
It’s All Greek to Me!
Understanding the Pricing Factors
That Drive Option Prices
BetterTrades Instructor
BILL CORCORAN
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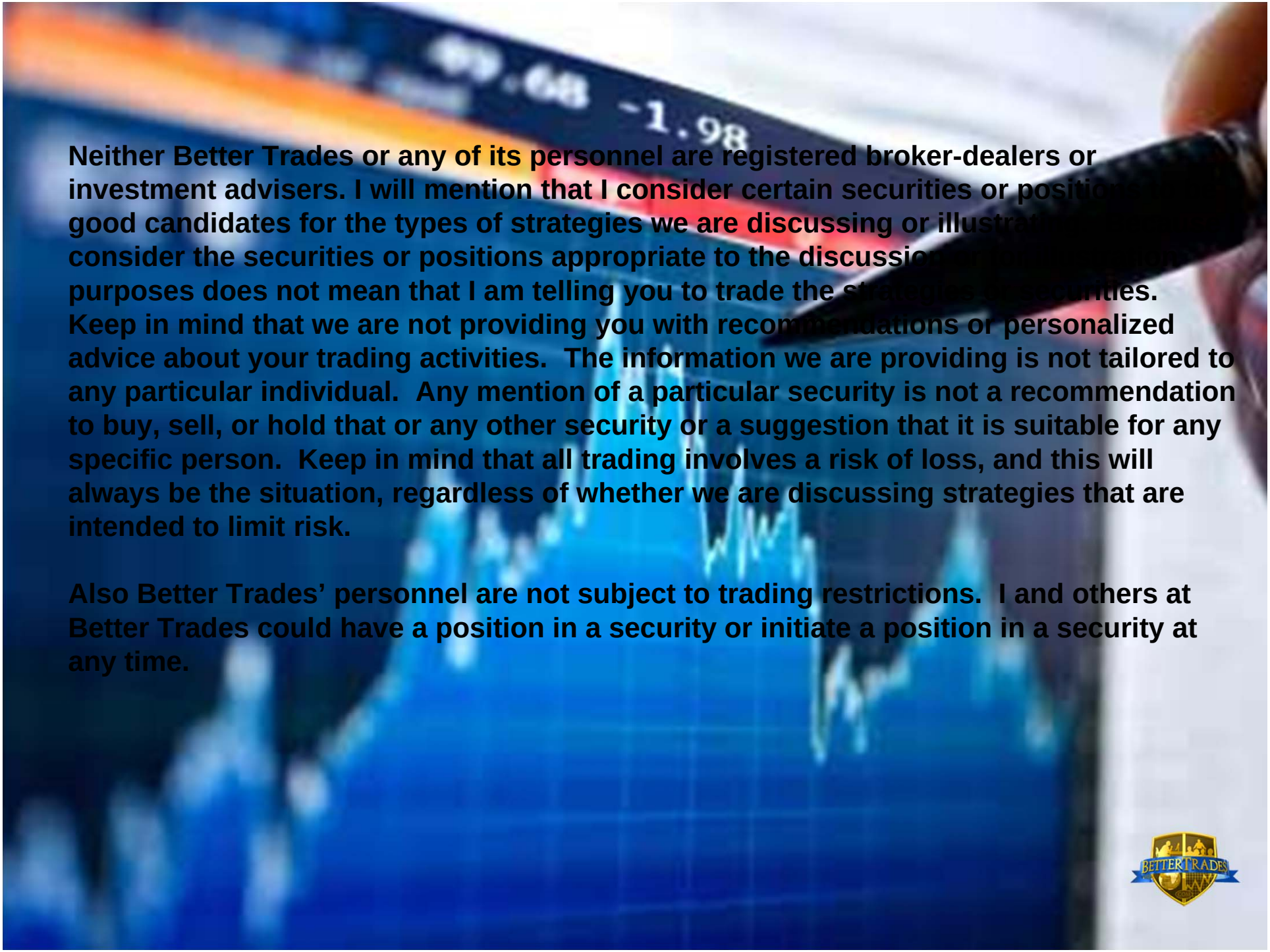

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Practice First

- There is risk involved in any form of trading!
- The strategies taught in this workshop are designed to teach advanced Option Pricing concepts to help the student identify the potential impact to option profits.
- You must practice these concepts and apply them in unfunded trading until you understand them and are comfortable with them before you ever use them in a funded trade!

Basic Concepts

- The “Greeks” measure sensitivity of option pricing to four factors of the pricing model.
  - Changes in Stock Price
  - Changes in Time
  - Changes in Volatility
  - Changes in Interest Rates
    - Least impact to option price

Basic Concepts

- The “Greeks” measure sensitivity of option pricing to four factors of the pricing model.
  - Changes in Stock Price — DELTA/ GAMMA
  - Changes in Time — THETA
  - Changes in Volatility — VEGA
  - Changes in Interest Rates — RHO
    - Least impact to option price

Option Pricing

- **The Black Scholes Option Pricing Model**

$$C_0 = S_0N(d_1) - Xe^{-rT}N(d_2)$$

Where:

$$d_1 = [\ln(S_0/X) + (r + \sigma^2/2)T]/ \sigma \sqrt{T}$$

And:

$$d_2 = d_1 - \sigma \sqrt{T}$$

And where:
C_0 = current option value
S_0 = current stock price
N(d) = the probability that a random draw from a standard normal distribution will be less than (d).
X = exercise price
e = 2.71828, the base of the natural log function
r = risk-free interest rate (annualized continuously compounded rate on a safe asset with the same maturity as the expiration of the option; usually the money market rate for a maturity equal to the option's maturity.)
T = time to option's maturity, in years
ln = natural logarithm function
σ = standard deviation of the annualized continuously compounded rate of return on the stock


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STOCK PRICE MOVES

Sensitivity to Price

- We can measure option "sensitivity" to movement of the underlying stock with **DELTA**.
  - **DELTA** helps determine how much an option price will move relative to the underlying stock price movement.
  - The easy way to see this is:
    - If the stock moves $1, the option price will move by the **DELTA.**

DELTA

- DELTA is affected by movement in the price of the underlying stock.
- DELTA is also affected by the time to expiration.
- DELTA can be affected by IMPLIED VOLATILITY.
- Call options have positive (+) DELTA
- Put Options have negative (-) DELTA
- Intrinsic Value always trades with a 1 DELTA
- As expiration approaches, the DELTA changes.
  - ITM DELTA moves toward 1.00 (GAMMA increase)
  - OTM DELTA moves toward 0.00 (GAMMA decrease)

DELTA Example

Stock moves	DELTA	Option M
$1	1.00	$1
$1	.50	$.50
$1	.25	$.25

DELTA Strategies

- **Directional ITM option trades**
  - **DELTA is the primary consideration in directional option trades.**
  - **ITM options have a higher DELTA and therefore gain value as a function of DELTA faster.**
- **Directional OTM option trades**
  - **OTM options carry lower DELTA and therefore may require more time to develop.**
  - **DELTA is relative to the ITM-ness and OTM-ness of the strike price.**

DELTA Strategies

- **DELTA Neutral Strangle**
  - Call option DELTA is positive (+).
  - Put option DELTA is negative (-).
  - DELTA is cumulative.
- **Calculating Neutral DELTA**
  - Call DELTA x Number of contracts.
    - Example: (positive) .40 delta x 10 cts = 400 net delta
  - Put DELTA x Number of contracts
    - Example: (negative) - .40 delta x 10 cts= -400 net delta
- **Balancing DELTA**
  - After a move takes one side profitable, then delta is recalculated and contracts are sold to bring DELTA neutral.


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DELTA MOVES

DELTA Moves Too?

- DELTA is not constant, it will move:
  - If the underlying stock price moves:
    - If the stock price moves up, the DELTA on the call options tend to also move up, while the put option DELTA moves down.
    - If the stock price moves down, the DELTA on the put options move up and the call option DELTA moves down.
  - As Expiration approaches.
    - DELTA moves up
  - If Implied Volatility changes
    - Higher Implied Volatility typically suppresses DELTA
- The rate of change of the DELTA is called the GAMMA

GAMMA

- GAMMA is displayed as the projected [illegible] in the DELTA given a $1 move in the underlying stock.

- GAMMA is also affected by time to expiration.

  - The less time to expiration, the more pronounced the GAMMA

ATM GAMMA Example

Stock Moves	ATM Call DELTA Moves Up (Gamma .10)	ATM Put DELTA Moves (Gamma .10)
$1	.50 → .60	.50 → .40

*Numbers are examples only.

GAMMA Strategies

- **Evaluating GAMMA can potentially enhance the speed of profitab**
  - **One strike OTM tends to have the highest GAMMA**
  - **The less time to expiration, the more pronounced the GAMMA**
    - **Buying the one strike OTM close to expiration can have the fastest rate of DELTA change.**
- **The GAMMA Strangle involves buying the one strike OTM call and put.**
  - **The high GAMMA offers the opportunity to move the winning leg up quickly while the losing leg moves down slowly.**


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IT'S ABOUT TIME!

TIME

- Time is a diminishing resource.
- As expiration approaches, there is less time left.
- The price of an option can include “time value”.
- The time value component of an option price is reduced as expiration approaches.
- This time value “decay” is represented by the THETA.
- THETA can be affected by the IMPLIED VOLATILITY.

THETA

- **THETA is the measure of an options price "sensitivity" to diminishing time.**
- **THETA only affects the "*TIME VALUE*" portion of an options price.**
- **At expiration, there is no more time left, hence there is no "*TIME VALUE*"**
- **Because there is no "TIME VALUE", all OTM options have expired worthless.**
- **THETA increases as expiration approaches.**

THETA CURVE

THETA

- **THETA is represented as the amount that the "*TIME VALUE*" will decay in one day.**
- **THETA is highest for ATM options regardless of time to expiration.**
- **ITM options have lower THETA due to decreased "*TIME VALUE*"**
- **OTM options have lower THETA due to reduced cost of the option.**
- **THETA can be significantly different for calls and puts**

THETA Example

TIME PERIOD	THETA	Option M
1	- .15	- $.15
1	- .65	- $.65

* numbers are estimates

** numbers are based on no movement in stock price

THETA PROFILE

- Option buyers experience negative (-) THETA
- Option sellers experience positive (+) THETA
- THETA profile can potentially help balance risk
- Calculating THETA
  - Calculate positive THETA (options that are sold to open)
  - Calculate negative THETA (option that are bought to open)

THETA Strategies

- **THETA negative (-) Option Strategies**
  - **Long call or put positions**
  - **Strangles**
  - **Horizontal Calendar Spreads**
  - **Diagonal Calendar Spreads**

- **THETA positive(+) Option Strategies**
  - **Credit Spread**
  - **Iron Condor**
  - **Iron Butterfly**
  - **Put Selling**
  - **Covered Call**


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VOLATILITY

HISTORICAL VOLATILITY

- Historical Volatility is specific to [illegible]
  - Measures how much a stock “moves”.
  - Based on deviation from an average over a period of time.
  - More volatile stocks move more than less volatile ones over the same period of time.

IMPLIED VOLATILITY

- **Implied Volatility is specific to the Option**
  - **Is an estimate of the stock's volatility as determined by the Option Market Maker**
  - **Represents the "risk premium" priced in by the Market Maker.**
  - **Determines the "time value" portion of the option price.**
  - **Can change dramatically as market conditions change.**

THE OTHER SIDE OF YOUR TRADE

- Who is the **Market Maker**?
- In today's market, you are likely [illegible] with a computer.
  - Most smaller size trades are quickly executed by a computerized algorithm.
- The **Market Maker** is not "out to get you".
- The **Market Maker** is not "hitting your stops".
- The **Market Maker** may not even be a person.

VEGA

- **VEGA measures the option price s**
  to a move in Implied Volatilit

- **It represents how much the option price will change based on a 1% change in Implied Volatility.**

VEGA Example

Implied Vol. moves	VEGA	Option M
1%	.1	$.10
1%	.65	$.65

* numbers are estimates

** numbers are based on no movement in stock price

VEGA Strategies

Long Volatility

- Straddles
- Strangles
- Bollinger Band Pinch

Short Volatility

- Iron Condor
- Iron Butterfly

The Vega Strangle

- Set up days or weeks before earnings
  - High historical volatility stocks
  - OTM Call and Put
    - Low Implied Volatility
    - Low Delta
    - Low Gamma
- Wait for Implied Volatility to spike
- Sell both positions before earnings

The Short Volatility Strangle

- Set up just before Implied Volatility collapse such as Option Expi
  - High historical volatility stocks
  - STO OTM Iron Condor
    - Relatively High Implied Volatility
- Wait for Implied Volatility Collapse
- BTC short positions after the collapse
  - Consider 50% of premium as potential exit

SETTING UP YOUR OPTION CHAIN

What If?

- Your Trades started out Completely Neutral?
- If I took the time to sit with you and teach you all eight strangle strategies, would you be interested?
- If I spent time teaching you how to use the Option Greeks, could you learn to exploit them too?


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• Join me for an exciting 4-hour live online class Feb 14th from 6-10 PM
• Bonus! Class is archived for 30 Days.
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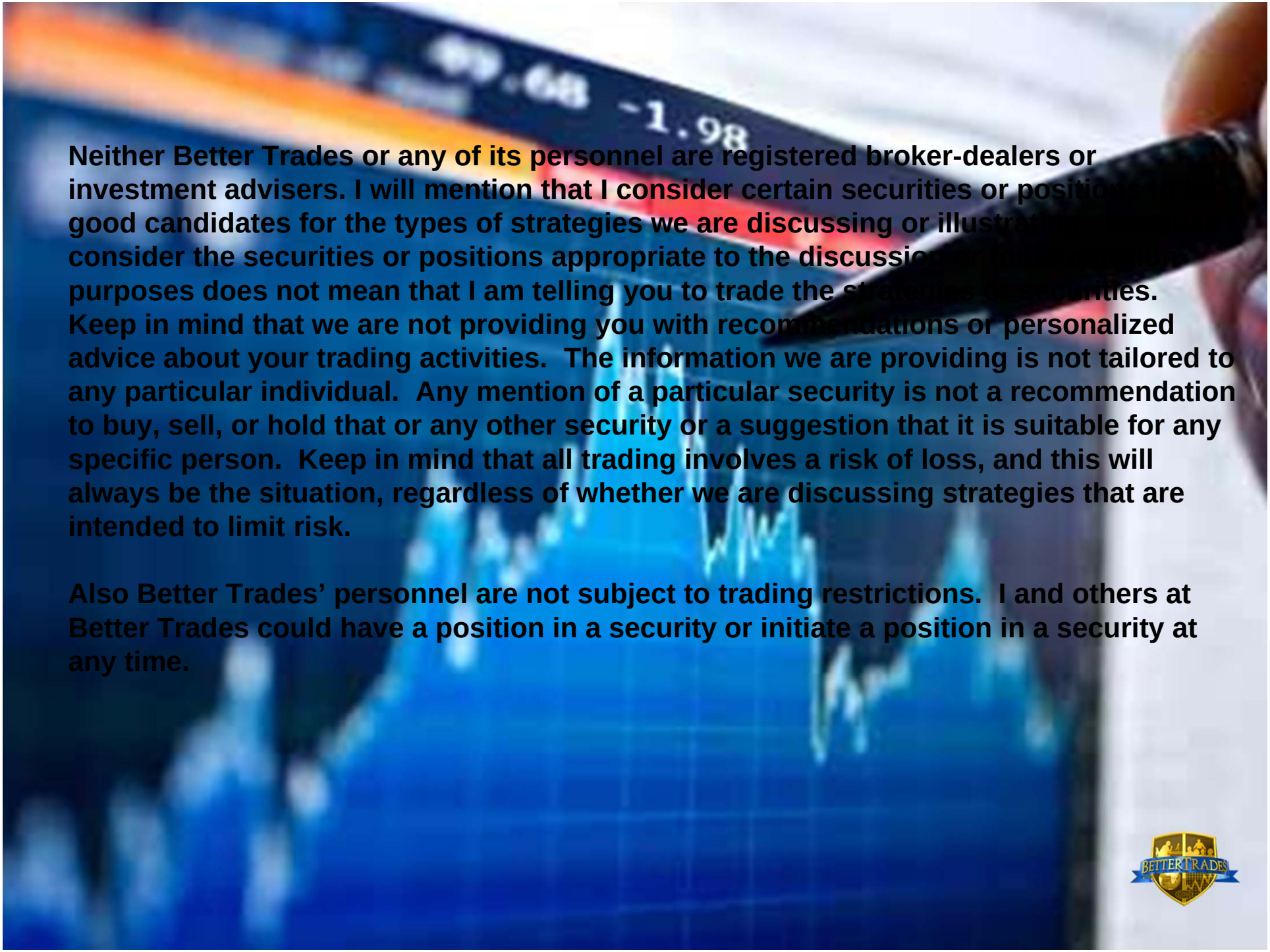

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