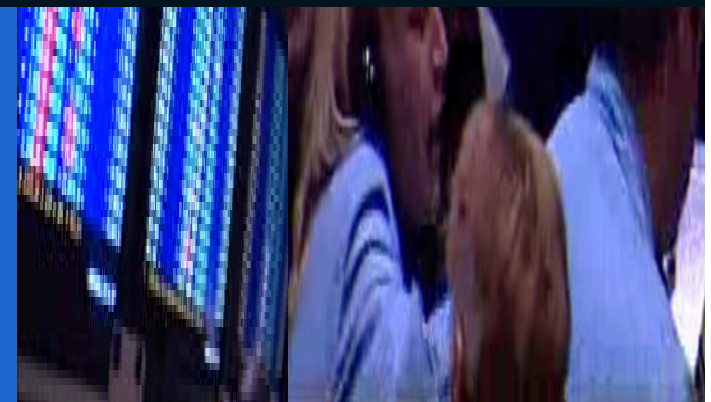




Trading Volatility

What You Need to Know About
VIX Futures & Options

Jim Bittman, Senior Instructor
The Options Institute at CBOE

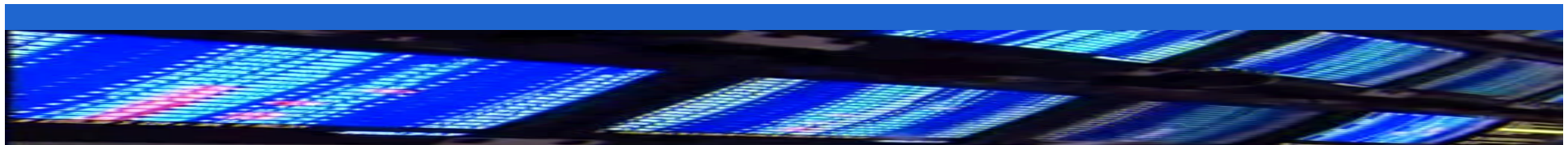


Disclosures

In order to simplify the computations, commissions have not been included in the examples used in these materials. Commission costs will impact the outcome of all stock and options transactions and must be considered prior to entering into any transactions.

Any strategies discussed, including examples using actual securities and price data, are strictly for illustrative and educational purposes only and are not to be construed as an endorsement, recommendation, or solicitation to buy or sell securities.

Options involve risks and are not suitable for everyone. Prior to buying or selling an option, an investor must receive a copy of Characteristics and Risks of Standardized Options. Copies may be obtained from your broker or from The Chicago Board Options Exchange, 400 S. LaSalle, Chicago, IL 60605. Investors considering options should consult their tax advisor as to how taxes may affect the outcome of contemplated options transactions.

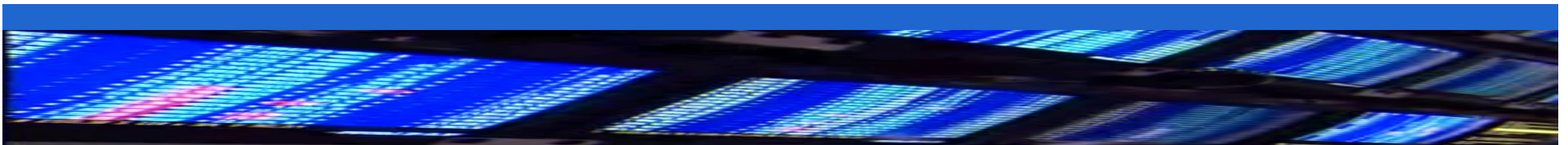


Presentation Outline

- The VIX Index – What is it?
- VIX Futures and Options

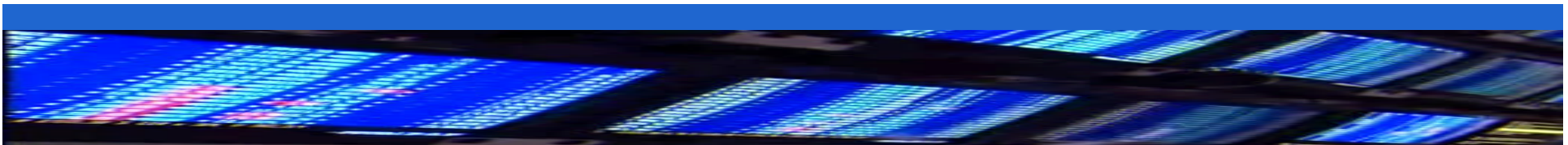
What You Need to Know

Trading Case Study

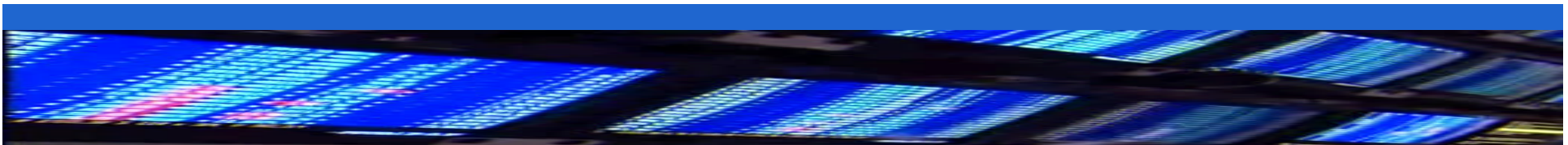
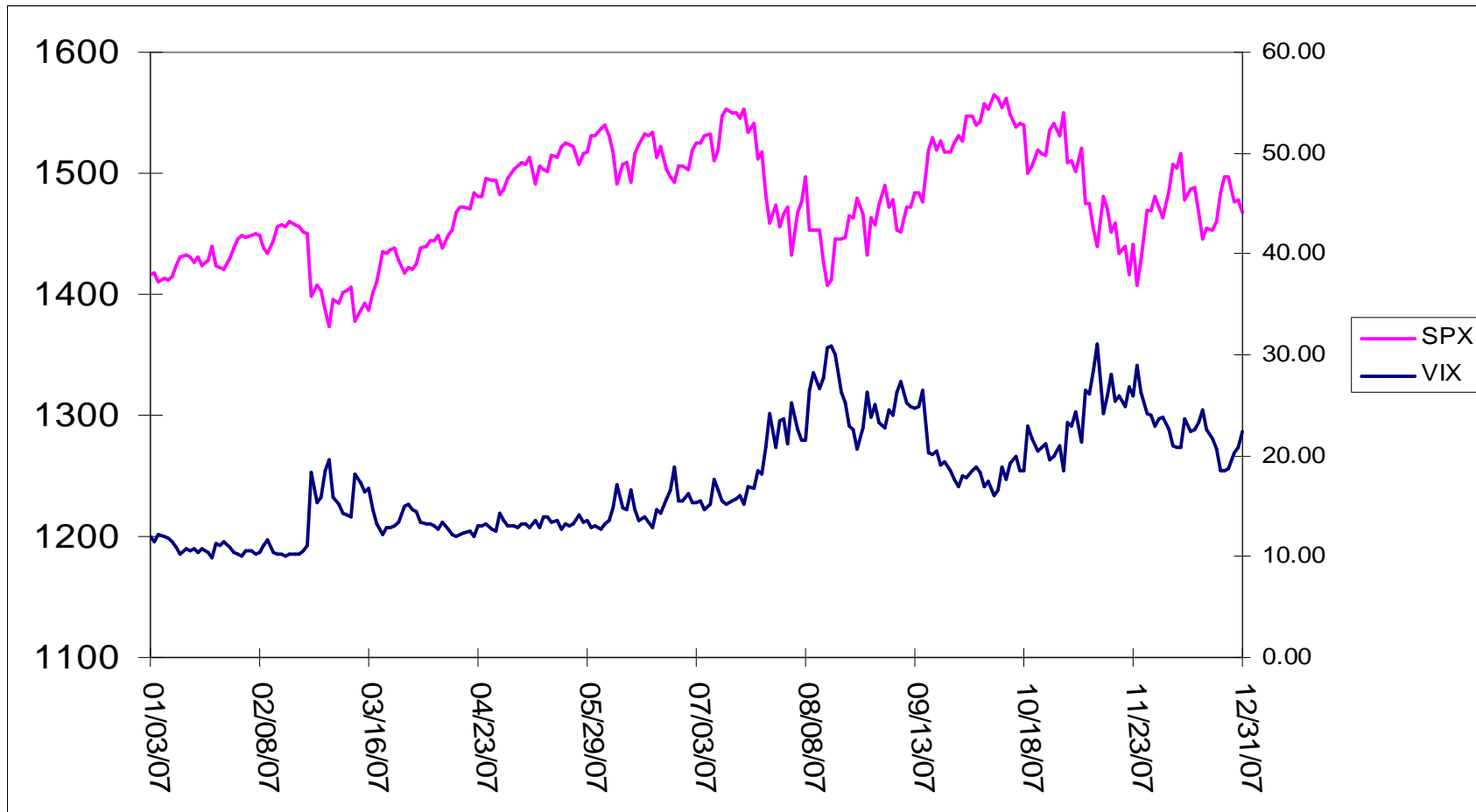


The CBOE Volatility Index (VIX)

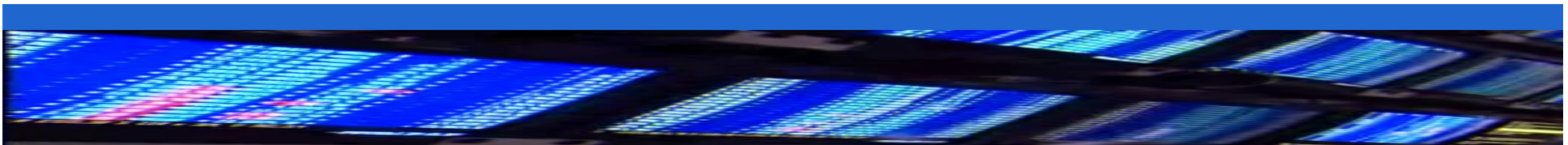
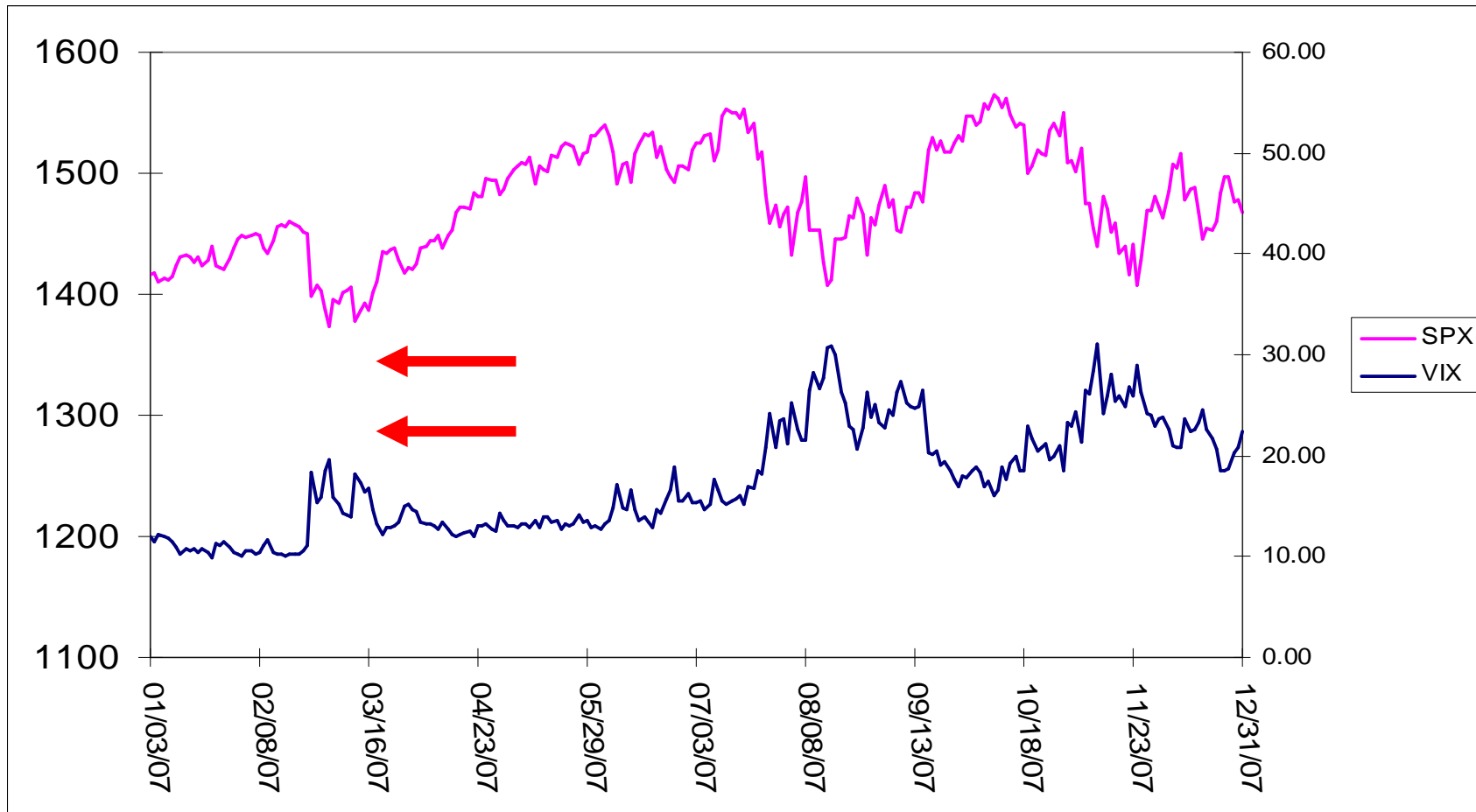
- VIX: a measure of 30-day implied volatility
- Created in 1993 by CBOE & Duke Univ.
- Goal: to trade and hedge against changing implied volatility
- Originally based on OEX options
- 2003 – New formula based on SPX options



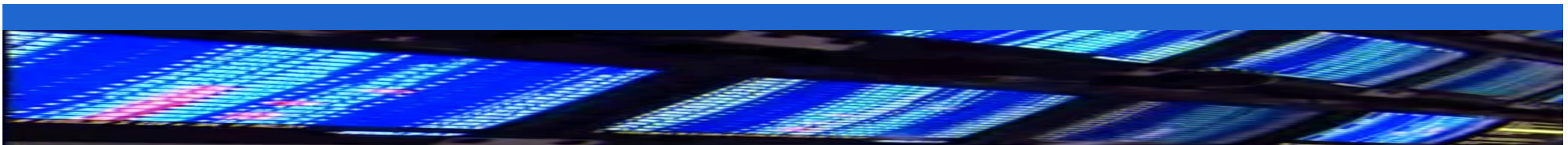
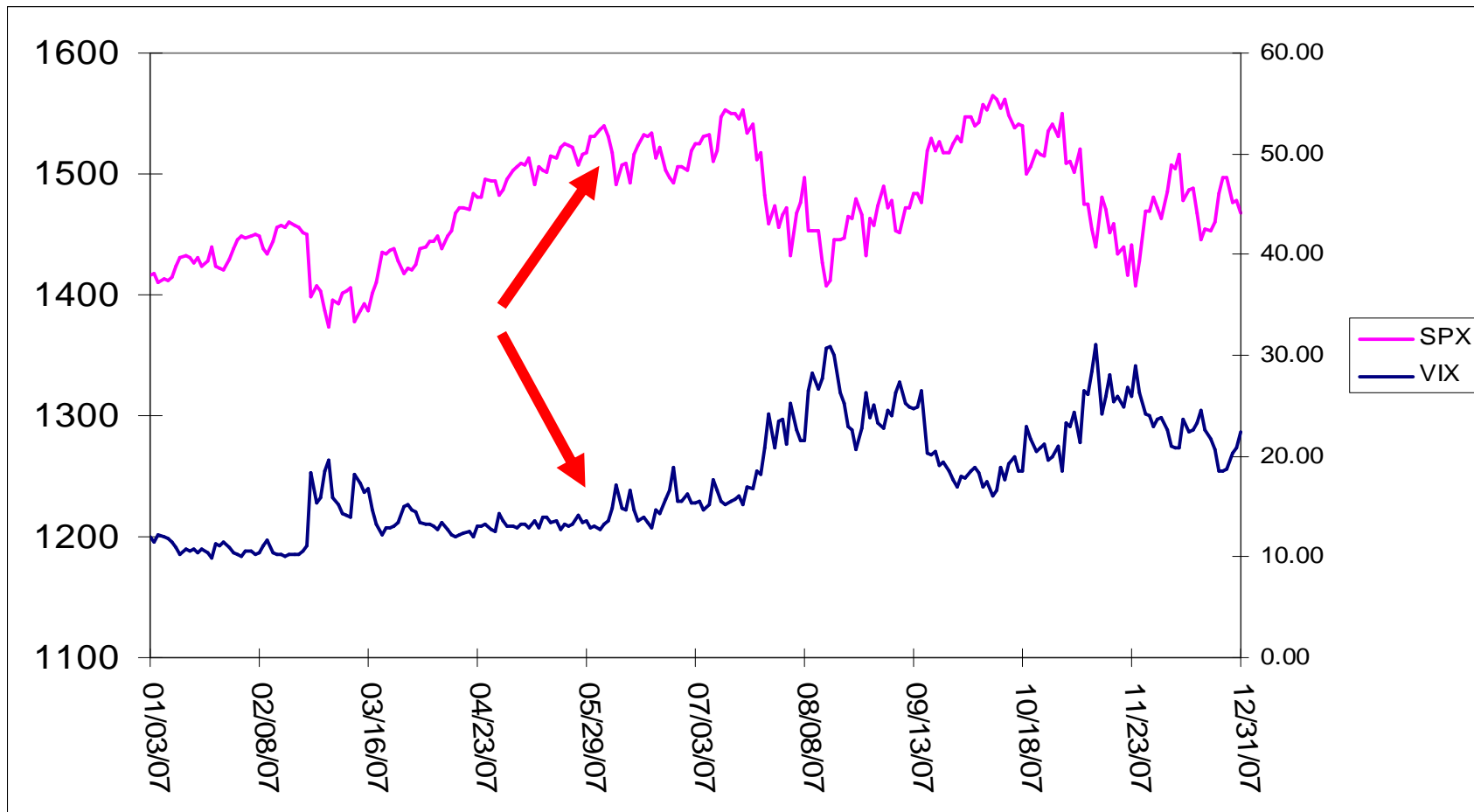
VIX & SPX 2007



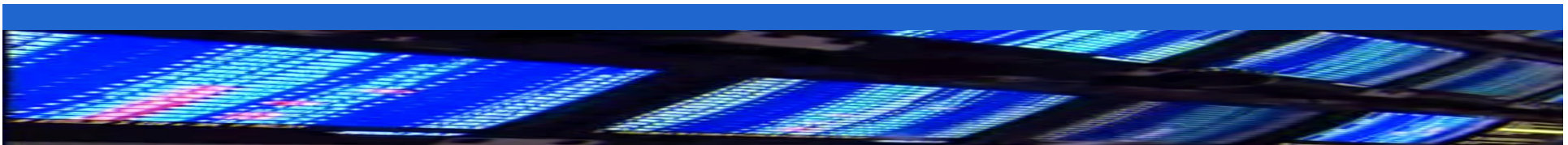
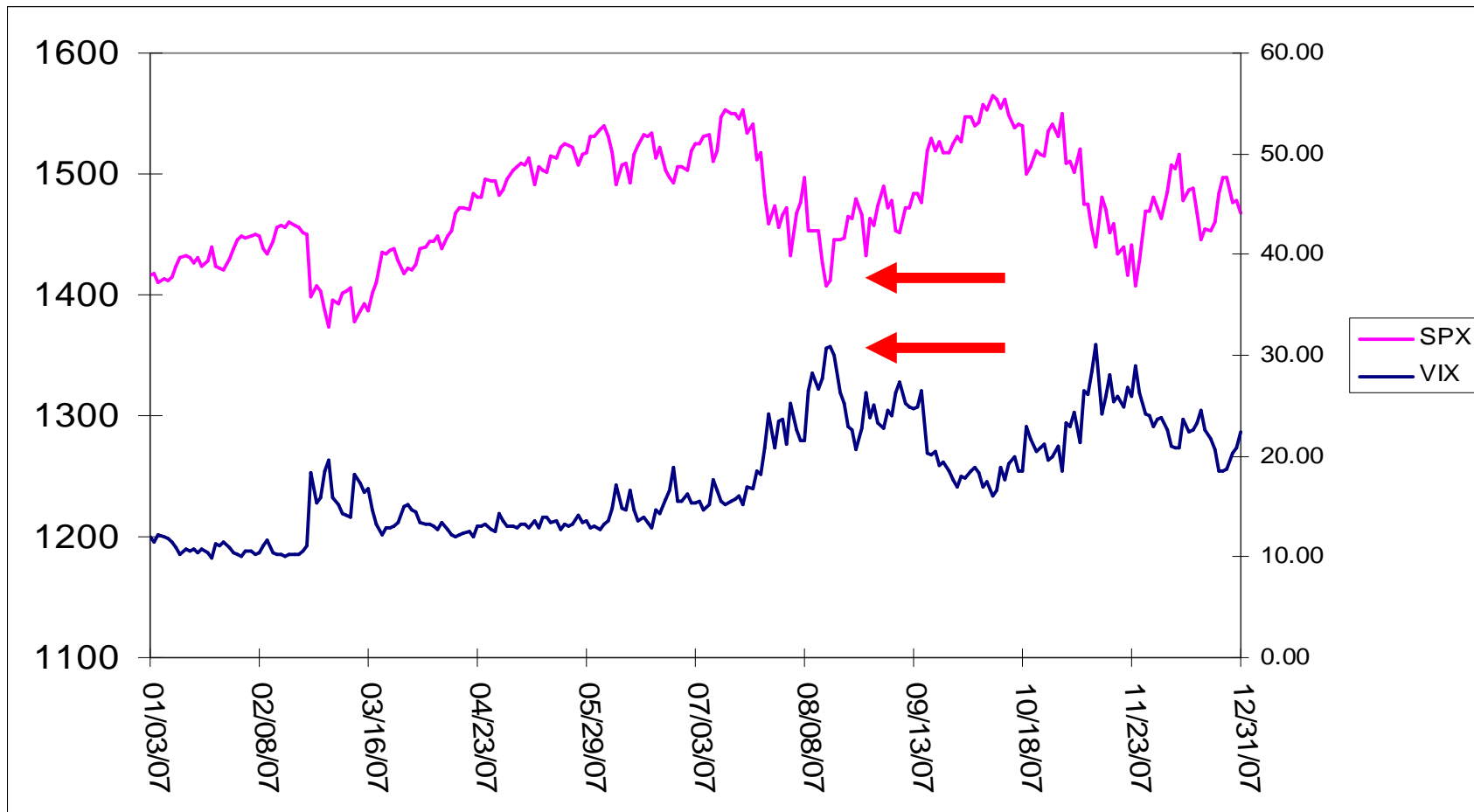
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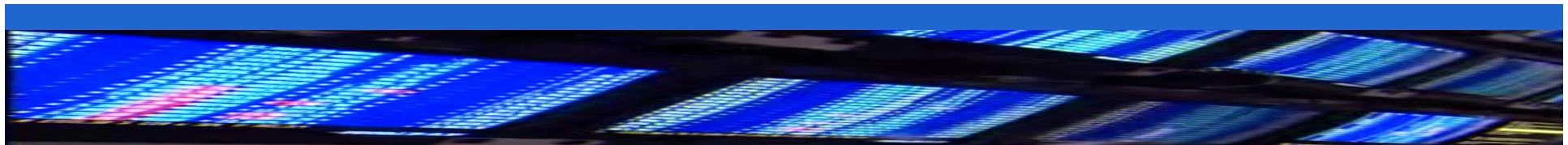
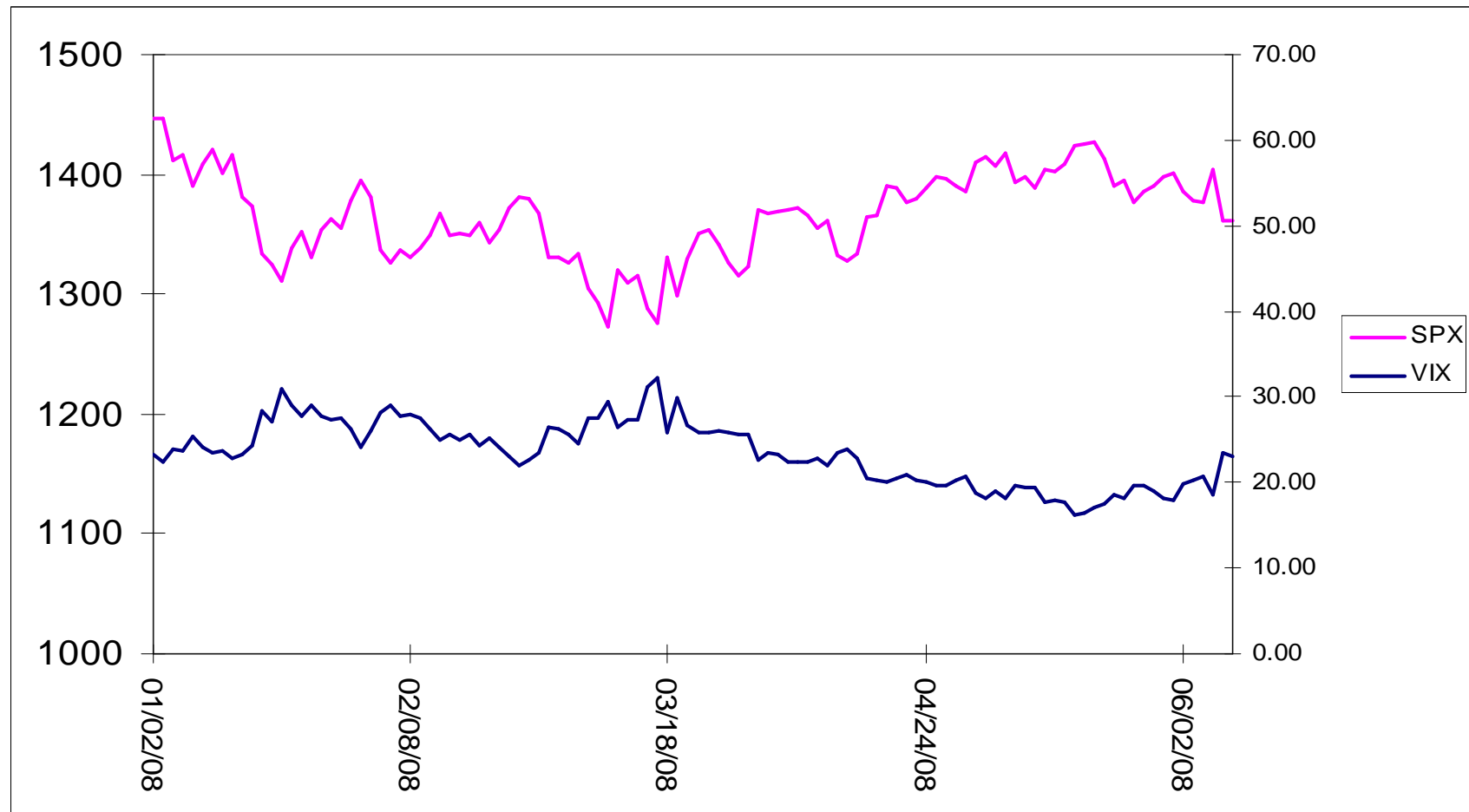
VIX & SPX 2007



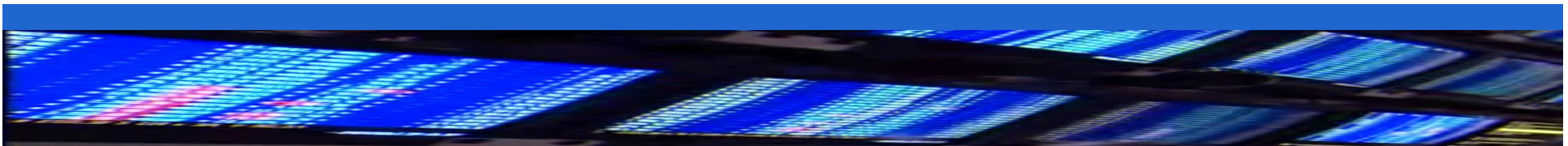
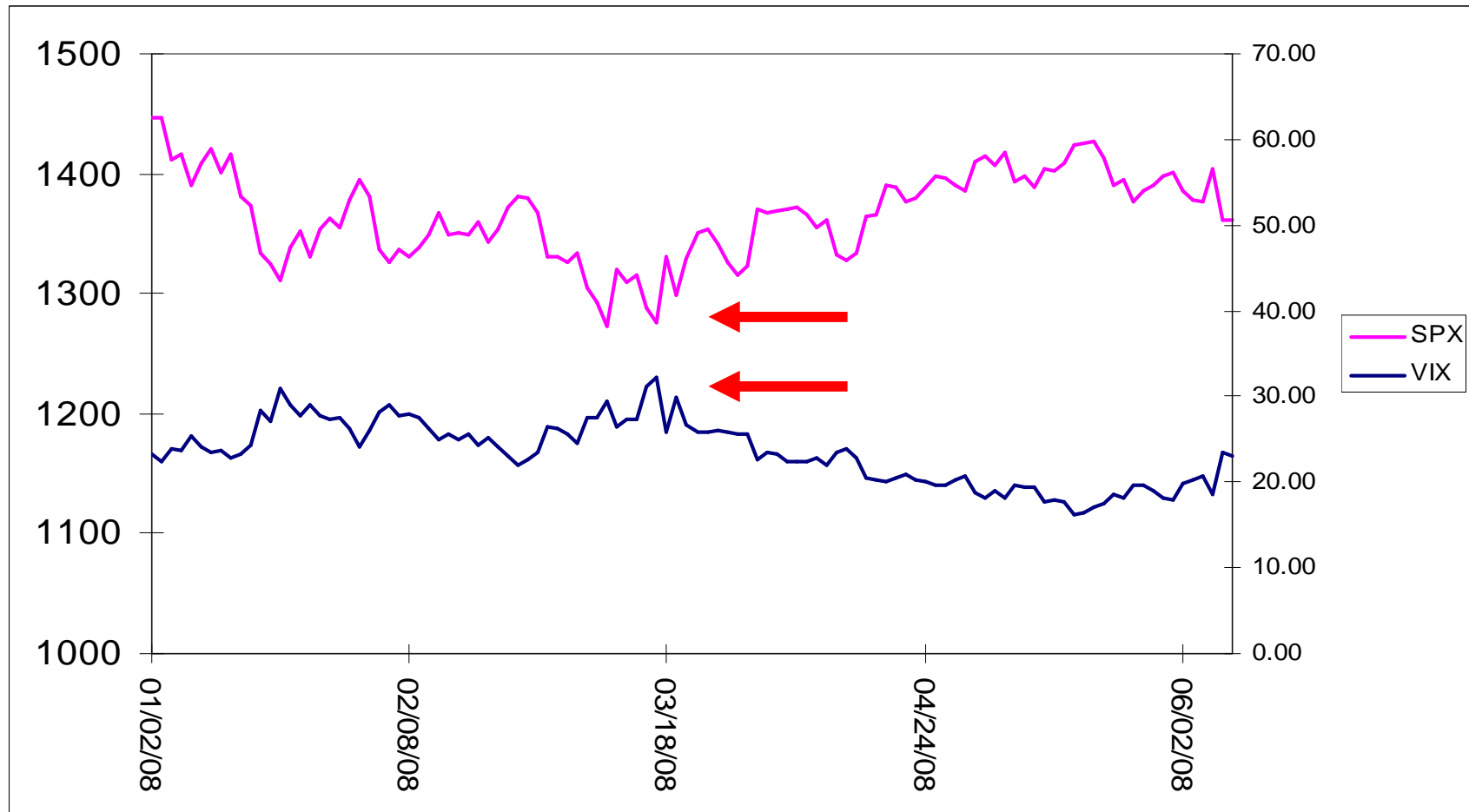
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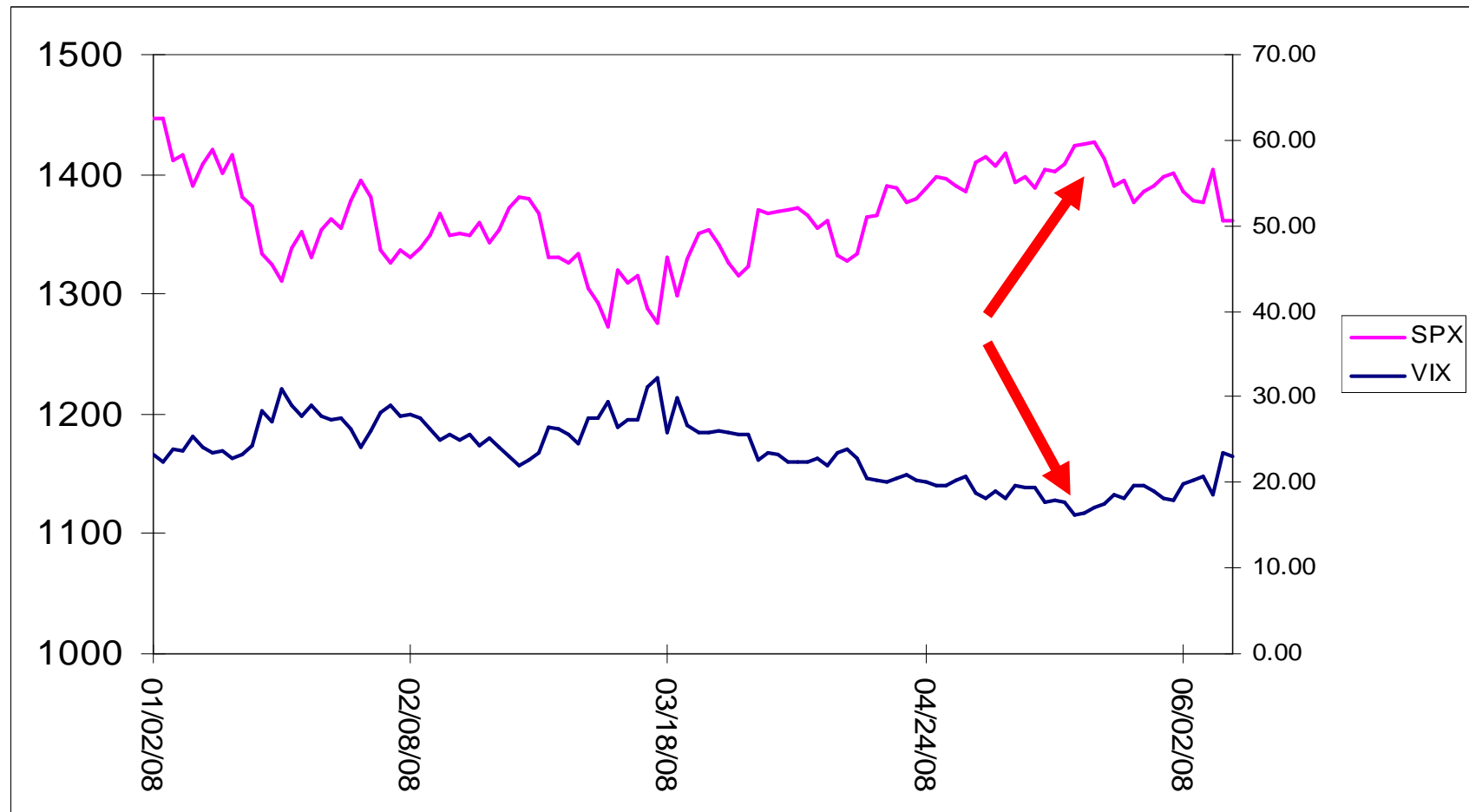
VIX & SPX 1/1/08 to 6/9/08



VIX & SPX 1/1/08 to 6/9/08

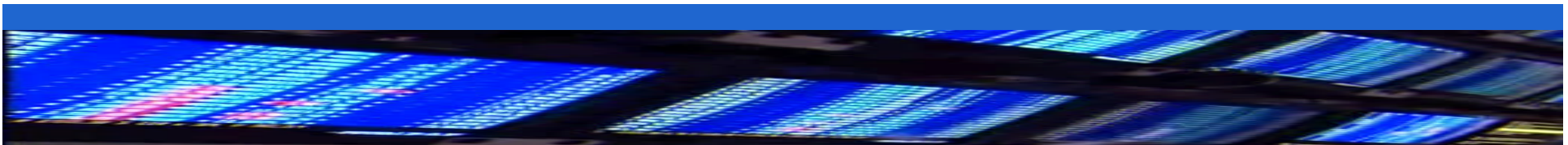


VIX & SPX 1/1/08 to 6/9/08



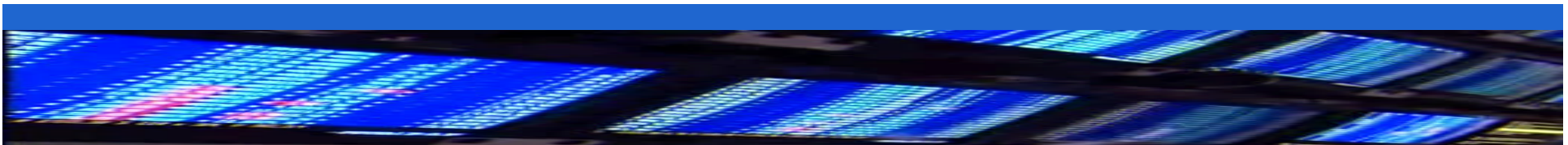
VIX and the S&P 500

- Also known as the “**Fear Index.**”, VIX gives an indication of options market anxiety.
- VIX tends to rise as the S&P 500 falls
- A “low” VIX indicates complacency.
- A “high” VIX indicates anxiety.
- VIX readings are very difficult to interpret as an indicator of market direction.



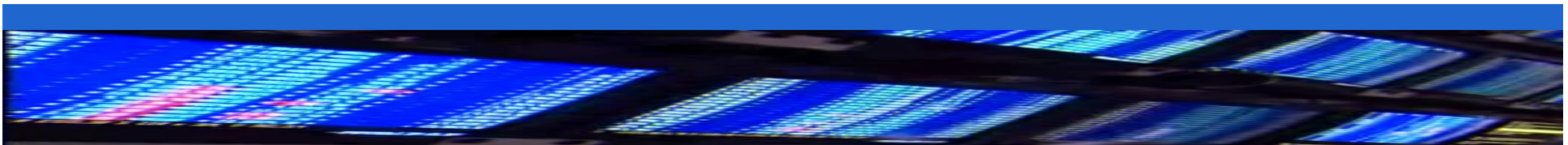
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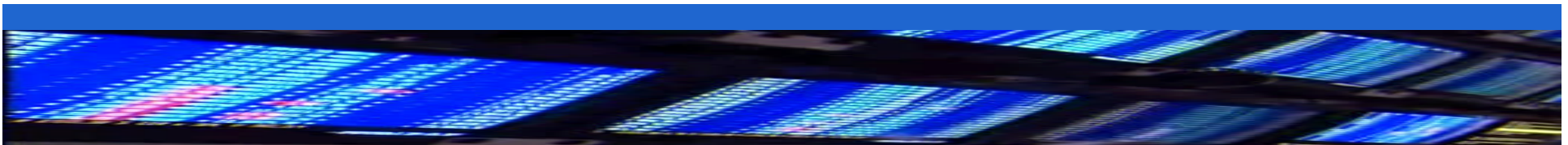
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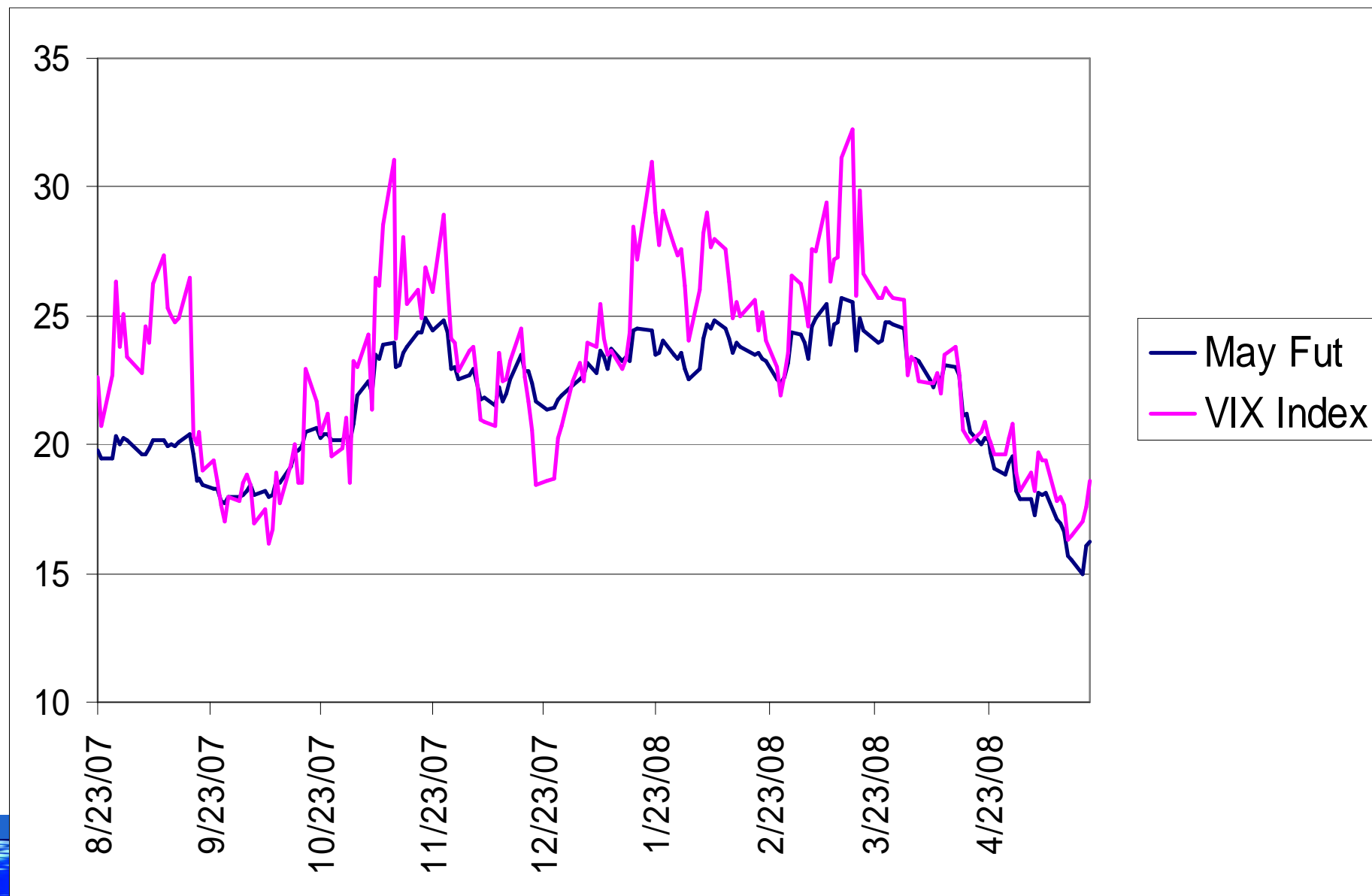


VIX Futures

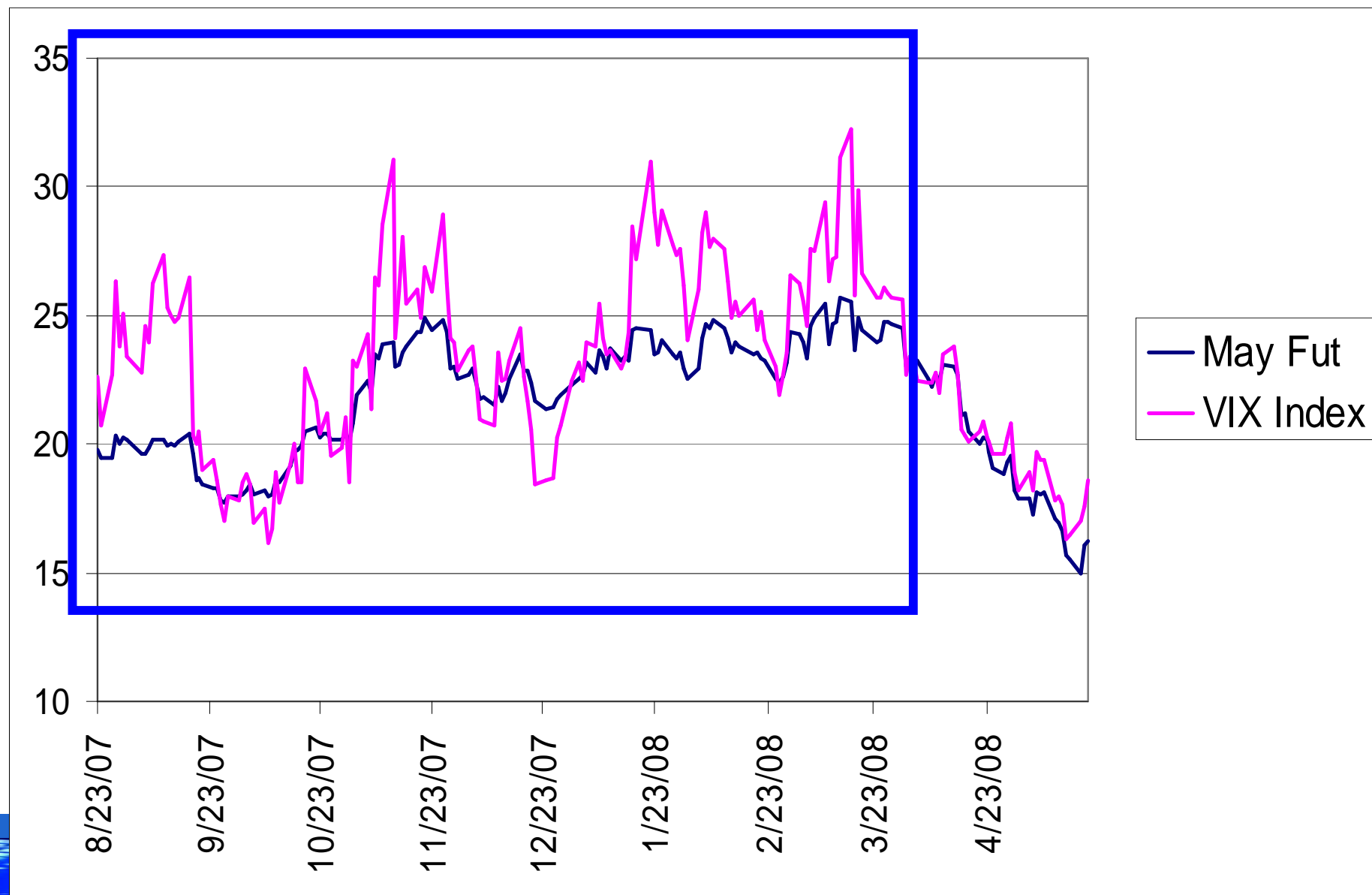
- Launched November, 2004
- Symbol – VX or VIX
(varies by data vendor)
- Unique pricing and price behavior



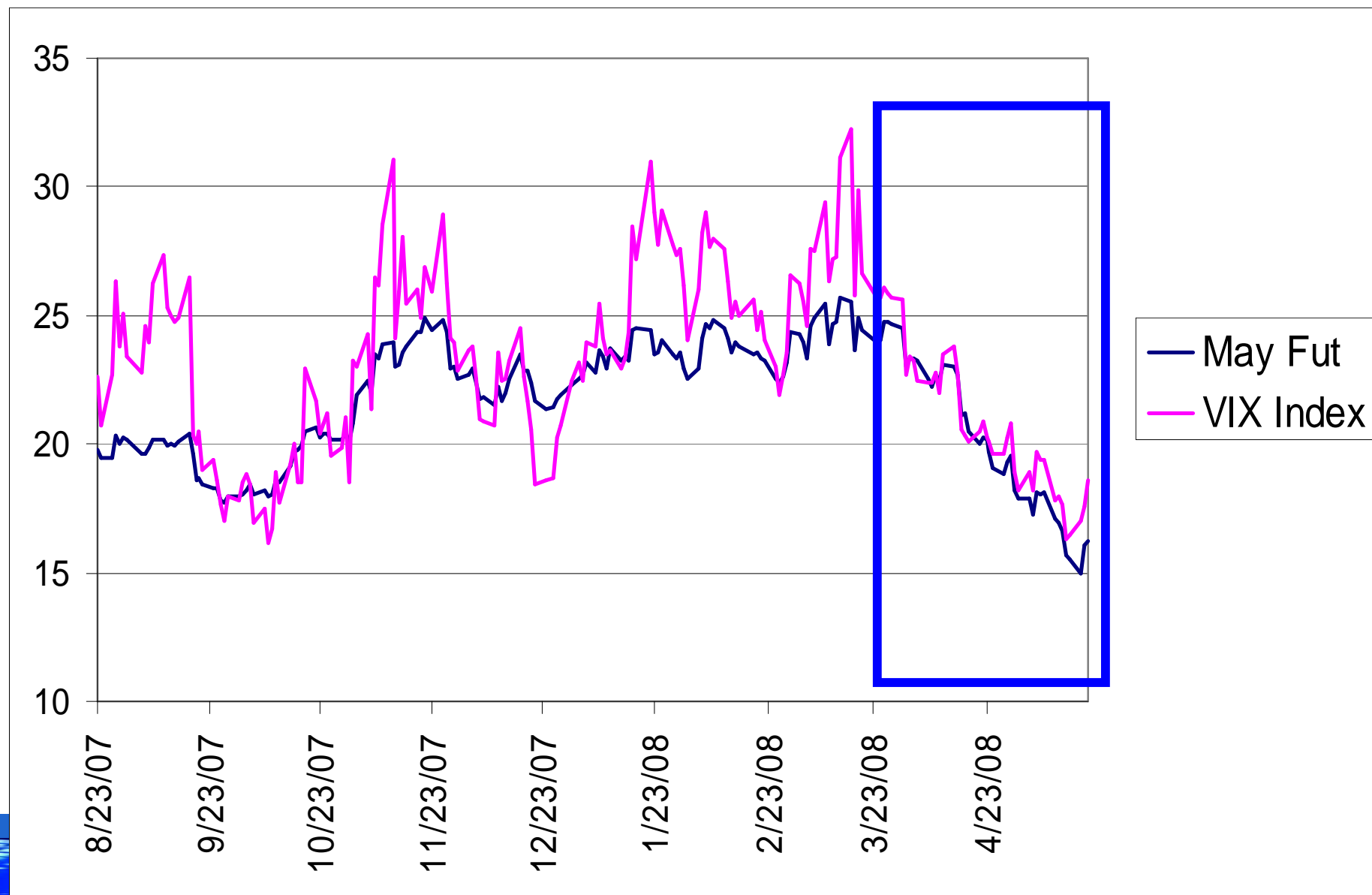
VIX compared to May 08 VIX Futures



VIX compared to May 08 VIX Futures

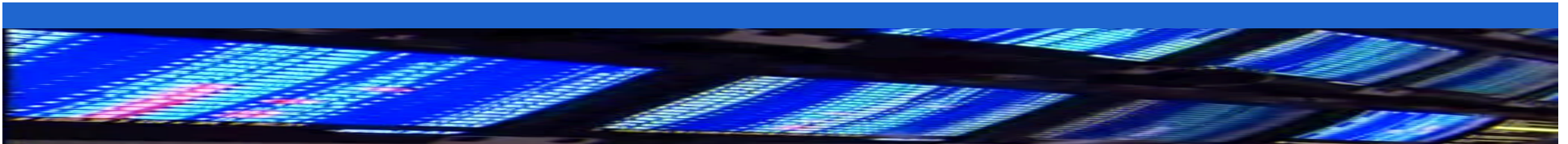


VIX compared to May 08 VIX Futures



VIX Futures vs. VIX Index

- No traditional futures-to-cash relationship!



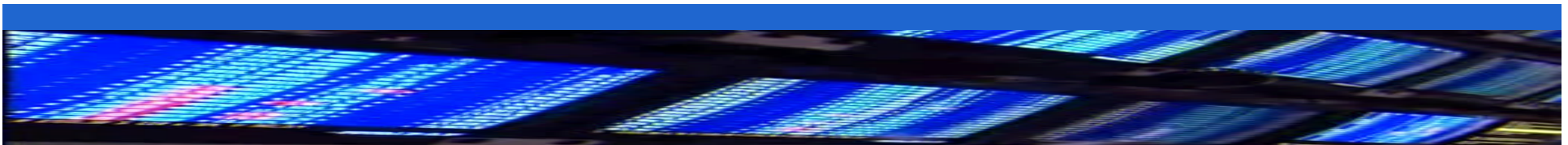
VIX Futures vs. VIX Index

- No traditional futures-to-cash relationship!
- No cost-of-carry relationship.



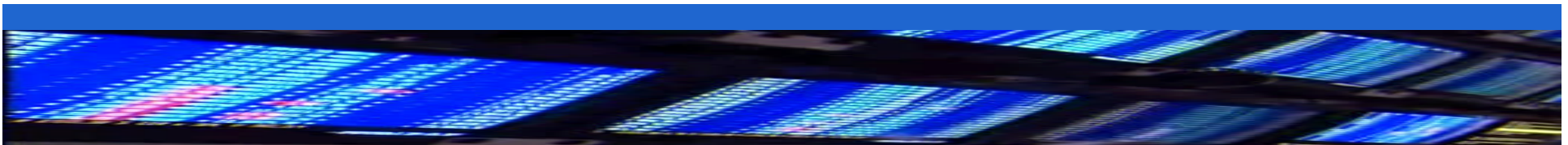
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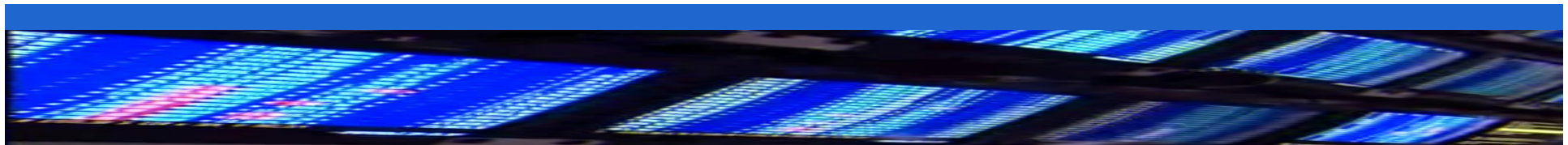
VIX Futures vs. VIX Index

- No traditional futures-to-cash relationship!
- No cost-of-carry relationship.
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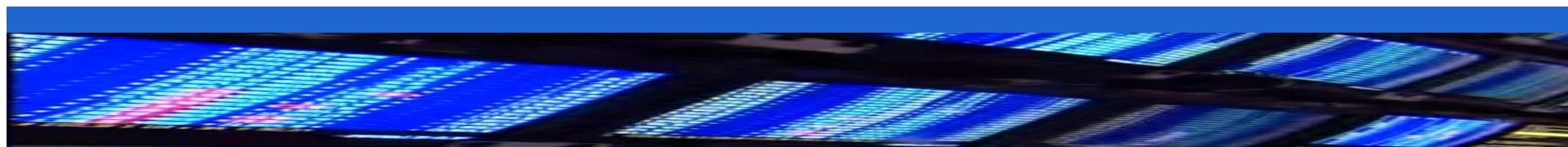
(non-) Correlation

- VIX futures trades independently of the VIX Index prior to expiration.
- VIX futures can trade above or below the VIX Index.
- Convergence at expiration.



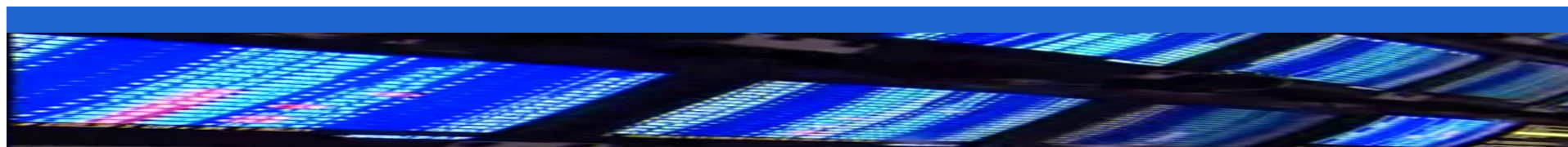
VIX Futures vs. Index Sample Dates

<u>Date</u>	<u>May Fut</u>	<u>VIX Index</u>
02/27/08	22.58	22.69
03/04/08	23.99	25.52
03/10/08	25.46	29.38
03/14/08	25.70	31.16
03/17/08	25.53	32.24
03/18/08	23.67	25.79
03/19/08	24.93	29.84
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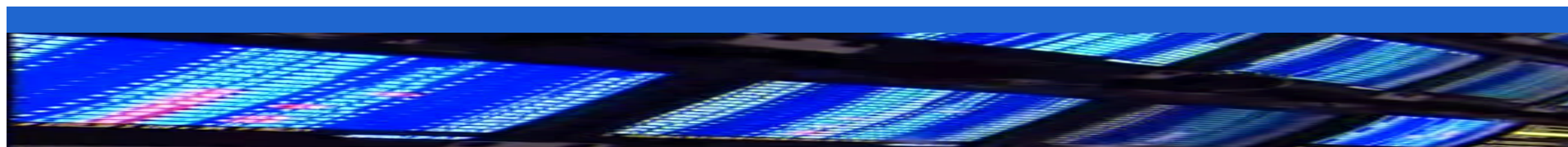
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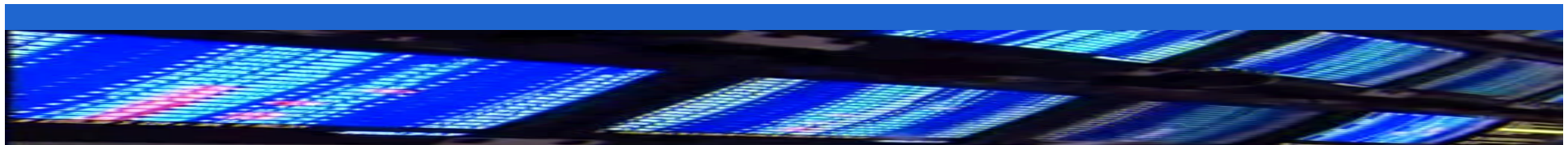
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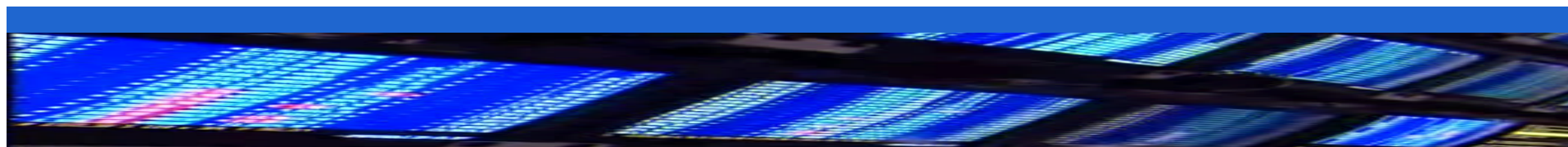
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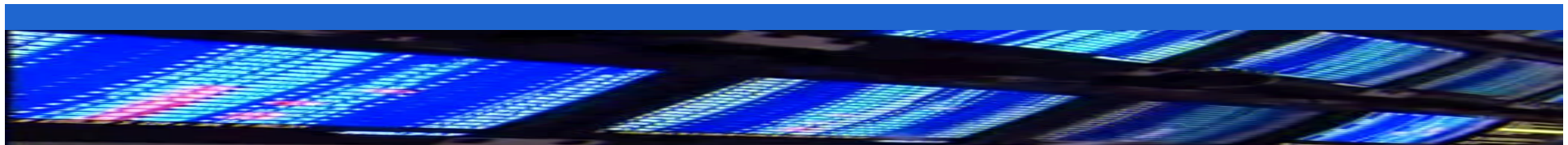
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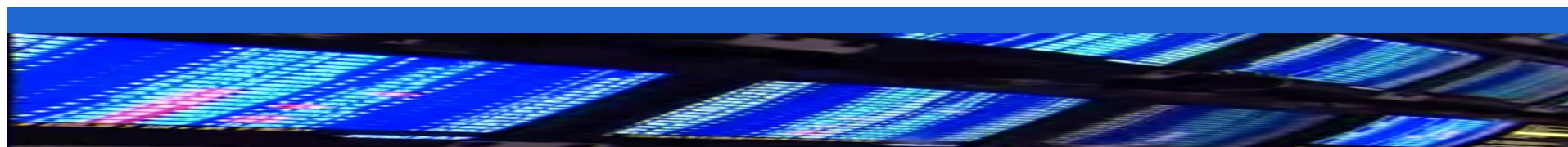
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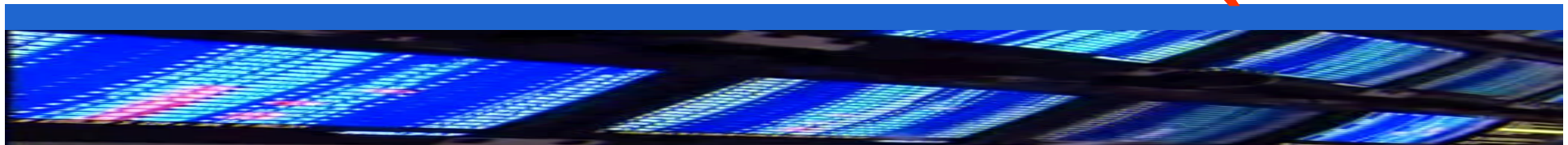
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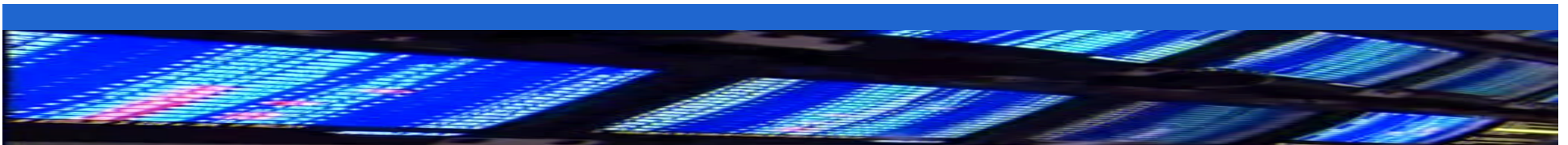
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VIX Options

- Launched February 24, 2006
- Symbol – VIX



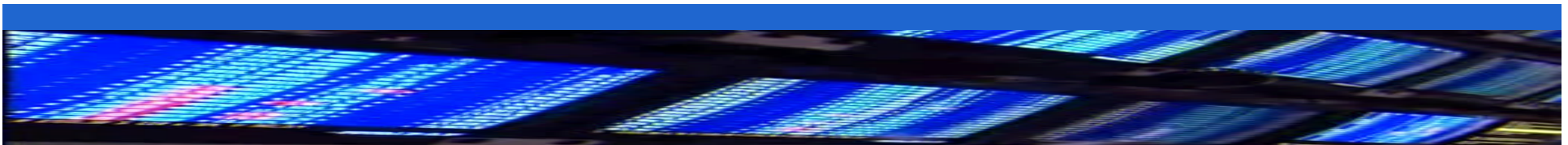
VIX Options

- Launched February 24, 2006
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- Cash-settled, European, \$100 multiplier



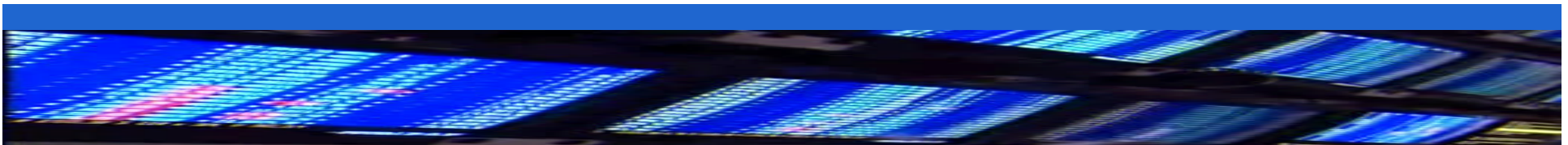
VIX Options

- Launched February 24, 2006
- Symbol – VIX
- Cash-settled, European, \$100 multiplier
- 1-point strikes below 20; 2½ above



VIX Options

- Launched February 24, 2006
- Symbol – VIX
- Cash-settled, European, \$100 multiplier
- 1-point strikes below 20; 2½ above
- 6 expirations available



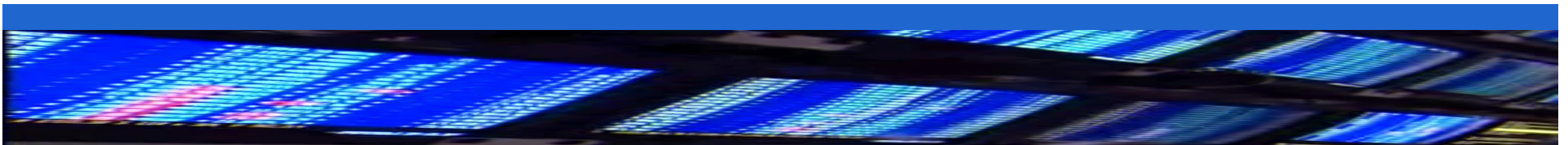
VIX Options

- Launched February 24, 2006
- Symbol – VIX
- Cash-settled, European, \$100 multiplier
- 1-point strikes below 20; 2½ above
- 6 expirations available (3 near term plus 3 in February quarterly cycle)



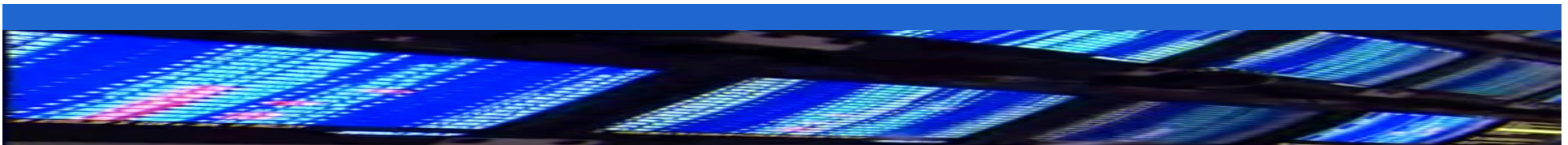
VIX Settlement (at Expiration)

- VIX expiration is the Wednesday 30 days prior to the next month's option expiration.



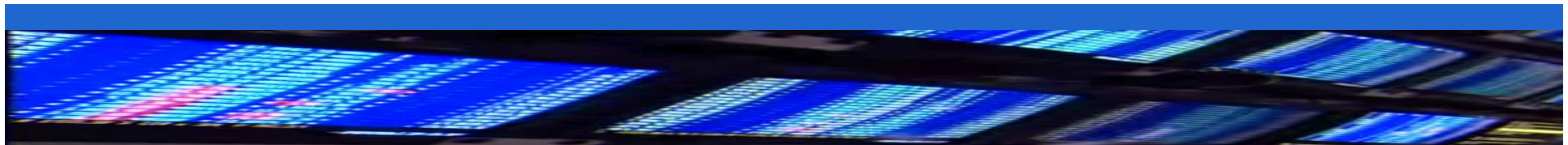
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VIX Settlement (at Expiration)

- VIX expiration is the Wednesday 30 days prior to the next month's option expiration.
- Last trading day is the Tuesday before the Wednesday VIX option/futures expiration.
- Settlement based on VIX calculation using next-month options (e.g., June VIX settlement uses July SPX options)



VIX Options – Pricing

- Date: 3/10/08
- Current VIX Index 25.46
- May 30 Call 2.70
- May 30 Put 3.40



VIX Options – Pricing

- Date: 3/10/08

- Current VIX Index

25.46

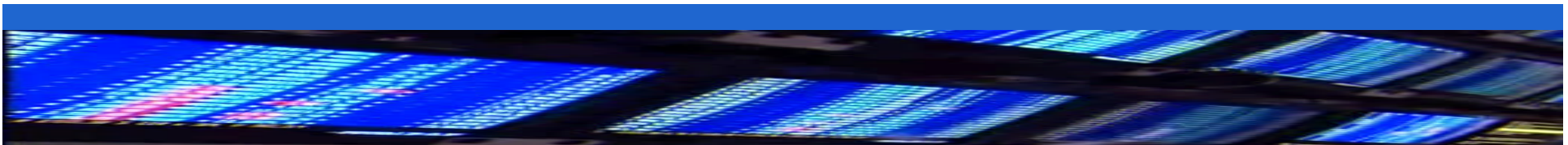
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3.40

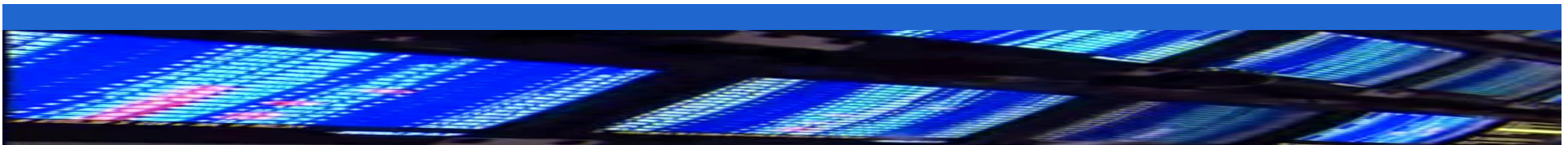
?



VIX Options – Pricing

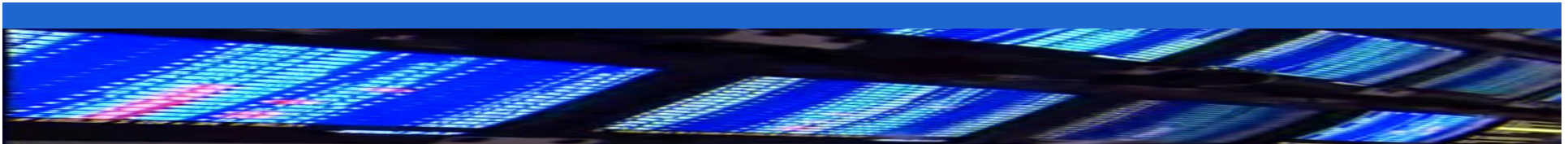
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May VIX Futures 29.40



Inputs to Option Prices

- Underlying Price
- Strike Price
- Time to Expiration
- Interest Rates
- Volatility



Inputs to Option Prices

- Underlying Price

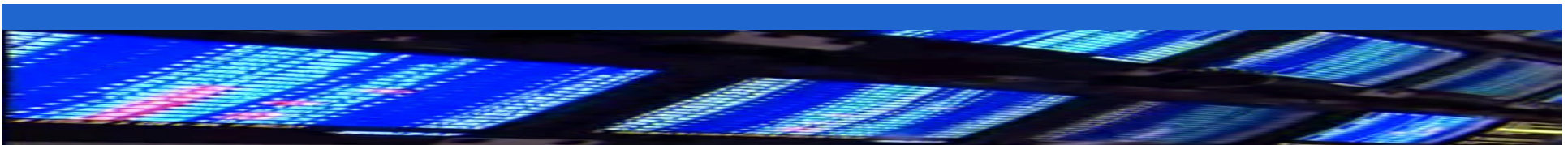
- Strike Price

- Time to Expiration

- Interest Rates

- Volatility

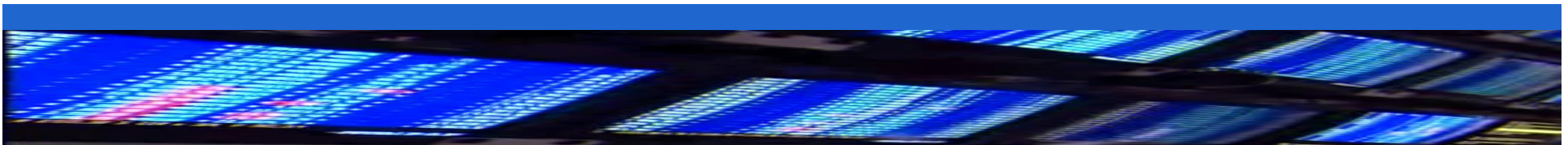
The VIX futures price is the “underlying price” for VIX options.



Inputs to Option Prices

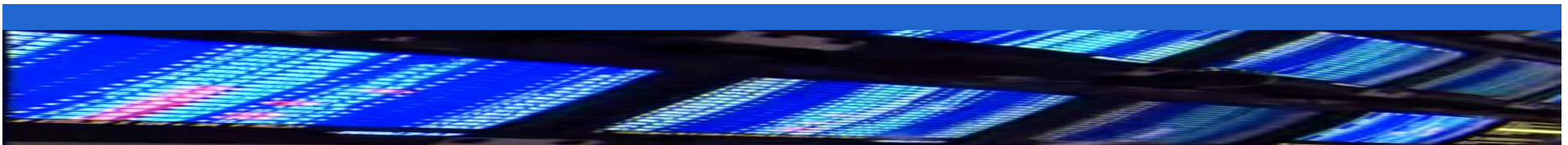
- Underlying Price
- Strike Price
- Time to Expiration
- Interest Rates
- Volatility

Use 0% (to mimic the “Black” model)



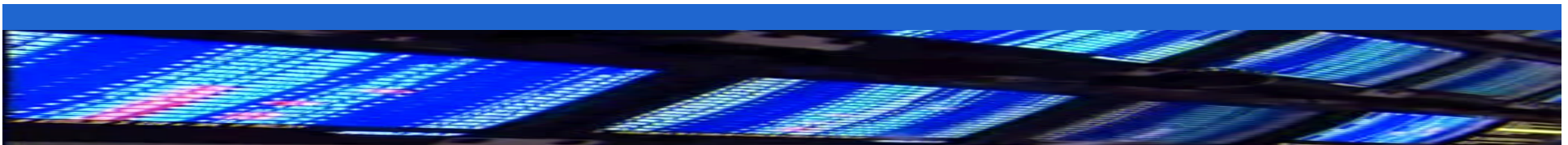
VIX Case Study

- Date 2/27/08 (90 days to May exp.)
- VIX Index 22.69
- VIX MAY Futures 22.58
- VIX MAY 22.50 Call 3.40



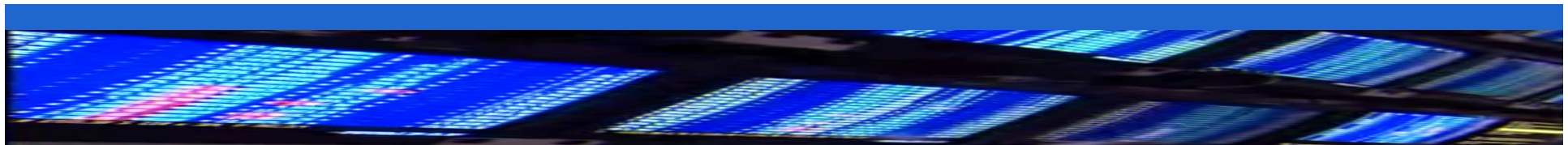
VIX Case Study – the Forecast - 1

- Date 2/27 → 3/10
- VIX Index 22.69 → 29.38
- May Futures 22.58 → ???
- May 22.50 Call 3.40 → ???



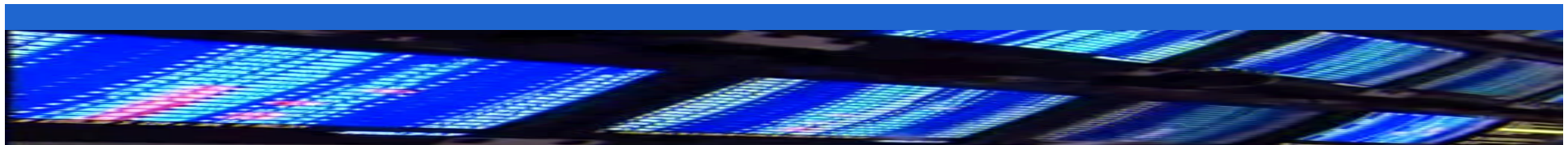
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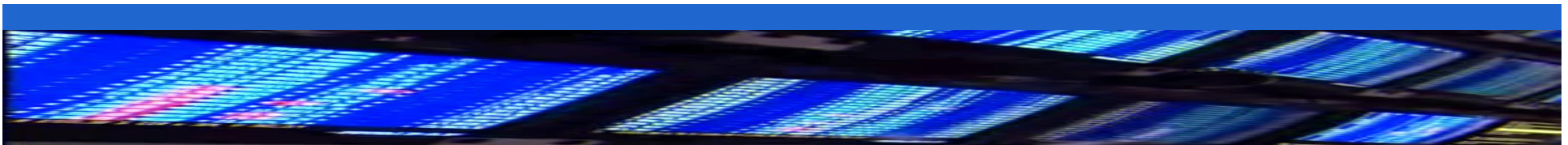
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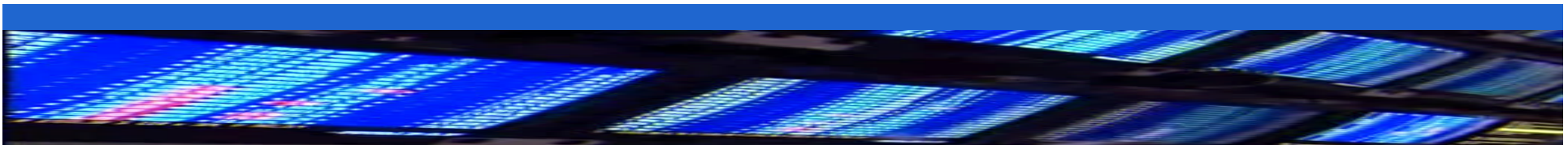
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- Date 2/27 → 3/10
 - VIX Index 22.69 → 29.38
 - May Futures 22.58 → ???
 - May 22.50 Call 3.40 → ???
-



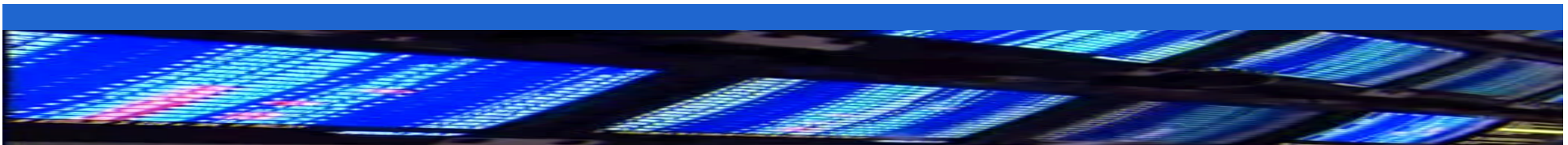
VIX Case Study – the Forecast - 2

- Date 2/27 → 3/10
- VIX Index 22.69 → 29.38
- May Futures 22.58 → **25.46**
- May 22.50 Call 3.40 → ???



VIX Case Study – the Forecast - 3

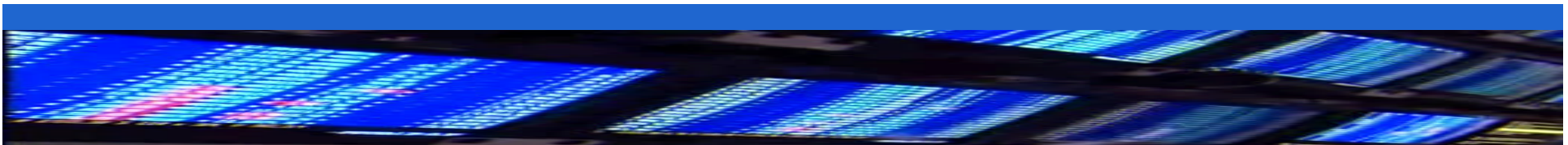
- Date 2/27 → 3/10
- VIX Index 22.69 → 29.38
- May Futures 22.58 → **25.46**
- May 22.50 Call 3.40 → **5.40**



VIX Case Study – the Forecast - 3

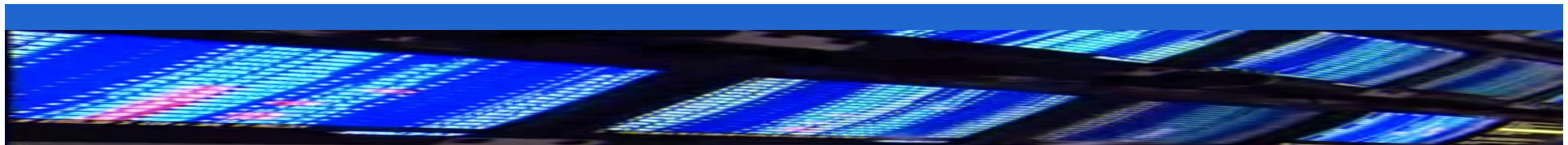
- Date 2/27 → 3/10
- VIX Index 22.69 → 29.38
- May Futures 22.58 → **25.46**
- May 22.50 Call 3.40 → **5.40**

NOTE: The 22.50 Call appears to be trading below parity to the VIX index!



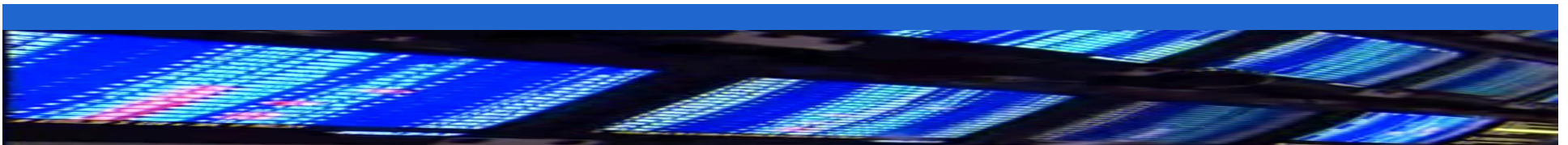
Case Study – Observations

- With approximately 90 days to expiration, the VIX futures changed less than the VIX Index.
- Traders of VIX options must pay attention to the price of the VIX futures.



Summary

- VIX is an index of implied volatility of SPX options.



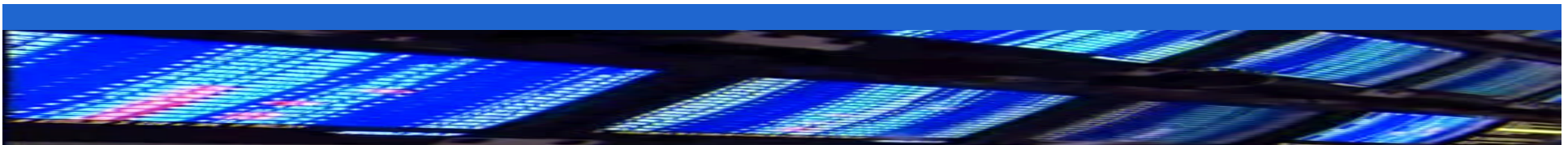
Summary

- VIX is an index of implied volatility of SPX options.
- VIX has been negatively correlated to the market.



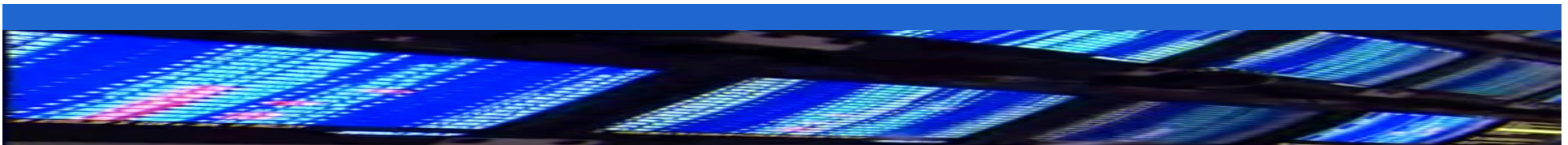
Summary

- VIX is an index of implied volatility of SPX options.
- VIX has been negatively correlated to the market.
- Unique contract specifications.



Summary

- VIX is an index of implied volatility of SPX options.
- VIX has been negatively correlated to the market.
- Unique contract specifications.
- The “underlying” for VIX options is the same expiration VIX futures contract.





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