DK Analytics, Post #25: Interest rate impact on S&P 500 valuation (& energy disconnect) 01/17/18
Trade weighted US$: 86.86; US 10-yr: 2.56%; S&P 500: 2,776; Oil: $63.46; Gold: $1,336; Silver: $17.22

Estimated NPV of S&P 500 using 4%, 5%, 7% discount rates (current TTM S&P 500 P/E: 26.7; E/P: 3.7%): 1,676
Estimated NPV of S&P 500 using 6%, 7%, 9% discount rates (current TTM S&P 500 P/E: 26.7; E/P: 3.7%): 1,163

Introduction:

In past posts and videos, including our prior post #24 labeled "Stock and bond markets are reversion beyond the mean machines," we have referenced the fact that valuations -- net present value or NPV -- of both asset classes are highly interest rate sensitive. In other words, in addition to fundamentals, such as:

- *GDP growth*; recall that long-term EPS growth cannot outstrip long-term nominal GDP growth (page 3)
- *Debt*; highly-indebted economies have borrowed from the future, implying lower GDP growth ahead
- *And earnings quality* (is debt low and cash flow high?) and the nature of EPS growth (is it organic or inferior "M&A" or stock buyback-based?, p.5), …

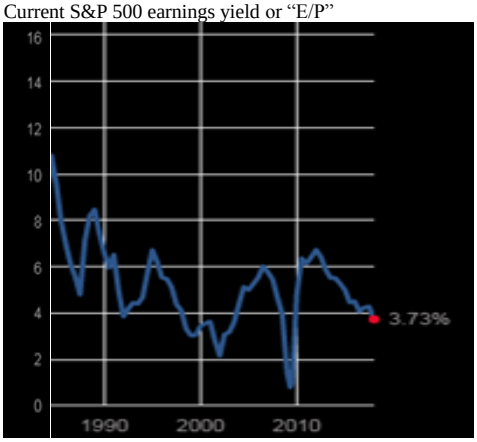
… *valuations* are very extensively determined by benchmark interest rates and by risk premiums.

Risk premiums are relevant to lower quality bonds and to stocks as an asset class. Risk premiums are added to benchmark rates (Treasury bond yields). They are called "spreads" (Moody's chart). They are called "discount rates" when referring to stocks. When discount rates rise, lower stock NPVs result, which beget lower P/Es/higher earnings yields. Spreads and earnings yields tend to balloon prior to and during periods of financial or economic stress:

Moody's seasoned Baa corporate bond yield relative to 10-yr Treasury constant maturity

Source: https://fred.stlouisfed.org/series/BAA10Y

Current S&P 500 earnings yield or "E/P"



Source: www.multpl.com/s-p-500-earnings-yield

Valuation color, albeit messy (we apologize), using 4%, 5%, and 7% discount rates:

Net present value or NPV of S&P 500 estimate
Key *assumptions* and *projections* -- all EPS and balance sheet numbers are nominal, and EPS are GAAP-based:

1. Given the ultra-long duration nature of Blue Chips, the 30-yr Treasury yield, which has a 2.85% yield as of this post's publication date (we've notched it up to 3% for NPV calculation purposes), is the discounting "benchmark."
2. 2017 GAAP EPS of $110.57 (this is S&P's estimate).
3. Once again: over time, nominal EPS growth = nominal GDP growth (page 3).
4. A major recession once every 10 years. EPS, which are typically single-digit sales residuals, are extremely GDP contraction "leveraged." In a recession, EPS can collapse well in excess of 50% (in 2008, by 77.5% in one year and by 81.7% since 2006). Meanwhile, cessation of "big bath" accounting charges combined with an "outsized spurt" of GDP growth right after a recession can result in doubling or tripling (such as in 2009) of EPS. That said, it took five years for S&P 500 EPS to (barely) surpass the 2006 high!
5. In the first decade, specifically in calendar years 2018 & 2019, an outsized EPS correction along 2007/2008 lines given a) an extremely long "upcycle" and b) that we've "doubled-down" on debt while losing productivity growth.
6. That we'll likely have an EPS recovery along leveraged 2009/2010 lines (law of "small numbers") in 2020/2021.

7. EPS "post-recession" & "post-recession recovery" (EPS-PR&PRR) compounding at 5% average from 2017 to 2026; discount rate 4% (3% 30-year Treasury plus a 1% risk premium).
8. EPS-PR&PRR compounding at 4% average from 2027 to 2036; discount rate 5% (3% 30-year Treasury plus a 2% risk premium -- higher inflation, higher interest rates, higher uncertainty given policy).
9. EPS-PR&PRR compounding at 2% from 2037 to 2046 (law of large #s); discount rate 7% (3% 30-year Treasury plus a 4% risk premium -- even higher inflation, even higher interest rates, even higher uncertainty given policy).
10. Years 2037 to 2046 EPS capitalized at 13x (earnings yield of 7.7%); mean earnings yield over 147 yrs: 7.4%.
11. "First decade" discount rate of 4% (T-bond plus 100 BPs) with step up to 5% (second decade) and to 7% (third decade) used to calculate NPV at year-end 2017. Rate rise tied to increasing interest rate assumption in US.
12. *Over time, capital markets will demand higher interest rates and discount rates* thanks to rising monetary policy-based inflation and solvency risks. In the US, increasing currency devaluation given long-standing gaping current account deficits coupled with a perennially currency debasing monetary policy will exert additional rate pressure.

Significant: please note that from 2006 (EPS: $81.51) to 2017 (EPS: $110.57), S&P 500 EPS CAGR was 2.8%; our guesses for the ensuing three decades have S&P 500 EPS CAGRs of 2.6%, 2.4%, and 1.9% per decade, respectively.

S&P 500's est. NPV per share:		
NPV yrs 17 - 26 (decade):	816	
NPV yrs 27 - 36 (decade):	658	
NPV yrs 37 - 46 (decade):	616	
sum of above:	2090	
less net debt per most recent data*:	414	
= est. intrinsic value:	**1676**	or 15.2x est "puffy" 17 EPS (avg P/E over 147 yrs: 14.7)
share price:	2776	1/17/2018
loss potential:	39.6%	

* - S&P 500 net debt per share as of Q3:17:
LT debt: $720; ST debt: $216; ag debt = $936; "discretionary" cash $522; $936 - $522 = $414 net debt
Source: senior S&P index analyst Howard Silverblatt, mid-January 2018

Valuation color, albeit messy (we again apologize), using 6%, 7%, and 9% discount rates:

First of all, an explanation on the "why higher discount rates" front. The reason is simple: we ~~could~~ should have substantially higher "benchmark" rates due to our progressively higher debt (over $217trn globally or over 2.9x global GDP and over $68trn domestically or some 3.5x US GDP), due to higher monetary policy-based inflation risks, due to "redistributionism" and to progressively weaker property right protections in OECD nations, and due to sustained weakness in productivity growth -- which could turn negative thanks to longstanding misallocations enabled by our toxic public policy stew. In a nutshell, interest rate suppression and the related yield starvation won't be a permanent fixture of our financial landscape. And we are convinced that the upcoming "reset" will have "American roots" (and will likely usher in even more pronounced global currency debasement), as we noted in an 11/12/17 post:

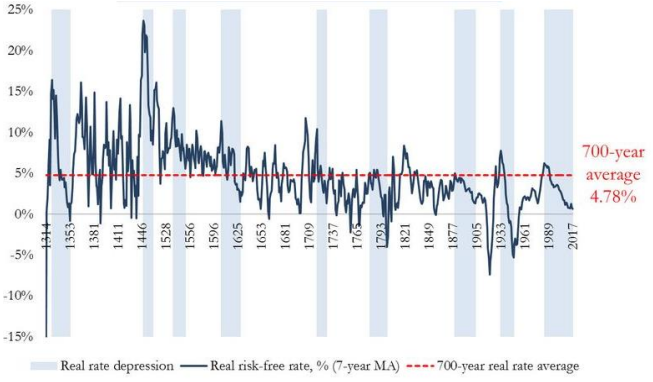
> For some fairly recent historical perspective, consider that 36 years ago America was still a $227bn net creditor nation (vs. a $8.3trn net debtor recently), government debt-to-GDP was 31% (vs. 103% recently), one measure of "published" inflation was 9.4% (vs. 1.3% recently), and Volcker's "tough love" monetary policy coupled with high inflation expectations had 10-year Treasury yields reaching 15.3% (vs. 2.4% recently).
>
> Fast forward to today: given America's hugely diminished manufacturing and financial stature juxtaposed against a) enormous external financing needs (about $500bn p.a.), b) overall foreign dollar holdings that have been estimated as high as $16trn, and c) a concerted effort by leading countries to conduct trade in non-USD terms, whether America can continue to indebt itself at nominal cost (low yields) isn't an academic discussion. Specifically, Asian success at scaling up non-dollar and/or gold-backed payment systems to compete with -- and eventually displace -- the all-important "petrodollar" standard used in the world's biggest and most important trade (oil) would have increasingly superfluous overseas dollars

come home. If a trickle became a gusher, this would place enormous pressure on the buck's value, trigger much higher domestic inflation, and elevate the US government's, and thus America's, cost of capital substantially, as the latter is based on a premium to the "benchmark" 10-year Treasury yield.

More important, in our view, is a "the die is cast" observation: the currently huge solvency and monetary inflation risks "scream" for much higher risk compensation in the form of materially higher interest and discount rates, as any financial analysis 101 textbook would clearly indicate. And this is before Mr. Market goes from his manic phase (our current asset bubbles) to his depressive phase. Said differently, it is before reversion well beyond the mean, which will, if history and human nature are any guides, ultimately result in much higher interest rates/bond yields and much lower P/Es/higher earnings yields, which will provide undervalued stocks and bonds -- and good return prospects!

With the aforesaid as a backdrop, we have raised the discount rates in an admittedly arbitrary fashion by two percentage points per decade over the subsequent three decades from our S&P 500 discount rate valuation assumptions above. As stated, given our financial (the global economy is de facto insolvent) and economic (productivity growth evisceration) issues, we could have much higher interest rates, and thus higher discount rates, much, much sooner than we deploy over the next three decades in our S&P 500 NPV estimate (please recall that Blue Chip stocks are the ultimate long-duration financial assets), and we likely will! But that misses the points that we are trying to raise here, namely: recessions recur, EPS get compressed, and *long duration valuations, especially when interest rates/bond yields and earnings yields are low, are incredibly interest rate sensitive*! For graphical depiction of just how historically low our interest rates are when viewed over centuries, check out the chart on the below on the left. For more a recent historical perspective, i.e., prior to revisiting our higher discount rate S&P 500 net present value (NPV) estimate, the US Treasury rate chart below on the right depicts an epic 36-year bond bull market:

The real risk-free rate since 1311



10-year Treasury constant maturity rate

Sources: www.bloomberg.com/news/articles/2017-11-07/centuries-of-data-forewarn-of-rapid-reversal-from-low-interest-rates; https://fred.stlouisfed.org/series/DGS10

NPV of S&P 500 estimate using higher discount rates (6%, 7%, and 9% instead of 4%, 5%, and 7%)
Key *assumptions* and *projections* -- all EPS and balance sheet numbers are nominal, and EPS are GAAP-based:

1. Given the ultra-long duration nature of Blue Chips, the 30-yr Treasury yield, which has a 2.85% yield as of this post's publication date (we've notched it up to 3% for NPV calculation purposes), is the discounting "benchmark."
2. 2017 GAAP EPS of $110.57 (this is S&P's estimate).
3. To repeat: over time, nominal EPS growth = nominal GDP growth (page 3).
4. A major recession once every 10 years. EPS, which are typically single-digit sales residuals, are extremely GDP contraction "leveraged." In a recession, EPS can collapse well in excess of 50% (in 2008, by 77.5% in one year and by 81.7% since 2006). Meanwhile, cessation of "big bath" accounting charges combined with an "outsized spurt" of GDP growth right after a recession can result in doubling or tripling (such as in 2009) of EPS. That said, it took five years for S&P 500 EPS to (barely) surpass the 2006 high!
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8. EPS-PR&PRR compounding at 4% average from 2027 to 2036; discount rate 7% (3% 30-year Treasury plus a 4% risk premium -- higher inflation, higher interest rates, higher uncertainty given policy).

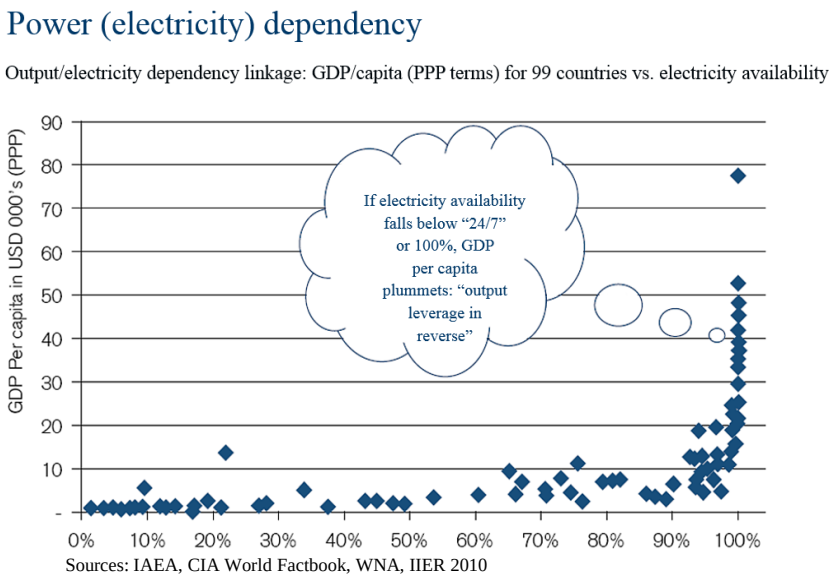
9. EPS-PR&PRR compounding at 2% from 2037 to 2046 (law of large #s); discount rate 9% (3% 30-year Treasury plus a 6% risk premium -- even higher inflation, even higher interest rates, even higher uncertainty given policy).
10. Years 2037 to 2046 earnings capitalized at 9x (earnings yield of 11.1%). Mean earnings yield over 147 yrs: 7.4%.
11. "First decade" discount rate of 6% (T-bond plus 300 BPs) with step up to 7% (second decade) and to 9% (third decade) used to calculate NPV at year-end 2017. Rate rise tied to increasing interest rate assumption in US.
12. *Over time, capital markets will demand higher interest rates and discount rates* thanks to rising monetary policy-based inflation and solvency risks. In the US, increasing currency devaluation given long-standing gaping current account deficits coupled with a perennially currency debasing monetary policy will exert additional rate pressure.

Significant: please note that from 2006 (EPS: $81.51) to 2017 (EPS: $110.57), S&P 500 EPS CAGR was 2.8%; our guesses for the ensuing three decades have S&P 500 EPS CAGRs of 2.6%, 2.4%, and 1.9% per decade, respectively.

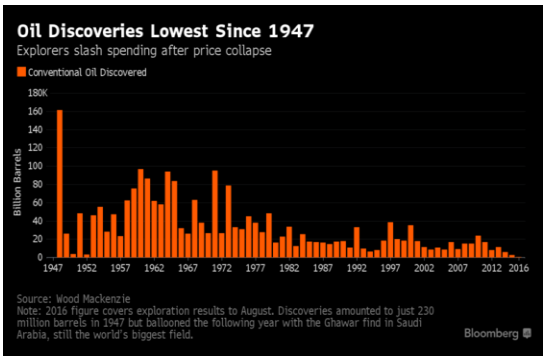
S&P 500's est. NPV per share:		
NPV yrs 17 - 26 (decade):	732	
NPV yrs 27 - 36 (decade):	491	
NPV yrs 37 - 46 (decade):	353	
sum of above:	1577	
less net debt per most recent data*:	414	
= est. intrinsic value:	**1163**	or 10.5x est "puffy" 17 EPS (P/E over 147 yrs: 14.7)
share price:	2776	1/17/2018 intraday
loss potential:	58.1%	

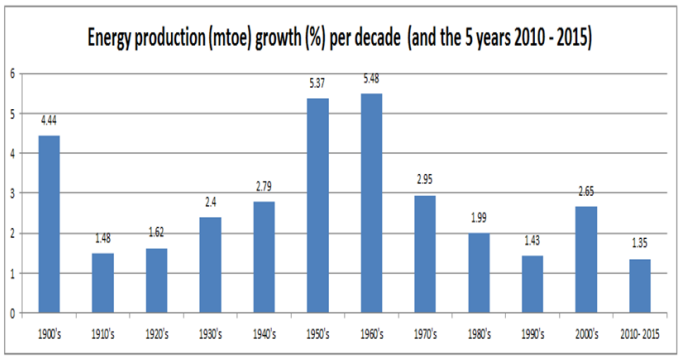
* - S&P 500 net debt per share as of Q3:17:
LT debt: $720; ST debt: $216; ag debt = $936; "discretionary" cash $522; $936 - $522 = $414 net debt
Source: senior S&P index analyst Howard Silverblatt, mid-January 2018

Potential energy disconnect, a real strategic output and thus capital preservation (valuation) threat:
The impact on leveraged economic output (productivity!), on earnings, and on debt carrying capacity (the globe's debt has eclipsed $217trn!), and thus on the value of stocks and bonds, should leading economies lose access to affordable, "24/7" dense energy (fossil fuel and nuclear power based), would be nothing short of apocalyptic. Below a chart which expresses this at the power (electricity) availability energy consumption level:



Oil and its "sister" natural gas provide 56% of the world's primary energy while coal provides 29%. In total, fossil fuels provide 85% of primary energy, while nuclear kicks in another 4%, meaning dense energy accounts for a whopping 89% of our current global primary energy. Comprising 32%, oil remains the single most important source of primary energy (and more); our transportation network, our global "supply chain," and the production of consumer goods, capital goods, and infrastructure depend heavily on it. Yet while green crony capitalists aligned with despotic statists seek to sustain our energy sector misallocations, oil -- and thus natural gas -- is increasingly difficult and expensive to unearth, much less to replenish. This is despite the loss making (note that the industry never made money, even when oil sold for $100 plus per barrel), unsustainable, and environmentally degrading "fracking bonanza."





Source: Bloomberg and macrostrategy.co.uk (The quality of MTOE growth has been declining thanks to a mix shift to less dense than oil fuels!)

Upshot: the S&P 500 NPV estimates above, which are based on sustained, nominally positive GDP growth over the succeeding decades, *assume* adequate and affordable energy availability. *If this is fails to be the case, both stocks and bonds, which are ultimately claims on massive dense energy exploitation and output leverage, will become worthless.* In a related sense, we know that a barrel of oil, or 42 US gallons/159 liters, generates heat when burned. That heat is turned into inconceivable amounts of work in machinery such as turbines, generators, motors, engines, and in all kinds of vehicles outfitted with "powerplants." Specifically, one oil barrel of work is the "energy slave" equivalent of one ag worker toiling in the field for 11.1 years, or one horse hitched to a wagon for over one year!

Conclusion:

The business cycle hasn't been rendered academic. America's paltry, eight year-plus expansion is running on fumes. Real world inflation rates are creeping up after nearly a decade of extreme and unparalleled global monetary policy (ZIRP and QE). OECD productivity growth is disappearing while both China and India grapple with productivity growth slowdowns. Central banks seem bent on raising short-term interest rates so that they can lower them from a few percentage points (versus today's near zero percent interest rate levels) at the onset of the next recession. And the US federal government deficit is set to expand massively thanks to increasing government spending (pp. 6 - 7), lower tax revenues associated with the just-passed tax cut bill, and an ever closer recession. Yet stocks, as measured by the leading Blue Chip index, the S&P 500, are trading at a lofty 26.7x (peak?) EPS as of January 17th, 2018!

How does one spell grossly overvalued equities? How does one spell huge, cyclically-based EPS contraction risk? How does one spell huge, solvency and monetary inflation-based "spread" and discount rate risks even as benchmark interest rates (AAA-rated, 10-year or 30-year government bonds) are still flirting with historical lows? How does one spell an S&P 500 Index that could conceivably be 40% to 60% cheaper within a year or two (recall that drawdowns occur much faster than bull market-based capital gains)? How does one spell a "double-whammy?"

How much longer can both stock and bond valuations stay irrational? How much higher could stocks and bonds go? We don't know, but we do know that eventually the laws of economics trump politics, manipulation, financial repression, and computerized trading/algorithms, which in essence lead to purchasing more of the very assets that go up in price the most. What will prick the unprecedented global asset bubble, be it in stocks, bonds, or real estate? We don't know. But we do know that when it does occur, it should be dramatic. Recall that once assets fall in value, those same computerized trading programs will sell ever more of them, pushing prices down even further, faster. Also recall that markets are reversion beyond the mean machines! In this case, it will be from a unparalleled boom to what will likely be an unprecedented bust. That same bust will yield tremendous values in stocks and in bonds.

So why reduce exposure materially to bubble value assets, or asset valuations divorced from both sound capital preservation and ROI prospects? Because they don't ring a bell at the top. But they don't have to. Just boring, but strategically remunerative concepts such as a) that business cycles haven't been rendered academic, b) that bubble valuations invariably lead to underwhelming -- and often disastrous -- portfolio returns, and c) that a reversion beyond the mean interest rate cycle from unprecedentedly low interest rates will result in "fire sale" valuations that typify precisely the kind of investment opportunities -- and future returns -- that can be once in a lifetime.

Is "1983, revisited" in your dry powder future? And have you hedged your bets by holding real wealth/real money, namely physical precious metals (PMs) in your possession? The latter are insurance policies not only against the potential ravages of either deflation or inflation, but PMs also represent *claims on energy already spent* (getting them out of the ground!) *versus claims on future energy burned*. As such, PMs will become even more valuable if our leveraged economic output, and the stock and bond valuations that it enables, becomes increasingly questionable or even unfeasible. Given some $280trn in global investable assets featuring a well under 1% exposure to PMs, only a minute shift away from stocks and bonds would result in massively higher PMs equilibrium prices given substantial mining and above ground supply constraints (as well as strategic holders' price inelasticity).

Moreover, have you committed funds to vital scarcity assets that can't be printed? In particular, to dense energy assets and to ag assets (we offer some "vertical market starting points" in our quarterly theoretical portfolio performance tabulations)? We both know that when leading politicians, power-addicted fiat money central bankers and their cabal member money center banksters, and "rent-seekers"/K Street cronies feel that their wealth or status quo is threatened, e.g., by a thundering recession, that they will always resort to the printing press (currency debasement) as a remedy. Why? Because they (still) can! In other words, their "public policy stew" and the associated growth in misallocations (evidenced in the ongoing demise of productivity growth) and debt will require even much larger "QE rounds" to offset, much like an alcoholic requires perpetually more alcohol to stay, much less get, inebriated. This will make drilling for ever harder to unearth and progressively more expensive, materially demand inelastic oil "affordable," while pushing up its price in increasingly debased fiat currencies.

For flavor, consider a decade of intense fracking. A decade of huge and ongoing financing requirements juxtaposed against gaping industry losses and hugely negative "free cash flow." Ah, the wonders of financial repression -- also known as yield starvation-induced asset bubbles -- such as capitalizing the uneconomical fracking industry and unleashing the subsequent valuations froth. Sound familiar? And sometimes a picture is worth a thousand words:

America's shale firms don't give a frack about financial returns

The bottom line: look for a money printing (QE) boomerang, i.e., once the "quantitative tightening" or QT claptrap comes to a rapid end, lest all those central bank asset bubble babies pop "prematurely," and possibly the despotic elitist/plutocrat status quo along with them. Last but not least, count on stock and bond market meltdowns -- the coming "fire sale" allocation opportunity. We believe that the valuation compressions will unleash untold global money printing, which will eventually "lift" stock prices. However, given the pervasive financial, economic, and political damage done over the past decade, the stock and bond "fire sale" window will likely stay open substantially longer than during 2008 financial crisis and its aftermath. Caveat emptor.

Sincerely, Dan Kurz, CFA
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