

MTA Adder: A More Sound Implementation of Initial Margin Plus Variation Margin

SUFFOLK FUND

A Tale of Two Credit Philosophies

ALL UPFRONT

- Cover all expected losses over the lifetime of the trade
- Entire sum collected upon entering trade
- Collateral collected based on expected profit/loss (perhaps with some buffer)
- For collateral purposes, trade is “in the money” or “out of the money” at inception depending on whether it was purchased above or below reference price

INITIAL + VARIATION

- Require small initial margin up front and collect accruing losses over time as needed
- Smaller initial margin designed to cover maximum expected loss in one day (until another collateral call can be made), plus additional credit when portfolio mark-to-market (MTM) is negative
- Trade is always “at the money” at inception—no view of final price is needed

These are fundamentally different approaches!

A Tale of Two Market Types

Feature / Component	PJM FTR Market	Other Markets (i.e., markets addressed by ISDA/EEI protocols)
Price visibility	Monthly (for BOPP) or more (LT)—mark to <i>auction</i>	Daily/intraday—mark to <i>market</i>
Initial collateral/margin purpose	Designed to cover entire expected losses accrued over life of FTR	Designed to cover expected loss until next collateral call (usually daily if needed)
Subsequent collateral calls purpose	N/A currently for existing positions (except annual ref price update)	Designed to cover accrued MTM losses
Initial collateral level	Based on historical reference price	Based on volatility
Expected profit/loss	Based on historical reference price	Not considered—clearinghouse doesn't care where the value ends up since they can collect losses daily as they accrue and the initial margin is always there to protect against the next move
Action upon default	Hold until settlement (newly adopted rule)	Liquidate
Price range of underlying	Negative and positive	Positive (generally)

Financial Industry Standard Initial Margin is Volatility-based

According to FINRA rules, initial margin is at least:

(1) the amount specified in Regulation T, or Rules 400 through 406 of SEC Customer Margin Requirements for Security Futures, or Rules 41.42 through 41.49 under the Commodity Exchange Act ("CEA")

Rule 41.45 of the CEA:

(b) Required margin - (1) General rule. The required margin for each **long or short** position in a security future shall be **twenty (20) percent of the current market value**¹ of such security future.

But, as Investopedia explains in layman's terms²:

During periods of high market **volatility**, the exchanges may increase initial margin requirements to any level they deem appropriate, and brokers may decide to increase initial margin levels above those required by law.

These principles are similar to current INC and DEC credit, in that:

- **Long and short** positions have the same credit
- Credit is a function of **volatility** of the underlying node's DART spread
- Credit is **independent** of bid or cleared price
 - The credit rule takes no consideration of expected profit/loss like existing FTR credit rules do

1. PRICE LEVEL HERE CAN BE CONSIDERED PROXY FOR VOLATILITY WHEN UNDERLYING PRICE CAN BE MODELED AS LOGNORMAL (WHICH IS NOT THE CASE FOR FTRS)

2. [HTTPS://WWW.INVESTOPEDIA.COM/TERMS/I/INITIALMARGIN.ASP](https://www.investopedia.com/terms/i/initialmargin.asp)

Problems with adding MTA to existing credit rules

It is an oversimplified approach to combining two different credit philosophies whose assumptions are contradictory

Initial margin is designed to cover the expected loss between collateral calls

- Using existing credit as the initial margin implies that the expected loss between auctions is equal to (what has been considered) the expected loss over the entire period of the FTR

Existing credit as initial margin is too much MTA cushion for most portfolios, but **too little cushion for the portfolios we should be concerned about**

The correct approach to calculate initial margin for an FTR is to use the path's inter-auction volatility

- Long term FTRs have more time between auctions and much more time to settlement to accrue volatility¹, and their reference prices can change, so they should be required to have more MTA cushion

A simple proxy for volatility is using the MTA itself

- This is similar to financial markets using 20% of price level as initial margin
- Using MCPs for price level is problematic because of potential for negative values
- This more closely follows MTA percentage changes—e.g., a -\$10M MTA portfolio is generally more likely to lose another \$1M than a -\$2M MTA portfolio is², **so why should we require potentially the same cushion for both?**
- Current MTA is a better indicator for future potential losses than existing initial credit
 - Initial credit was set at trade inception; MTA takes into account all market information from trade inception to current point in time

Proposal: Max with MTA Adder

Use maximum of current credit requirement and MTA plus “MTA adder”

- MTA adder functions as cushion once initial (existing) credit has been eroded by MTA losses, addressing concerns raised by Appian Way

Proposed adders:

- 20% of MTA loss for FTRs awarded in BOPP and annual auction
- 50% of MTA loss for long-term FTRs

Advantages over simple additive approach

- “Cushion” is dynamic—it grows as MTA loss grows rather than remaining constant regardless of the level of MTA loss
- Better correlates collateral to risk
 - more cushion on riskier long term FTRs
 - more cushion for very negatively marked (high-risk) portfolios
 - less excess cushion for slightly negatively marked (and therefore lower risk) portfolios still well within bounds of initial (existing) credit requirements
- Fewer collateral calls
- Takes positive aspects of MTA and integrates them into a complex, multi-faceted credit framework rather than turning whole existing model into an initial+variation framework

Notes on Evaluating Credit Proposals

Backtesting rule changes should be taken with a grain of salt

- Simply applying proposed rules to GreenHat's portfolio (or everyone else's) does not consider fact that **new rules would have changed behavior** and in GreenHat's case, probably would have stopped them years ago with only a few million dollars of loss
- We need to design sound rules that prevent future "gaming"

More credit across the board is not necessarily better

- We need to ensure credit is **properly allocated to the portfolios representing greatest risk** of material default
 - If we decrease everyone's credit overall but increase it for those several portfolios (both now and in the future) actually at risk of material default, that's a good thing!
- Many "cushions" are already built into existing credit requirements:
 1. 10% adjustment to historical reference prices
 2. Adjustment of historical reference prices for transmission upgrades
 3. Requiring a minimum credit for all positions, even if they appear to be winners (similar to initial margin concept)
 4. Undiversified adder
 5. Taking the maximum of multiple credit requirements (minimum, historical ref price, adjusted historical ref price, and now potentially MTA)
 6. Not netting credit requirements across months. For example, an annual FTR bought at \$1200 whose reference prices are \$1000 for January and \$0 for every other month will require \$0 for January (excluding the min credit) and \$100 for every other month (\$1200/12mos). The total credit required is then \$1100 even though the FTR was bought for only \$200 more than the total expected payout. This monthly calculation necessarily results in credit requirements greater than or equal to expected losses.

Proposal: Max with MTA Adder

- Below is an example of GreenHat's last year of credit requirements under additive vs. our proposal
- Our proposal is less coverage, but only because of the backtesting circumstances

- Going forward, with new minimum credit rule, participants will not likely amass huge portfolios of "low-value" low-volatility paths that require \$0.10/MWh of credit in order to hopefully make \$0.01/MWh
- It's easy to imagine a scenario where the MTA loss per MWh is much higher than ~\$0.10/MWh
- Consider if GreenHat's same MTA loss was on a tenth of its volume:

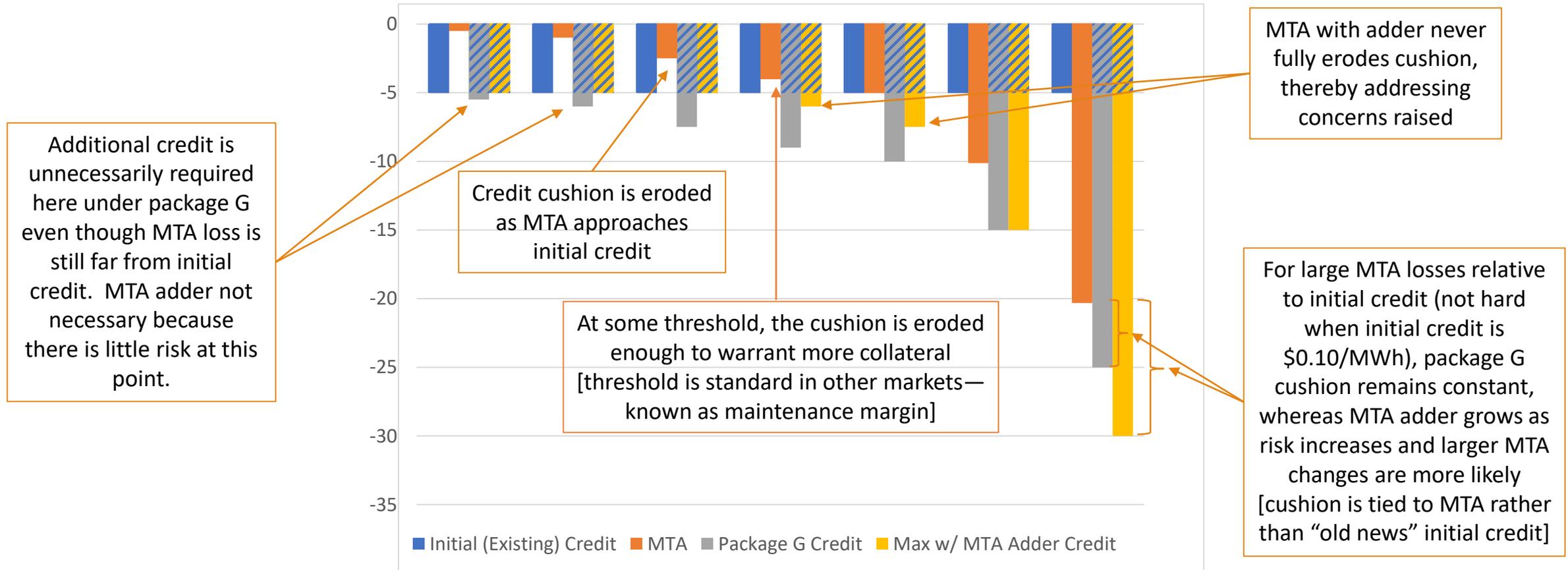
	MWh (MM)	Init. Credit (\$MM)	MTA (\$MM)	MTA/MWh	Credit (\$MM)	
					Additive (Package G)	Max w/ MTA Adder
Jun 2017	375	\$37.5	(\$39)	(\$0.10)	\$76.5	\$58.5
Sep 2017	450	\$45.0	(\$37)	(\$0.08)	\$82.0	\$55.5
Dec 2017	620	\$62.0	(\$46)	(\$0.07)	\$108.0	\$69.0
Apr 18 R1	622	\$62.2	(\$80)	(\$0.13)	\$142.2	\$120.0
Apr 18 R2	675	\$67.5	(\$80)	(\$0.12)	\$147.5	\$120.0
Apr 18 R3	770	\$77.0	(\$75)	(\$0.10)	\$152.0	\$112.5
Apr 18 R4	870	\$87.0	(\$79)	(\$0.09)	\$166.0	\$118.5
Final	900	\$90.0	(\$127)	(\$0.14)	\$217.0	\$190.5

	MWh (MM)	Init. Credit (\$MM)	MTA (\$MM)	MTA/MWh	Credit (\$MM)	
					Additive (Package G)	Max w/ MTA Adder
Jun 2017	37.5	\$3.8	(\$39)	(\$1.04)	\$42.8	\$58.5
Sep 2017	45.0	\$4.5	(\$37)	(\$0.82)	\$41.5	\$55.5
Dec 2017	62.0	\$6.2	(\$46)	(\$0.74)	\$52.2	\$69.0
Apr 18 R1	62.2	\$6.2	(\$80)	(\$1.29)	\$86.2	\$120.0
Apr 18 R2	67.5	\$6.8	(\$80)	(\$1.19)	\$86.8	\$118.8
Apr 18 R3	77.0	\$7.7	(\$75)	(\$0.97)	\$82.7	\$111.4
Apr 18 R4	87.0	\$8.7	(\$79)	(\$0.91)	\$87.7	\$117.3
Final	90.0	\$9.0	(\$127)	(\$1.41)	\$136.0	\$186.7

*These numbers are not exact as they were pulled from a plot, but they are close and serve to illustrate the point nonetheless. Also, since annual auction positions were entered at \$0 MTA, the MTA ratio between annual/LT was estimated to be 0/100 for R1, 5/95 for R2-4, and 10/90 for Final [note this is different from volume ratio]. Init. credit is assumed to be the minimum \$0.10/MWh.

Proposal: Max with MTA Adder

Comparison of credits for portfolios with the same initial (existing) credit and different MTA losses



Notes on Evaluating Credit Proposals

We have raised two primary concerns:

- 1) designing rules with only history tested or considered, not future behavior
- 2) increasing overall credit, while not adequately covering material, tail-risk defaults
 - Raising half of participants' credit by 5% disproportionately to risk is worse than raising 5% of participants' credit by half if those 5% are the ones we should be worried about—even if it's less credit overall

Our dynamic MTA adder proposal addresses these concerns the best, as it would be **higher for seriously problematic portfolios** constructed (“gamed”) in the future such that their initial credit was the \$.10/MWh minimum, and this proposal would **not unnecessarily requiring more credit from participants with small MTA losses well within bounds of initial credit**

Backtesting caveats aside, our proposal would have resulted in a final GreenHat collateral around \$190M, and it is **better positioned for protection against future behavior** that takes into account newly adopted rules