# Logical Optimized Model of Trustworthy Mathematical and Trendy Advanced Stressed Crises Compound of Pricing Models

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*Abstract*—**Multifaceted Options are out of the ordinary Derivatives Instruments that be capable of be second-hand to diminish the extent of speculation risk, in equivocation and provisional strategies which put together them Cheaper than the unembellished vanilla options and outstandingly leveraged. From the conventional JamiluAuwaluAdamu methods of combination options assessment is exceptionally plainly assumed Normality to Monte Carlo simulations method of valuation of transform.**

**nth –simulation of uniform variables hooked on customary Variables. Where every part of underestimate the compound options prices because of the simple ordinariness Assumptions that governed the formulation of the models or process. Above all they lag the incorporation of Fat – Tailed Effects of returns happening compound options underlying assets' probability distributions to permit them capture the popular Black Swan Events as propagated by Nassim N. Taleb furthermore supplementary professional risk management associations approximating prmia. on the other hand, in this paper, the Author attempted to fit in fat – tailed effects into the models by means of Jameel's slim down and thinning elsewhere out Stress Methods so as to enable them precisely traces the trajectories of the ancient times and opportunity Black Swan events to avoid reoccurrences of opportunity economic furthermore pecuniary crises related to exotic options supplementary often or else makes the existing models more reliable robust, sophisticated and holistic. As a final point, the proposed Jameel's sophisticated Stressed Exotic Options Pricing Models are anticipated to conspicuously amplify the markets buoyancy additionally quietly reduces the markets Risks.**

## I. Introduction

THEmultifaceted opportunity gives the possessor the accurate to get hold of or put on the publicize the underlying preference. Multifarious options are options on options. The deep-seated asset is itself an Option. Compound Option has two strike prices.

(1 X : multifaceted and 2 X : underlying) as well as two termination dates

(1 T : Compound in addition to 2 T : original by means of technique of T1 < T2 ).

At the foremost do exercises engagement 1 T you be required to make your mind up whether it is significance exercising the first option Depending on the thump consequences 1 X moreover the present skill price S. If so, you get a further option with strike price 2 X and maturity 2 T .There are four basic types of compound options:

Call on Call (CoC)
Call on Put (CoP) or
Put on Put (PoP)
Put on Call (PoC).

The reimburse hushed losing currency to of a composite verdict involves the significance of any more occasion. In number present are four impending payoffs:

Call on call:Max{ C( S,T )- X1 ,0 }
Call on put:Max{ P( S,T )- X1 ,0 }
Put on call:Max{ X1- C( S,T ),0 }and
Put on put:Max{ X1- P( S,T ),0 }

The overreliance of familiarity guess in the survey course of stroke of out of the ordinary Options has gravely and incessantly threatens the hard-wearing of cost-effective and pecuniary solidity reference to the unusual Options Pricing. Massively, the diminutive probability edge has considerable collision in our striking Options Prices as propagate by Nassim N. Taleb in addition to other world economic and financial leading actors. recital of valuing composite options unspoken customariness and constant volatility, so they out rightly underestimates the prices while the Monte Carlo simulations transform n – simulations of uniform variables into normal variables, on the other hand, these seriously disused the would-be effects of Small Probabilities Margin or Low – Probability, High – Impact events occurs at the fourth quadrant . These are of course thrown the risk of underestimate compound options prices to the entire world economic and financial systems. In view of the foregoing, we need to plainly pressure all our unusual option pricing Models by incorporating fat- tailed effects hooked on them to permit them specifically take into custody likely Black Swans.

Proposed Jameel's CALL on CALL Stressed Option Models

**Class 1:**

$$CC_{Stressed} = Se^{-qT_2}\left[N_2\left(\mu_{X_1}\mu_{X_2}\mu_S\left(a_1, b_1; \sqrt{T_1/T_2}\right.\right.\right.$$
$$- X_2 e^{-rT_2}\left[N_2\left(\mu_{X_1}\mu_{X_2}\mu_S\left(a_2, b_2; \sqrt{T_1}\right.\right.\right.$$
$$- X_1 e^{-rT_1}\left[N\left(\mu_{X_1}\mu_{X_2}\mu_S\left(a_2\right)\right) \pm \sigma_{X_1} f\right.$$

**Class 2:**

$$CC_{Stressed} = Se^{-qT_2}\left[N_2\left(\mu_{X_1X_2S}\left(a_1, b_1; \sqrt{T_1/T_2}\right)\right) \pm\right.$$
$$- X_2 e^{-rT_2}\left[N_2\left(\mu_{X_1X_2S}\left(a_2, b_2; \sqrt{T_1/T_2}\right)\right.\right.$$
$$- X_1 e^{-rT_1}\left[N\left(\mu_{X_1X_2S}\left(a_2\right)\right) \pm \sigma_{X_1X_2S} f_1(\right.$$

Where,

$$CC = Se^{-qT_2}N_2\left(a_1, b_1; \sqrt{T_1/T_2}\right) - X_2 e^{-rT_2}N_2\left(a_2, b_2; \sqrt{T_1/T_2}\right) - X_1 e^{-rT_1}N\left(a_2\right)$$

These are the universal form of the proposal, however, we preserve utilize combinators to obtain special probable Combination of terms as well as cipher to realize different values of

Stressed CC : positive, negative, high, low, close and so on. Class 1 and 2 are optimal at:

$$CC_{Stressed} = Se^{-qT_2}\left[N_2\left(a_1, b_1; \sqrt{T_1/T_2}\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right] - X_2 e^{-rT_2}\left[N_2\left(a_2, b_2; \sqrt{T_1/T_2}\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right] - X_1 e^{-rT_1}\left[N\left(a_2\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right]$$

For some $\sigma_{X_i}$'s $=1$ $(i=1,2)$ with (i) All $\mu_{X_1} = \mu_{X_2} = \mu_S = 1$ (ii) Some $\mu_{X_i}$'s $=1$ $(i=1,2)$

And/Or

$$CC_{Stressed} = Se^{-qT_2}\left[N_2\left(a_1, b_1; \sqrt{T_1/T_2}\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right] - X_2 e^{-rT_2}\left[N_2\left(a_2, b_2; \sqrt{T_1/T_2}\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right] - X_1 e^{-rT_1}\left[N\left(a_2\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right]$$

For some $\sigma_{X_1X_2S}$'s $=1$ $(i=1,2)$ with (i) All $\mu_{X_1X_2S} = 1$ (ii) Some $\mu_{X_1X_2S}$'s $=1$ $(i=1,2)$

Proposed Jameel's CALL on PUT Stressed Option Models

These are the universal form of the proposal, however, we preserve utilize combinatory to obtain special probable Combination of terms as well as cipher to realize different values of

Stressed CP : positive, negative, high, low, close and so on. Class 1 and 2 are optimal at:

Class 1:

$$CP_{Stressed} = X_2 e^{-rT_2}\left[N_2\left(\mu_{X_1}\mu_{X_2}\mu_S\left(-a_2, -b_2; \sqrt{T_1/T_2}\right)\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right] - Se^{-qT_2}\left[N_2\left(\mu_{X_1}\mu_{X_2}\mu_S\left(-a_1, -b_1; \sqrt{T_1/T_2}\right)\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right] - X_1 e^{-rT_1}\left[N\left(\mu_{X_1}\mu_{X_2}\mu_S\left(-a_2\right)\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right]$$

Class 2:

$$CP_{Stressed} = X_2 e^{-rT_2}\left[N_2\left(\mu_{X_1X_2S}\left(-a_2, -b_2; \sqrt{T_1/T_2}\right)\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right] - Se^{-qT_2}\left[N_2\left(\mu_{X_1X_2S}\left(-a_1, -b_1; \sqrt{T_1/T_2}\right)\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right] - X_1 e^{-rT_1}\left[N\left(\mu_{X_1X_2S}\left(-a_2\right)\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right]$$

Where,

$$CP_{Stressed} = X_2 e^{-rT_2}N_2\left(-a_2, -b_2; \sqrt{T_1/T_2}\right) - Se^{-qT_2}N_2\left(-a_1, -b_1; \sqrt{T_1/T_2}\right) - X_1 e^{-rT_1}N\left(-a_2\right)$$

Proposed Jameel's PUT on CALL Stressed Option Models

Where,

These are the universal form of the proposal, however, we preserve utilize combinators to obtain special probable Combination of terms as well as cipher to realize different values of

Stressed PC : positive, negative, high, low, close and so on. Class 1 and 2 are optimal at:

$$CP_{Stressed} = X_2 e^{-rT_2}\left[N_2\left(-a_2, -b_2; \sqrt{T_1/T_2}\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right] - Se^{-qT_2}\left[N_2\left(-a_1, -b_1; \sqrt{T_1/T_2}\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right] - X_1 e^{-rT_1}\left[N\left(-a_2\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right]$$

For some $\sigma_{X_i}$'s $=1$ $(i=1,2)$ with (i) All $\mu_{X_1} = \mu_{X_2} = \mu_S = 1$ (ii) Some $\mu_{X_i}$'s $=1$ $(i=1,2)$

And/or

$$CP_{Stressed} = X_2 e^{-rT_2}\left[N_2\left(-a_2, -b_2; \sqrt{T_1/T_2}\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right] - Se^{-qT_2}\left[N_2\left(-a_1, -b_1; \sqrt{T_1/T_2}\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right] - X_1 e^{-rT_1}\left[N\left(-a_2\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right]$$

For some $\sigma_{X_1X_2S}$'s $=1$ $(i=1,2)$ with (i) All $\mu_{X_1X_2S} = 1$ (ii) Some $\mu_{X_1X_2S}$'s $=1$ $(i=1,2)$

**Proposed Jameel's PUT on PUT Stressed Option Models**

Class 1:

$$PC_{Stressed} = X_2 e^{-rT_2}\left[N_2\left(\mu_{X_1}\mu_{X_2}\mu_S\left(-a_2, b_2; -\sqrt{T_1/T_2}\right)\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right] - Se^{-qT_2}\left[N_2\left(\mu_{X_1}\mu_{X_2}\mu_S\left(-a_1, -b_1; -\sqrt{T_1/T_2}\right)\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right] + X_1 e^{-rT_1}\left[N\left(\mu_{X_1}\mu_{X_2}\mu_S\left(-a_2\right)\right) \pm \sigma_{X_1} f_1() \pm \sigma_{X_2} f_2() \pm \sigma_S f_3()\right]$$

Class 2:

$$PC_{Stressed} = X_2 e^{-rT_2}\left[N_2\left(\mu_{X_1X_2S}\left(-a_2, b_2; -\sqrt{T_1/T_2}\right)\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right] - Se^{-qT_2}\left[N_2\left(\mu_{X_1X_2S}\left(-a_1, -b_1; -\sqrt{T_1/T_2}\right)\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right] + X_1 e^{-rT_1}\left[N\left(\mu_{X_1X_2S}\left(-a_2\right)\right) \pm \sigma_{X_1X_2S} f_1() \pm \sigma_{X_1X_2S} f_2() \pm \sigma_{X_1X_2S} f_3()\right]$$

where

$$PC = X_2 e^{-rT_2}\left[N_2\left(-a_2, b_2; -\sqrt{T_1/T_2}\right)\right] - Se^{-qT_2}\left[N_2\left(-a_1, -b_1; -\sqrt{T_1/T_2}\right)\right] + X_1 e^{-rT_1}\left[N\left(-a_2\right)\right]$$

These are the universal form of the proposal, however, we preserve utilize combinatory to obtain special probable

Combination of terms as well as cipher to realize different values of

Stressed PP : positive, negative, high, low, close and so on. Class 1 and 2 are optimal at:

$$\begin{aligned} PC_{Stressed} = {} & X_2 e^{-rT_2}\left[N_2\left(-a_2, b_1; -\sqrt{T_1/T_2}\right) \pm \sigma_{X_2} f_1(.) \pm \sigma_{X_1} f_2(.) \pm \sigma_S f_3(.)\right] \\ & - S e^{-qT_2}\left[N_2\left(-a_1, -b_1; -\sqrt{T_1/T_2}\right) \pm \sigma_{X_2} f_1(.) \pm \sigma_{X_1} f_2(.) \pm \sigma_S f_3(.)\right] \\ & + X_1 e^{-rT_1}\left[N\left(-a_2\right) \pm \sigma_{X_2} f_1(.) \pm \sigma_{X_1} f_2(.) \pm \sigma_S f_3(.)\right] \end{aligned}$$

For some $\sigma_{X_i}$'s $=1$ $(i=1,2)$ with (i) All $\mu_{X_1} = \mu_{X_2} = \mu_S = 1$ (ii) Some $\mu_{X_i}$'s $=1$ $(i=1,2)$

And/or

$$\begin{aligned} PC_{Stressed} = {} & X_2 e^{-rT_2}\left[N_2\left(-a_2, b_1; -\sqrt{T_1/T_2}\right) \pm \sigma_{X_1X_2S} f_1(.) \pm \sigma_{X_1X_2S} f_2(.) \pm \sigma_{X_1X_2S} f_3(.)\right] \\ & - S e^{-qT_2}\left[N_2\left(-a_1, -b_1; -\sqrt{T_1/T_2}\right) \pm \sigma_{X_1X_2S} f_1(.) \pm \sigma_{X_1X_2S} f_2(.) \pm \sigma_{X_1X_2S} f_3(.)\right] \\ & + X_1 e^{-rT_1}\left[N\left(-a_2\right) \pm \sigma_{X_1X_2S} f_1(.) \pm \sigma_{X_1X_2S} f_2(.) \pm \sigma_{X_1X_2S} f_3(.)\right] \end{aligned}$$

For some $\sigma_{X_1X_2S}$'s $=1$ $(t=1,2)$ with (i) All $\mu_{X_1X_2S} = 1$ (ii) Some $\mu_{X_1X_2S}$'s $=1$ $(t=1,2)$

MATERIAL AND METHODS

However, the main aim of this research paper is to consider the Existing Derivatives Pricing Models and apply JAMEEL'S Constructional and Expansional Stress Methodology such that they can capture Low – probability, High impacts events popularly known as black swan events so as to predict future Global Economic and Financial Crises given accurate, valid and reasonable models' independent variables.

Other procedures used by some firms to apprehension their exposure to extreme market events include a maximum loss approach, in which risk administrators estimate the combination of market moves that would be most damaging to a portfolio, and extreme value theory, which is the statistical theory concerned with the behavior of the "tails" of a distribution of market returns. Thanks to the Idea of Stress Testing and by extension Extreme Value Theory. Nassim N Taleb (2011), emphases in most of his papers, the effects of Low – Probability, High – impact Events and incompleteness of prediction models to accurately capture Financial and Economic crises or chaotic situations in the other field of knowledge.

However, the main aim of this research paper is to consider the Existing Derivatives Pricing Models and apply JAMEEL'S Constructional and Expansion Stress Methodology such that they can capture Low – possibility, High impacts procedures prevalently recognized as BLACK SWAN events so as to predict future Global profitable and Financial Crises given accurate, valid and reasonable models' independent variables.

Result and Discussion

All the proposed Jameel's Advanced Stressed Exotic Options Pricing Models are expected to adequately and efficiently work more especially at the times of economic and financial recoveries or recessions at their most favorable principles stated in each case of the proposals based on the Jameel's Criterion and numerical results established and published in my previous papers. More so, the Models are expected to dramatically increases the markets buoyancy and drastically decreases the markets risk.Jameel's Advanced Stressed Exotic Options

Pricing Methods can be directly applied in other stochastic fields of Science, Arts, Social and Management Sciences, Medicine and Engineering. To capture chaotic situations or to increase the authority of the existing models' sensitivities to change.

Conclusion:

The existing Exotic options pricing models underestimates (overestimates) prices especially at the times of economic and financial recoveries or recessions just because of their simple Normality Assumption and failure to incorporate underlying assets returns probability distributions. However, based on the research findings, the author improved the existing models by incorporating fat – tailed effects of the underlying assets returns of exotic derivative product in question using Jameel's Criterion and Jameel's Constructional and Expansion Stress Methods to enable them capture potential black swans. For the sake of practitioners, it is believe that the existing exotic options pricing models out rightly underestimates (overestimates) exotic products prices especially at the stress periods to extent in which Nassim N. Taleb and EspenGararder Hang (2011) wrote a paper entitled: ' Option Traders use (very) Sophisticated Heuristic, never the Black – Scholes – Merton Formula', they stated that the formula is 'fragile to jumps and tail events' just because of its Normality Assumption thereby it is one of the major factors that contributed to the late 2007 – 2008 economic and financial crises. In view of the above, all the proposed Jameel's Advanced Stressed exotic options pricing models class 1 and 2 presented in this paper, will be more reliable, robust, sophisticated, holistic and extraordinary, providing better approximations, increasing the probabilities of high losses and above all have the ability to precisely traces the trajectories of the past and future economic and financial crises related to exotic options pricing. Finally, for the sake of future research direction, the models can be improved further to capture more vital information using more macroeconomic indicators and models' independent variables than ordinarily only S, X1 and X2 or 1 2 S, K and K .Credit Metrics™ (1997) stated that "We be redolent our readers that rejection quantity of sophisticated analytics drive replace tempo along with able outcome in the world risks". Credit Metrics™ is nothing more than a high-quality tool for the proficient risk executive in the monetary markets and is not a certification of decided domino effect."

"If a seatbelt do not make available perfect safety, it immobile makes prudence to show off one, it is well again to have on a seatbelt than to not wear one". It is better off civilizing alien Options Pricing Models to incorporate fat – tailed effects than not.

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