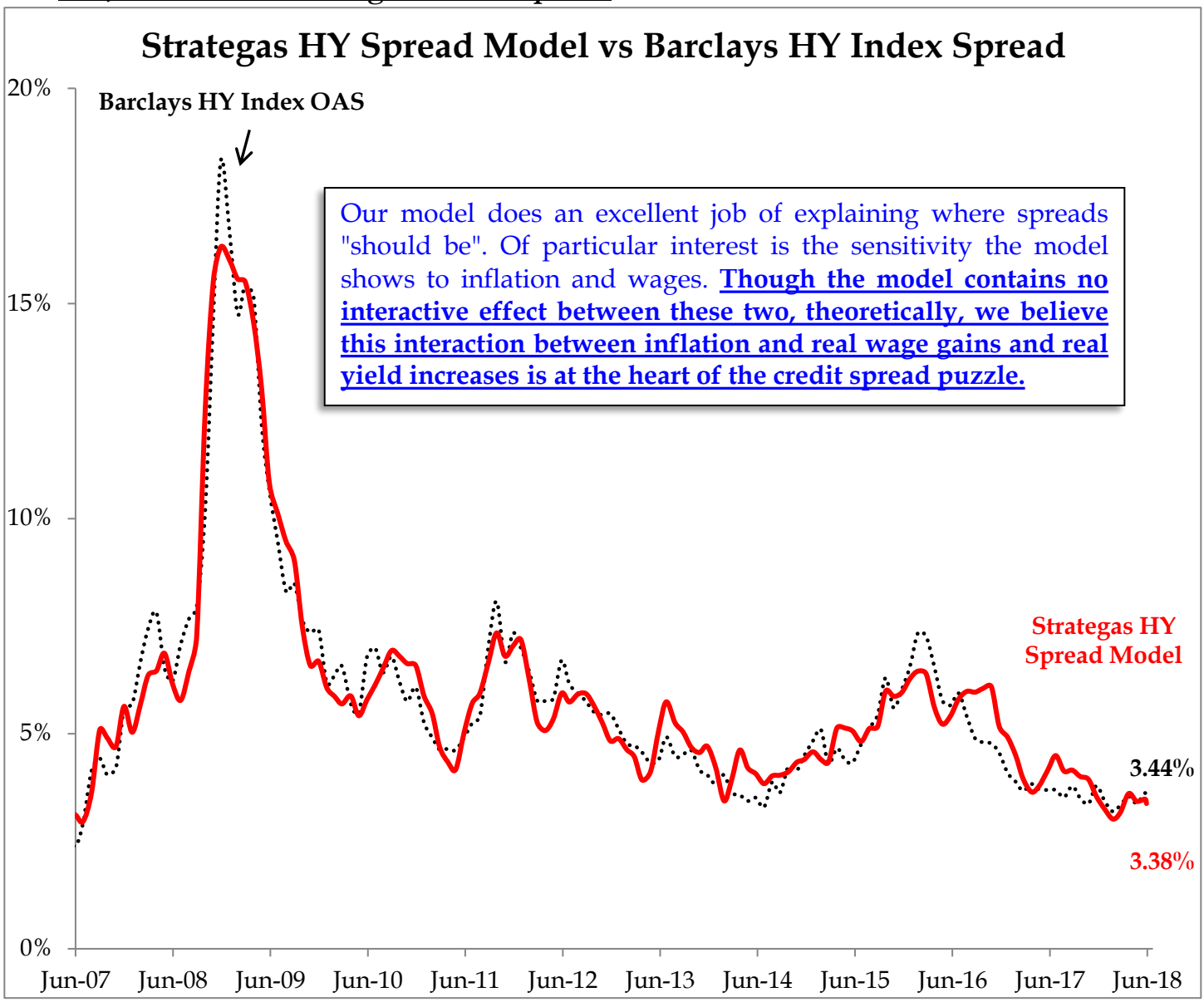
Top Down HY Sub Sector Hi/Low Dispersion (Model for Forecasting Index Level Spread Trend)

Top Down Regression Model for Barclays HY Index OAS (Valuation Model)

Today's Focus is the Strategas Fair Value Regression Model for Spreads

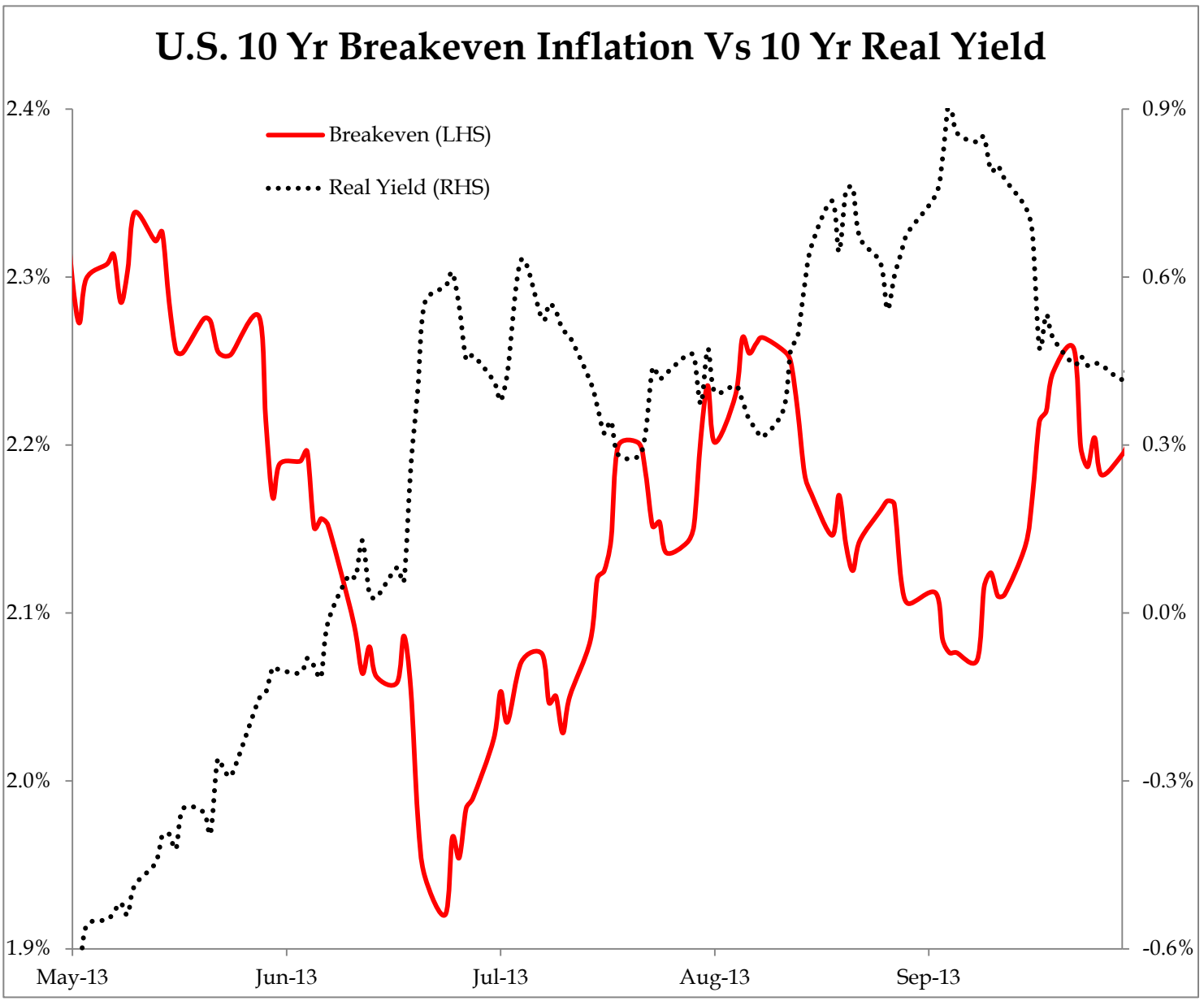
THE STRATEGAS HY FAIR VALUE SPREAD MODEL

- Model is a simple regression that attempts to provide a fair value for the Barclays HY index OAS
- Rather than a forecast, it's a valuation model, and admittedly, it uses lagged data, data that itself arrives with a lag, so its power is more for "what if" and as a sanity check for richness/cheapness.
- **It uses 6 macro inputs, some lagged, some real time, all of which attempt to explain the complex process by which growth, wages, inflation, Fed policy, capital investment, and the cost of liquidity eventually lead to earnings growth, debt service likelihood, and eventually spreads.**
- The model has an exceptionally high R-squared. The tight fit allows researchers to estimate spread changes given expectations of changes to any of the 6 major inputs. **As we will see, wages and inflation estimates are critical inputs. It's when wages are high and real yields rise, that "TSY crowding out" takes place.**



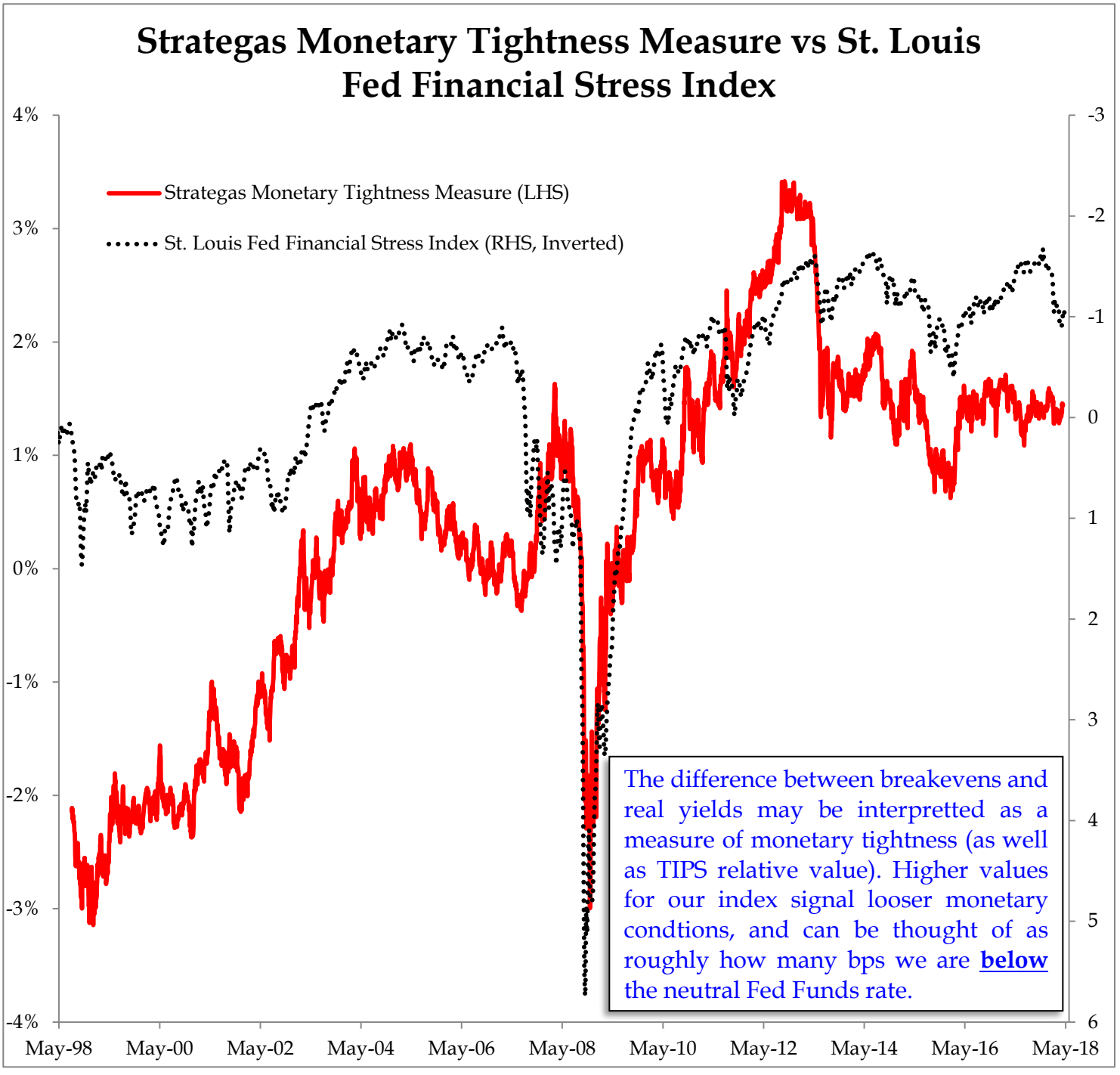
BACKGROUND OBSERVATIONS PART 1: REAL YIELD VS BREAKEVEN CROSS IS A WARNING OF TIGHTER MONEY

- From May 2013 to September of 2013, 10 year real yields blasted higher by about 150 bps
- During this time, breakevens plunged 45 bps in 2 months, before eventually settling in for a less troubling 15 bps drop over 4 months.
- At the time, Fed President Bullard, who had been hawkish up to this point, noted indirectly that this crossing pattern is usually an indicator of trouble emerging, as it signals a rapid tightening in monetary "expectations", which, in theory, should lead to some future tightening in monetary/financial conditions.



THE STRATEGAS MONETARY TIGHTNESS MEASURE

Our Strategas Monetary Tightness Measure, defined as the 10 year breakeven minus the 10 year real yield, was motivated by the observation during the "taper tantrum", that a large rise in real yields, concurrent with a large drop in inflation expectations, is a leading indicator of financial stress. Though certainly relevant to HY, this is broadly applicable to all forms of credit (and equity markets). Incidentally, this is likely the secondary driver of the current EM scare (aside from local geopolitical stress), as there's historically a lag between rising U.S. real yields and capital flight from EM.

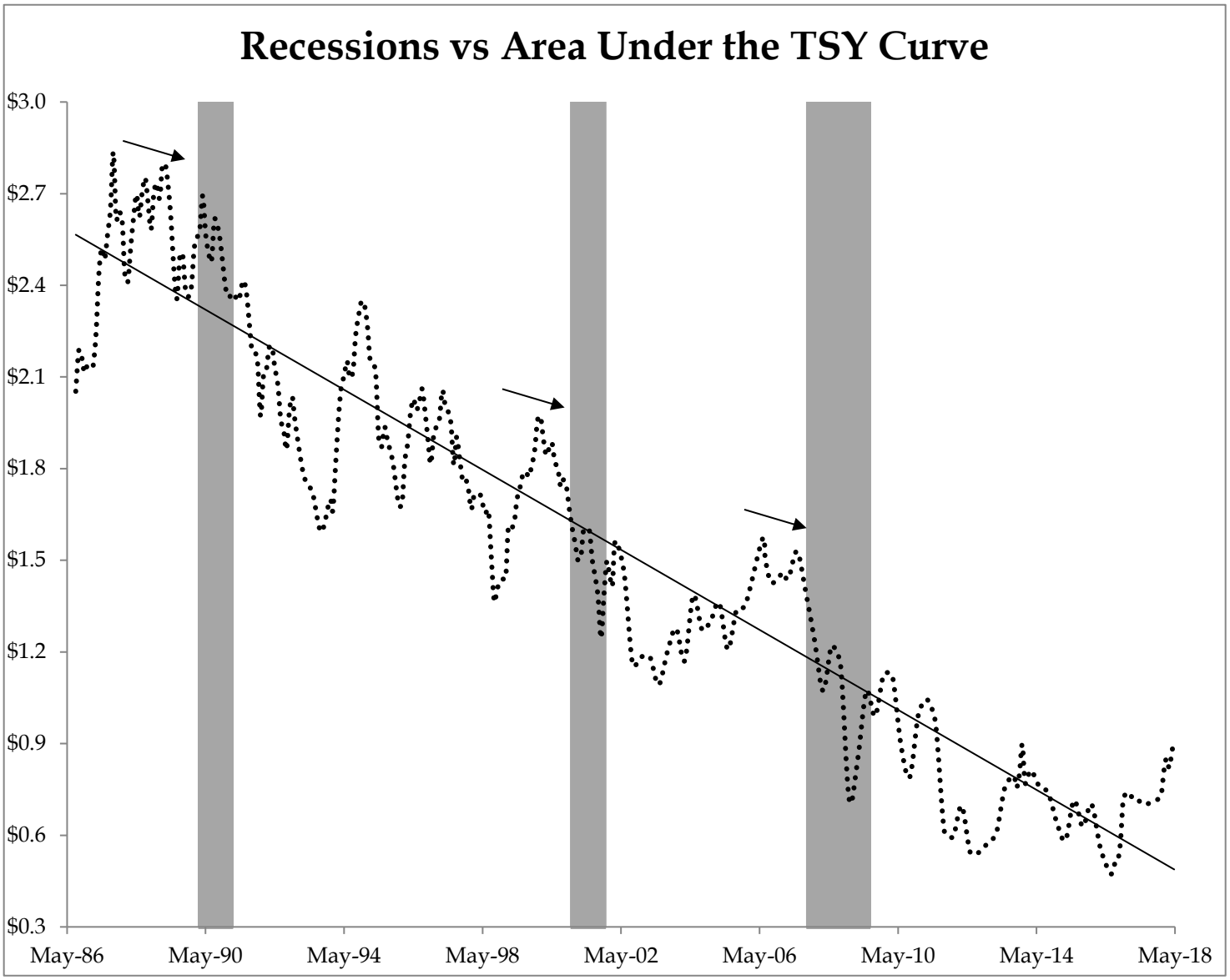


A RELATED CONCEPT THAT WE TRACK IS "AREA UNDER THE TSY CURVE"

- Peaks in area tend to lead recessions by about 12 months, with the magnitude and duration of the recession being reflected in the magnitude of the drop in area from peak to trough.

- The logic here is that there are different degrees of curve flattenings. Those that see yields rising across the curve are usually less concerning than those that witness yields declining on the back end while short rates rise. In the worst case, when long rates are dropping more than short rates are rising, risk assets tend to show heightened downside volatility. This tends to happen when inflation expectations are declining on the back end faster than real yields are rising on either end of the curve.

- This is almost the definition of a policy mistake, and our Monetary Tightness Measure, as well as the "area under the TSY curve", tend to measure these patterns in real time.



BREAKEVENS PLAY A LARGE ROLL IN OUR FAIR VALUE REGRESSION MODEL, BUT WHY ARE THEY SO USEFUL?

- **The U.S. TSY market is the world's most robust gambling pit. It's the "Mos Eisley Spaceport" of the global financial markets; you'll never find a more wretched hive of scum or villainy than you find in the Treasury market, so don't ignore its signals.**

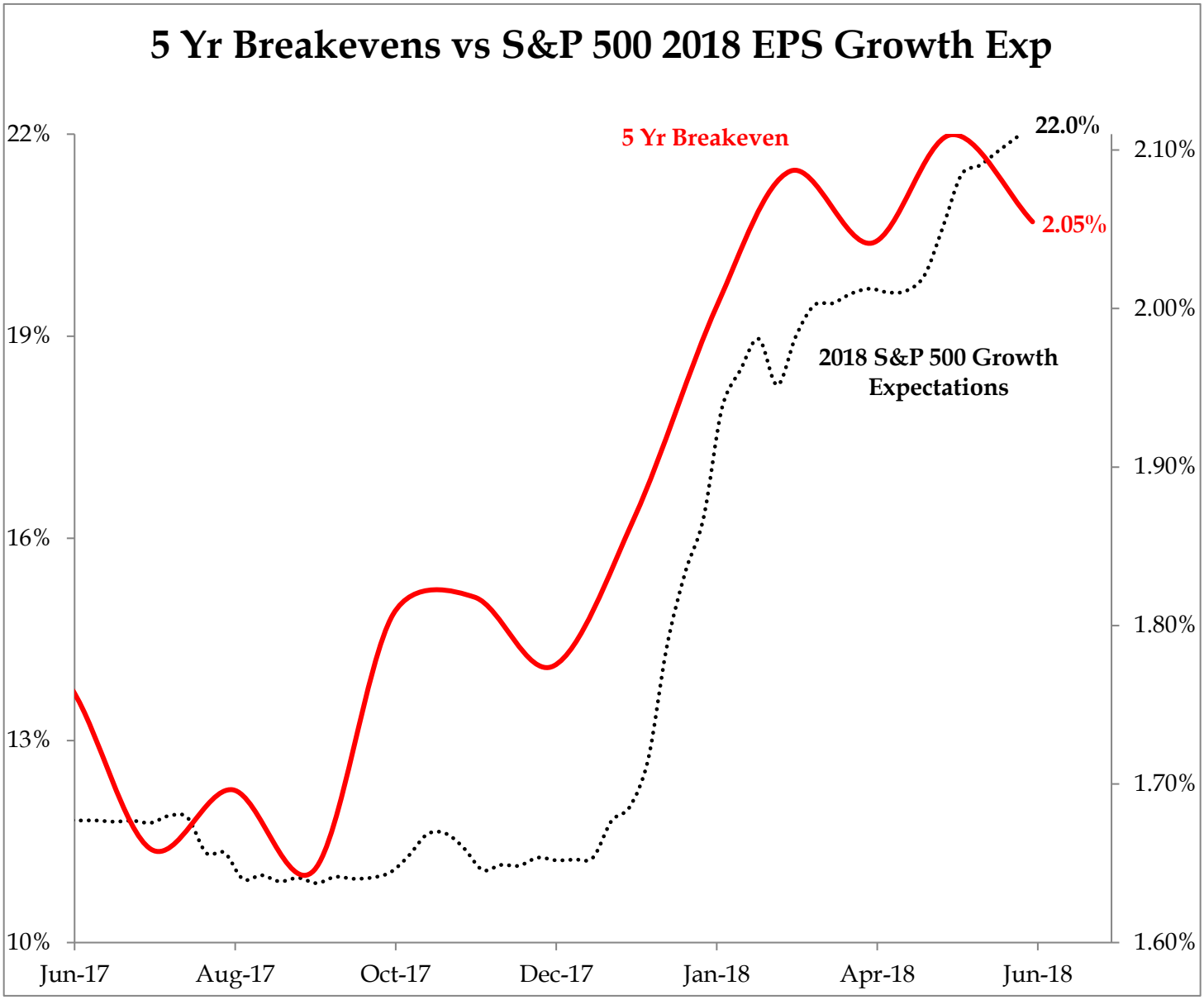
- We use 5 year breakevens in our regression model, vs 10 year breakevens, because the duration profile is more appropriate for high yield bonds.

- The economic logic for breakevens is twofold: 1) they make up roughly half of the nominal growth expectations puzzle, so they're practical real time measures of broad growth expectations and 2) they're highly correlated with earnings expectations, so they have a very direct relationship to free cash flow and debt service outcomes.

THESE AREN'T THE BONDS YOU'RE LOOKING FOR!!

BREAKEVENS ARE TIGHTLY BOUND TO EARNINGS GROWTH EXPECTATIONS

- Ideally we'd chart 1 year breakevens vs earnings expectations to illustrate this point, but even 5 years out, earnings expectations track well with 12-18 months forward earnings growth expectations

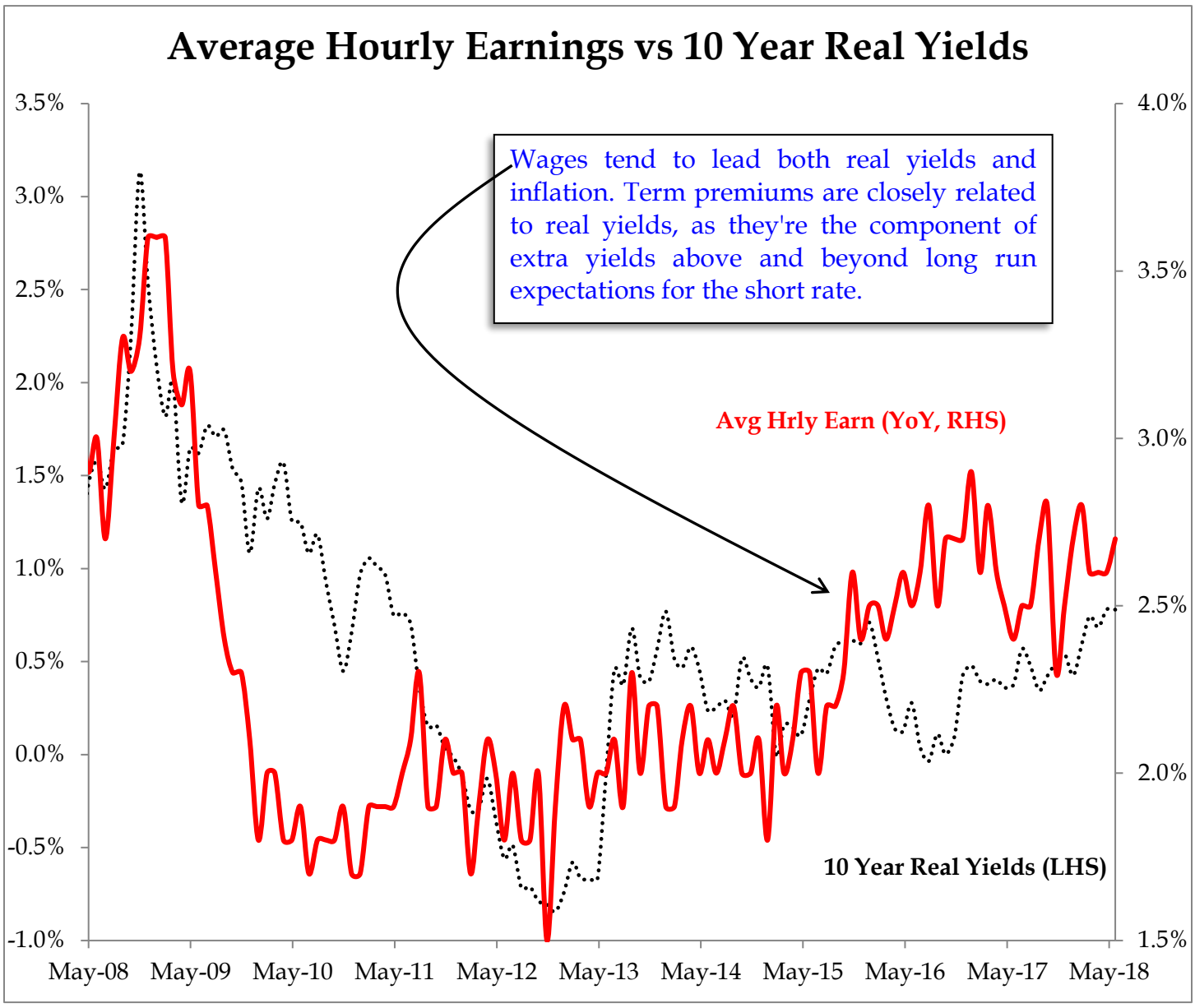


- Incidentally, this is the part of long Treasuries that "hedges equities", and when breakevens and real yields are low, Treasuries aren't such a good hedge anymore!

BACKGROUND OBSERVATIONS PART 2: WAGES TEND TO LEAD/COINCIDE WITH REAL YIELDS/TERM PREMIA

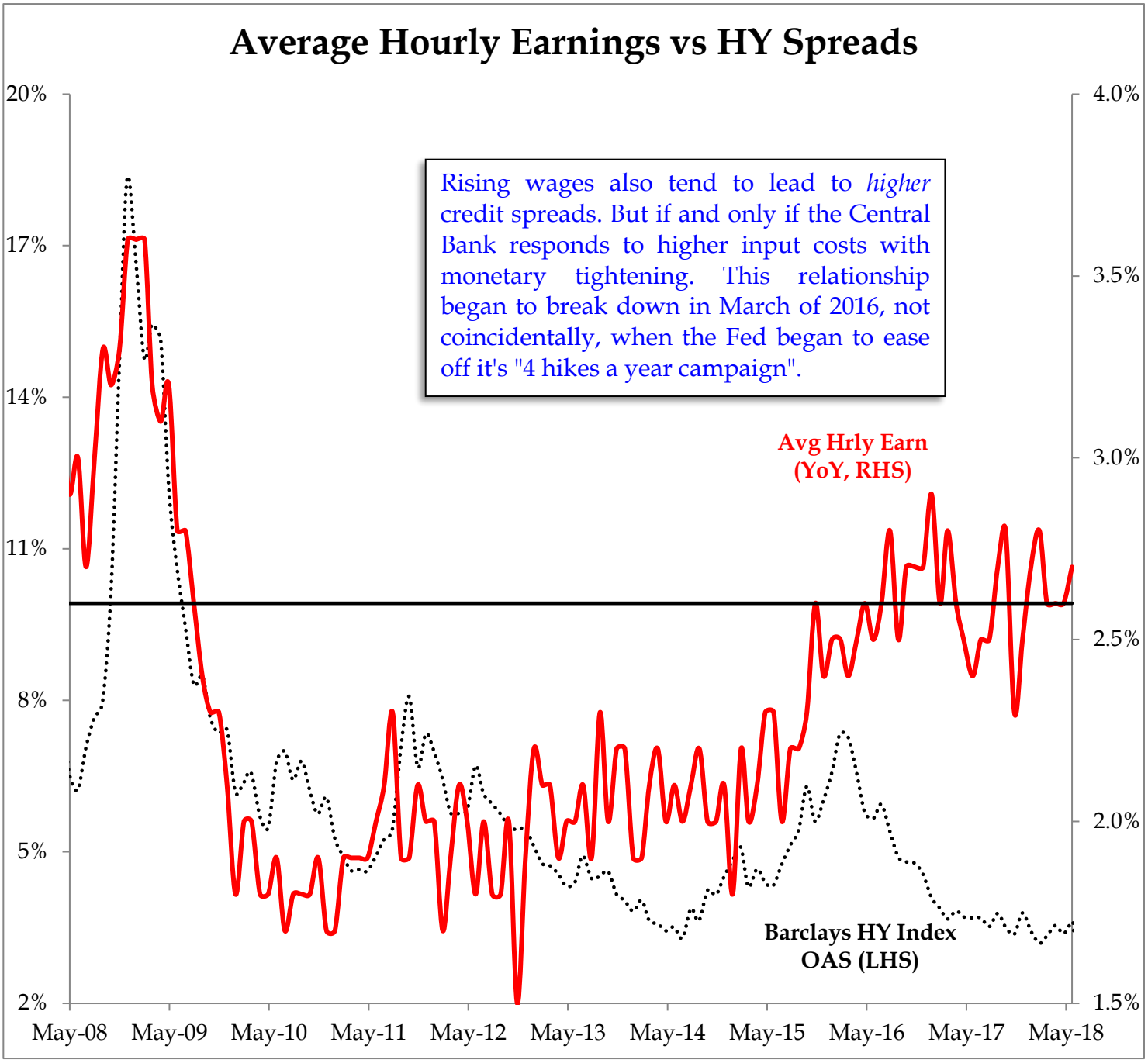
- When real yields rise, the real cost of liquidity is rising. **In other words, it's a true tightening of money for ALL borrowers and this tends to crowd out issuers with "current account deficits". For EM borrowers, this means Turkey and Brazil and Argentina, for corporate borrowers, this means capital intensive, highly leveraged corporates.**

- When wages rise, real yields and term premia both tend to rise, signaling that borrowing costs are rising for all borrowers, on all parts of the curve. This usually leads to a top in operating margins, and thus, a rise in credit spreads for those borrowers most sensitive to small changes in margins (usually HY).



BACKGROUND OBSERVATIONS PART 3: WAGES TEND TO LEAD SPREADS, ASSUMING A NORMAL FED CYCLE

- This assumes a ***credible*** Central Bank; that is, rising wages only lead to rising real yields if the Fed tightens into this or is expected to. If policy never tightens, then inflation expectations will rise with a rise in yields, and the effect on spreads will be negligible. This is the difference between a rising area under the curve (expectations for modest or little Fed tightening) and a declining area under the TSY curve (expectations for aggressive overtightening).



WHAT DRIVES OUR FAIR VALUE MODEL?

- Key to our fair value model of HY spreads is the interplay between wages, inflation, the Fed, and profit margins. **If wages remain subdued, inflation rises, and the Fed stays on hold, then, in theory, margins will stabilize and top line growth may even bounce higher.** All of this would be good for high leverage firms, and, not surprisingly, as this scenario played out in 2016 and early 2017, spreads in fact narrowed quite a bit.

- Other inputs (shown below with coefficients) are the 3 month LOIS spread (a measure of the credit component of real borrowing costs), housing starts (a leading indicator of top line growth), ISM new orders (a leading indicator of capex and real growth, and thus how sensitive spreads are going to be to wages, and capacity utilization (a leading indicator of inflation)

- Together, these inputs create a model that should provide strong predictive power for the variables that most impact spreads; revenue growth, operating margins, and thus earnings growth, debt service costs, current pricing power, and lastly future pricing power. Not surprisingly, we get an exceptionally high R-squared of about 0.95.

STRATEGAS FAIR VALUE SPREAD MODEL SPECIFICATION

HY OAS Fair Value =

0.2386 + 1.8798*(3 Mo LOIS Spread) + 0.9660*(Avg Hrly Earn – 2.6%) + -0.00003*(Housing Starts) + -0.001*(ISM New Orders) + -0.0008*(Cap Utilization) + -1.7845*(5 Yr Inf Exp)

3 Mo LOIS Spread: The 3 Month LIBOR to Overnight Indexed Swap Spread (no lag)

Avg Hrly Earn: The rolling 2 month YoY average hourly earnings -2.6% (lagged 1 month)

Housing Starts: The rolling 2 month Housing Starts (lagged 1 month)

ISM New Orders: The rolling 2 month ISM New Orders Index (lagged 1 month)

Cap Utilization: The rolling 2 month Capacity Utilization Index (lagged 1 month)

5 Yr Inf Exp: The 5 yr, market implied, breakeven inflation expectation (no lag)

HOW WE USE THIS MODEL
AND THE STRATEGAS SPREAD FORECAST

- We update this model about once a week with real time data and once a month with the lagged economic data, but this only gives us a fair value, it doesn't say where spreads are going.

- As a forecast tool, we use this model along with our forecasts of wages, inflation, and Fed tightening to forecast a top down expectation for spreads. This makes AVERAGE HOURLY EARNINGS THE MOST CRITICAL ECONOMIC DATA POINT EACH MONTH!! We can't stress this enough. Next month we'll begin hosting a monthly "after the jobs report webinar" to discuss the implications of the report at 8:45 am.

- We then combine this without our bottom up default rate forecast model to arrive at a spread forecast range. The result is our forecast range.

- **Our bottom up model suggests a NTM default rate of about 2.75%, and if we assume a 30% recovery rate, this would imply about a 400 bps spread level for the Barclays HY OAS.**

- **Today our tops down model says spreads should be about 345 bps today, and we expect wages to rise to about 3.0% by year end, with a smaller rise in inflation, which, from the summary output on the next page, suggests, all other variables equal, that spreads should finish the year around 360 bps.**

SUMMARY OUTPUT

- We don't use a very sophisticated model, we like simple and easy to produce in excel so our clients can reproduce this if they desire.
- The key points here are that each variable is significant, and is directionally consistent with what we expect, and the overall model is significant as well.
- Of interest, we find that for every 1 bps rise in LOIS, we get about 2 bps rise in HY spread, or the equivalent of about 2 extra defaults every 12 months in the Russell 2000 index for every 25 bps rise in LOIS.
- For a 50 bps rise in wages, with no concurrent rise in inflation, we get about a 50 bps rise in OAS.
- But a 50 bps rise in wages that triggers a 25 bps rise in inflation, doesn't raise spreads at all
- If housing starts (actually slightly negative coefficient) were back to pre-crisis levels, spreads would be about 260 bps, all else equal.
- If new orders revert to more normal mid to high 50s expansion, spreads widen 50 to 60 bps.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.97
R Square	0.94
Observations	109

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6	0.084825913	0.014137652	320.0591688	8.61125E-64
Residual	102	0.004505544	4.4172E-05		
Total	108	0.089331456			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	0.239	0.025	9.463	0.000	0.189
3 Mo LOIS	1.880	0.277	6.776	0.000	1.330
AVG HE	0.966	0.200	4.824	0.000	0.569
Housing Starts	0.000	0.000	-6.639	0.000	0.000
ISM NO	-0.001	0.000	-8.282	0.000	-0.001
Cap Utilization	-0.001	0.000	-2.153	0.034	-0.002
BE5	-1.785	0.173	-10.312	0.000	-2.128

BOND BUBBLES & THE IMPOSSIBLE TRINITY OF STABILITY

In early 2008, when the world was on the verge of financial Armageddon, I had a front row seat as an analyst at Freddie Mac. As markets began to implode, and government intervention became inevitable, I asked our chief risk officer, who in an earlier life was a physicist, what lesson from physics was most applicable to the unfolding market madness of the time. His answer was a simple one; ***the change in entropy over time is constant***. What he meant was that nature has a desired level of order, and that level of order changes with time at a rate that is invariant to our mortal rules. So nothing we do to make the system "safer", or more "stable" has any real effect on stability. In other words, despite the wisdom of all of our rules about required capital for large institutions, and sound banking regulations, and even a predictable monetary policy, it all amounts to rearranging the deck chairs on the Titanic. Forced order creates chaos, and yet, out of chaos, order forms naturally.

Today, as inflation sits near historical lows, with little volatility around those lows, we see a world that is devouring itself with populist uprisings and financial markets that look more bubbly than they did in 2008. In contrast, during the rebellious years of the 60s, the high inflation of the 70s, and even the global political tensions of the 80s, financial markets managed to avoid anything that remotely resembled a systemic collapse (though we would stop short of saying financial markets were stable). **If there's a lesson to be learned from this, it's that complete stability is not attainable. Particularly, there's an Impossible Trinity of Stability, where any effort to achieve price stability (low inflation), asset market stability (no bubbles that end up popping) and social stability (no populist revolutions), is futile, because nature simply won't allow it.** This is clearly evident in regions of the world that cap civil liberties in the name of social stability, and then find that financial markets are too volatile to aid in the financing of development and prices of goods and services are often volatile; markets can't clear when investors and consumers can't vote their conscience. But what about when central banks become so credible in their fight against inflation, that markets begin to view a secular disinflationary downturn as permanent (i.e. stable prices of goods and services forever)? When that happens, we find that anything that sheds positive cash flows can be leveraged into a low vol carry trade. And if low inflation and low inflation volatility persist forever, then infinite leverage can be added to obtain any level of return desired, provided default risk is not a factor. That sounds like the foundation of financial instability. But then, what if we mandate financial market stability, or at least use monetary policy to nudge markets to a more stable zone? We find that capital is hoarded, firms aren't allowed to fail as often as they should, and social instability grows as wealth inequality further separates the haves from the have nots.

It seems as if forced order in one of these three spheres eventually leads to chaos in the other 2. Growth and development depend on the social instability that results as a side effect of a democratic society that values human rights. And social stability relies on the upward mobility that the free flow of capital

produces, in part because free markets allow for a more efficient allocation of capital, lifting all participants along the way, but also because "winners" can never win forever in a free market (consider the average length of time that a new company sits atop the "world's largest corporations list). But what about stability in prices for goods and services? We've seen the horrors that high and volatile inflation can bring to an economy, so it seems logical that low and stable inflation should be stabilizing. But it's not. **This decade has shown us that when low and stable inflation is forced on the economy by effective central bank control of the money supply, it leads to bubbles in asset markets that kick off predictable cash flows (i.e. fixed income) and eventually any asset that has regular cash flows, whether predictable or not (equities and HY).**

The mid-twentieth century showed us that when a society prioritizes the rights of individuals over existing social order, the economy benefits from higher innovation and greater contribution from all. The last decade showed us that regulations designed to make the system safer actually increase instability by wasting capital and preserving the market share of ineffective companies. And the current decade has added further to this observation, and has shed light on the notion that policies designed to produce stable prices also have unintended consequences for asset markets, and eventually social structure. **The primary lesson, in all cases, is that mother nature will determine the level of order that's right for the economy and society as a whole, not benevolent social planning bureaucrats with idealistic, albeit altruistic goals. The secondary lesson, for a new generation that believes benevolent social planners can devise a "better" system than capitalism, is that those who deny the fairness of capitalism's invisible hand, are doomed to meet the merciless fist of mother nature!**

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