
VOLUME AND VOLATILITY IN THE FUTURES AND OPTIONS MARKETS

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I-1. An Overview of Volume

What is Volume?

- Reflects supply and demand
- Volume has been ignored as a factor affecting prices by a number of people who examine markets
- Is there a more useful measure of “market pressure” than TOTAL volume, especially in futures markets?



II-1: A New Type of Volume

Volume By Type of Trader

- A better measure of market supply/demand is volume by type of trader
- CTI traders: Customer Trade Indicator
 - ▶ CTI1: Scalper (dealer on the floor)
 - ▶ CTI2: Clearing Members (Commercial Traders) trading for their own account
 - ▶ CTI3: Floor Traders making a trade for another Floor Trader
 - ▶ CTI4: The General Public (traders without a seat)



II-2: A New Type of Volume

What Do the CTI Traders Do and What are Their Advantages?

- **CTI2s: Commercials (Clearing Members)**
 - ▶ Trade for their own account (hedging and position taking)
 - ▶ Benefits from “inside” knowledge of the cash market (analysis)
 - ▶ Know what their customers are doing
 - ▶ Proximity to futures trading floor and cash market (trading screens)
- **CTI3s: Floor Traders making trades for others**
 - ▶ Spread trades with other contracts
 - ▶ Hedge trades with options
 - ▶ Proximity to futures trading floor
- **CTI4s: General Public**
 - ▶ Considered least knowledgeable
 - ▶ Farthest from the trading floor



II-3: A New Type of Volume

Is Trader Type Volume Useful? What Do the Floor Traders Say

- Steidermeyer: developed concept; “made millions”
 - ▶ How does he do it?
 - Who on the floor is trading?
 - Size of contract?
 - Timing of contract?
- Floor traders can “see them coming”: consistent orders from a brokerage or advisory house
 - ▶ Prices adjust
- Market Profile is a real time offshoot of type of trader information
 - ▶ But it only uses price information
 - ▶ Perhaps certain traders send prices “to an extreme”



III-1: The Relation between Volume by Trader Type and Volatility

Or, Who Causes the Volatility?

- Answer: the General Public (Daigler and Wiley, 1999 JF)
- Reasons:
 - ▶ They do NOT have the resources to analyze the cash market (quality of information)
 - ▶ They do NOT have the information on order flow that others do
 - Clearing Members (Commercials) know what their customers are doing
 - Proximity to the trading floor allows one to see “the flow of orders”
 - Source of trades, short-term price direction, and order imbalances
- Clearing Members and floor traders often decrease volatility



III-2: The Relation between Volume by Trader Type and Volatility

What is the Key to the General Public's Trading Effects on Volatility?

- The General Public are associated with the high and low prices
 - ▶ Thus, they seem to trade at the extremes
 - Speculation rather than value
 - Panic?
 - ▶ Consistent with Steidermeyer's view on the markets
- Thus, “uninformed traders who cannot differentiate liquidity demand from fundamental value change increase volatility” (Shalen, RFS)
 - ▶ Consistent with the general public having imprecise information
 - ▶ Also consistent with the general public having a greater dispersion of expectations than commercials
 - ▶ Use of technical analysis associated with these factors



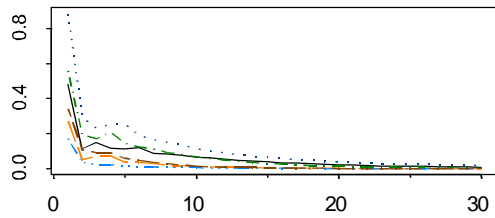
III-3: The Relation between Volume by Trader Type and Volatility

What Else do We Know?

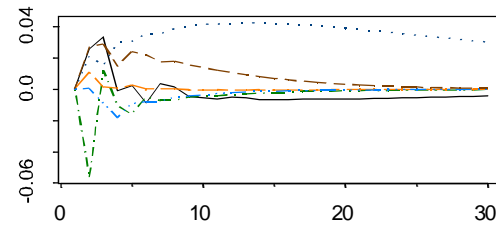
- “Unexpected Volume” is more important than a past average of volume or “Expected Volume” (by trader type)
 - ▶ Therefore, technical analysis using past volume may be less useful
- The response of the variables to shocks (next graph)



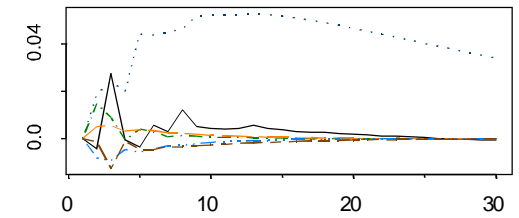
(1.1):Resp of GK to 1 STD of GK



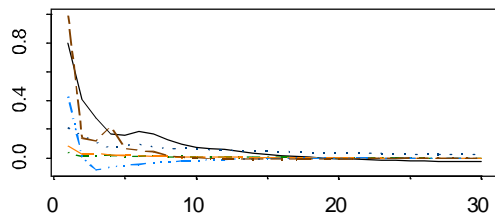
(1.2):Resp of GK to 1 STD of CTI2



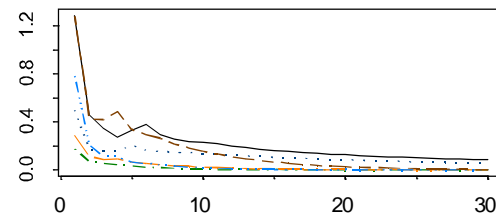
(1.3):Resp of GK to 1 STD of CTI4



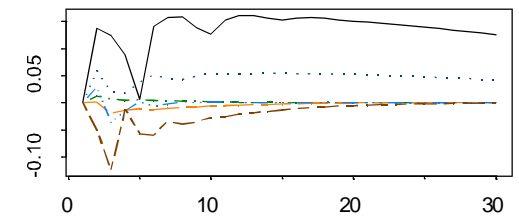
(2.1):Resp of CTI2 to 1 STD of GK



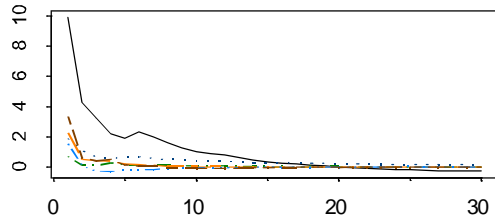
(2.2):Resp of CTI2 to 1 STD of CTI2



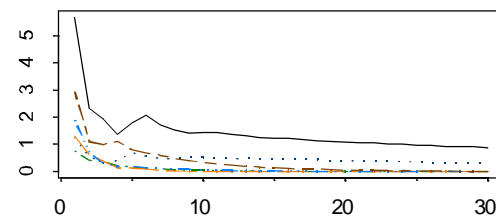
(2.3):Resp of CTI2 to 1 STD of CTI4



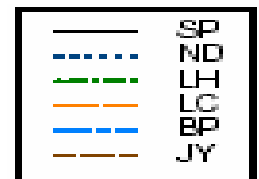
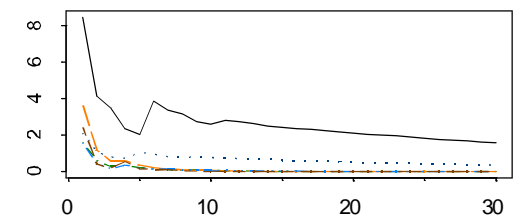
(3.1):Resp of CTI4 to 1 STD of GK



(3.2):Resp of CTI4 to 1 STD of CTI2



(3.3):Resp of CTI4 to 1 STD of CTI4



IV-1: The Distribution of Volume by Trader Type

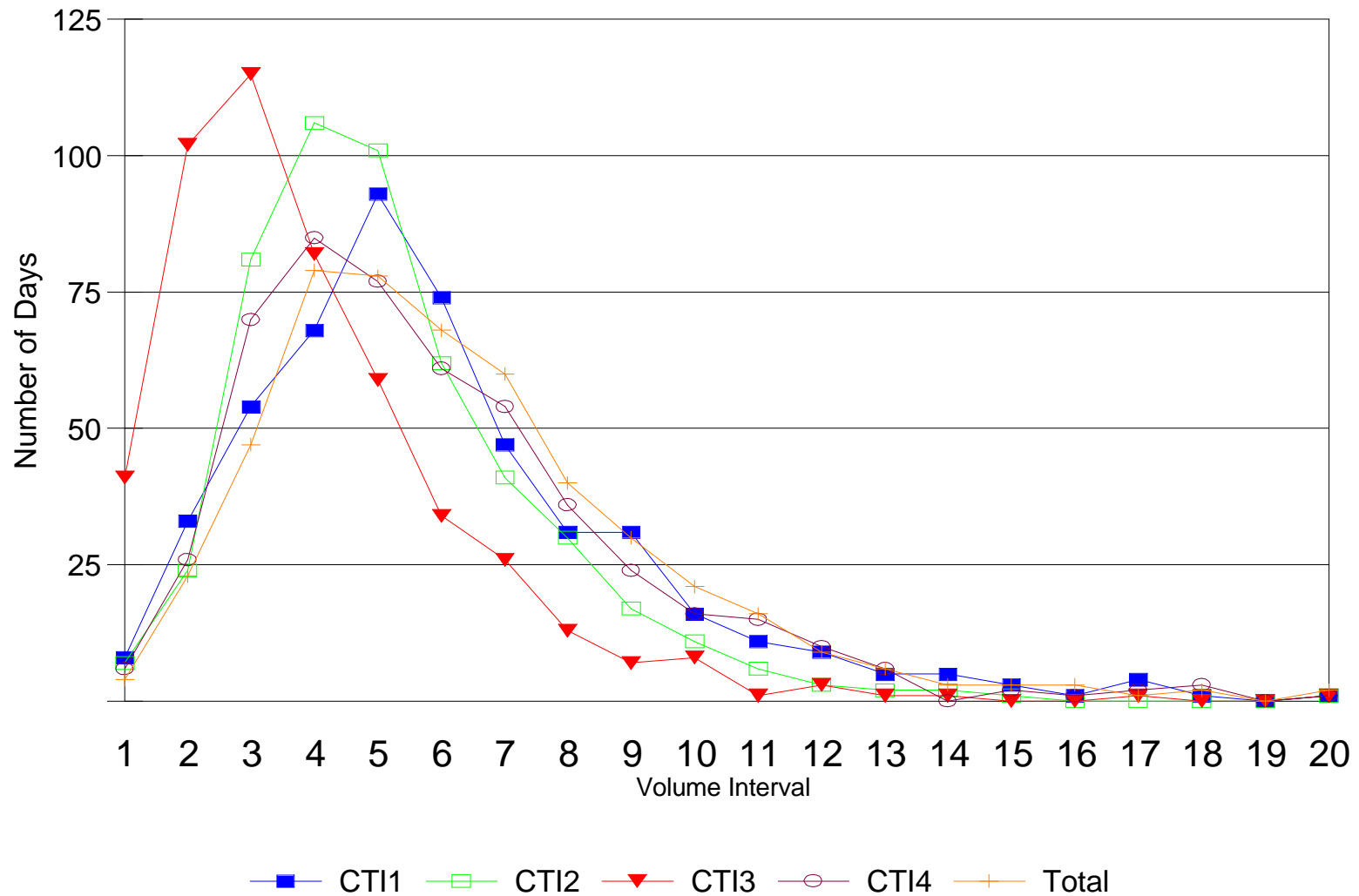
Is Volume “Normal”?

- The following graphs show the distribution of daily volume by CTI group
- The graphs show that volume is NOT distributed normally
- There are differences between more liquid (T-note) and less liquid (Muni bond) contracts
- Unexpected volume is less normal than expected volume



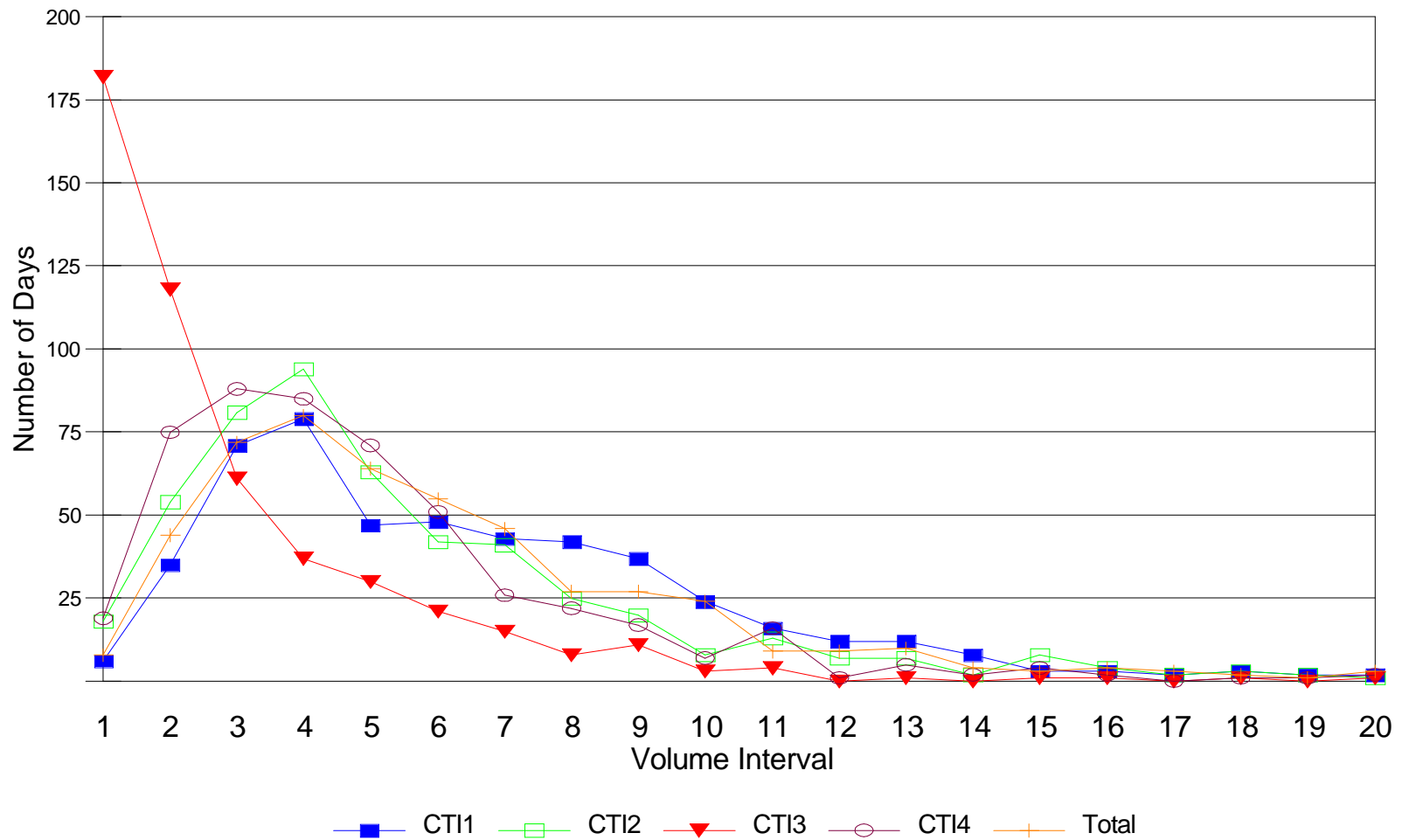
IV-2: The Distribution of Volume by Trader Type

T-note Total Volume Distribution



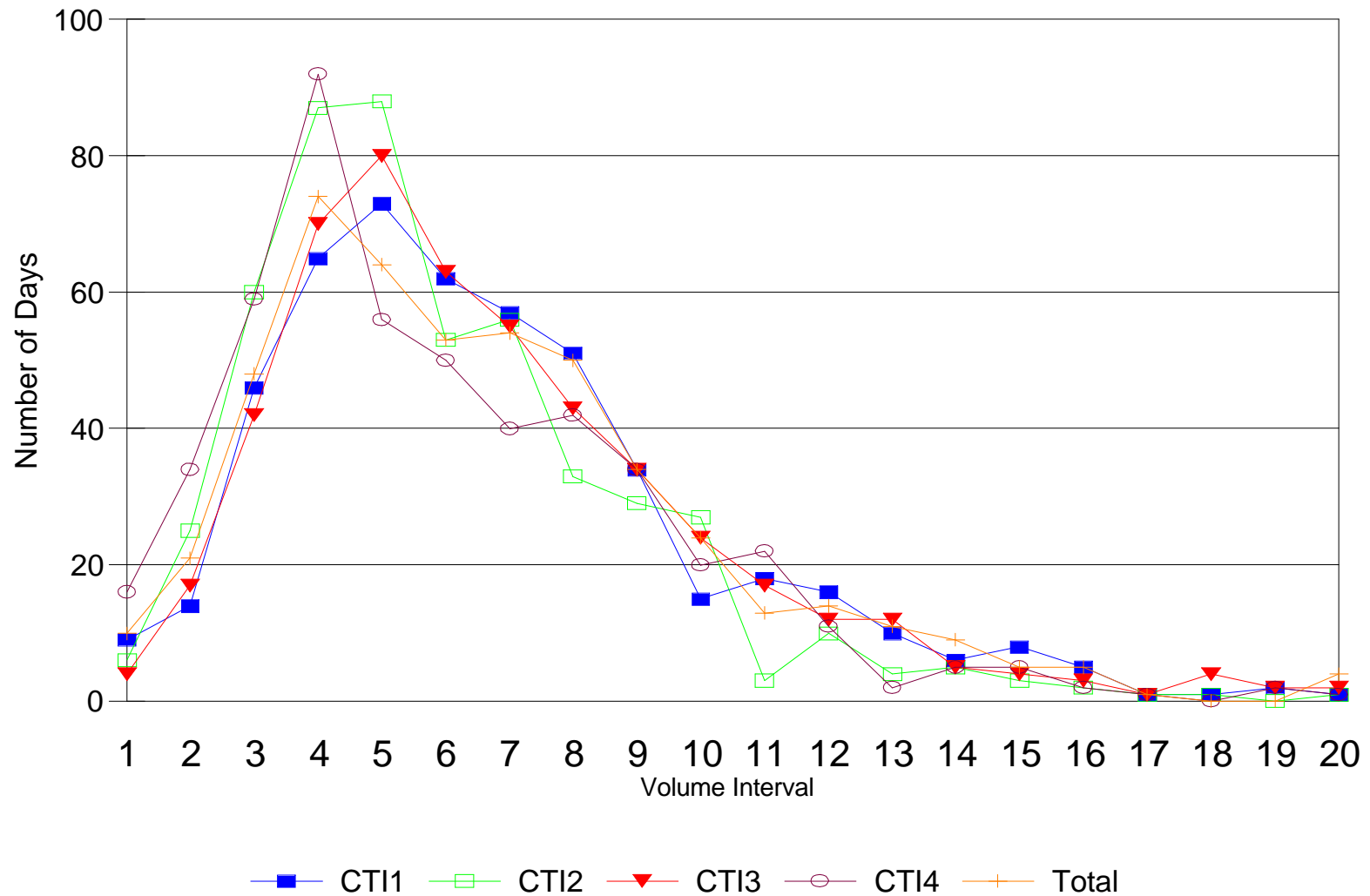
IV-3: The Distribution of Volume by Trader Type

Muni Total Volume Distribution



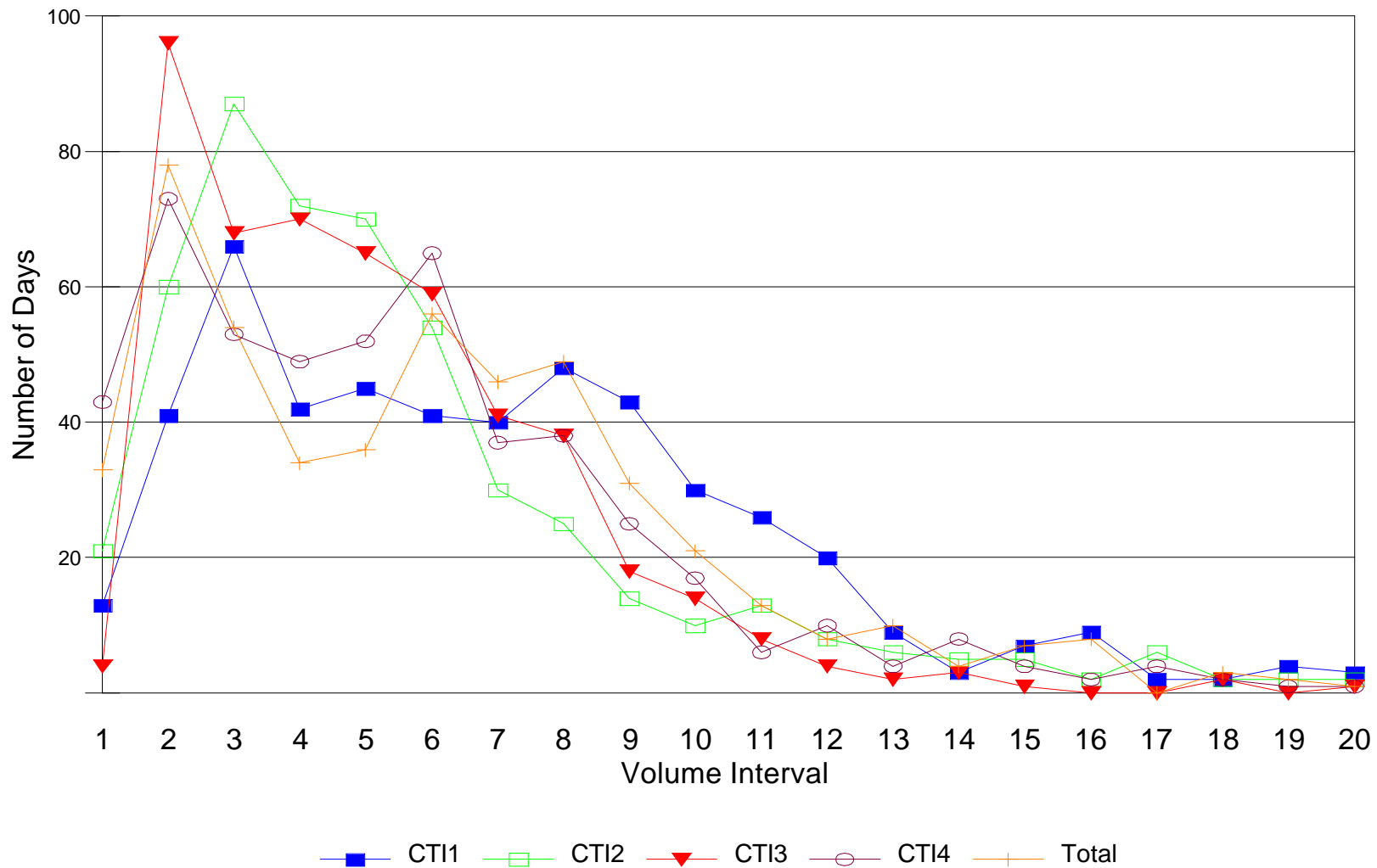
IV-4: The Distribution of Volume by Trader Type

T-note Expected Volume Distribution



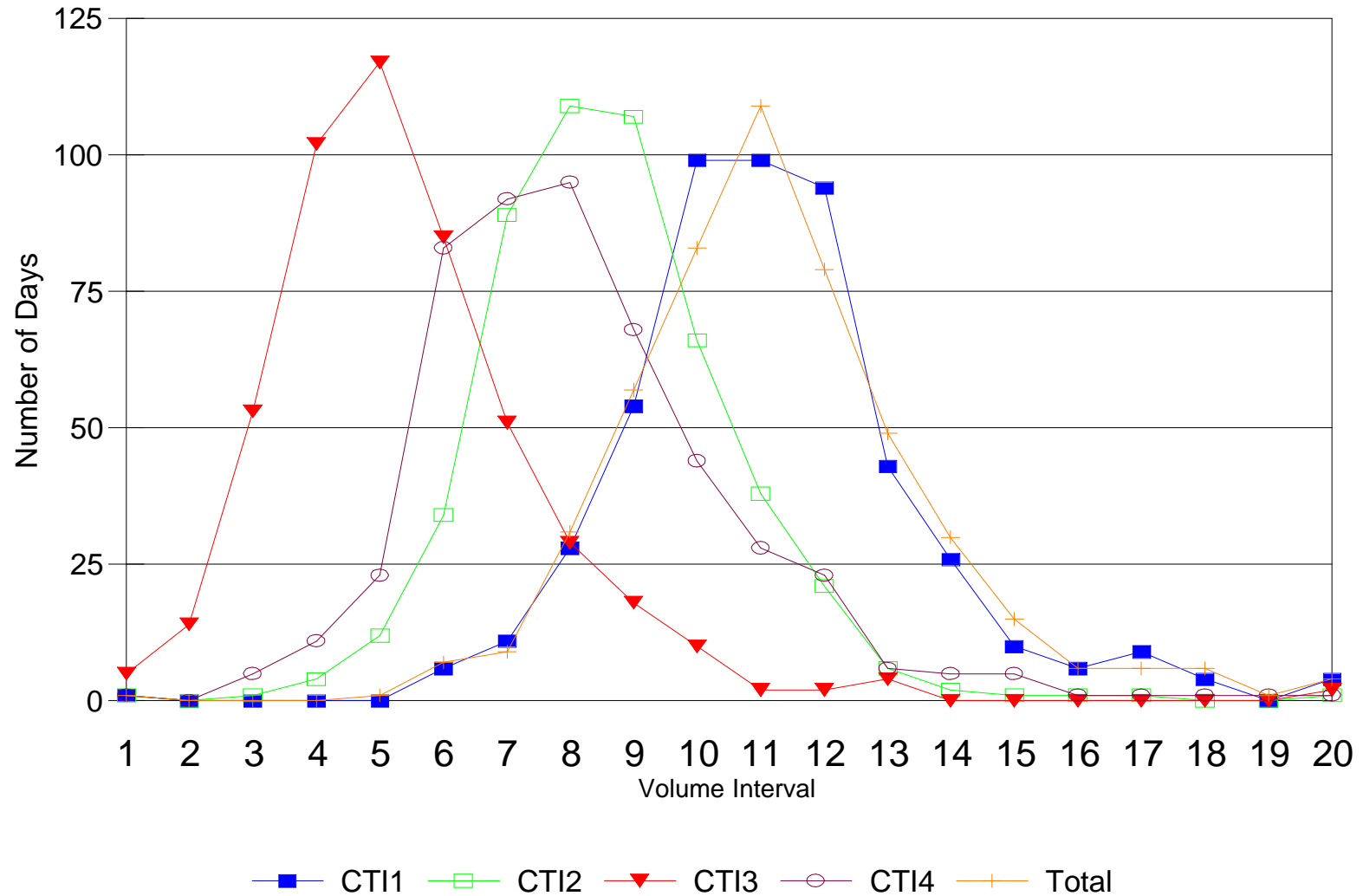
IV-5: The Distribution of Volume by Trader Type

Muni Expected Volume Distribution



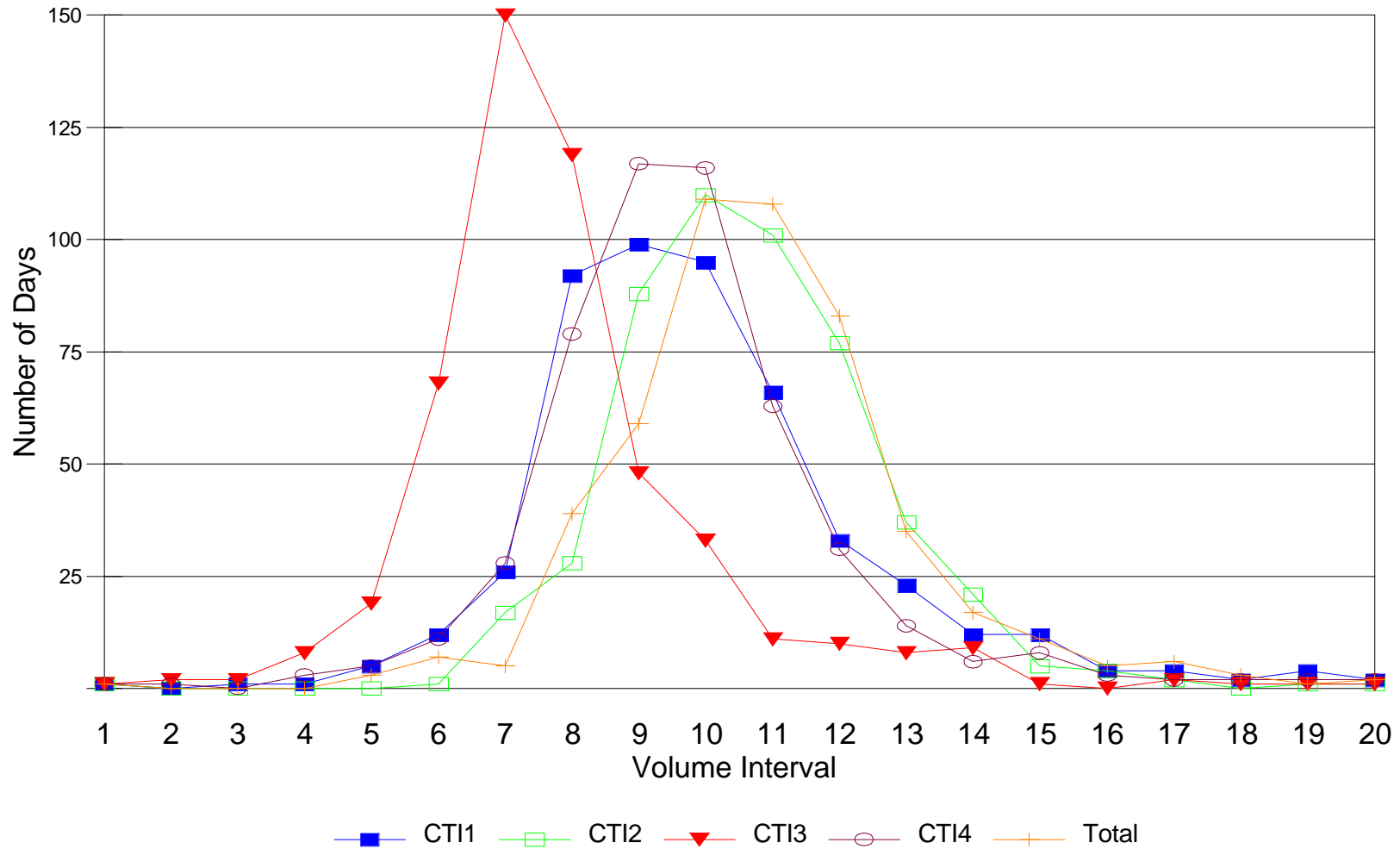
IV-6: The Distribution of Volume by Trader Type

T-note Unexpected Volume Distribution



IV-7: The Distribution of Volume by Trader Type

Muni Unexpected Volume Distribution



V-1: Floor Traders: Market Makers or Speculators?

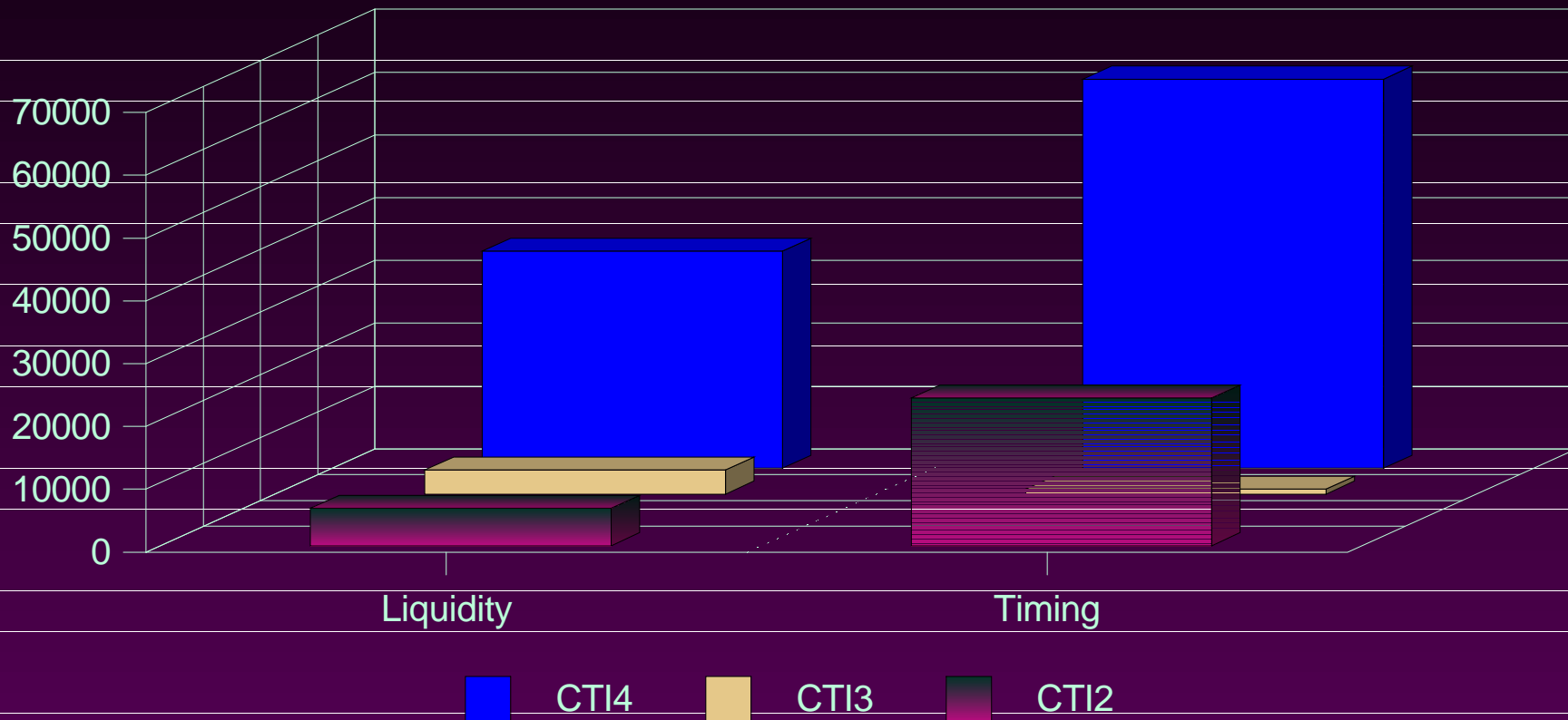
Evidence from the Pits

- Locals (market makers) have information advantages that enable them to adjust inventory in anticipation of favorable price movements. (Manaster and Mann, RFS)
- Most of the locals profits are derived from buying ahead of positive price movements, and selling before negative price movements
 - ▶ Thus, market makers are “informed traders” in some sense, not merely order fillers providing liquidity.
 - ▶ The “information” can be from order flow.
- So, market makers have both an execution advantage (bid-ask spread) and a timing advantage



V-2: Floor Traders: Market Makers or Speculators?

Where do the Locals Profits Come From? (\$000)



- Profits from timing are larger than from bid-ask spread (liquidity)
- Profits mostly from the General Public



VI-1: Options and Type of Traders

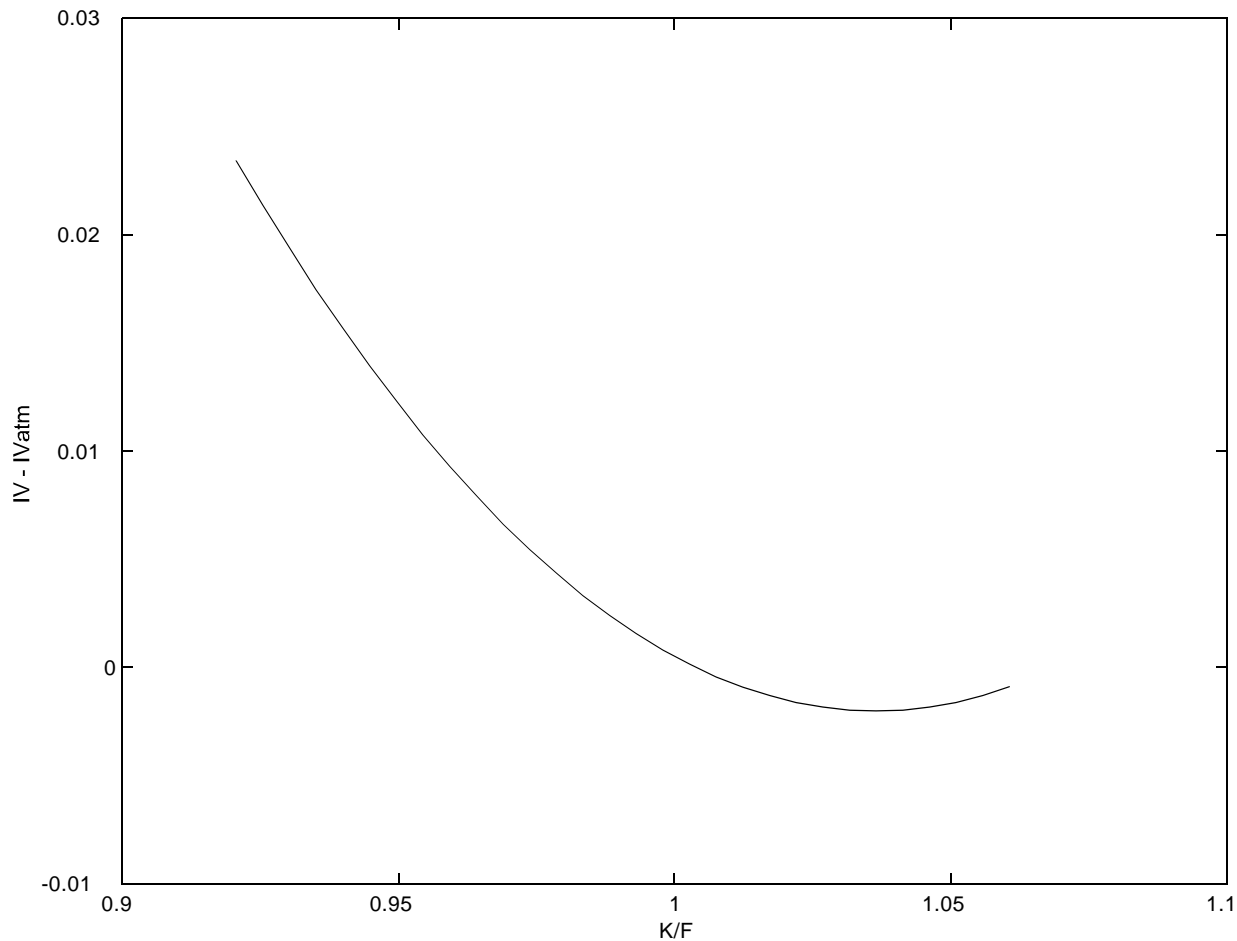
Strategies Matter

- **Common wisdom:**
 - ▶ Speculators are willing to pay more than the “fair value”
 - ▶ Out-of-the-money puts are purchased for protection from a “crash”



VII-1: Volume and Implied Volatility Skews

- Implied volatility skew: away-from-the-money options have higher implied volatilities; here the T-bond options skew is only to the left: out-of-the-money puts and in-the-money calls ($K/F < 1$)



VII-2: Volume and Implied Volatility Skews

What Causes the Skew?

- To date investigators have concentrated on refining the Black-Scholes model to consider the skew: to consider the higher implied volatilities away-from-the-money
 - ▶ Jump models and non-constant volatility models have been tested, with limited success
 - ▶ Rubinstein's implied binomial tree fits any current data
- Here we look at another approach: how option strategies can affect implied volatilities
 - ▶ Especially out-of-the-money puts purchased for protection
 - ▶ Thus, how "excess volume" can affect prices



VII-3: Volume and Implied Volatility Skews

Who Buys the Puts?

- The General Public are the ones buying out-of-the-money puts

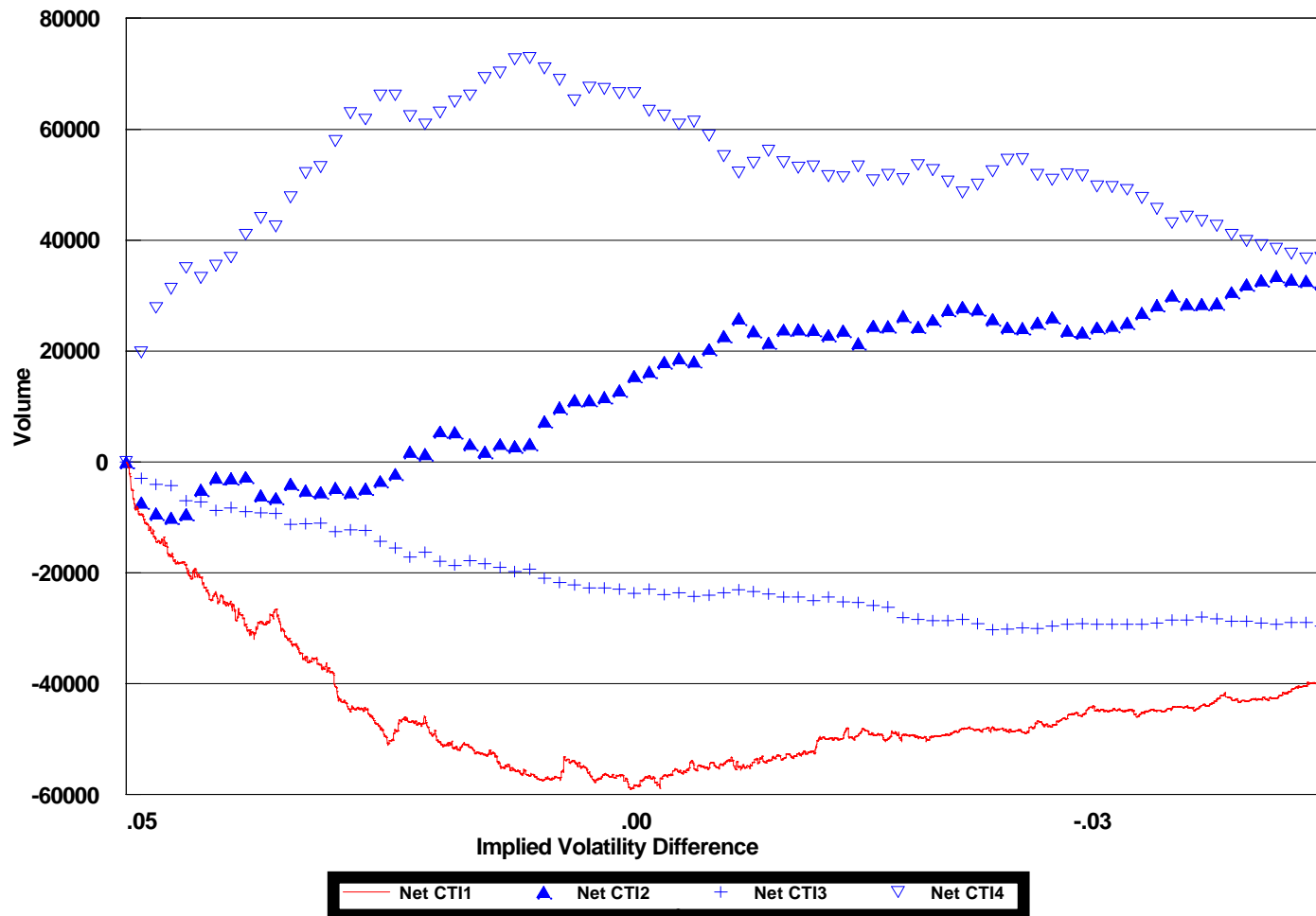


Figure 3a: Cumulative Volume by Implied Volatility Difference
Out-of-the-Money Puts



VII-4: Volume and Implied Volatility Skews

Interpreting the Graph

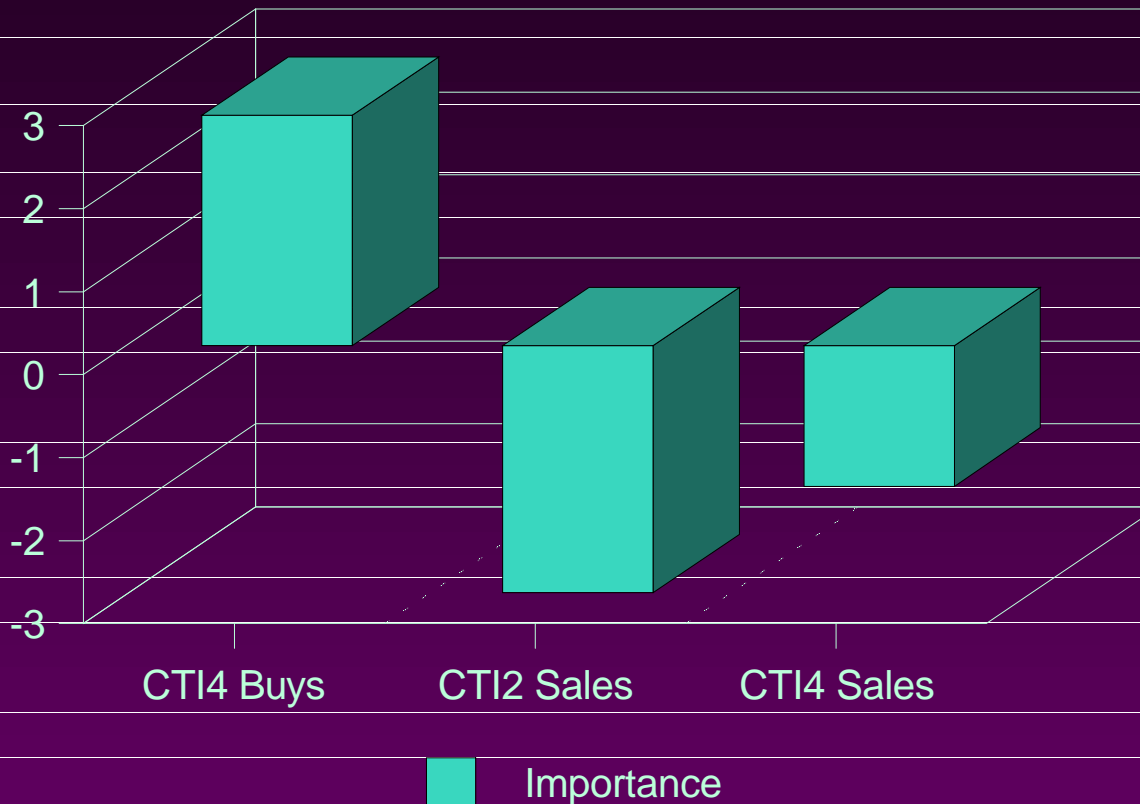
- The previous graph shows:
 - ▶ The General Public takes large net positive positions in out-of-the-money puts that have high implied volatilities
 - But they sell more of the near-the-money, lower implied volatility puts
 - ▶ Market Makers sell these puts to the buyers
- The General Public also buys high implied volatility far-in-the-money call options (not shown here)



VII-5: Volume and Implied Volatility Skews

Who Affects Implied Volatility?

- As the General Public (CTI4) buys numerous out-of-the-money puts, the implied volatility increases
- As Clearing Members (CTI2) and the General Public sell these puts, the implied volatility decreases



VIII-1: Do Options Traders Pay Too Much?

Conventional Wisdom vs. Actual Trading

- Conventional wisdom: speculators pay too much
- The next two graphs show actual T-bond futures options trading
 - ▶ The General Public pays too much for out-of-the-money puts
 - ▶ Limited evidence that speculators pay too much
- The graphs show put delta positions
 - ▶ Buying a put creates a negative delta
 - ▶ Thus, a negative put position is a net buyer of puts
 - ▶ A positive put position is a net seller of puts
- The graphs depict positions above and below the skew line
 - ▶ Above the skew line graph (1st): means those with negative position deltas pay or sell for more than the “average” price (CTI4, CTI2)
 - ▶ Below the skew line means you pay or sell for less than the “average” price (CTI4, CTI3)



VIII-2: Do Options Traders Pay Too Much?

Those Trading at Higher than Average Prices

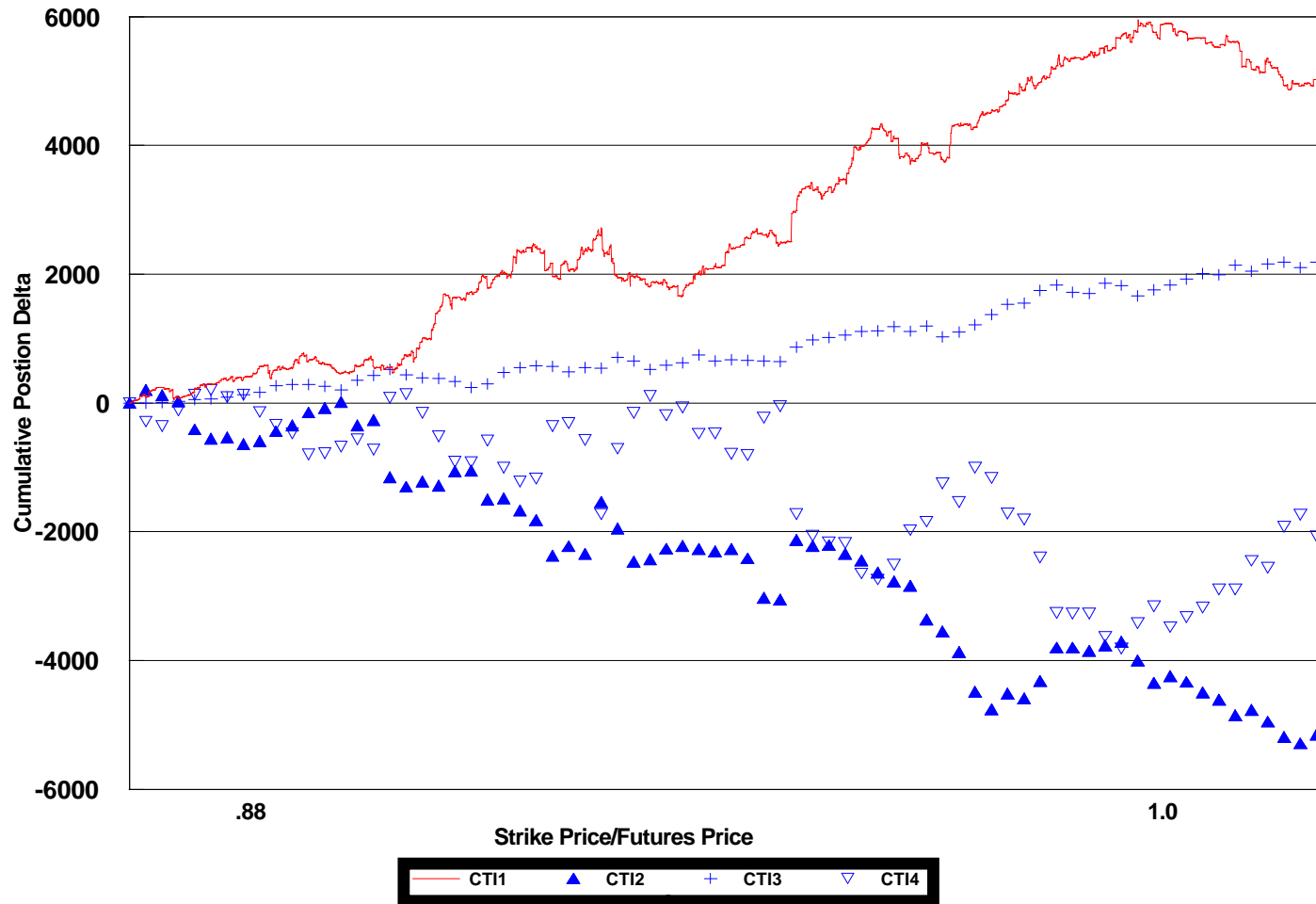


Figure 4a: Cumulative Position Delta by K/F ratio
Out-of-the-Money Puts Above the Skew Line



VIII-3: Do Options Traders Pay Too Much?

Those Trading at Lower than Average Prices

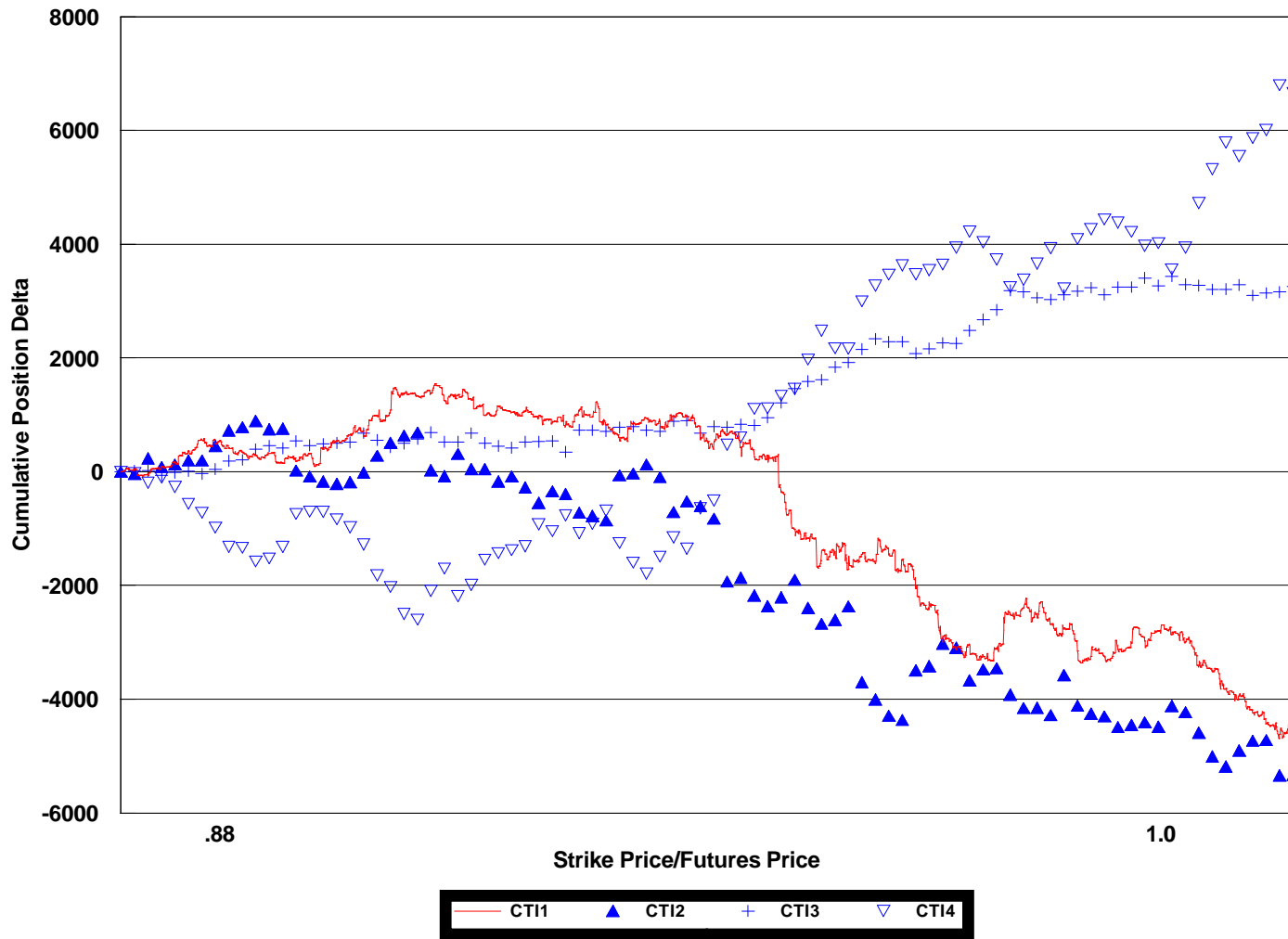


Figure 4b: Cumulative Position Delta by K/F Ratio
Out-of-the-Money Puts below the Skew Line



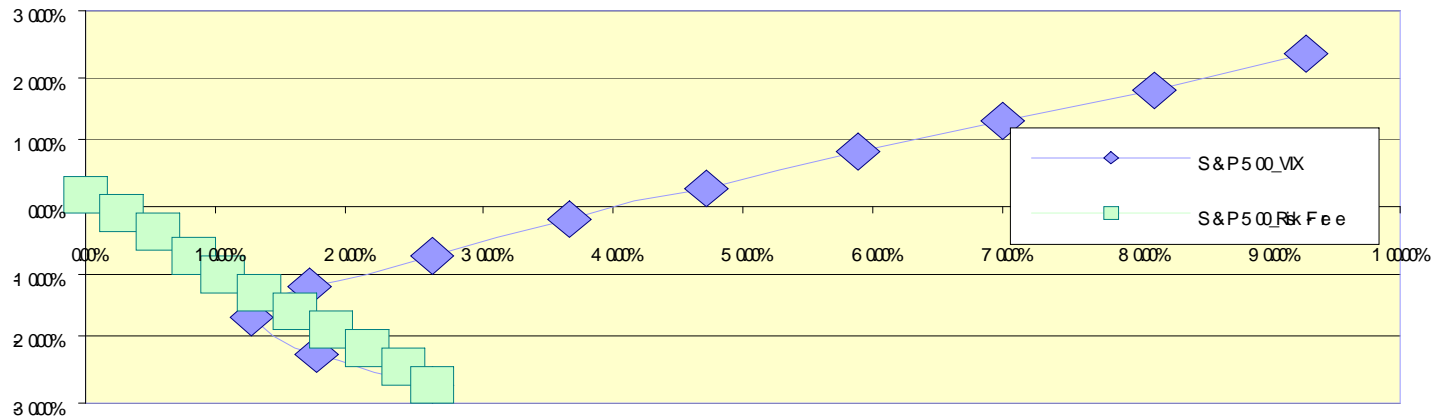
IX-1 Volatility and Portfolio Risk-Return

VIX Plus the S&P 500

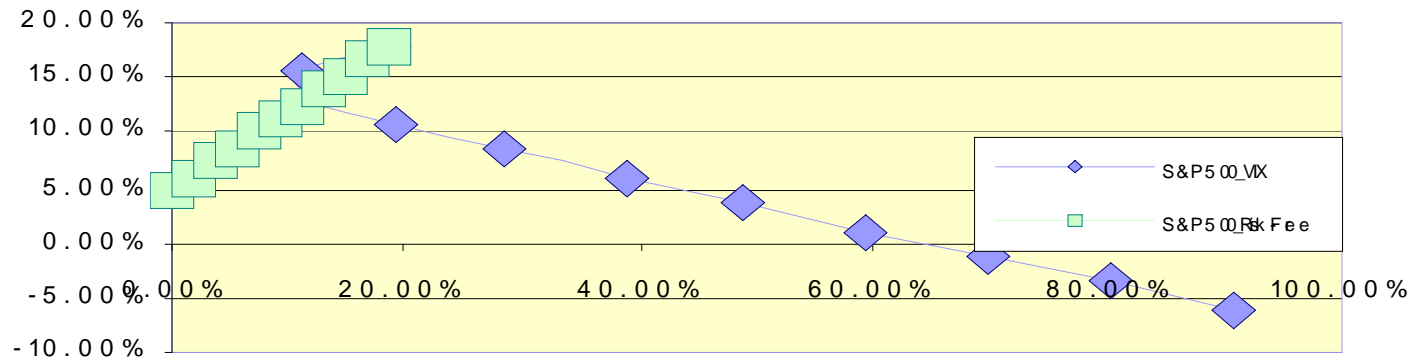
- VIX is the implied volatility index for the S&P 500
 - ▶ VIX futures now trade on the Chicago Futures Exchange
- What if: one “purchased volatility” and purchased the S&P 500 to obtain an optimal portfolio?
- Correlations between the S&P 500 returns and VIX returns range from -.454 to -.824
 - ▶ Daily observations, yearly samples
 - ▶ 8 of 11 years were more negative than -.69
- The minimum risk weights for the VIX ranged from 5.6% to 20.2% (from 1997 to 2002 from 14.7% to 20.2%)
- The return and risk using the previous year’s minimum risk weights are each typically within 1% of the optimal returns and risk values



S & P 5 0 0 _ V I X vs. S & P 5 0 0 _ R i s k - F r e e E f f i c i e n t F r o n t i e r

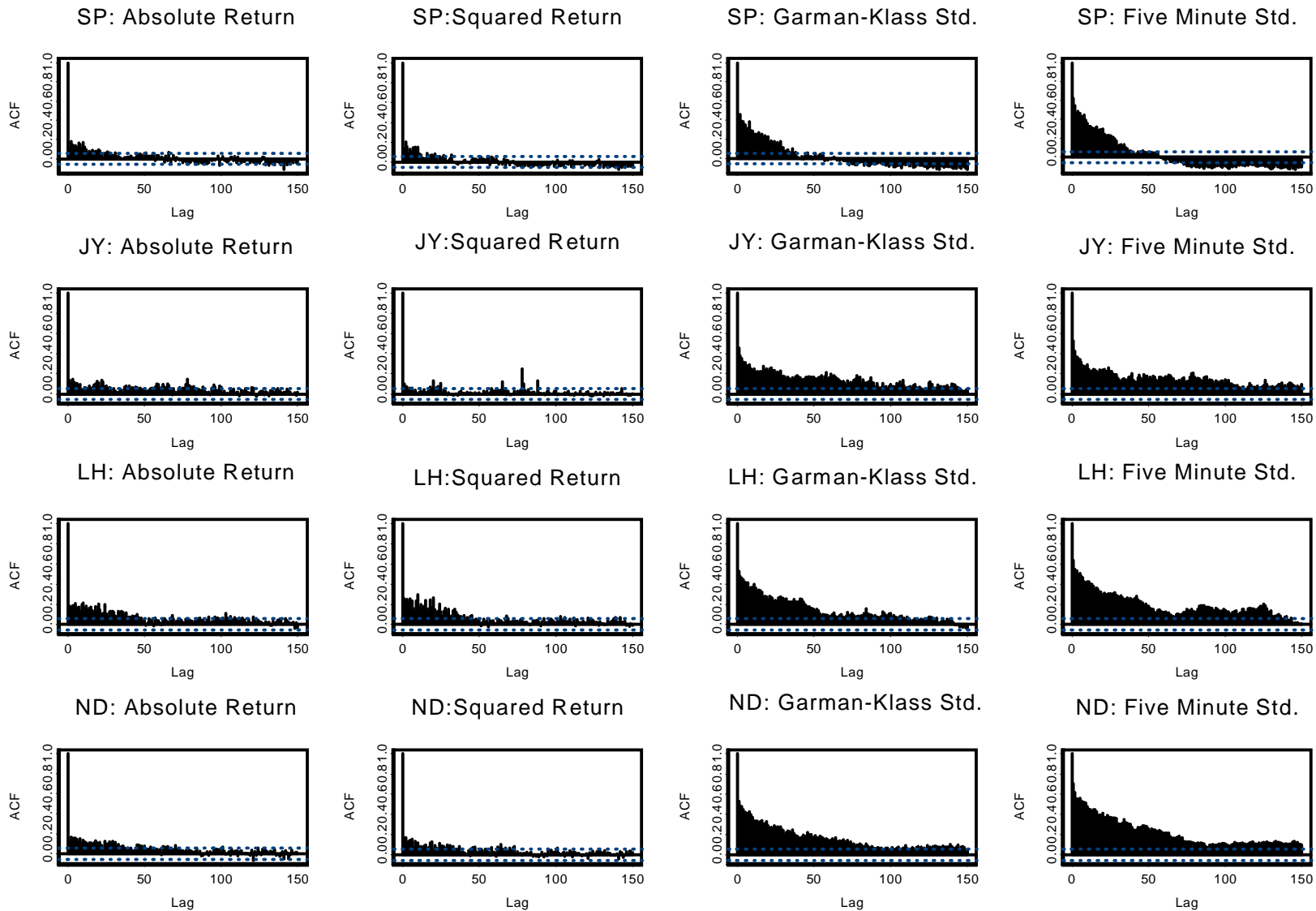


S & P 5 0 0 _ V I X vs. S & P 5 0 0 _ R i s k - F r e e E f f i c i e n t F r o n t i e r



X-1 Persistence of Volatility

Comparing Measures of Volatility



XI-1 Current and Future Research

On Volume

- Who were the players in the 1998-2000 bull market and “Crash” in SIF? (Ongoing)
 - ▶ The General Public was key in the NASDAQ
 - ▶ We will
 - Compare markets
 - Compare market periods
- Can volume by type of trader forecast future prices?
- Can volume by type of trader forecast volatility?
- Who trades at daily market extremes?
- Who trades during the T-bond expiration (delivery) month?



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