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CHICAGO BOARD OPTIONS EXCHANGE

## Alternative Volatility Indexes

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The VIX –

CBOE Volatility Index<sup>®</sup>.

Measures S&P 500<sup>®</sup> implied volatility.

Based on S&P 500 Option bid/ask quotes.

Uses the nearby options with at least 8 days until expiration.

Has been promoted as a ‘fear index’ by the business media.

Trading Products –

VIX Futures

VIX Options

Weekly Options on VIX Futures

Over a Dozen Exchange Traded Fund / Note products

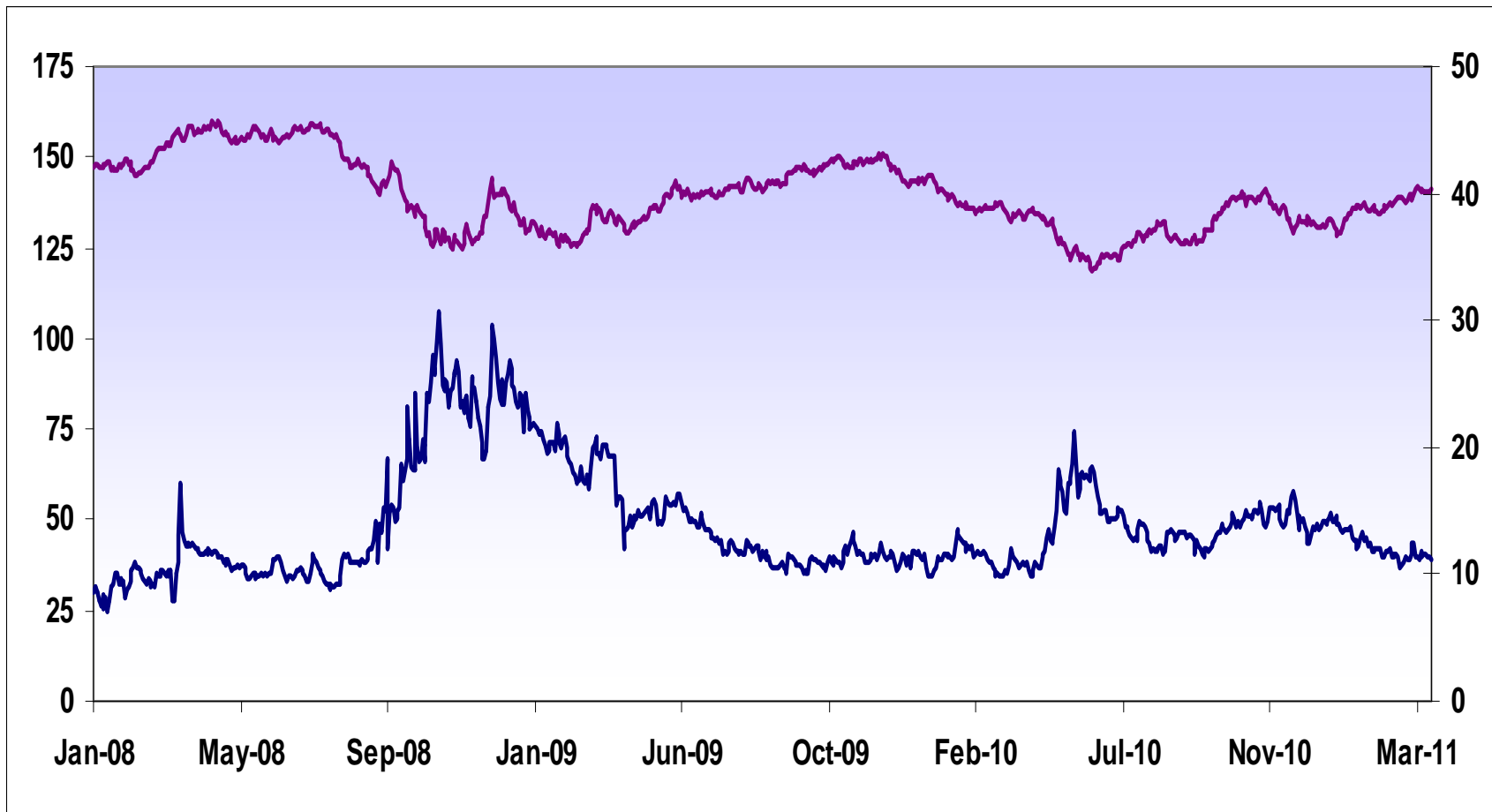
Euro Currency (EVZ) –

- CBOE EuroCurrency Volatility Index
- Measures market expectation of volatility of the \$US / Euro exchange rate
- Based on option prices on FXE exchange traded fund

# Alternative Volatility Indexes



## FXE - EVZ





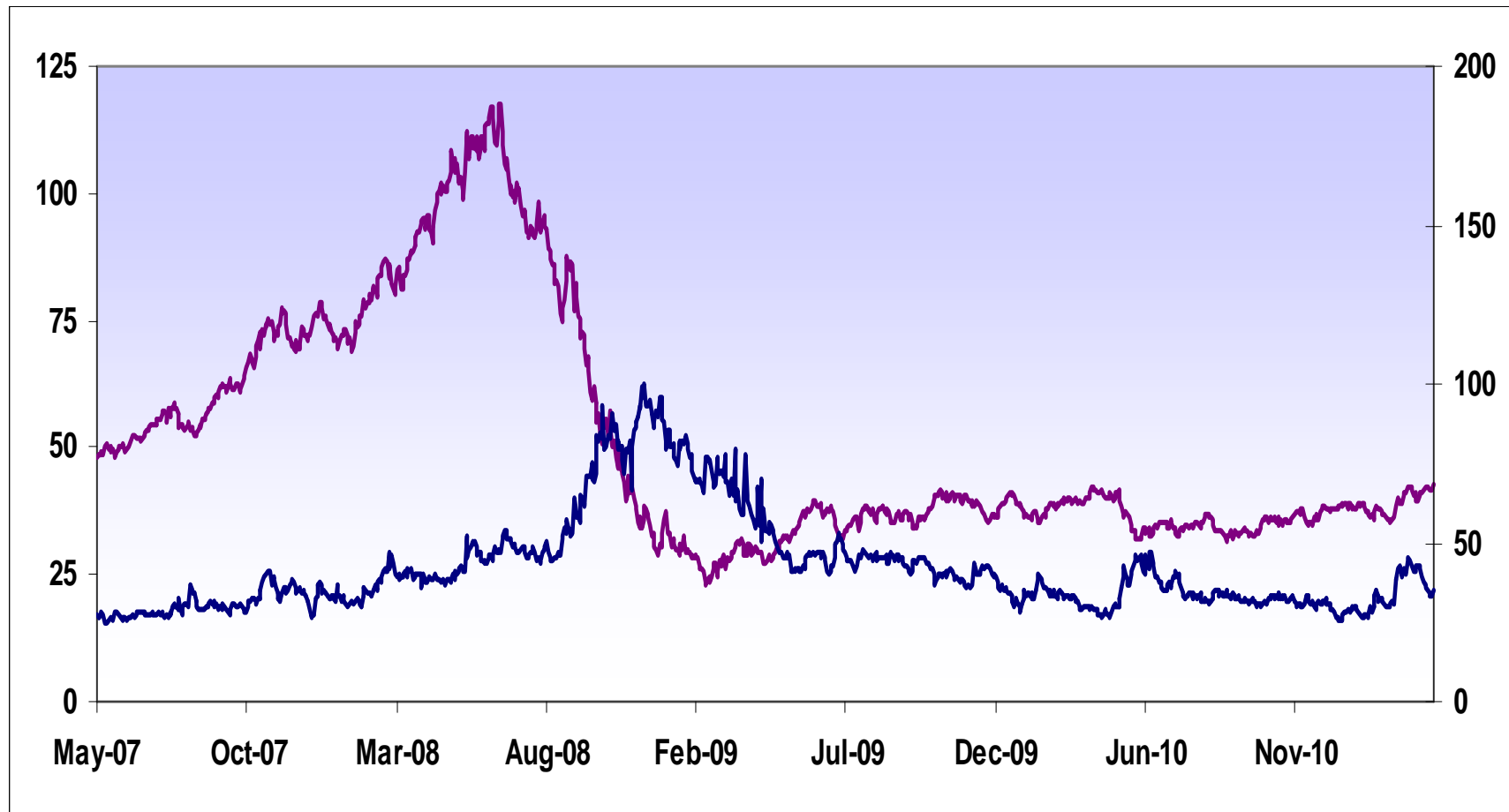
## Oil (OVX) –

- CBOE Crude Oil Volatility Index
- Measures market expectations of volatility of the crude oil market
- Based on option pricing of USO exchange traded fund
- CBOE filed for approval to trade options on this index

# Alternative Volatility Indexes



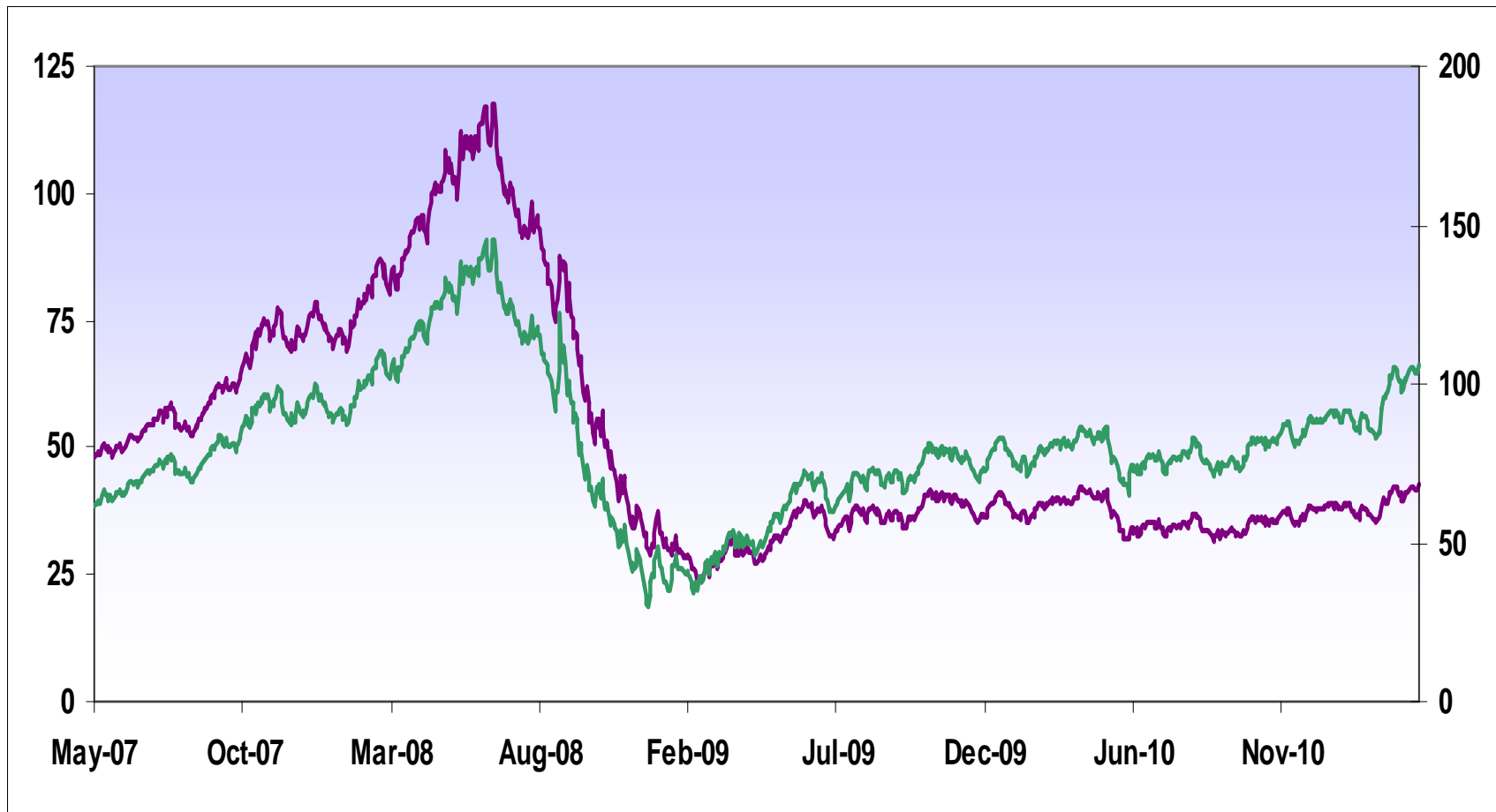
## USO - OVX



# Alternative Volatility Indexes



## USO – WTI Oil



# Alternative Volatility Indexes



Gold (GVZ) –

CBOE Gold ETF Volatility Index

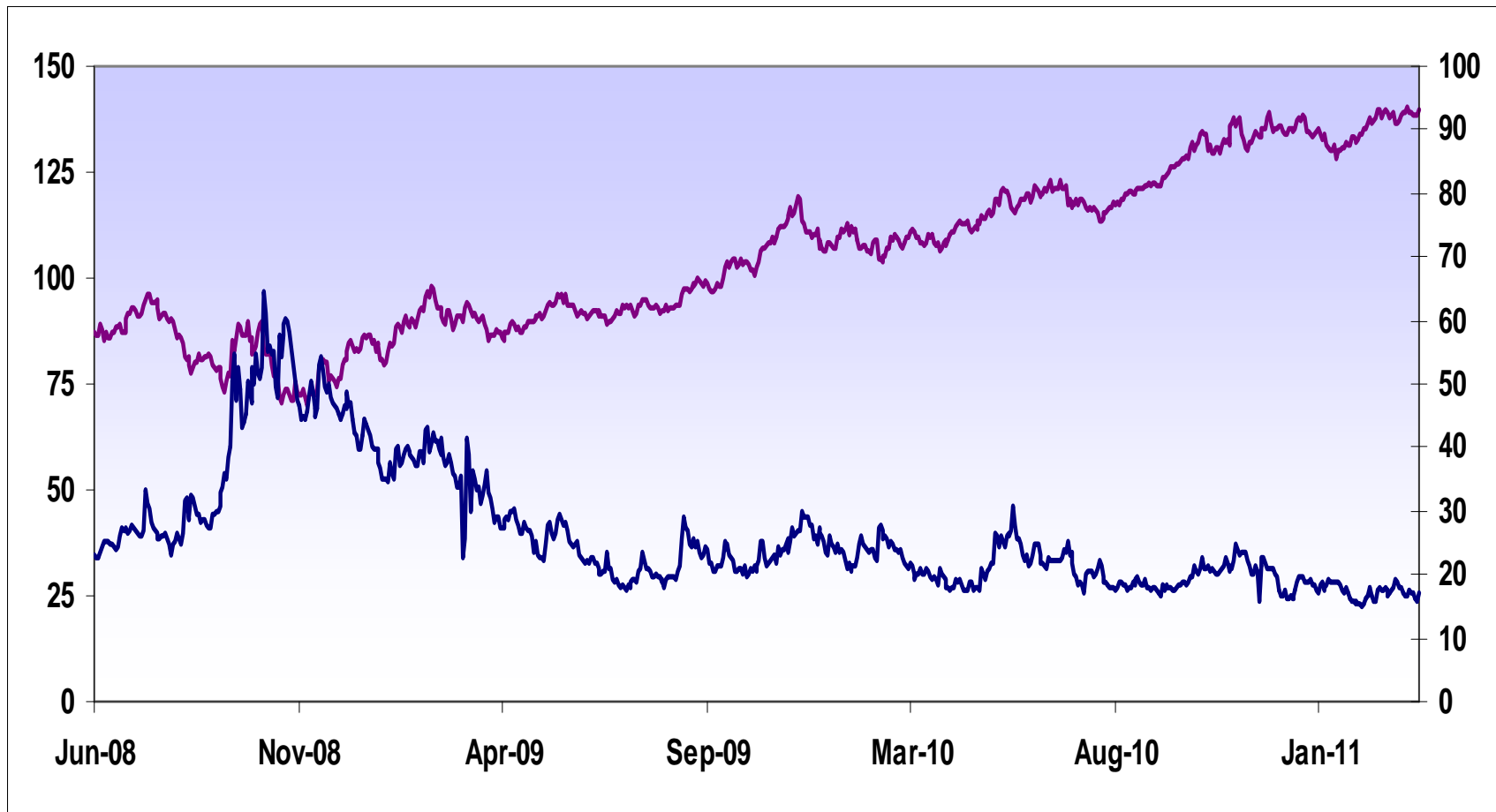
Measures market expectations of volatility of the price of gold

Based on option pricing of GLD ETF

Futures and options  
available on this Index

# Alternative Volatility Indexes

## GLD - GVZ



# Equity Specific Volatility



## Stocks –

Amazon

AMZN

VXAZN

Apple

AAPL

VXAPL

Goldman Sachs

GS

VXGS

Google

GOOG

VXGOG

IBM

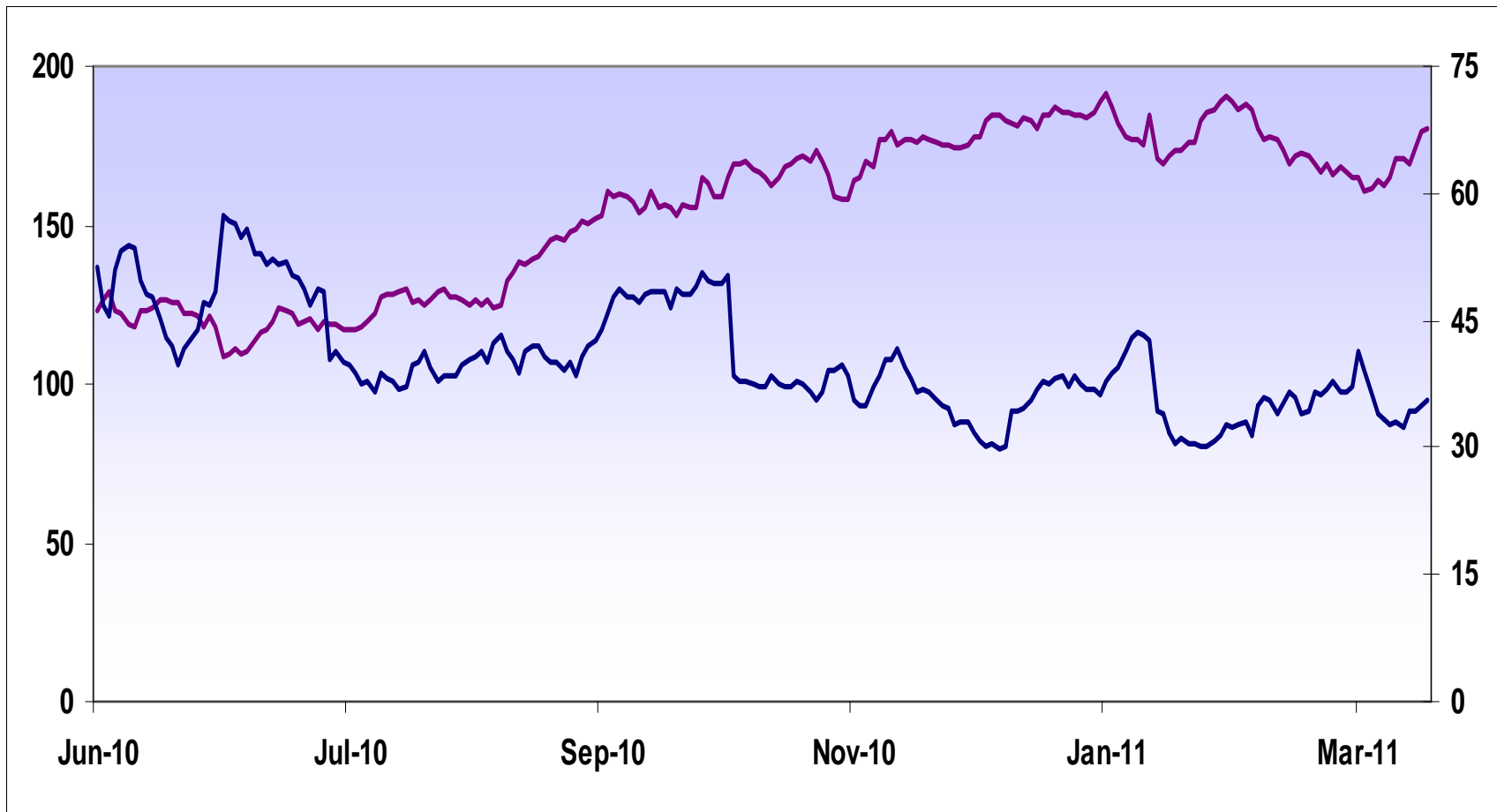
IBM

VXIBM

# Equity Specific Volatility



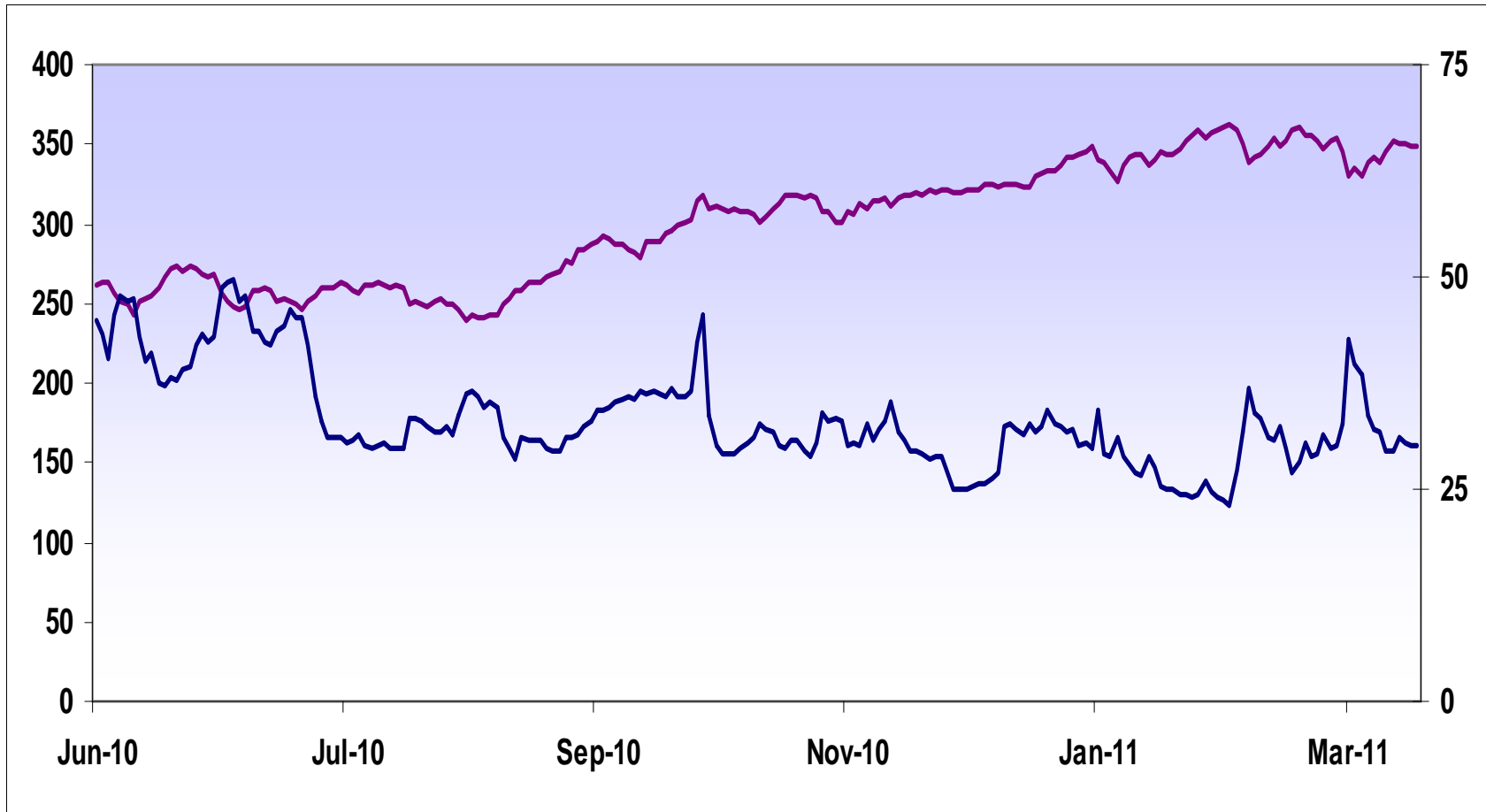
AMZN – VXAZN



# Equity Specific Volatility



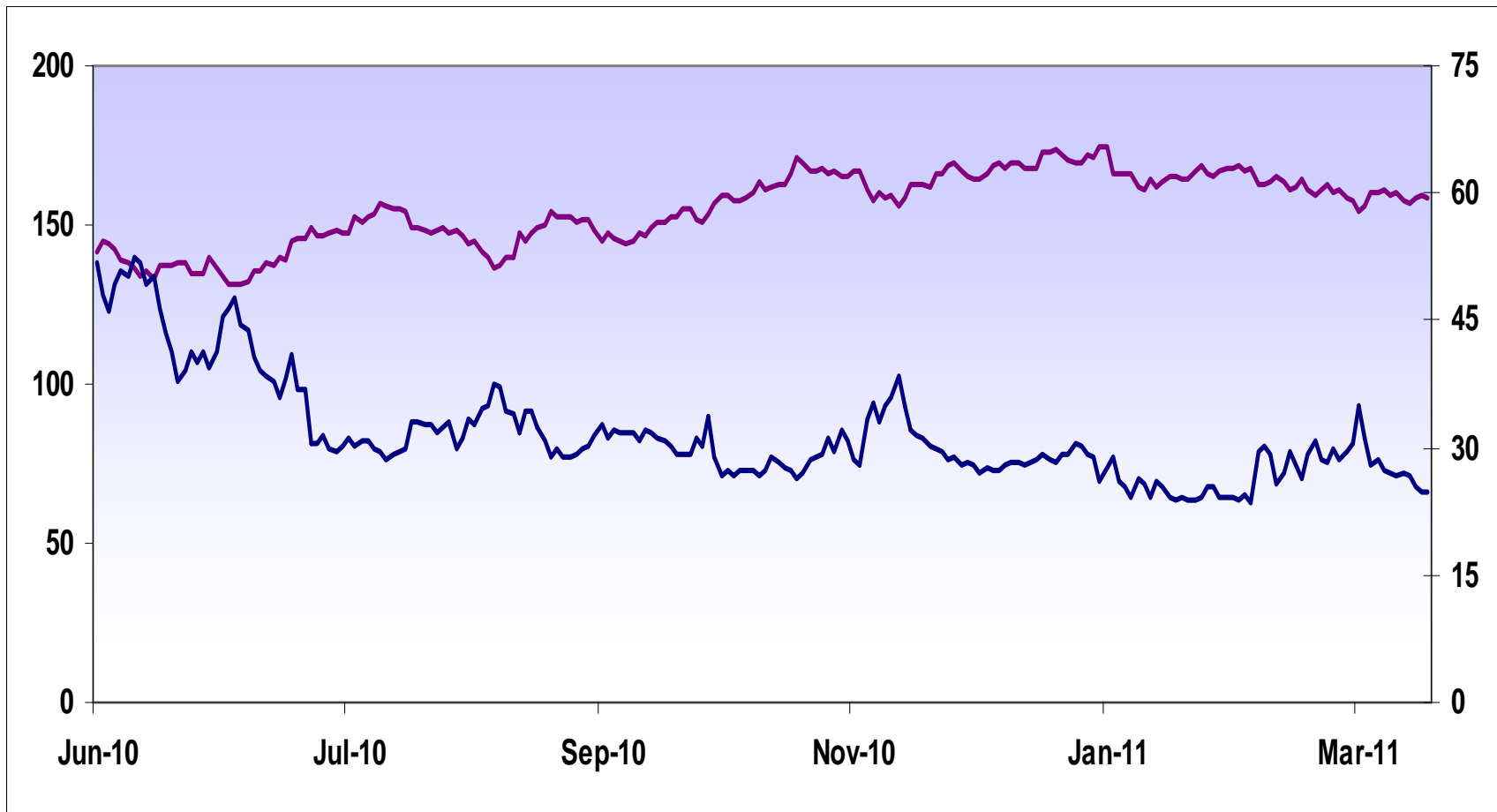
## AAPL – VXAPL





# Equity Specific Volatility

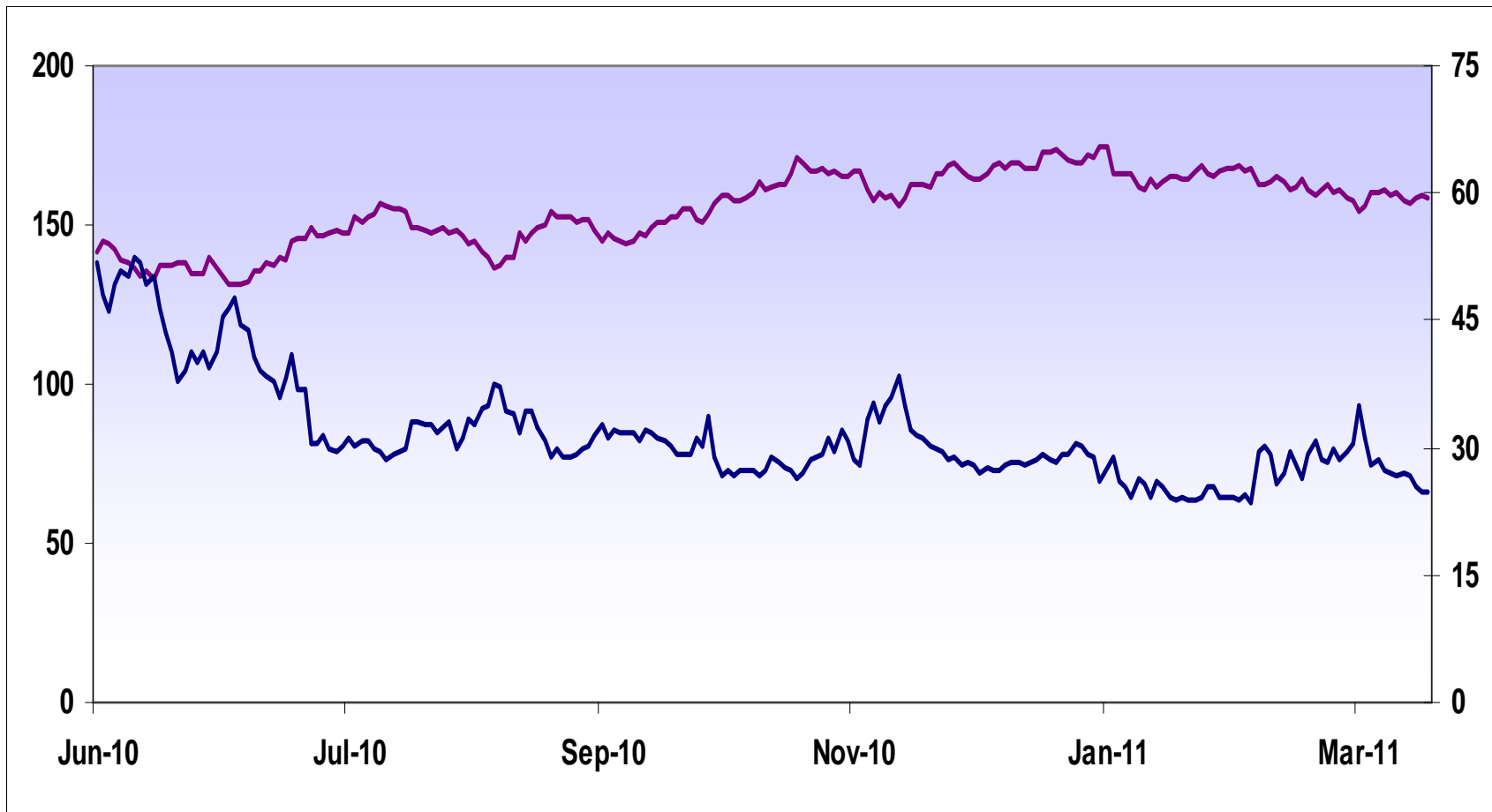
## GS – VXGS



# Equity Specific Volatility



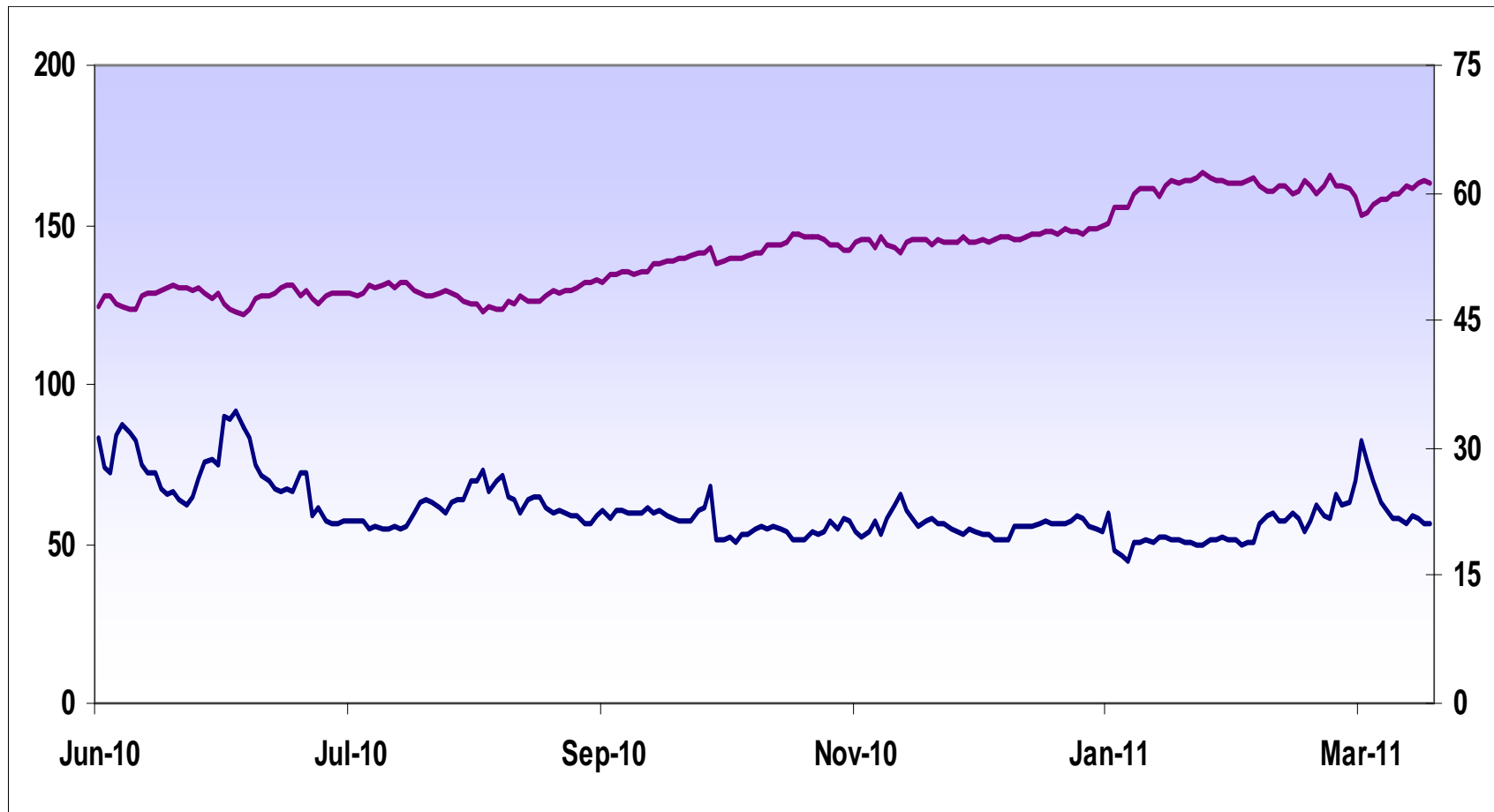
## GOOG – VXGOG



# Equity Specific Volatility



## IBM – VXIBM



# Equity Specific Volatility



Stocks –

30 day implied volatility indicated by option pricing

Plans to add more names over time

CBOE has filed for approval to trade options on  
these indexes

## Exchange Traded –

- 30 day implied volatility indicated by option pricing
- Plans to add more names over time
- Number of instruments with derivative trading to expand over time

# Equity Specific Volatility



## Exchange Traded Funds –

EuroCurrency	XLF	EVZ
Gold	GLD	GVZ
Crude Oil	USO	OVX
Emerging Markets	EEM	VXEEM
Silver	SLV	VXSLV
China Equity Market	FXI	VXFXI
Gold Miners	GDX	VXGDX
Brazilian Equity Market	EWZ	VXEWZ

## Market Indexes –

CBOE DJIA<sup>®</sup> Volatility Index – VXD

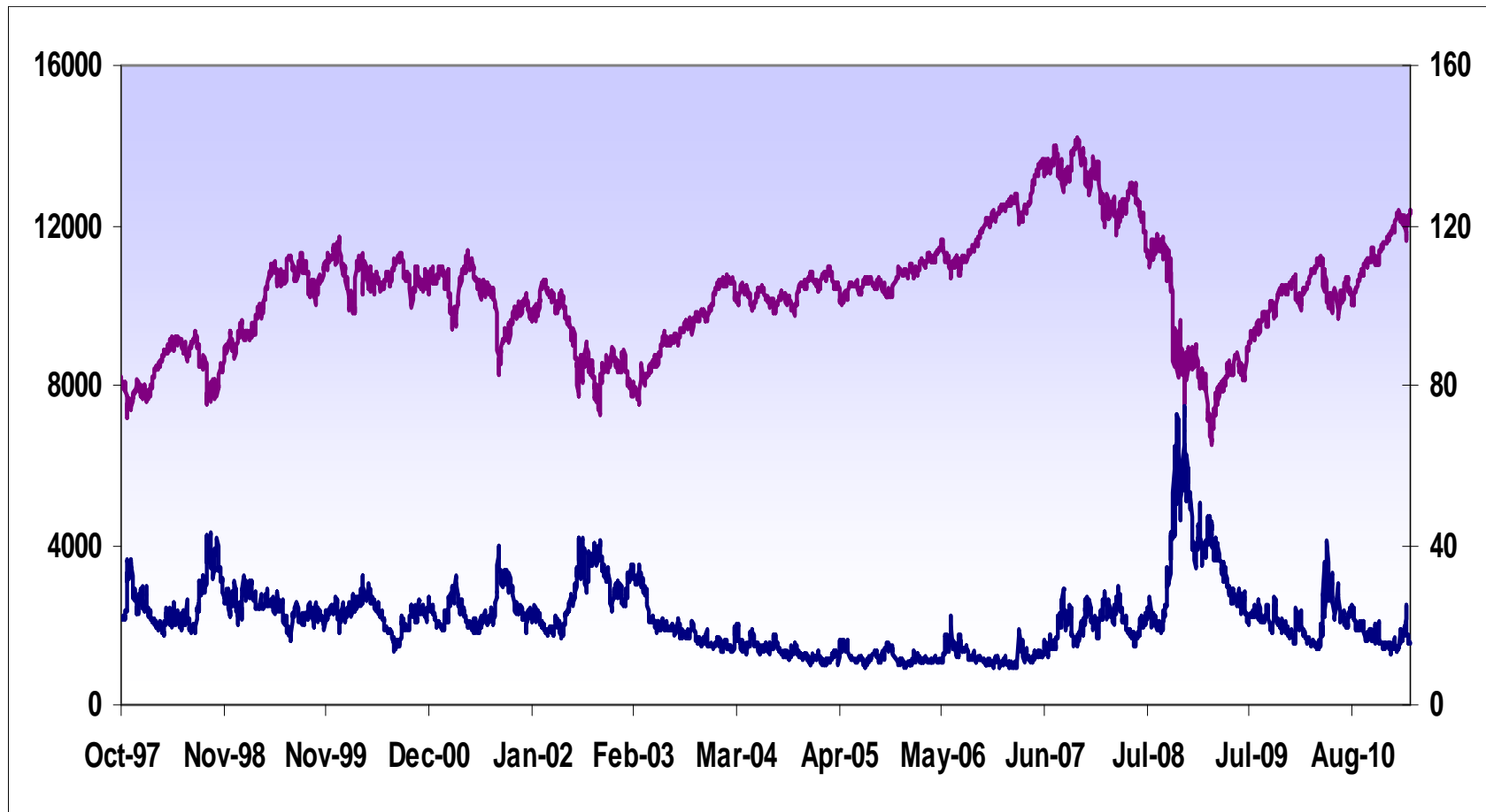
CBOE Nasdaq-100<sup>®</sup> Volatility Index – VXN

CBOE S&P 100<sup>®</sup> Volatility Index – VXO

CBOE Russell 2000<sup>®</sup> Volatility Index – RVX

# Equity Specific Volatility

## DJIA – VXD

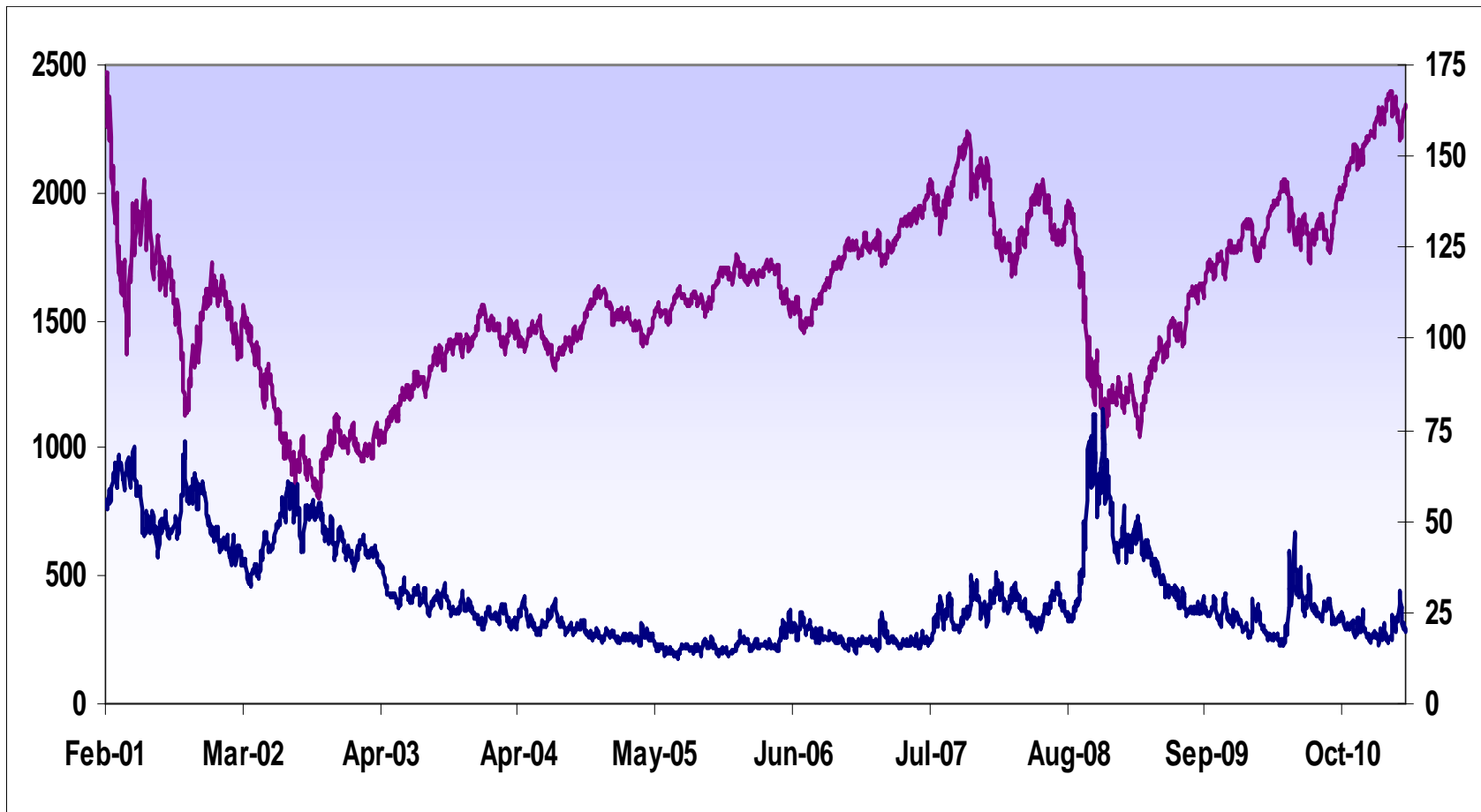




# Equity Specific Volatility

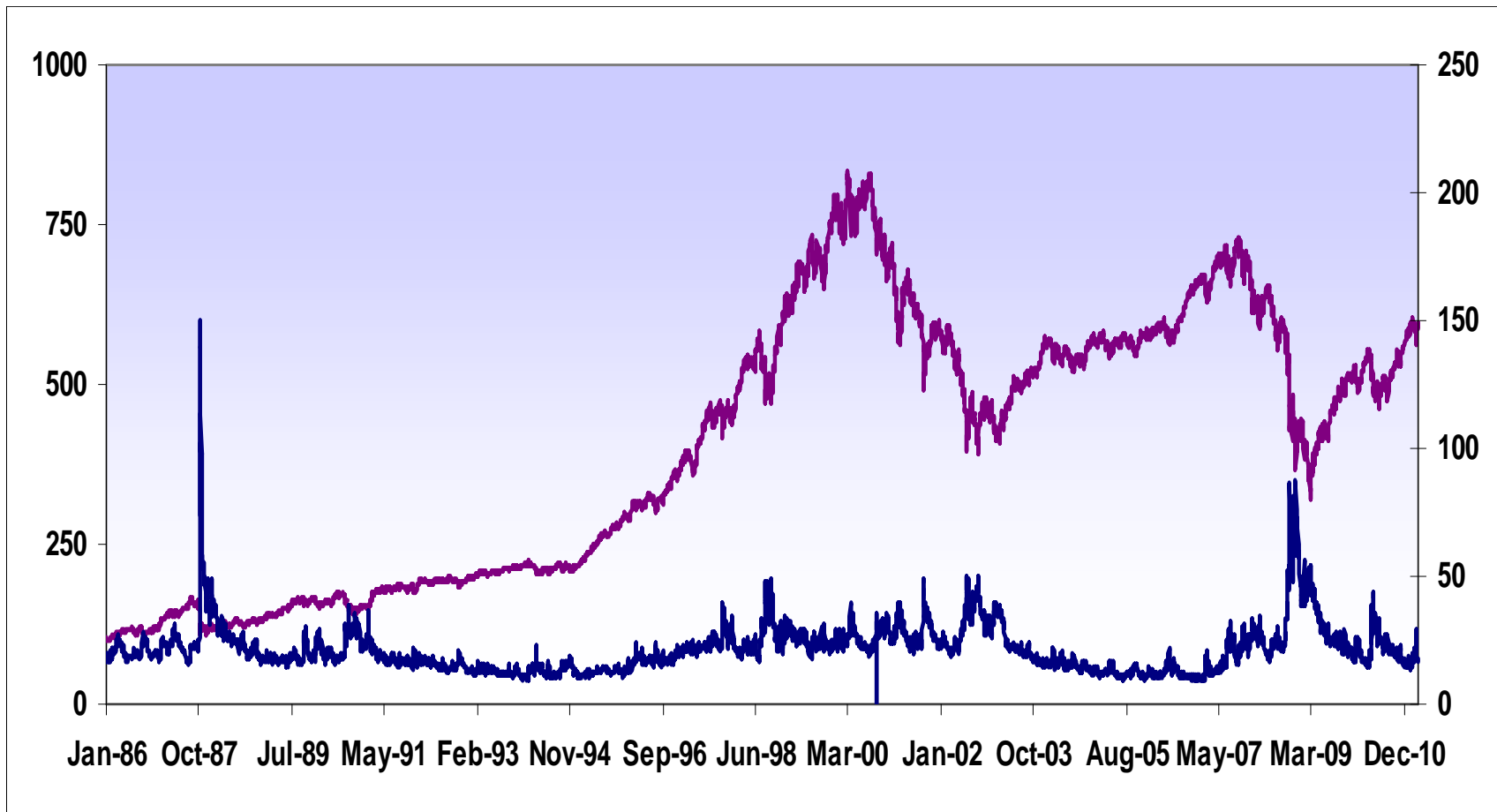


NDX – VXN



# Equity Specific Volatility

OEX – VXO



# Equity Specific Volatility

RUT – RVX

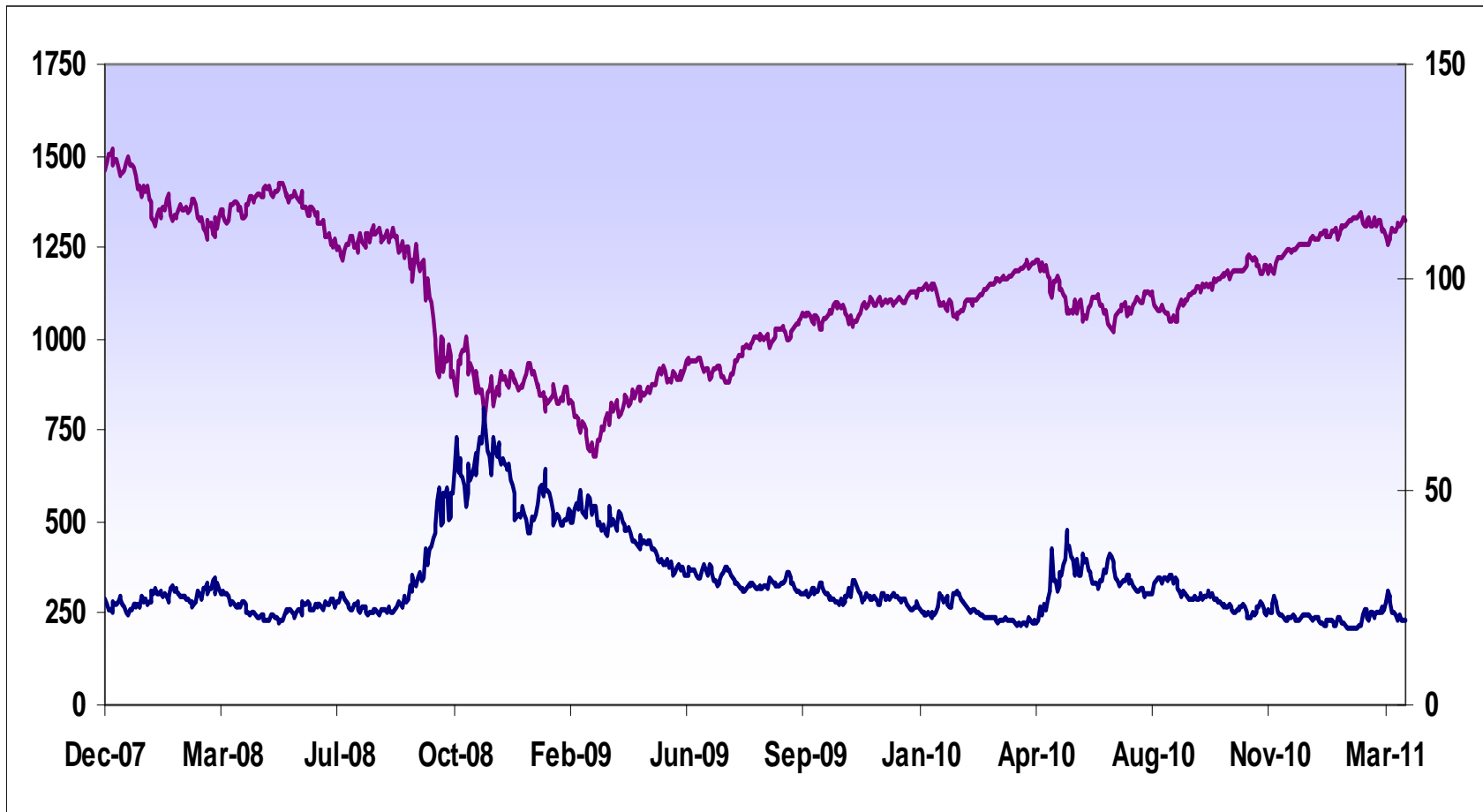


## CBOE S&P 500 3-Month Volatility Index – VXV

- Measure of 3 month implied volatility as indicated by S&P 500 index options
- Similar to VIX with longer time frame
- May be compared to VIX to be used as a market indicator

# Equity Specific Volatility

## VXV – SPX



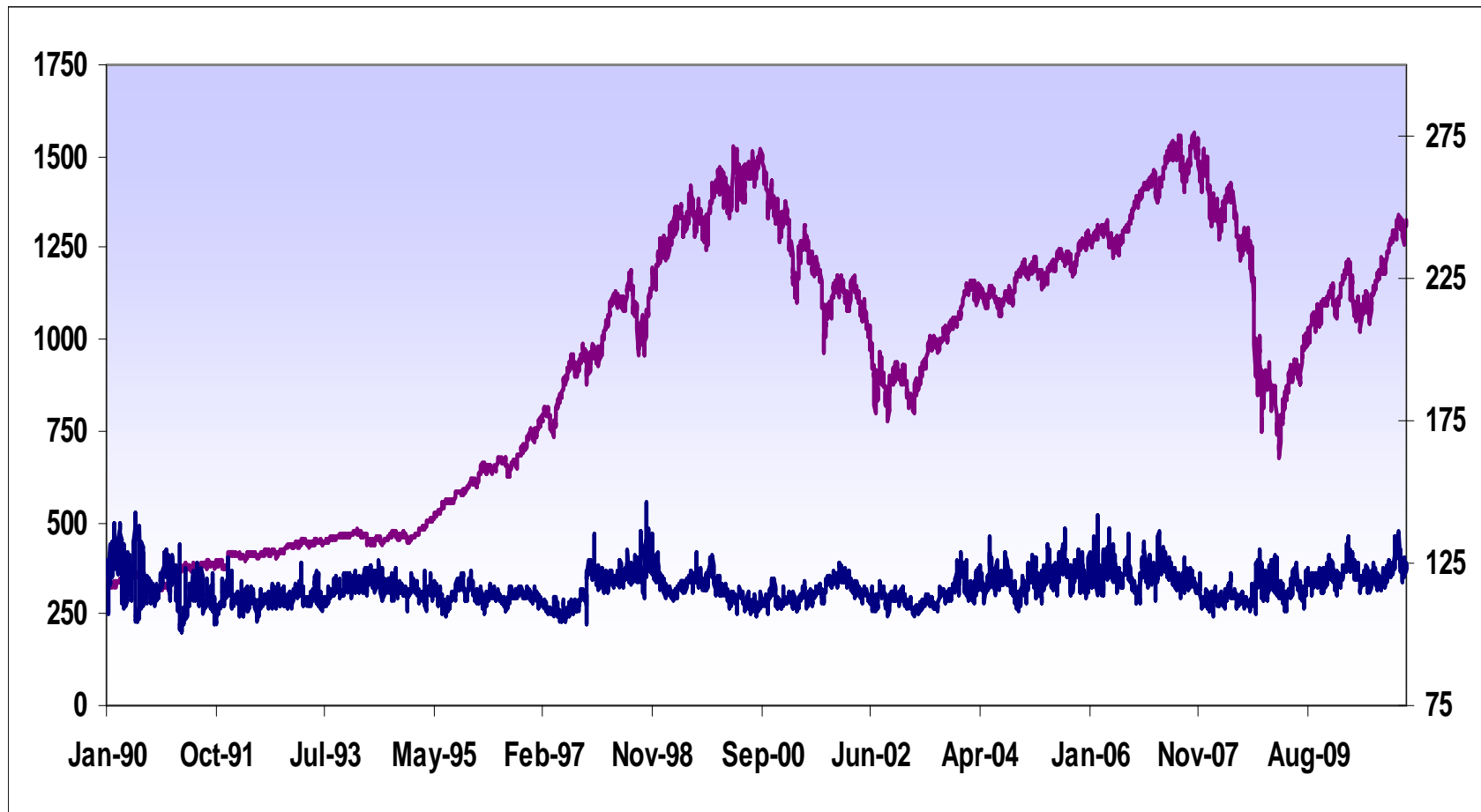
## CBOE S&P 500 SKEW Index – SKEW

- Introduced in February 2011
- Sort of a black swan index
- Measures the relative implied volatility of out of the money options

# Strategy Based Indexes



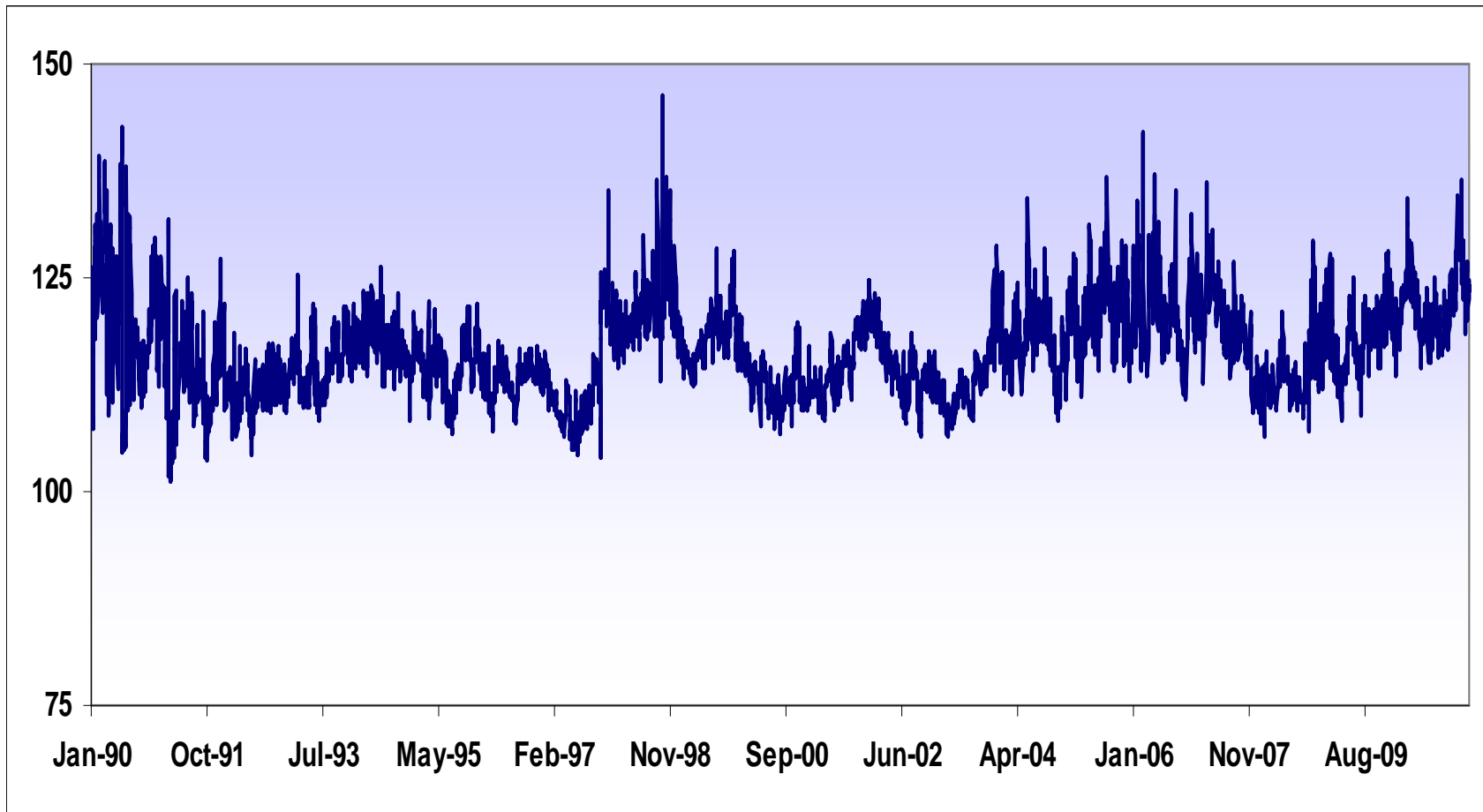
## SKEW – SPX



# Strategy Based Indexes



## SKEW





## CBOE VIX Premium Strategy Index – VPD

- Tracks performance of consistent short position in front month VIX future contract
- The portfolio consists of a money market investment and short VIX futures
- As a risk control measure a 25 point VIX rally is assumed as a worst case scenario
- The capital committed assumes a 25 point rally would result in a 25% loss to the portfolio

# Strategy Based Indexes



## VPD – SPX



## CBOE Capped VIX Premium Strategy Index – VPN

- Tracks performance of consistent short position in front month VIX future contract
- The portfolio consists of a money market investment and short VIX futures
- As a risk control measure out of the money call options are purchased against the short future position

# Strategy Based Indexes



## VPN – SPX



## CBOE S&P 500 VARB-X – VTY

- Tracks the performance of a hypothetical volatility arbitrage trading strategy
- Strategy involves capitalizing on the historical difference between SPX implied and realized volatility

# Equity Specific Volatility



VTY – SPX



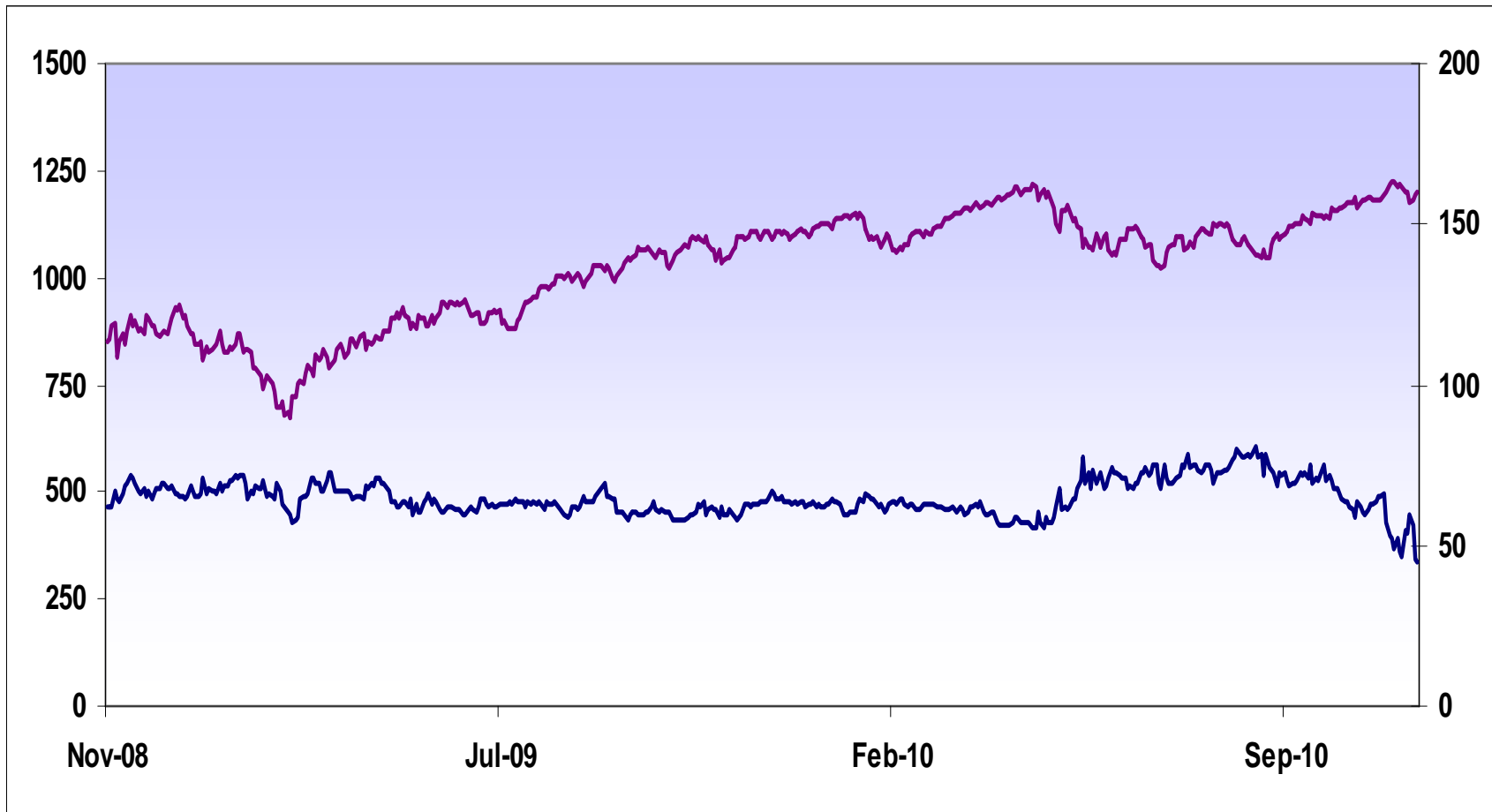
## CBOE S&P 500 Implied Correlation Indexes – ICJ, JCJ, KCJ

- Strategy index that compares individual equity and S&P 500 index option volatility
- Implied volatility of S&P 500 index options and that of largest 50 stocks in the index
- Current – JCJ 2011 / KCJ 2012 / ICJ 2013

# Strategy Based Indexes



## JCJ 2011 - SPX

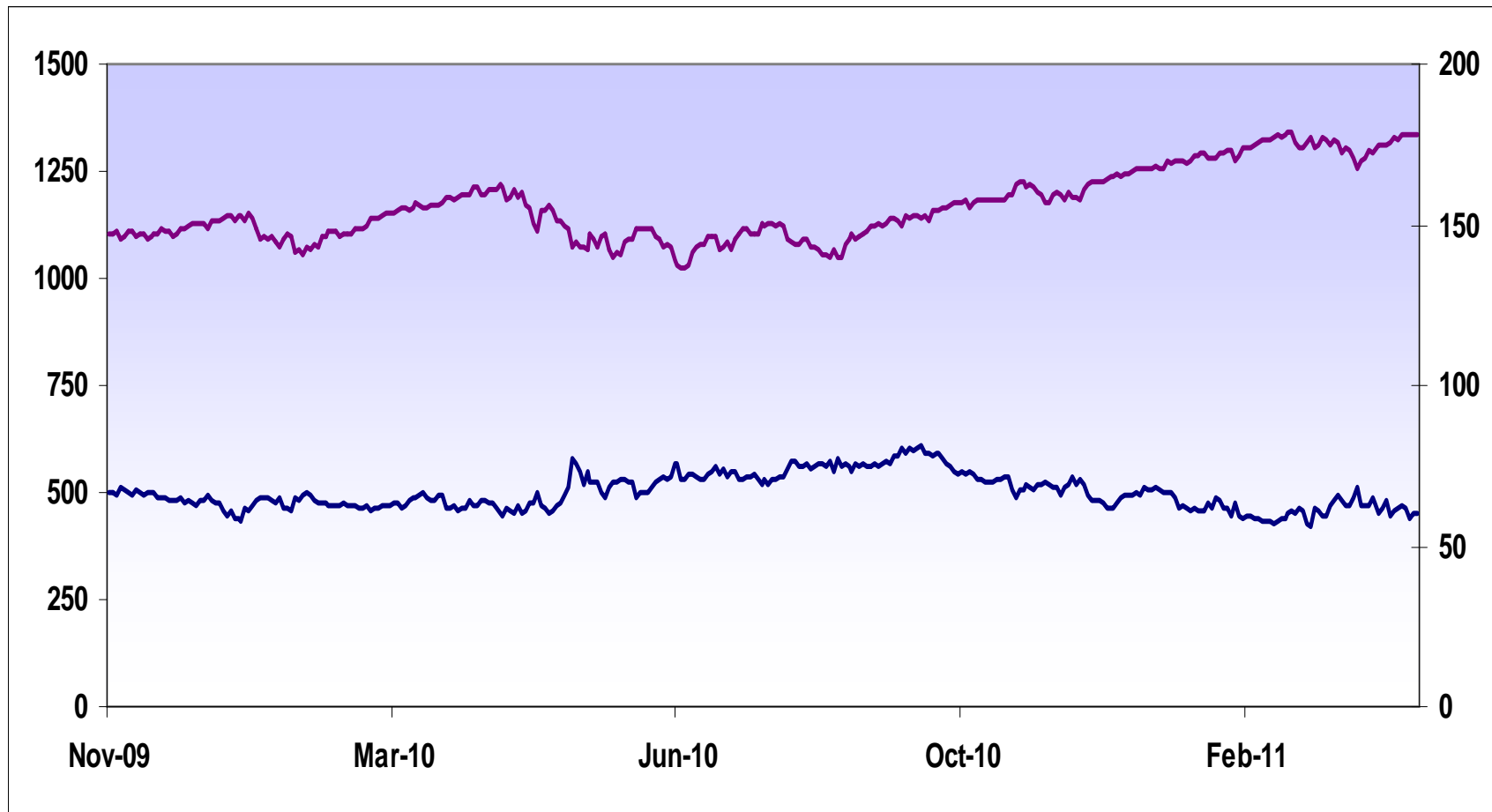




# Strategy Based Indexes



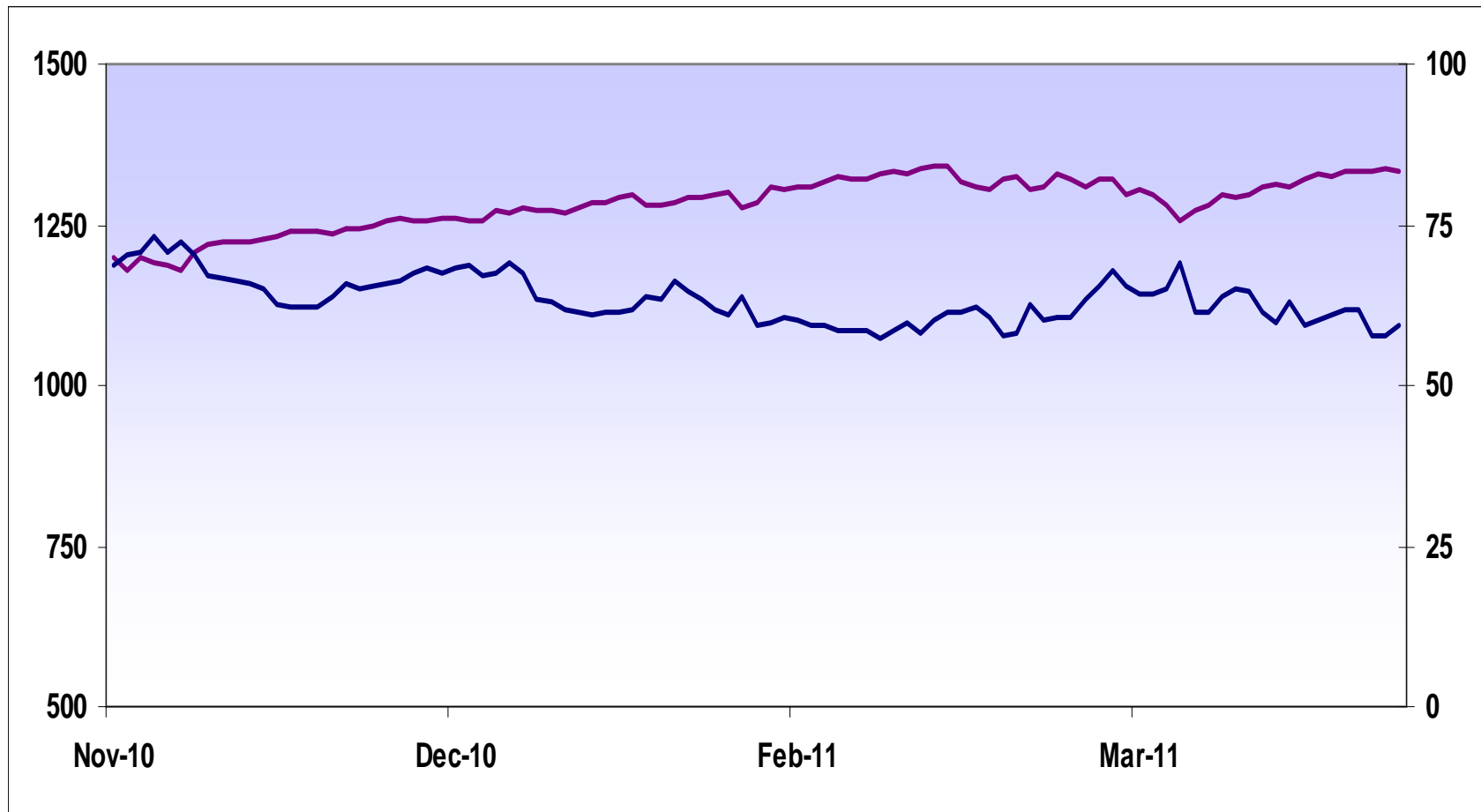
## KCJ 2012 - SPX



# Strategy Based Indexes



## ICJ 2013 - SPX



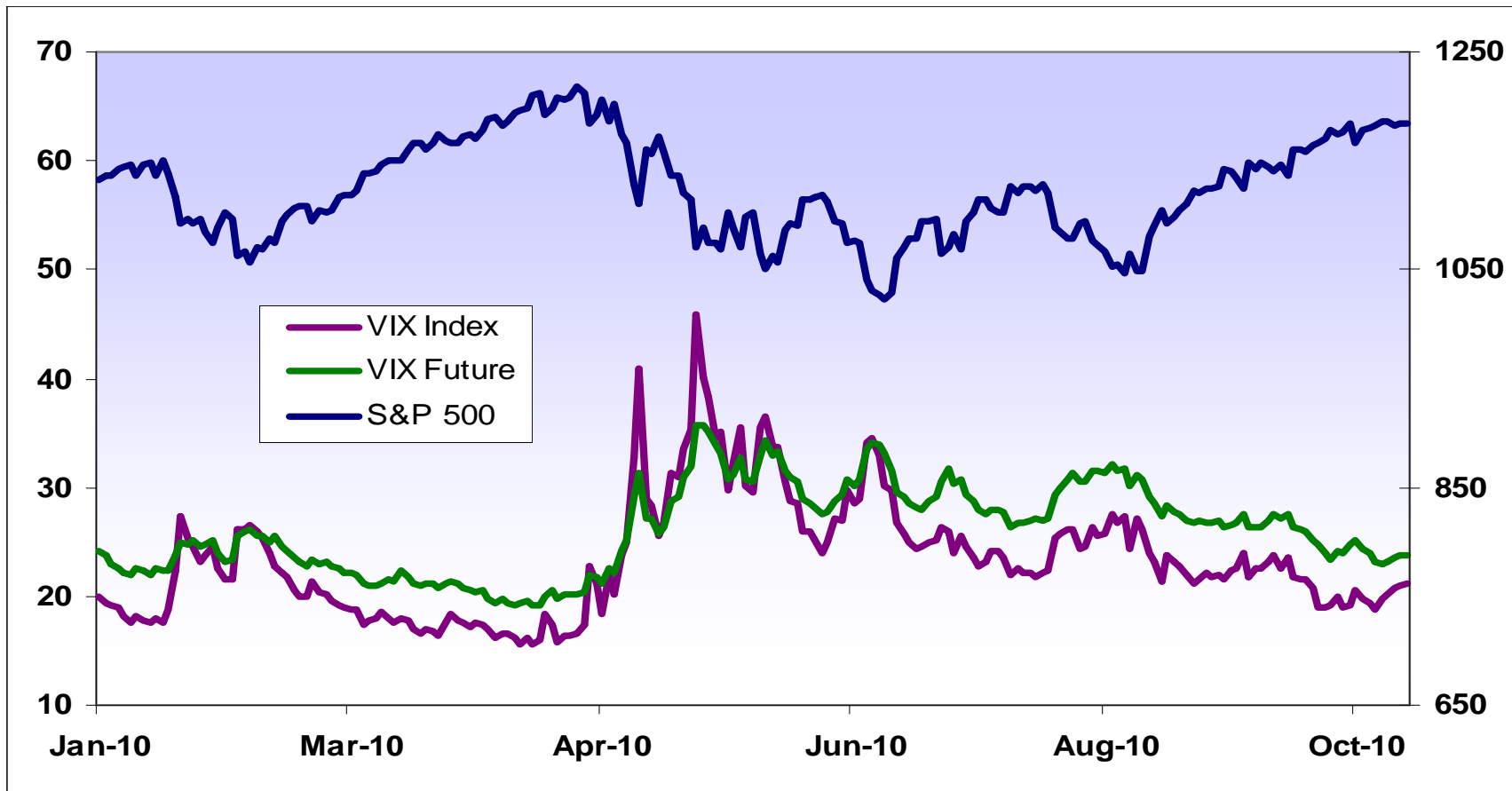
- VIX Futures are 100% anticipatory
- There is an inverse relationship between the S&P 500 Index and the VIX
- Futures prices are based on the direction the market expects the VIX Index to settle at expiration
- Since futures anticipate the VIX, they also indicate the market's S&P 500 expectations

## VIX Futures vs. VIX Index

- VIX Futures anticipate the direction of the VIX Index
- The Index moves in an inverse direction to the S&P 500
- A forecasting tool may consist of comparing the VIX Future price to that of the VIX Index
- Different VIX Futures prices may also be compared to each other

# VIX as a Market Indicator

## S&P 500 vs. VIX Index & VIX Future



- Venture created by Standard and Poor's and CBOE
- Created in March 2011
- Partnership to provide information sharing regarding VIX methodology
- Goal to promote VIX as global standard of measuring market volatility

VIX agreements in place –

- Australian Securities Exchange
- CME Group
- Deutsche Borse
- Hang Seng Indexes
- National Stock Exchange of India
- Euronext LIFFE
- Taiwan Futures Exchange
- TMX Group

Questions / Comments?

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