

Convexity Maven

A Commentary by Harley Bassman

November 15, 2018

"A Guide for the Perplexed"



Moshe ben Maimon (Maimonides) 1135 - 1204

Maimonides published "*The Guide for the Perplexed*" in 1190 as an effort to reconcile Aristotelian Philosophy with the theology of the Hebrew Bible. It is considered a canonical religious masterpiece and greatly influenced both Thomas Aquinas and Duns Scotus.

I have no such aspirations for this commentary, except perhaps remind readers that it is never different this time. Such is the case that while a professional investing career of forty years may be termed robust, in actuality it will likely capture only a pair of economic cycles; too few to fairly opine. Thus I find bothersome the chatter of "this is the worst..." or "this is the biggest..."

Are our politics presently the most polarizing and dangerous to the Republic ? Fifty years ago we endured two high-profile assassinations and the National Guard fired live ammo at college students. Only a few years separated me from being drafted to serve in another ill-fated conflict. Perhaps this is not the worst.

To quote Captain Renault: Let's round up usual suspects.

We are all human

Indeed, we are all (mostly) social beings who crave to be part of the group. When at a cocktail party where everyone is chatting about how well they are doing by being fully invested in the market, one feels the primal urge to join. Nobody wants to be the smarty pants who is sitting on a pile of cash. And if you end up being right, I can assure you that no one will want to hear about it.



Don't try to deny that you have these urges, rather recognize them for what they are. Thus my cardinal rule: *Sizing is more important than entry-level.*

Convexity is always lurking at the scene of the crime

Wall Street loves to make convexity sound complex (I suppose it's so they can charge higher fees?). We speak Greek (calling it "gamma"), employ physics as a metaphor (analogizing to it "acceleration"), and use mathematical definitions (since it is the second derivative of the asset's price change).

Pish, posh. An investment is convex if the payoff is unbalanced for equally opposite outcomes. So if there's the potential to earn a profit of two on a bet versus a maximum loss of one, the bet is positively convex. If you can lose three versus making two, it is negatively convex. That's it. The rocket scientists are called upon to help (fairly) price the cost (value) of such possible outcomes. This is why the expansion of derivative trading in the 1990's resulted in a hiring spree of physics PhD's.

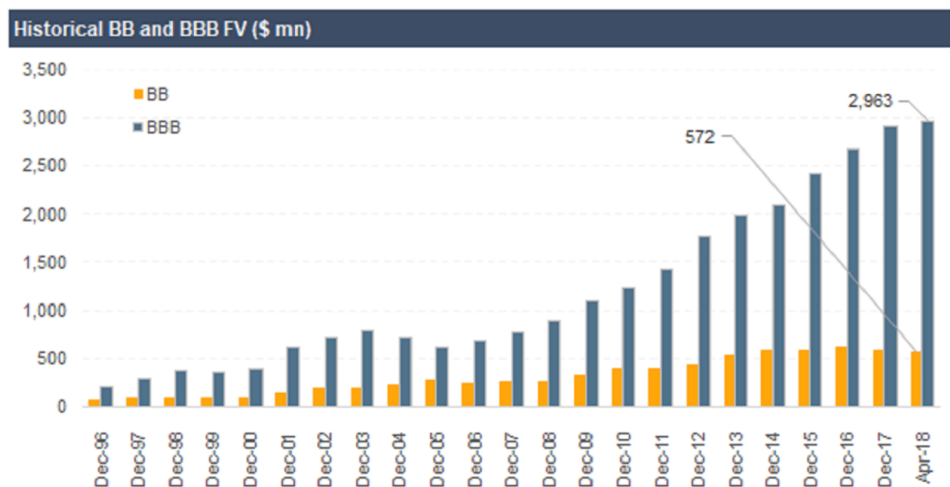
Investors have a conflicted relationship with convexity. It has been observed that the unpleasantness of losing one dollar is greater than the joy of making a similar sum; a social economist would say that people are not risk neutral. Yet incongruously, investment managers display a bias to be short optionality (convexity); a payoff profile where the losses can be greater than the gains.

The reason is simple: Convexity (option) sellers are paid up front, either via a coupon or cash (the option premium). In a nutshell, greed outweighs fear.

For simplicity, let's assume that US Treasuries (UST) have no convexity, so their yield is just the pure risk-free interest rate received to maturity. As such, we can model a non-callable corporate bond as a UST plus some extra yield for the risk the company cannot ultimately return your money. This will sort of look like being long a UST and short a put on the company's stock, but more accurately short a credit default option on the company.

A greater risk of default translates into a more expensive option and thus, a higher yield on such bonds. Presently, a bond issued by Apple yields about 42bps more than a similar maturity UST, while a bond backed by Tesla offers an extra yield of 406bps. Investment professionals will ponder which has a better 'risk-adjusted return'; but there no is doubt that buyers of Tesla bonds will receive an extra 364bps as long as Elon's company can make the coupon payments.

Among the many under-appreciated consequences of the Fed's Zero Interest Rate Policy (ZIRP) was how liability managers (pension / insurance) might overweight convexity risk in their effort to reach their return targets. This demand explains the massive growth in the -labrador bar- BBB-rated market relative to the -gingerline bar- BB-rated market.

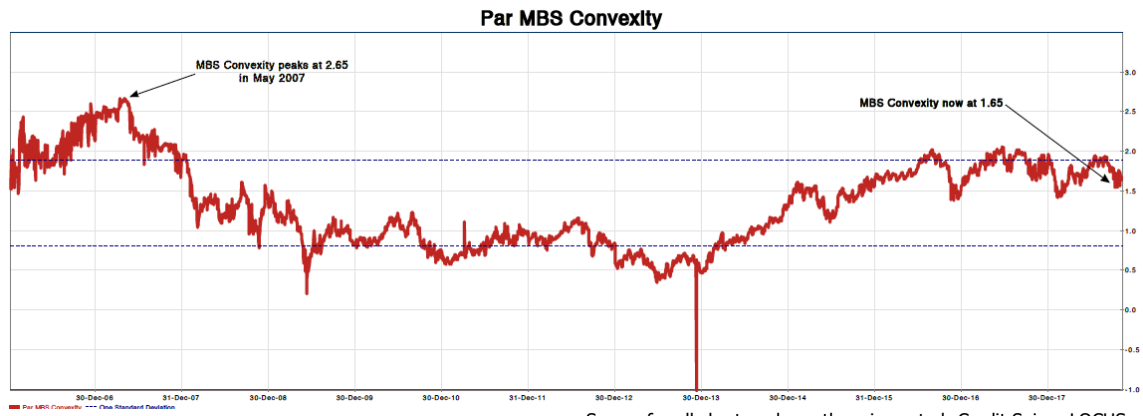


Source: CreditSights, ICE BofAML Indices data through 4/13/2018 Face Value presented in millions

An option is most convex when it is at-the-money; a location where it also has the greatest time value (yield). BBB-rated bonds reside at the credit inflection point – a notch lower and they become “junk” that may need to be quickly liquidated by investment-grade portfolios.

I am loath to use the word “always”, but over the course of my professional career, there always seems to be a concentration of short convexity at the core of extreme market turbulence. Convexity is the measure of unbalanced risk so, almost by definition, a negatively convex portfolio will be unstable. Markets become disturbed when the instability of convexity becomes greater than the market’s liquidity. Convexity is not the match, but rather the accelerant.

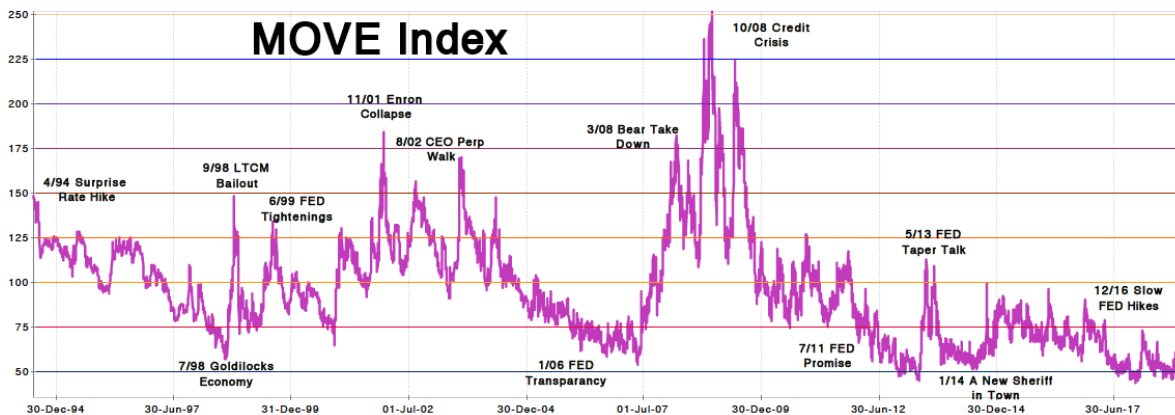
A decade ago, convexity risk was concentrated in the mortgage market, both in the **-incarnadine line-** Agency MBS market as well as sub-prime CDO’s. With MBS convexity 38% lower than its 2007 peak, the credit market is where the convexity risk now resides.



Why low Implied Volatility matters

The VIX is known as the “Fear Gauge”, a loftier level indicates more stress. But truth be told, investors should be more fearful about low Implied Volatility.

The **-amaranth line-** below is the MOVE Index (the VIX for bonds). One might note that touching a level near 50 is usually soon followed by a sharp increase.



Pundits often note that low levels of volatility indicate somnambulant investors who are unconcerned with risk. While this may well be true, the real reason markets tend to soon vibrate is that Convexity is inversely proportional to Implied Volatility (IVol). All else equal, as IVol declines, convexity (gamma) increases, and thus a short convexity investment become more unstable.

Reviving a chart from "*It's Never Different This Time*" (January 29, 2018), notice that not only are the losses greater at a 13% IVol versus 26% IVol (\$57 vs \$10), but also more impactful; the position change is nearly double (54.6% vs 28.9%). Investment managers must be much more active (sell) to maintain a risk profile.

SPX Straddles					
Strike = 2750					
Expiry = 1 year					
		<i>SPX = 2750</i>	<i>SPX = 2500</i>		
	<i>Ivol = 13%</i>			<u>Price change</u>	<u>Position Change</u>
Price		\$280	\$337	-\$57	
Delta		-5.40%	49.20%		-54.60%
Gamma		-6.00	-4.77		
Vega		-21.50	-15.55		
	<i>Ivol = 26%</i>				
Price		\$559	\$569	-\$10	
Delta		-10.30%	18.60%		-28.90%
Gamma		-2.98	-2.91		
Vega		-21.37	-19.00		

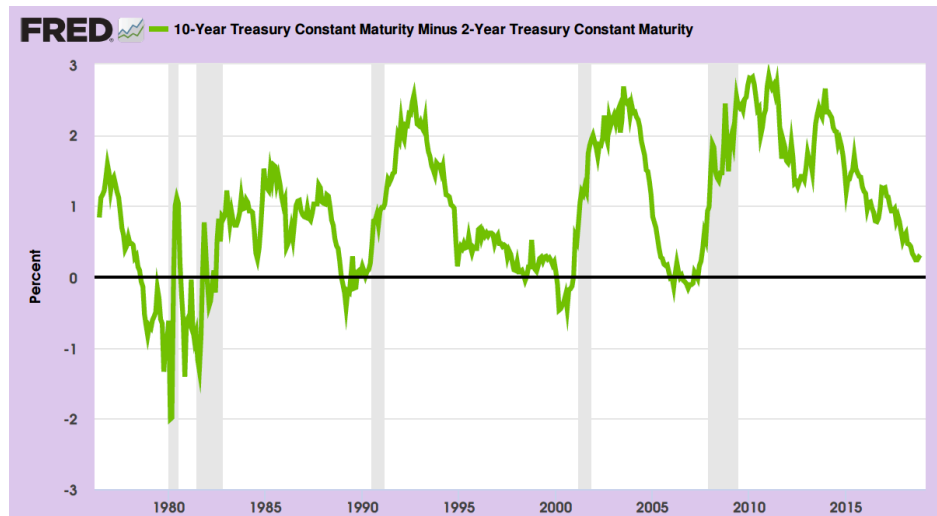
The shape of the Yield Curve is more than economic cocktail chatter

Of all the economic and financial vectors, the level and shape of the Yield Curve has offered the clearest window into the future. This should be no surprise since interest rates are the 'cost of money', and its cost tends to drive decisions in a global economy based upon a system of fractional reserve fiat-currency banking.

The Fed's primary management tool is now adjusting interest rates (short-term via the Fed Funds rate, and long-term via QE); this is different from prior times where regulation (Reg Q, Reg T, etc.) also played an important role.

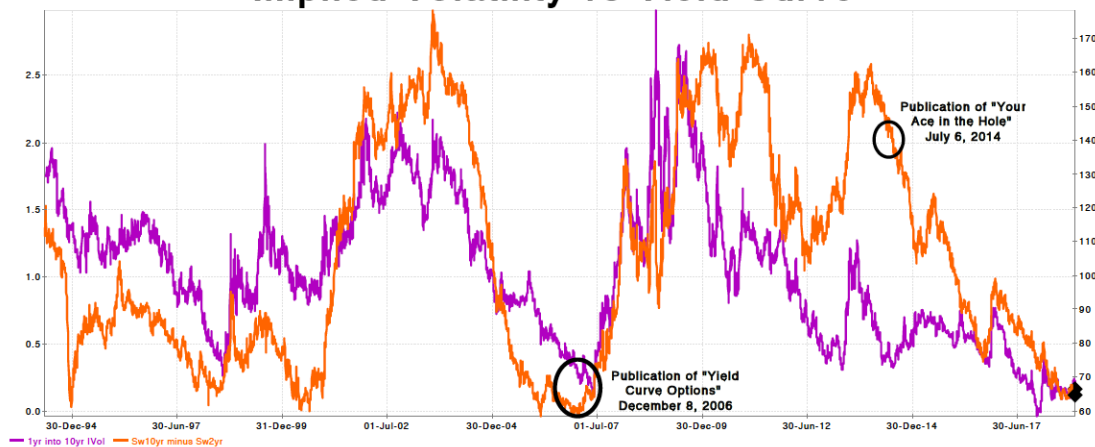
A primary complaint about the FED's heavy hand in managing the Great Financial Crisis is that they have distorted the information one discerns from the Yield Curve, and thus could alter the decision-making process of both businesses and investors (leverage, credit risk, etc.). I would also add that Fed policy has contributed to our dyspeptic politics by shifting the allocation of income/wealth between Labor and Capital; but we can save that for another discussion.

Notwithstanding the above, projecting the **-verditer line-** forward would be consistent with a **-shaded-area-** recession in early 2020. It is important to note that a flat Yield Curve does not cause a recession, but rather is a harbinger. A flat rate profile suggests that investors are not demanding a higher return in exchange for locking up their funds into the distant future; likely in anticipation of an economic slowdown that will reduce the demand (price) for money.



Similarly, a flat Yield Curve does not directly cause a decline in Implied Volatility, but rather reduces the demand for financial market insurance (options).

Implied Volatility vs Yield Curve

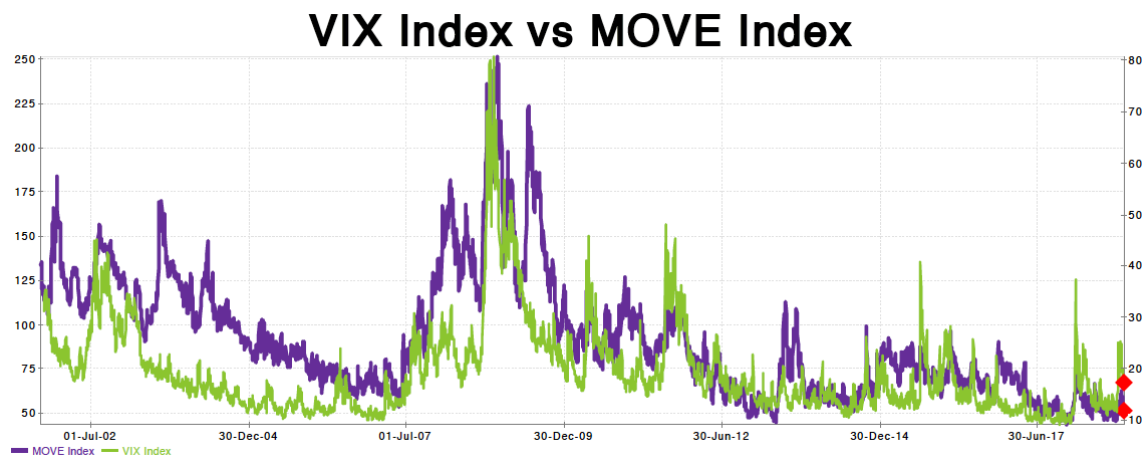


The shape of the **-sinoper line-** Yield Curve suggests a degree of uncertainty for the path of interest rates. If the curve is steep (long-term interest rates are higher than short-term rates), the projection of rates into the future (the forward rate) must be higher than today's interest rate (the spot rate); and the steeper the curve, the wider the separation between the spot and forward rate.

As such, a steeper curve fundamentally creates greater uncertainty, and thus is associated with a higher level of *-glaucous line-* Implied Volatility. This topic is discussed in greater detail in *"Your Ace in the Hole"* (July 6, 2014).

Financial market risk is one happy family

In a nutshell, all financial risk vectors are related. The shape of the Yield Curve, the level of Credit Spreads, the correlation of various points on the yield curve and the level of Implied Volatility should all move in tandem since the risk premium embedded in the Duration, Credit, and Convexity risk vectors should correlate in some grand manner. Notice the *-smaragdine line-* VIX Index roughly tracks the *-zaffre line-* MOVE Index.



A simpler explanation may be that the net carry (profit) across risk categories should equilibrate as "alpha seekers" allocate capital across the various risky assets in search of excess return. This is why you pay your investment manager, they are supposed to sell an asset class that offers a low return and move to an asset class that offers a higher return.

Market disruptions tend to occur when expected returns become low across all asset classes and investors employ (excessive) leverage to reach their target yields.

LTCM's assets were levered over equity by ninety to one in 1998. Bear Stearns and Lehman were levered nearly thirty to one in 2007. Merrill Lynch owned CDOs greater than their equity capital. Often, leverage risk is compounded by low Implied Volatility which increases the convexity risk of a portfolio. This is the kernel of truth that supports the dire warnings of so many pundits.

It's always Demographics

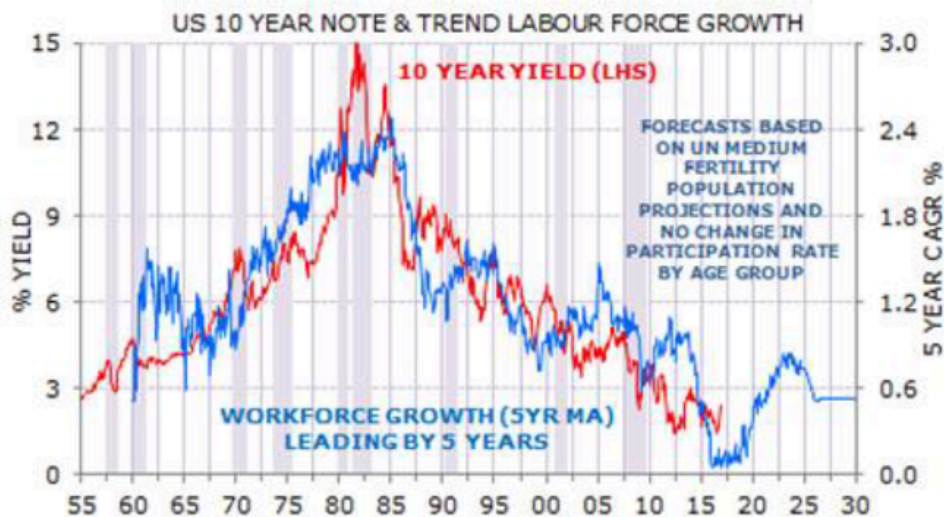
Demographics is the iceberg of investment management; it is 90% underwater and moves quite slowly. The cycle is generational, so one cannot 'trade' the process, but ultimately it is the primary determinant of the economy.

There is no question that Fiscal and Monetary policy can be effective at bending the edges of the economic cycle, but ultimately:

$$\text{GDP} = \text{Workers} * \text{Hours} * \text{Productivity}$$

The **-pervenche line-** highlights why those born between 1946 and 1964 were dubbed the "Baby Boomers" as Labor Force growth accelerated with their maturity. Partisans might claim that the 5% GDP growth in the 1980's was solely the result of Reagan's supply-side economics; but the underlying driver was the Baby Boomers entering their most productive years (ages 30 to 50).

The **-falu line-** of interest rates (and inflation) followed this trend as the Boomer's demand for goods and services (and money) outstripped the supply available from the previous generation.



Source: Gerard Minack, Minack Advisors

My worry: The greatest policy error the Government can commit is not related to trade, taxes or interest rates, but rather the risk we incur by reducing the flow of immigrants (legal or otherwise); or -- even more extreme -- reverse the flow of immigration (a.k.a. deportation). The GDP growth rate will decline without an offset of more hours worked or greater productivity.

I appreciate the public policy arguments on both sides, and I will not try to sway your views; I will only state that the economic consequences of these decisions that can be significant. Need more proof ? Check out Japan.

Separately, a reduced Labor Force growth rate supports my view that interest rates (UST-10yr) will not rise above 3.5% for the next five years. The Baby Boomers have just begun to retire, and maturing Millennials will not offset that decline for a few more years.

Who are you calling crazy ?

"Everybody acts rationally from their own point of view."

Consider the serial killer who is finally captured and taken to the police station. The disturbed detectives ask him why he did it ? The psychotic villain calmly replies: "The voices told me to do it, what would you have done ?"

Successful financiers often have the skill of determining why a certain asset is a good investment; and why someone else has not already scooped it up.

- 1) Bank portfolios often buy "rich" MBS bonds because they are restricted to purchasing only securities priced below par (100);
- 2) Pensions overpay for investment grade BBB-rated bonds because they are not permitted to buy the better valued BB-rated bonds;
- 3) Investors tend to prefer income over total return, despite exposure to an uneconomic (risk-adjusted) convexity profile.

This final inefficiency is my bread and butter: The preference for coupon/dividend over capital gain explains why convexity/options are sold too cheaply, and can be bundled into terrific portfolios.

Are these convexity sellers crazy ? Nope; it is simply a function of the Baby Boomers in Western Europe, Japan, and the U.S. demanding income today since they will not be here in twenty years to collect the superior capital gains. They are acting rationally from their own point of view.

On another topic: Why Closed-End Funds have underperformed

I have been an advocate for Closed-End Funds (CEF's) for quite a while, yet they have been crushed over the past few months. With some sporting discounts to NAV of 15%, many pundits are highlighting them as "cheap". Hhhmmmm.

As a reminder, a CEF is a fixed-pool of assets that can be redeemed by selling on the exchange, as opposed an Open Fund that is redeemed by the fund manager.

The price of a CEF can trade above or below the Net Asset Value (NAV) of its investments, while an Open Fund always trades at its NAV. CEF's often use leverage to increase the coupon, but this also adds extra risk, as we shall see.

As an example, let's consider a Muni bond fund so there is only interest rate risk. Let's assume a CEF is created with \$10mm to purchase 4% AA muni bonds. The CEF borrows \$3mm (30% leverage) at 1.5% and buys more 4% bonds.

This creates income of \$475,000 (4.0% on \$10mm plus a net 2.5% on \$3mm) to produce a 4.75% yield. If the Fed raises rates by 1%, the borrowing cost would increase from 1.5% to 2.5%. This would decrease the net spread of the \$3mm leverage to 1.5%, decreasing the income to \$445,000, and the yield to 4.45%.

To maintain the 4.75% yield on the CEF, its market price must decline by 6.5%.

Before Fed increase: $475 / 10,000 = 4.75\%$

After Fed increase: $445 / 9,350 = 4.76\%$

Until Fed Chairman Powell was nominated in November 2017, many Muni CEF's traded at about a 6.5% discount to NAV. Subsequently, he opined that the Fed would continue on its path to higher interest rates. In short order, CEF's prices declined widening their discount to NAV toward 13% to 15%. As per the math above, CEF's are not "cheap" at a 15% discount to NAV, rather they fully reflect anticipated dividend reductions that may occur due to the higher cost of borrowing; and the greater the leverage, the larger the possible dividend cut.

To be clear, I still like CEF's; they are fairly priced for an aggressive Fed.

It is always about character

If you don't understand this, I cannot explain it to you. If you teach your children one lesson, this is it.

The cautionary tale against "selling your soul to the devil" was just an allegory about the cost of ruining your good name.

I am always misty-eyed when "*It's a Wonderful Life*" (1946) closes with "Auld Lang Syne", despite having seen it a few dozen times. If you are still perplexed, turnoff your phone and take your family on a trip, that should reset your focus.

Your comments are always welcome at: harley@bassman.net

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November 15, 2018

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