DATA UPDATE 2 FOR 2021: THE PRICE OF RISK!

Risk on, risk off…

The ”One” Metric

- Investors are often in search of a single metric that will tell them whether a market is under or over valued, and consequently whether they should buying or selling holdings in that market.
- With equities, the metric that has been in use the longest is the PE ratio, modified in recent years to the CAPE, where earnings are normalized (by averaging over time) and sometimes adjusted for inflation.
  - That metric, though, has been signaling that stocks are over valued for most of the last decade, a ten-year period when stocks delivered blockbuster returns.
  - The failures of the signal have been variously attributed to low interest rates, accounting mis-measurement of earnings (especially at tech companies), and by some, to animal spirits.
- In this post, I offer an alternative, albeit a more complicated, metric that I believe not only offers a more comprehensive measure of pricing levels, but also a barometer of the ups and downs in the market in 2020.

The Price of Risk

Risk Premium	This is the "extra" return you demand for investing in a risky investment. It will be a function of (a) how risk averse you are, with premium increasing with risk aversion. (b) how much risk is perceive in the investment, with premium higher for riskier investments.
Risk free Rate	Expected return on an investment with guaranteed cash flows

Basic Propositions

1. Risk premiums can be estimated: If you can observe the price that an investor pays for a risky asset, and are willing to estimate the expected cash flows on that asset, you can estimate the expected return on that asset and net out the risk free asset to arrive at a risk premium.
2. Risk premiums can and will change over time: Risk premiums are driven by risk aversion, and risk aversion itself can change over time. In fact, greed and fear, two big drivers of market prices, also affect risk aversion, with investors becoming more risk averse and charging higher premiums, when the fear factor becomes dominant.
3. When risk premiums change, prices will move: As risk premiums change, the prices that investors are willing to pay for risky assets will also change, with the two moving in opposite directions. Intuitively, if you want to earn a higher risk premium on an investment, holding cash flows fixed, you will pay less for that investment today.

Corporate Bonds: The Price of Risk

- If you accept the proposition that a bond with default risk is riskier than an otherwise equivalent bond (same coupon and maturity) issued by a default-free entity, the price of risk in the bond market can be measured by looking at the differences in yields between the two bonds.

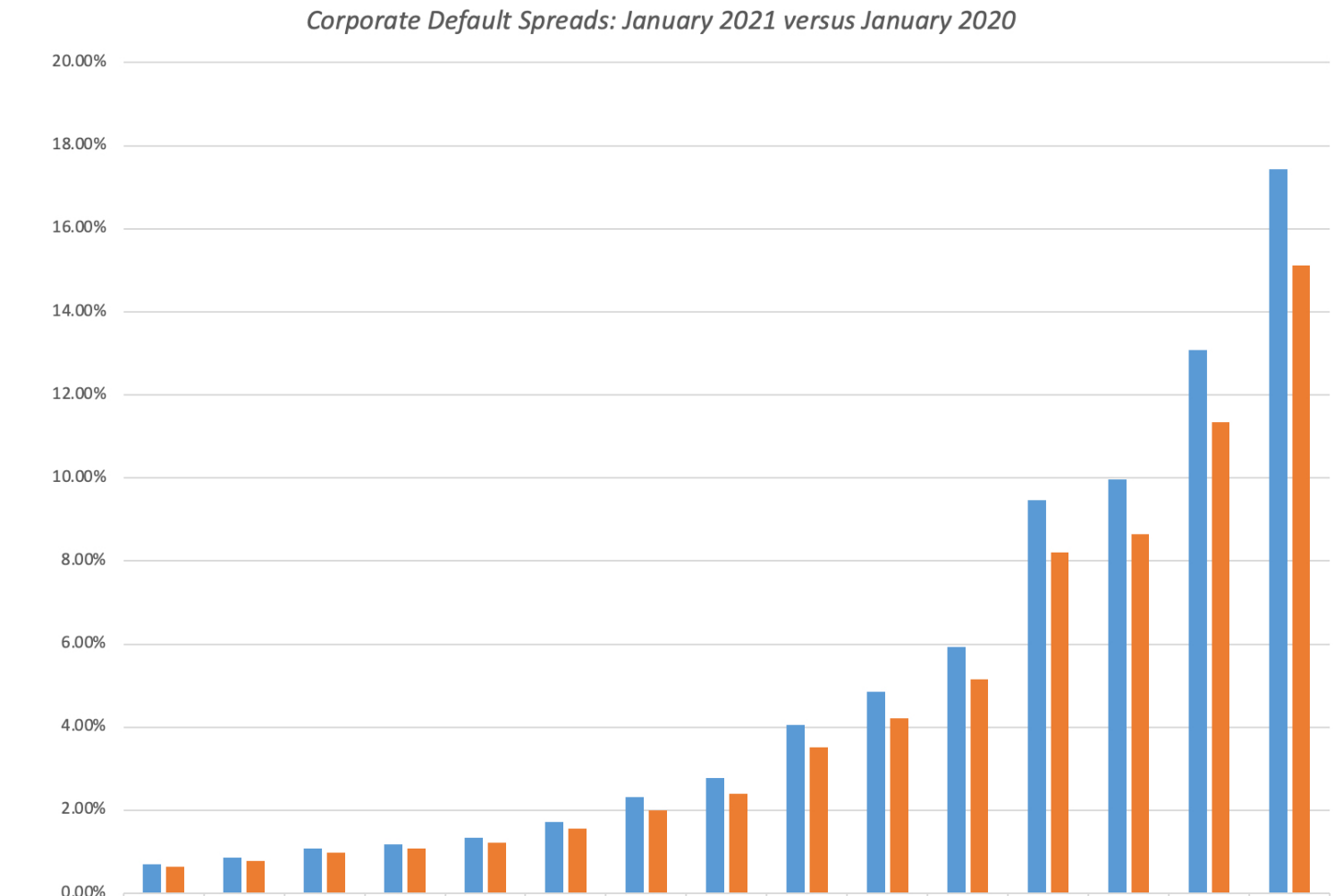
Yield to Maturity on a Bond: Mechanics and Intuition

The Intuition: If you the bond today, and the promised cash flows get delivered, this is the return you will earn on the bond over its maturity. If you pay a higher price, you will earn a lower expected return (yield to maturity).

$$\text{Bond Price today} = \frac{Coupon_1}{(1+r)} + \frac{Coupon_2}{(1+r)^2} + \frac{Coupon_3}{(1+r)^3} \ldots\ldots + \frac{Face\ Value\ of\ Bond}{(1+r)^n}$$

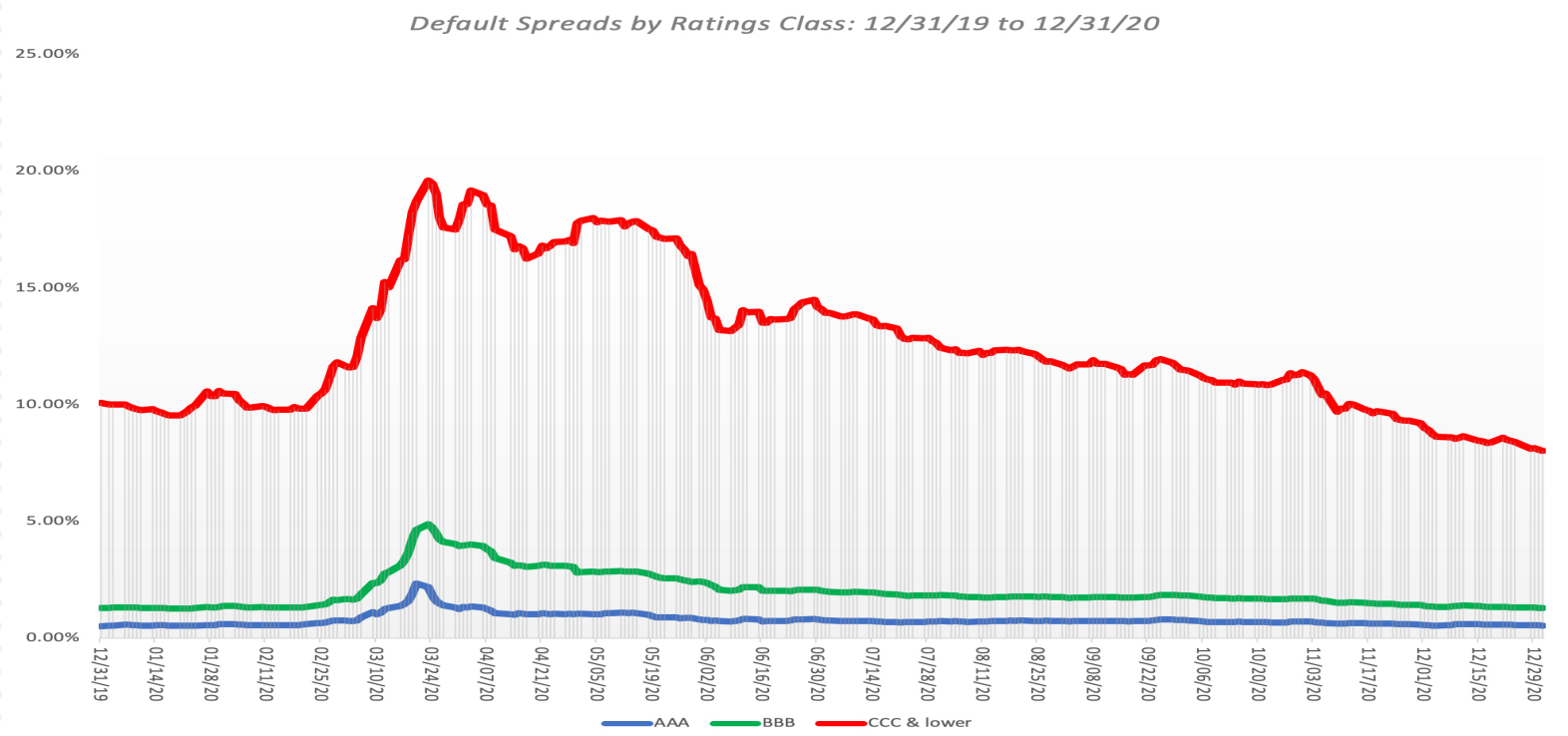
The Mechanics: The **yield to maturity** is that discount rate that yields a present value of cash flows = bond price today

Corporate Bond Spreads: Jan 2021 vs Jan 2020



	Aaa/AAA	Aa2/AA	A1/A+	A2/A	A3/A-	Baa2/BBB	Ba1/BB+	Ba2/BB	B1/B+	B2/B	B3/B-	Caa/CCC	Ca2/CC	C2/C	D2/D
Spread 2021	0.69%	0.85%	1.07%	1.18%	1.33%	1.71%	2.31%	2.77%	4.05%	4.86%	5.94%	9.46%	9.97%	13.09%	17.44%
Spread 2020	0.63%	0.78%	0.98%	1.08%	1.22%	1.56%	2.00%	2.40%	3.51%	4.21%	5.15%	8.20%	8.64%	11.34%	15.12%

After a roller coaster ride in 2020

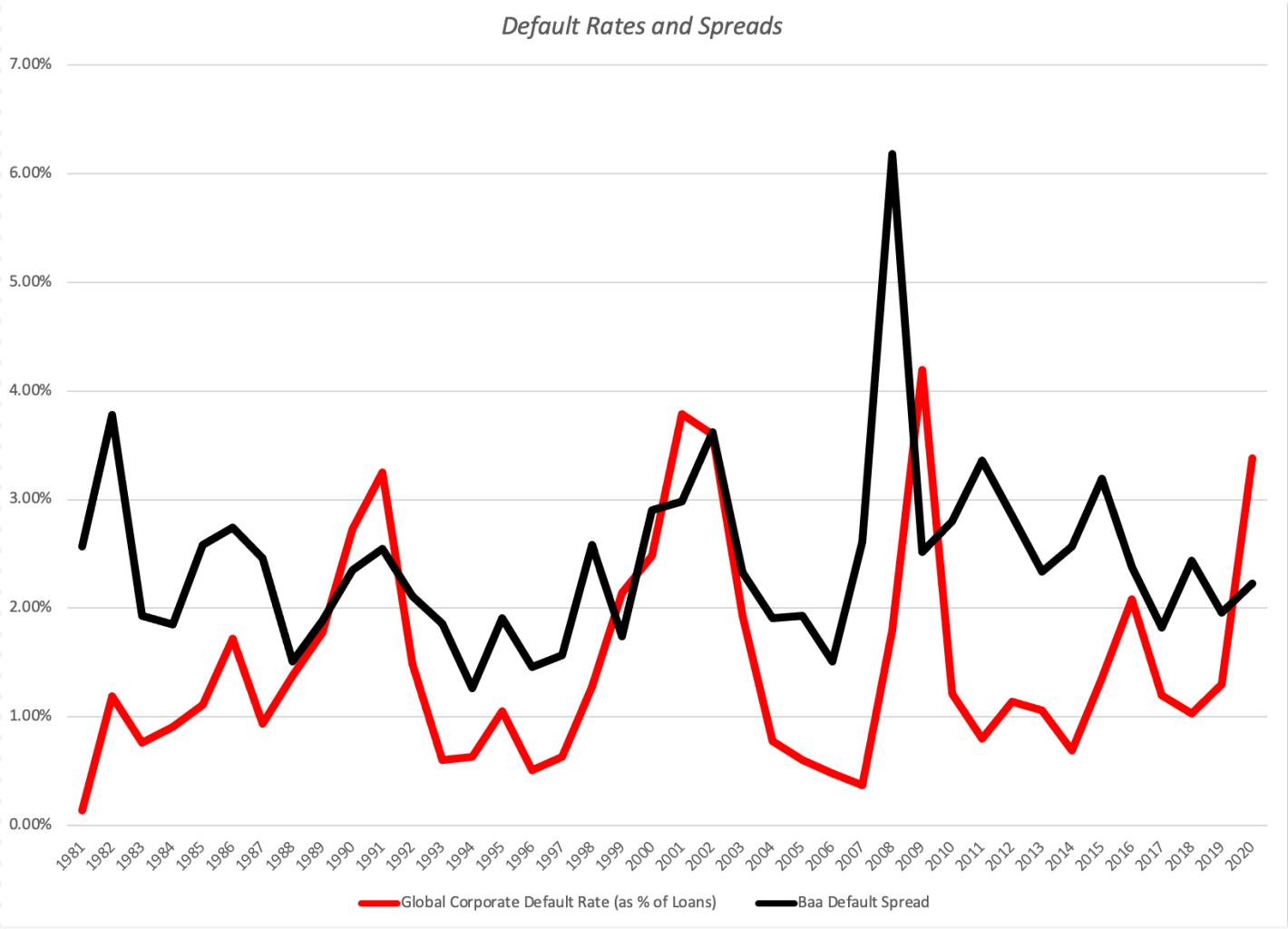


	Yields and Spreads on Corporates							
	Spread over 10-yr Treasury				*Yield on Corporate*			
S&P Bond Rating	12/31/19	2/14/20	3/20/20	12/31/20	12/31/19	2/14/20	3/20/20	12/31/20
AAA	0.63%	0.69%	1.43%	0.73%	2.55%	2.28%	2.35%	1.61%
AA	0.48%	0.72%	2.64%	0.80%	2.40%	2.31%	3.56%	1.68%
A	0.73%	0.80%	3.15%	0.84%	2.65%	2.39%	4.07%	1.72%
BBB	1.27%	1.33%	3.73%	1.57%	3.19%	2.92%	4.65%	2.45%
BB	1.85%	1.93%	7.45%	3.49%	3.77%	3.52%	8.37%	4.37%
B	3.40%	3.40%	10.74%	5.24%	5.32%	4.99%	11.66%	6.12%
CCC or lower	9.86%	9.65%	17.81%	10.83%	11.78%	11.24%	18.73%	11.71%

Are spreads too low? Comparing to history

Year	AAA	BBB	CCC& Lower
12/31/97	0.42%	0.93%	6.52%
12/31/98	0.62%	1.71%	9.22%
12/31/99	0.75%	1.53%	12.92%
12/31/00	0.98%	2.66%	16.29%
12/31/01	0.70%	2.22%	21.00%
12/31/02	1.02%	2.70%	20.69%
12/31/03	0.61%	1.30%	12.96%
12/31/04	0.55%	1.13%	7.99%
12/31/05	0.61%	1.21%	7.58%
12/31/06	0.56%	1.22%	6.20%
12/31/07	1.22%	2.45%	5.87%
12/31/08	3.43%	7.84%	16.75%
12/31/09	0.77%	2.48%	19.91%
12/31/10	0.66%	2.11%	10.18%
12/31/11	0.87%	3.15%	10.31%
12/31/12	0.64%	2.04%	11.04%
12/31/13	0.60%	1.74%	8.27%
12/31/14	0.65%	1.98%	7.57%
12/31/15	0.75%	2.41%	10.98%
12/31/16	0.71%	1.66%	14.37%
12/31/17	0.54%	1.28%	8.60%
12/31/18	0.78%	2.02%	7.67%
12/31/19	0.52%	1.30%	9.92%
12/31/20	0.55%	1.30%	12.61%
High	3.43%	7.84%	21.00%
Average	0.81%	2.10%	11.48%
Median	0.66%	1.86%	10.24%
Low	0.42%	0.93%	5.87%

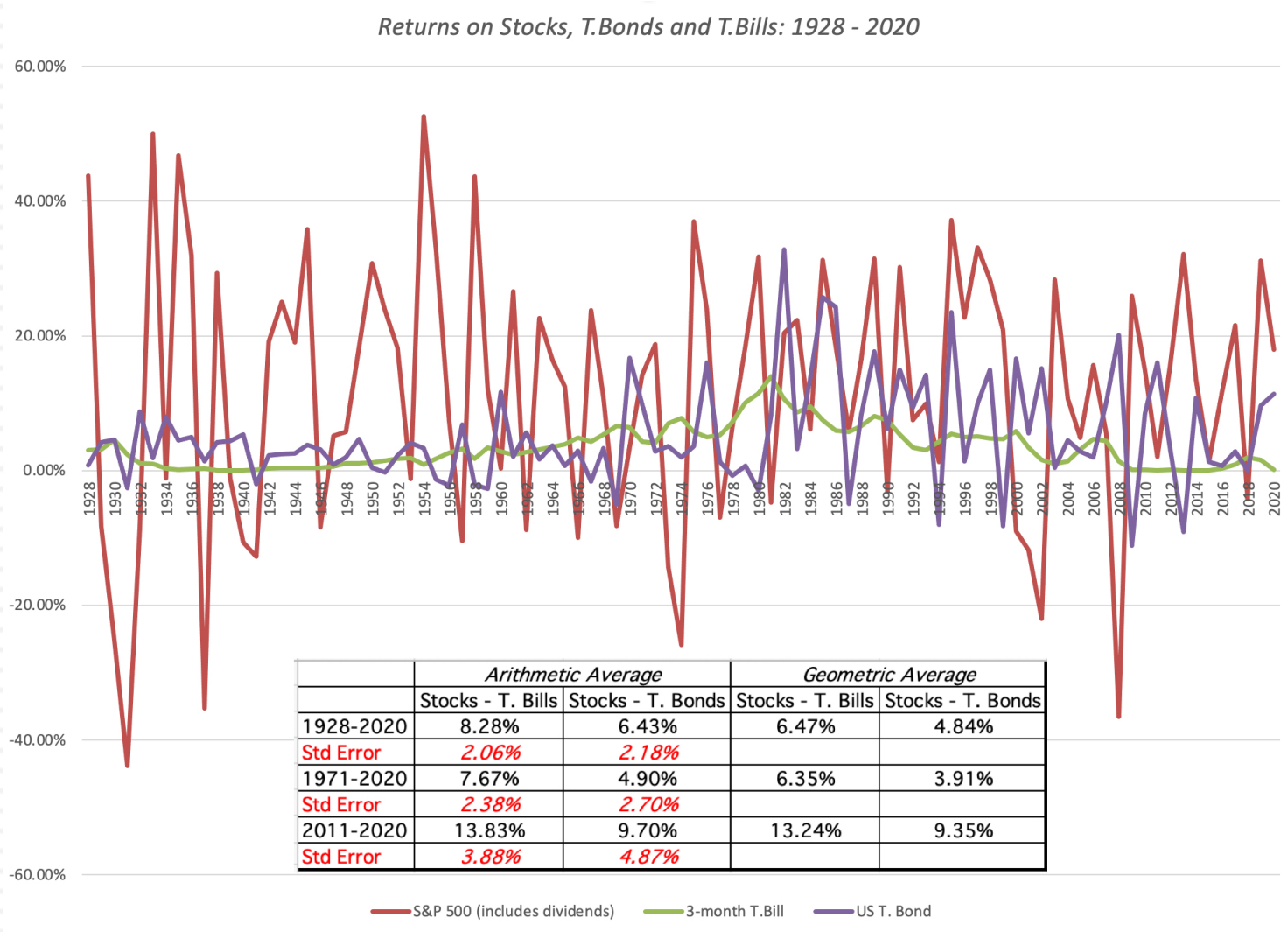
And to default rates…



Equities: The Price of Risk

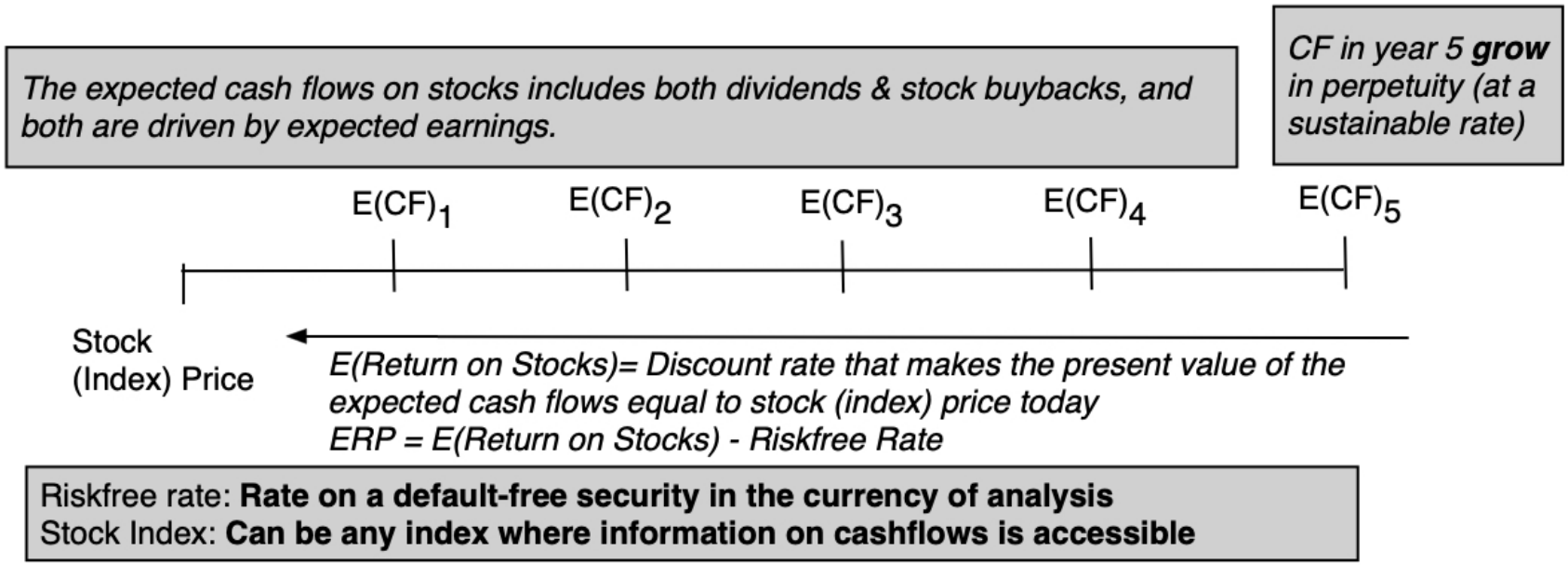
- Equities are riskier than bonds (or at least most bonds), and it stands to reason that there is a price of risk bearing in the equity markets.
- While that price has a name, i.e., the equity risk premium, it is more difficult to observe and estimate than the default spread in bond markets. The simple reason is that unlike a bond, which comes with specified coupons, the cash flows that you receive when you buy stocks are neither pre-specified nor guaranteed.
- This difficulty in observing the equity risk premium leads many to look backwards, when asked to estimate the equity risk premium.

Historical ERP



	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2020	8.28%	6.43%	6.47%	4.84%
Std Error	*2.06%*	*2.18%*		
1971-2020	7.67%	4.90%	6.35%	3.91%
Std Error	*2.38%*	*2.70%*		
2011-2020	13.83%	9.70%	13.24%	9.35%
Std Error	*3.88%*	*4.87%*		

An Alternative…



The ERP on January 1, 2021

In 2020, COVID caused major drops in both earnings & cash return from 2019 levels

Expected earnings/cashflow growth in next 5 years
Earnings for next year based upon analyst estimates for 2021 and 10.15% growth in earnings from 2021-25, mostly a recovery from COVID drop in 2020.

Base year cash flow (last 12 mths)
Dividends (TTM): 58.89
+ Buybacks (TTM): 68.89
= Cash to investors (TTM): **127.78**

Actual numbers | Forecasted numbers

	2019	*Last 12 months*	2021	2022	2023	2024	2025	*Terminal Year*
Expected Earnings	$ 163.00	$123.35	138.55	152.62	168.11	185.18	203.98	205.88
Expected cash payout as % of earnings	89.76%	103.59%	89.09%	90.21%	91.33%	92.46%	93.58%	93.58%
Expected Dividends + Buybacks =	$ 146.31	$127.78	$123.43	$137.67	$153.54	$171.21	$190.88	192.66

Earnings and Cash flows grow @0.93% (set equal to risk free rate) a year forever.

S&P 500 on 1/1/21= **3756.07**

$$3756.07 = \frac{123.43}{(1+r)} + \frac{137.67}{(1+r)^2} + \frac{153.54}{(1+r)^3} + \frac{171.21}{(1+r)^4} + \frac{190.88}{(1+r)^5} + \frac{190.88\,(1.0093)}{(r-.0093)(1+r)^5}$$

The last term in this equation is the expected index level at the end of year 5 (capturing price appreciation)

Solve for r

r = Implied Expected Return on Stocks = 5.65%

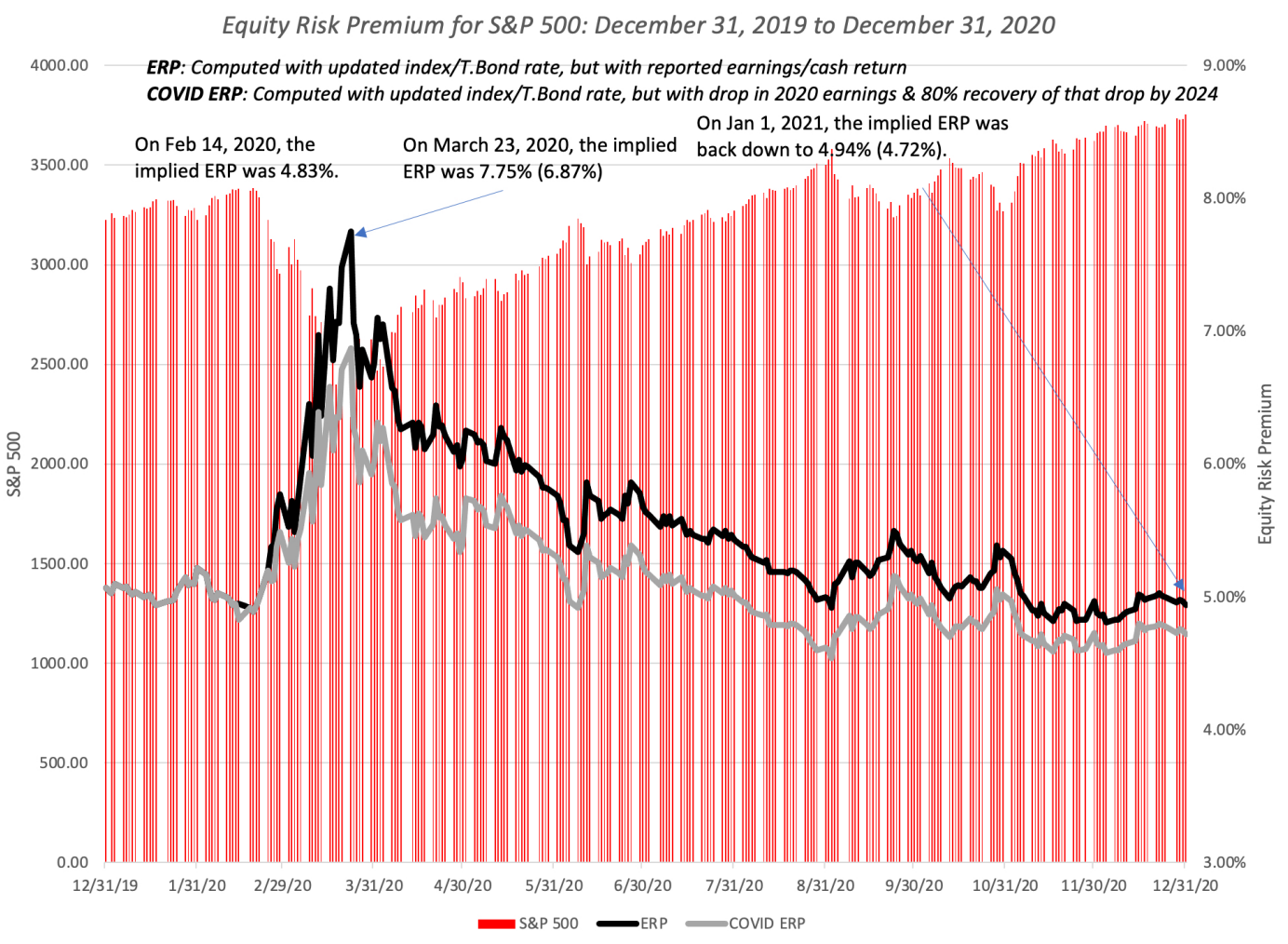
Minus

Risk free rate = T.Bond rate on 1/1/21= 0.93%

Equals

Implied Equity Risk Premium (1/1/21) = 5.65% - 0.93% = 4.72%

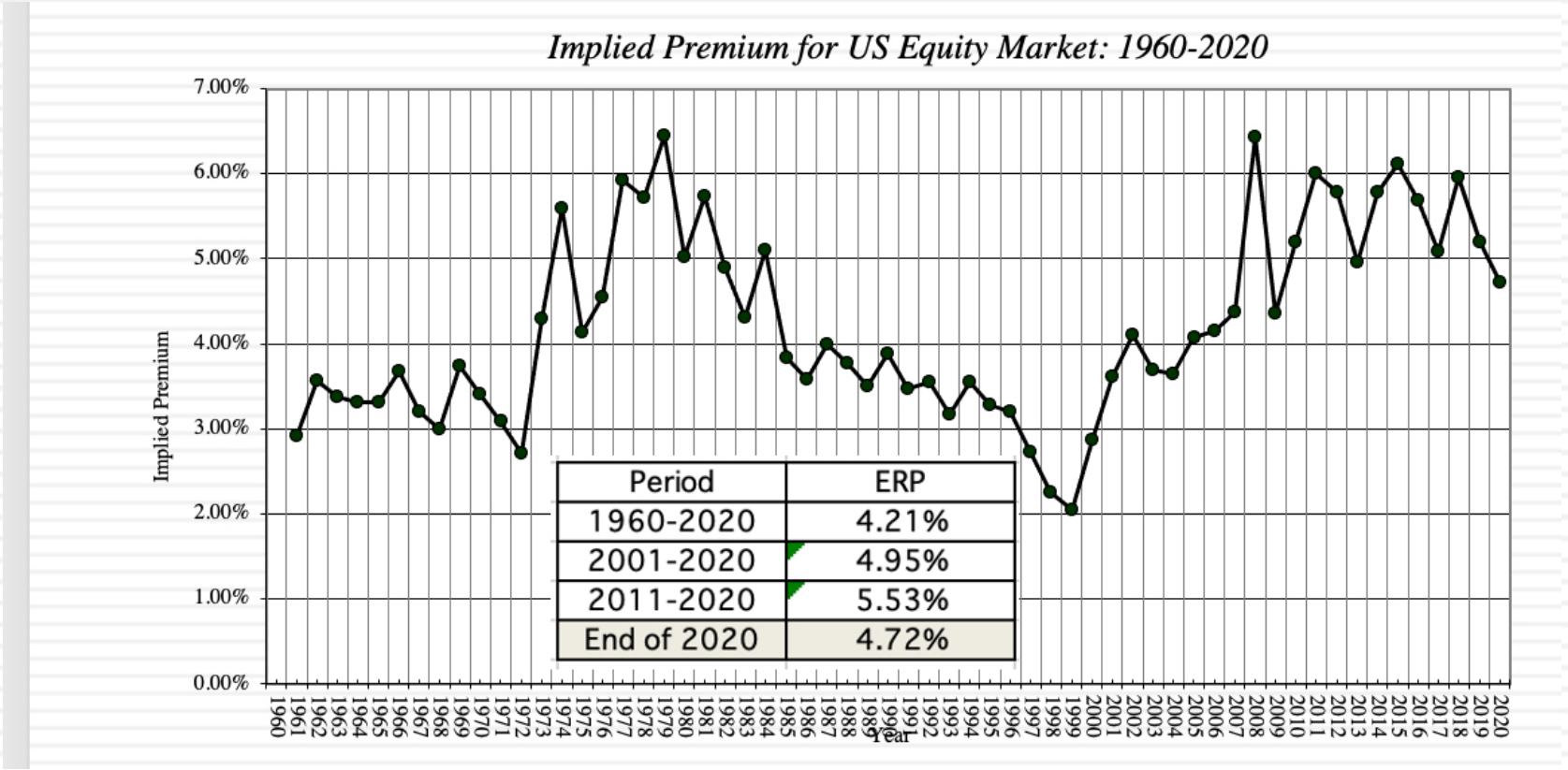
And the wild ride in 2020…



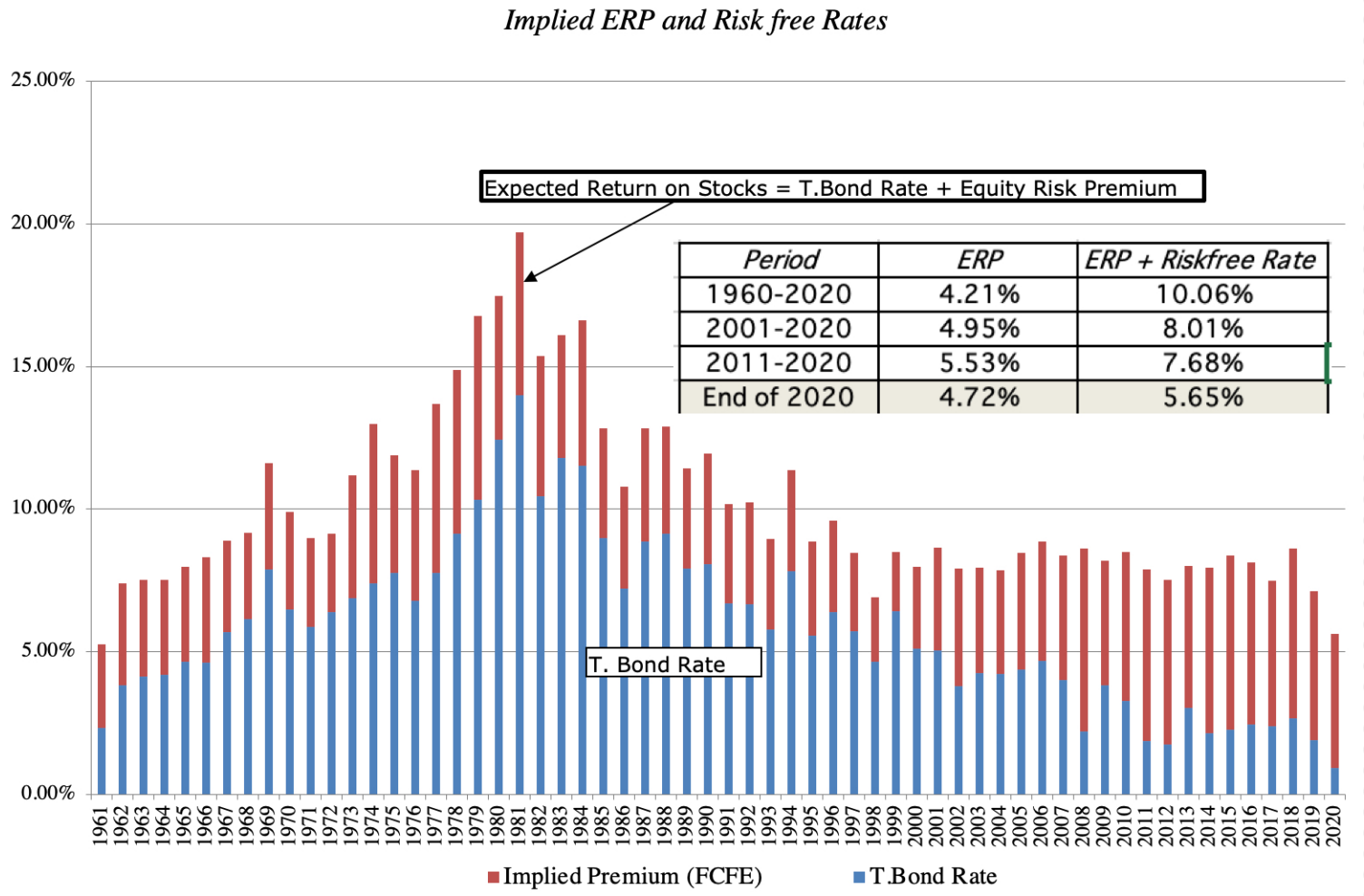
A Market Gauge?

- As we are engulfed by talk of market bubbles and corrections, it is worth nothing that any question about the overall market can really be reframed as a question about the implied equity risk premium.
  - If you believe that the current implied equity risk premium is too low, you are in effect also saying that stocks are overvalued, just as a judgment that the equity risk premium is too high is equivalent to arguing that stocks are undervalued.
  - So, at 4.72%, is the equity risk premium too low and is the market in a bubble?

Comparison to History



But....



Period	ERP	ERP + Riskfree Rate
1960-2020	4.21%	10.06%
2001-2020	4.95%	8.01%
2011-2020	5.53%	7.68%
End of 2020	4.72%	5.65%

To value the market…

- Earnings on the index: You cannot value a market based upon last year's earnings (though many do so). Investing is about the future, and uncomfortable as it makes you, you have to make estimates for the future. With an index like the S&P 500, you can even outsource these estimates, by looking at consensus forecasts from analysts tracking the index.
- Cash returned, relative to earnings: Since it is cash returned to stockholders that drives value, you also have to make judgments on what percent of earnings will be returned to stockholders, either in dividends or buybacks. To this, you can look to history, but recognize that it is also a function of the confidence that companies have about the future, with more confidence leading to higher cash being returned.
- Risk free rates over time: While it is generally not a good idea to play interest rate forecaster, we are in unusual times, especially because your views on future growth in the economy are intertwined with what will happen to risk free rates.
- An acceptable ERP: As I noted in the last section, equity risk premiums have been volatile over time, and particularly so in years in 2020. The equity risk premium, added to the risk free rate, will determine what you need stock returns to be, to break even on a risk-adjusted basis.

My S&P 500 valuation on Jan 1, 2021

Valuing the S&P 500 on January 1, 2021

Expected earnings in 2021 & 2022 represent consensus estimates for earnings on the S&P 500 from analysts. After 2022, earnings grow at the same rate as the riskfree rate.

Assume that the **10-year T.Bond rate** will rise garudally over the next 5 years to 2%.

Intrinsic Value Estimate (based on your choice of ERP)							
	2020	1	2	3	4	5	*Terminal Year*
Expected Earnings	$138.12	169.18	197.20	200.36	203.96	208.04	212.20
Expected cash payout as % of earnings	70.00%	75.00%	78.16%	81.33%	84.49%	87.65%	87.65%
Expected Dividends + Buybacks =	$96.68	$126.89	$154.14	$162.94	$172.33	$182.36	186.00
Expected Terminal Value =						$ 3,720.08	
Riskfree Rate	1.00%	1.20%	1.40%	1.60%	1.80%	2.00%	2.00%
Required Return on Stocks	6.00%	6.20%	6.40%	6.60%	6.80%	7.00%	7.00%
Present Value =		$ 119.48	$ 136.41	$ 135.27	$ 133.96	$ 2,835.03	
Intrinsic Value of Index =	**3360.14**	*Present value of expected cash flows & terminal value*					
Intrinsic Trailing PE =	**19.86**	*Based upon estimated earnings for 2020*					
Intrinsic CAPE =	**29.49**	*Based upon 10-year average earnings, adjusted for inflation*					
Level of the Index (1/1/21)	**3756.07**						
% Under or Over Valuation	**11.78%**						

Expected cash payout of 75% in 2021 is well below the 93% returned in 2019 & the 88% ten-year average but a step above the 70% returned in 2020. Over 2022-25, it moves to the payout in the terminal year, which is based upon a growth rate = risk freee rate and a ROE of 16.20% (2019 estimate for the S&P 500):

Payout ratio = 1 - g/ ROE

Required Return = T.Bond Rate + ERP. I am using a 5% ERP, higher than the 4.21% average from 1960-2020, but lower than the 5.5% average in the last decade.

The Drivers.. And Scenarios

	Economy strong	Economy weak
Interest rates stay low	Goldilocks market, with interest rates staying low (1%), earnings above expectations (+10%) and ERP drifting back to historic norms (4.2%). Index is undervalued by 19.83%	Big Bear market, with interest rates low (1%), earnings below expectations (-5%) and ERP moving to crisis levels (5.5%). Index is overvalued by 23.07%
Interest rates rise gradually	Reality-check market, with interest rates rising gradually (to 2%), earnings above expectations (+5%) and ERP settling in at 5%. Index is overvalued by 6.46 %	Big Bear market, with interest rates rising gradually (to 2%), earnings below expectations (-5%) and ERP moving to crisis levels (5.5%). Index is overvalued by 30.42%
Interest rates rise quickly	Rate Shock market, with interest rates rising quickly (to 2%), earnings at expectations and ERP settling in at 5%. Index is overvalued by 13.21%	Meltdown market, with interest rates rising quickly (to 2%), earnings below expectations (-10%) and ERP moving to crisis levels (5.5%). Index is overvalued by 39.41%

The Bottom Line

- I am a reluctant market timer, but ultimately we all time markets, implicitly or explicitly, the former in how much of your portfolio stays in cash or goes into non-equity investments, and the latter where you buy protection against market drops or bet on market moves.
- Going into 2021, I have far more cash in my portfolio than I usually do, and for the first time in a long, long time, I have bought partial protection against a market drop, using derivatives. It is insurance, and like all insurance, my best case scenario is that I never need to use it, but it reflects my wariness about what comes next.
- I am not and don't want to be in the business of doling out investment advice, and I think that the healthiest pathway for you is to make your own judgments on interest rates, earnings growth and acceptable risk premiums, and follow that with consistent actions.