The Dynamics of Volatility and Correlations in the Commodity Space

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CME Group Trading Volume Growth: Catalysts & Scenarios

1 Fiction of Normality and Volatility Dynamics

2 Catalysts for Volatility Shifts

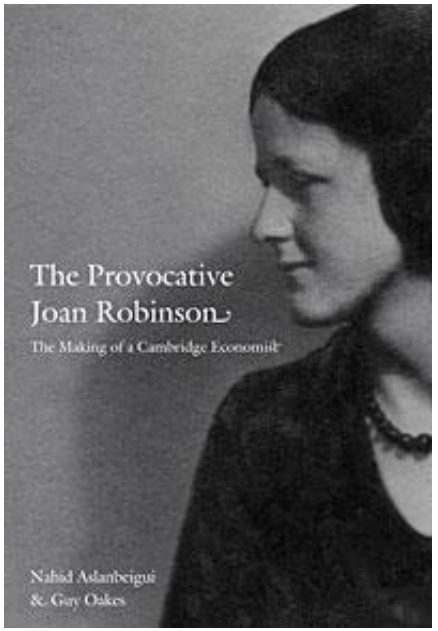
3 Examining Correlation Patterns

The Fiction of Normality

"There is no such thing as a normal period of history.

Normality is a fiction of economic textbooks."

-- Joan Violet Robinson (1903-1983)



Source: Duke University Press, Durham, NC (The Provocative Joan Robinson: Making of a Cambridge Economist, 2009).

Explanations and Definitions for Volatility and Price Momentum Charts to Follow

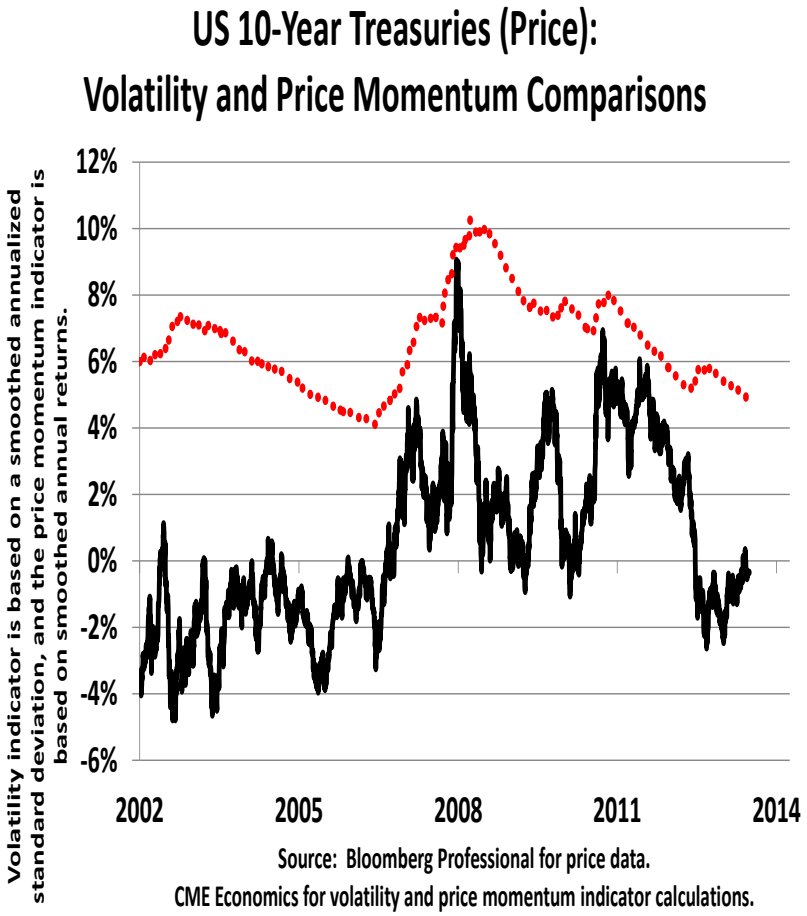
Chart Construction – The **red dotted line** is an indicator measuring the evolving pattern of ***volatility***.

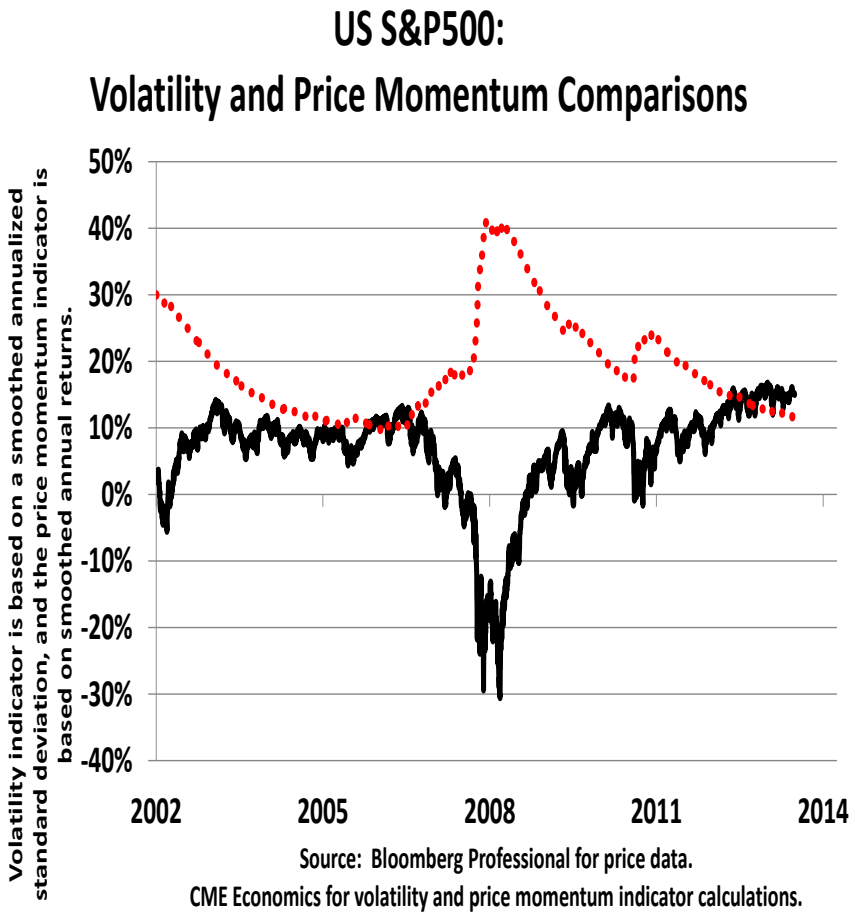
The **solid black line** is an indicator measuring the direction and strength of the evolving ***price momentum***.

Volatility – We used an estimate of the annualized standard deviation of daily price percent changes to represent volatility, expressed as a percent. Our volatility indicator is calculated from a smoothed exponential decay process.

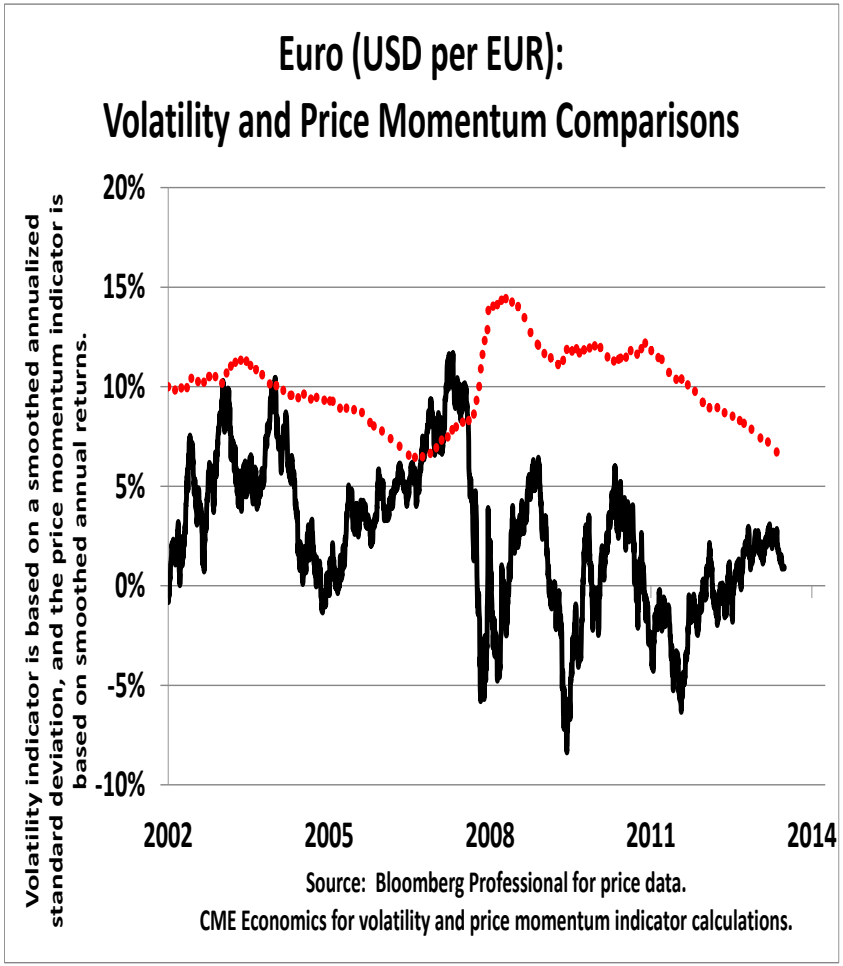
Price Momentum – We use an estimate of the annualized price momentum based on daily percent changes and a smoothed exponential decay process. The indicator suggests the current trend expressed as an annual percentage rate related to the current price momentum.

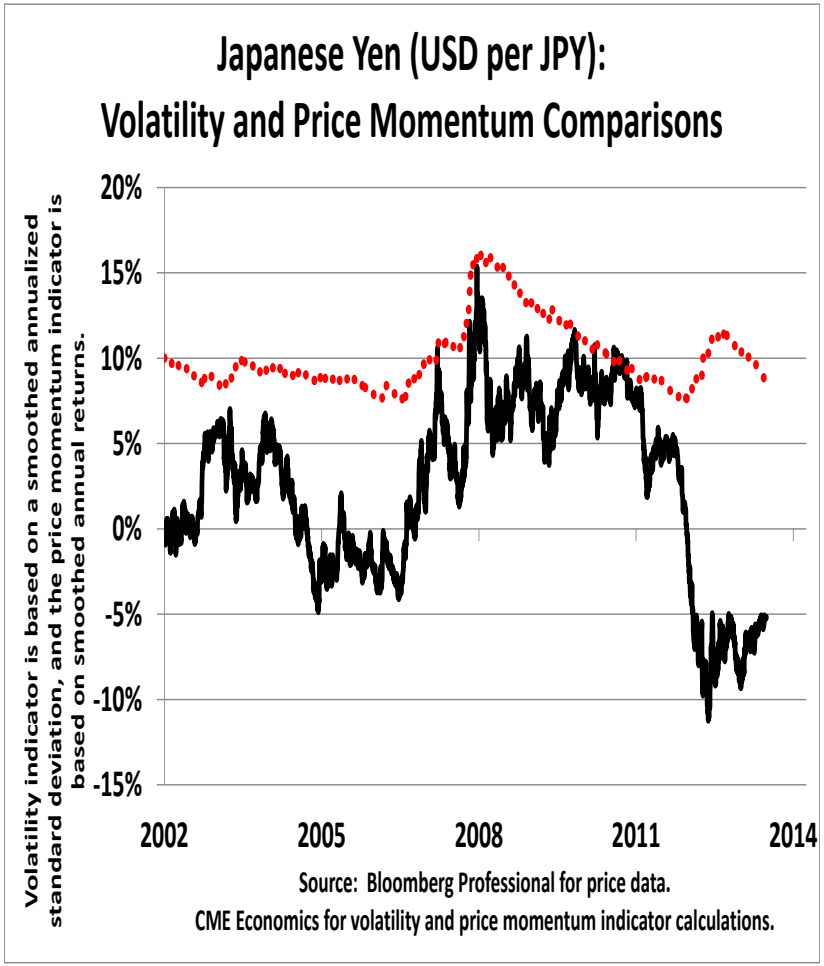
S&P and US Treasury Volatility Patterns are Typical – Declining to Lower Levels





The Same Declining Volatility Patterns are Occurring in Major Currency Markets





Volatility Patterns Across Almost All Products are Declining To Historical Lows

Volatility (Annualized Standard Deviation) by Selected Periods				
	2003-2006	9/2008 - 3/2009	2012-2013	2014 YTD
US Treasury 10-Year	5.81%	12.21%	5.12%	4.17%
S&P500 Index	12.24%	54.74%	11.71%	10.85%
Euro (USD per EUR)	9.41%	18.43%	7.71%	4.96%
Yen (USD per JPY)	8.62%	20.10%	9.92%	6.46%
WTI Crude Oil	34.58%	91.80%	22.26%	15.27%
Brent Crude Oil	32.18%	71.62%	20.03%	13.23%
Brent-WTI Spread Index	22.48%	55.88%	14.14%	11.25%
Natural Gas (US)	92.52%	59.19%	41.20%	112.67%
Gold	17.59%	36.68%	18.19%	12.85%
Copper	27.04%	61.83%	19.24%	14.10%
Corn	25.69%	54.73%	27.74%	20.49%
Wheat	28.00%	42.14%	22.45%	17.06%
Soybeans	30.89%	67.17%	27.29%	26.06%
Shading shows period with the lowest volatility.				
Source: Price data from Bloomberg Professional, Calculations by CME Economics.				

Declining Volatility is not necessarily the same as weak trading volumes

Primary Source of Declining Volatility: **Zero rates from the US Fed, ECB, and Bank of Japan**, along with the perceived market put, that these big central banks will do whatever it takes to avoid a future financial disaster, creates a relatively lower risk environment compared to the pre-2008 period.

Weak Trading Volumes in Certain Markets and Sectors: **The extensive increase in regulation, especially in the banking sector,** disrupted the previous model of bank proprietary trading. The pendulum is swinging to asset managers and hedge funds, but the transition period involves less trading and less capital allocated to risk trading.

Specific to US stock markets, algorithmic and other computerized trading systems may have seen their previous profits competed away by arrival of many more firms getting into the fray -- **higher returns attracted more players and then more players eliminated the higher returns** – resulting in less trading volume in stock markets.

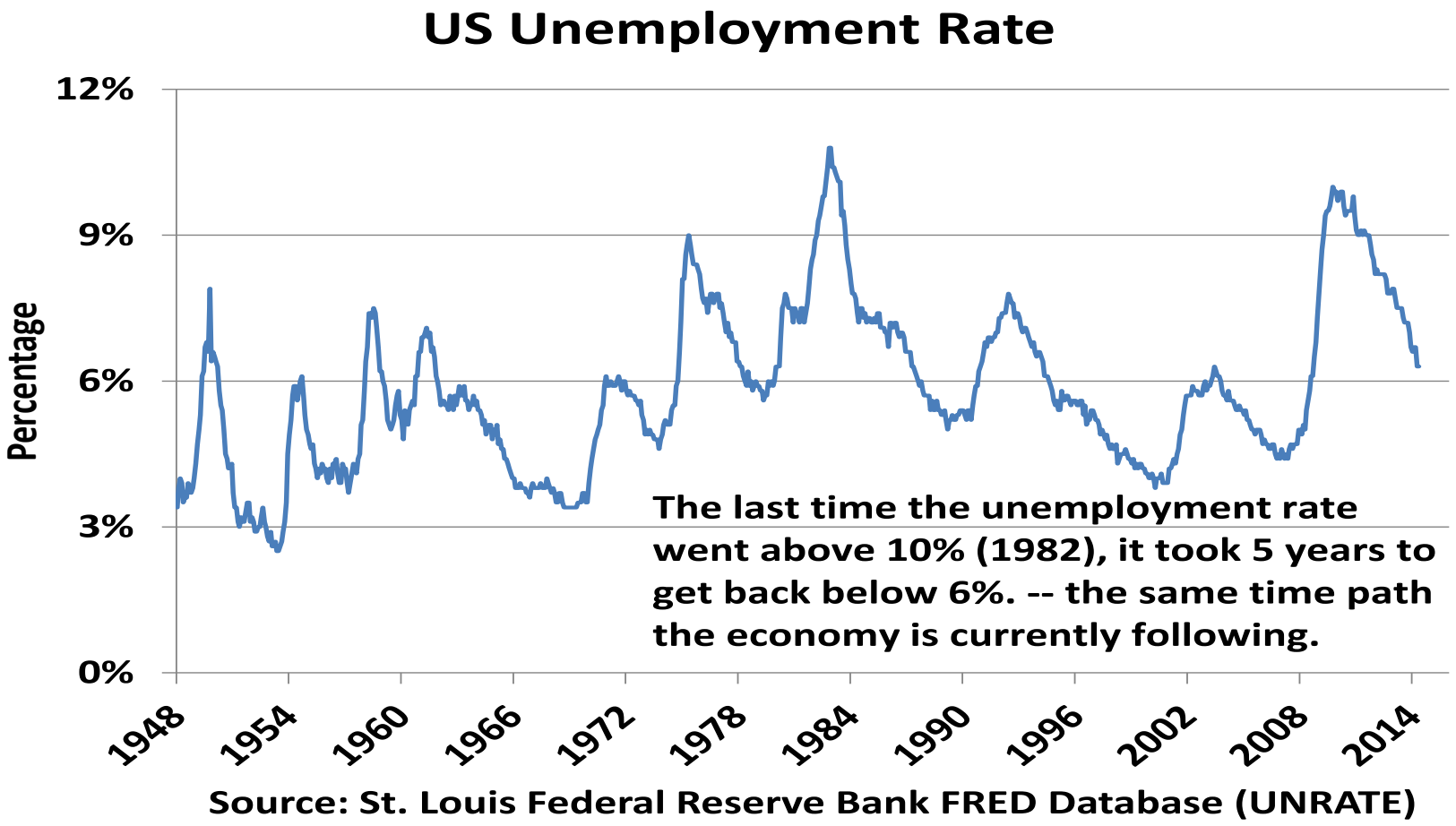
Scenarios for Fed Decision to Raise Rates and Possible Bond Market Reactions

Scenario #1 – US labor markets continue to improve while core inflation only creeps very slowly higher. Fed raises target federal funds rate in Q2/2015. Since no inflation pressure, the yield curve flattens. (60%)

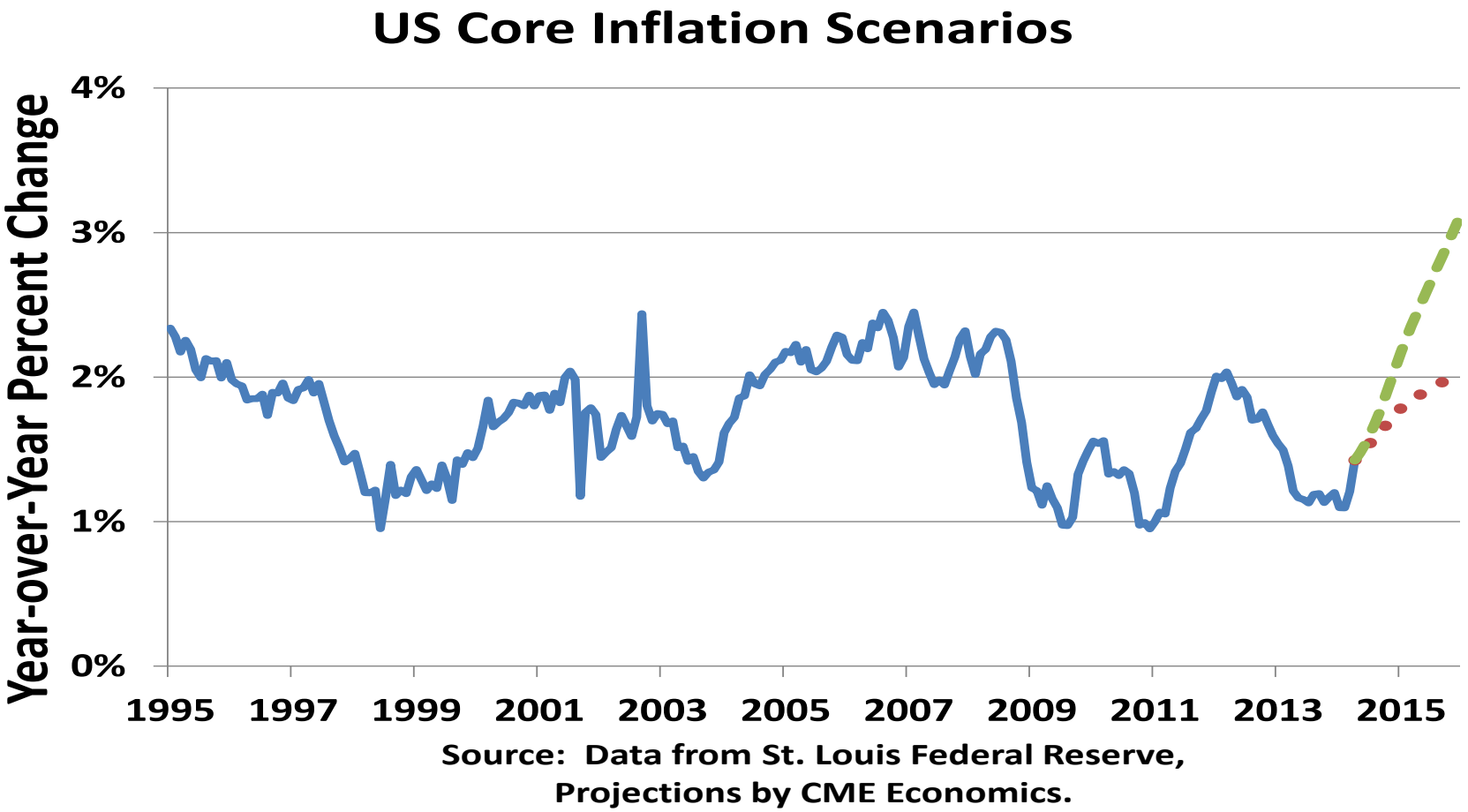
Scenario #2 – US labor markets continue to improve and core inflation rises above 2% year over year rate, and inflation expectations appear to rise toward 2.5% to 3% for a year ahead. Fed raises target federal funds rate in Q2/2015. With some inflation pressure, the Fed is perceived as being behind the game, and the yield curve rises in parallel across the maturity spectrum. (30%)

Scenario #3 – US economy hits a rough patch and Fed stays on hold. US Treasuries may rally and yields move lower. (10%)

US Unemployment Rate Projected to Decrease to 5.5% by Mid-2015



Inflation Path is Key to Bond Reaction to Any Fed Rate Rises



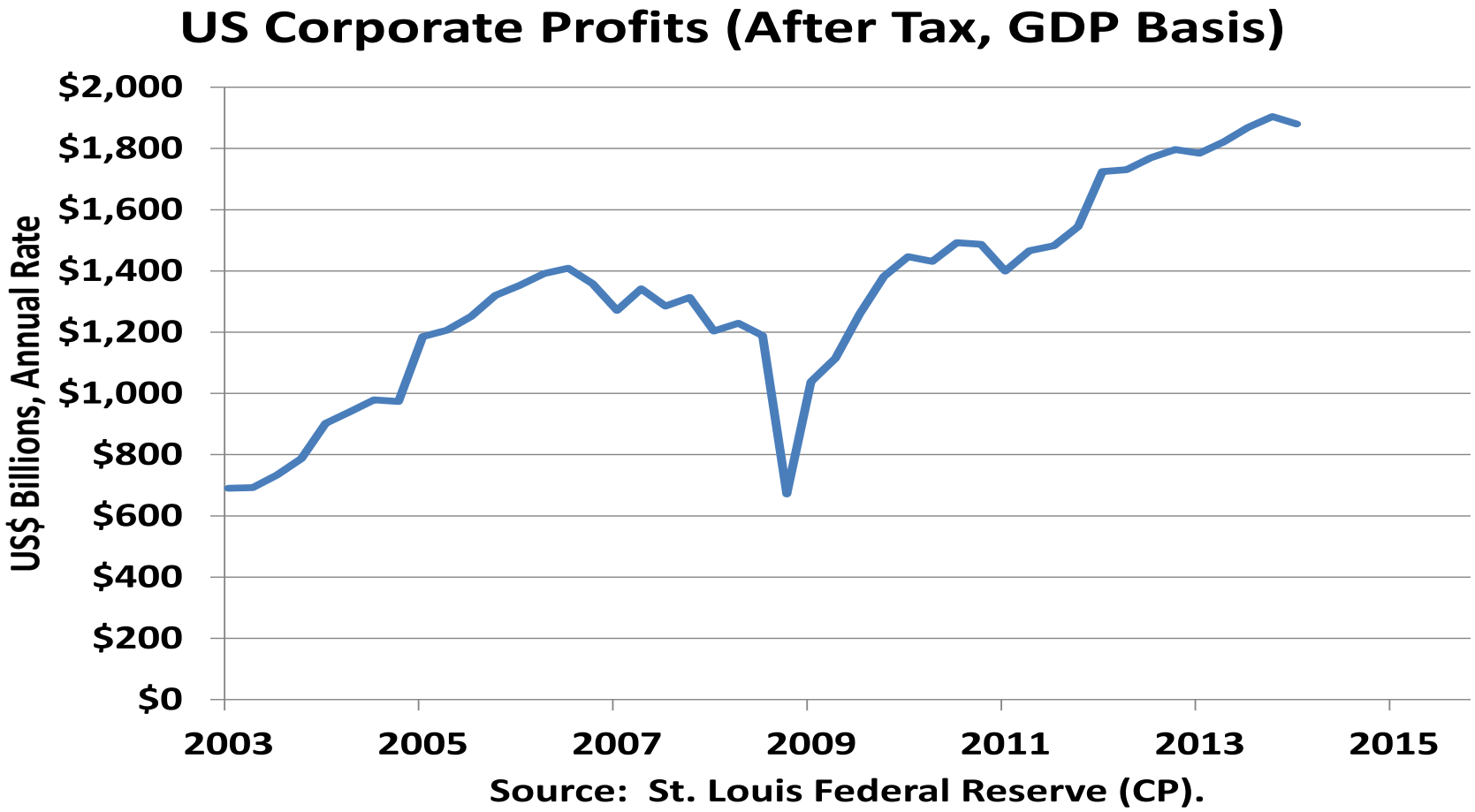
Scenarios for Equity Markets

Scenario #1 – US economy continues to improve, but with no inflation pressure, no pricing power for corporation, so earnings growth decelerates. S&P500 suffers a 10% correction but ends up on the year. (60%)

Scenario #2 – M&A activity and solid US economy propel S&P500 Index to new highs, up 10% or more on the year, give or take. (30%)

Scenario #3 – US economy hits a rough patch, (possibly due to international causes) and equities swoon, for a 20% bear market downturn. (10%)

Equity Markets & Earning Expectations Dynamics -- Growth Rate is Decelerating



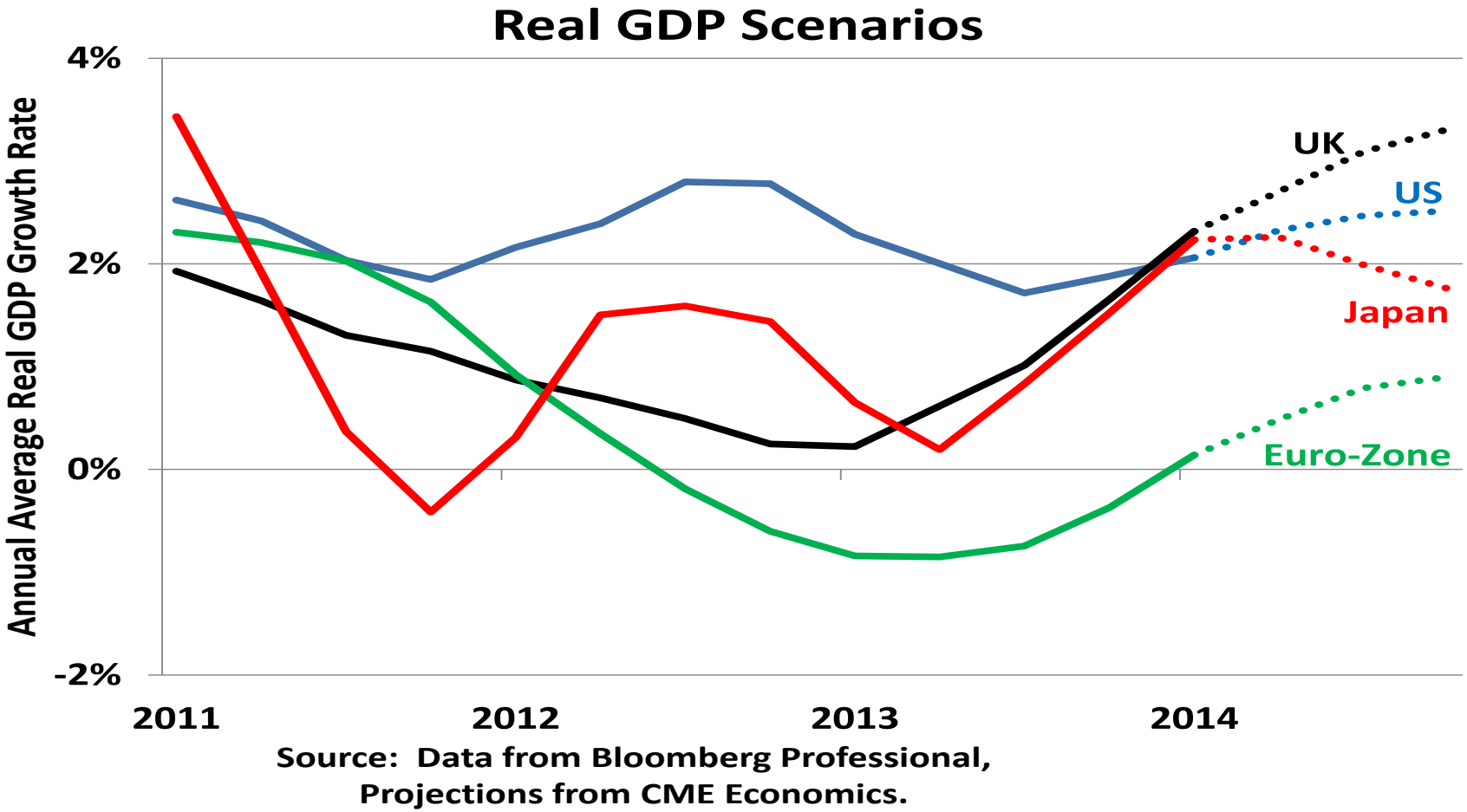
Scenarios for New Dynamics in FX Depend on Central Bank Divergence

Scenario #1 – US and UK economies perform well enough to lead to expectations of rate rises in 2015, while Euro-Zone and Japan hit economic rough patches. USD and GBP outperform EUR and JPY. (60%)

Scenario #2 – Creeping inflation in the US and UK versus deflation fears in Europe and Japan magnify country differences. (30%)

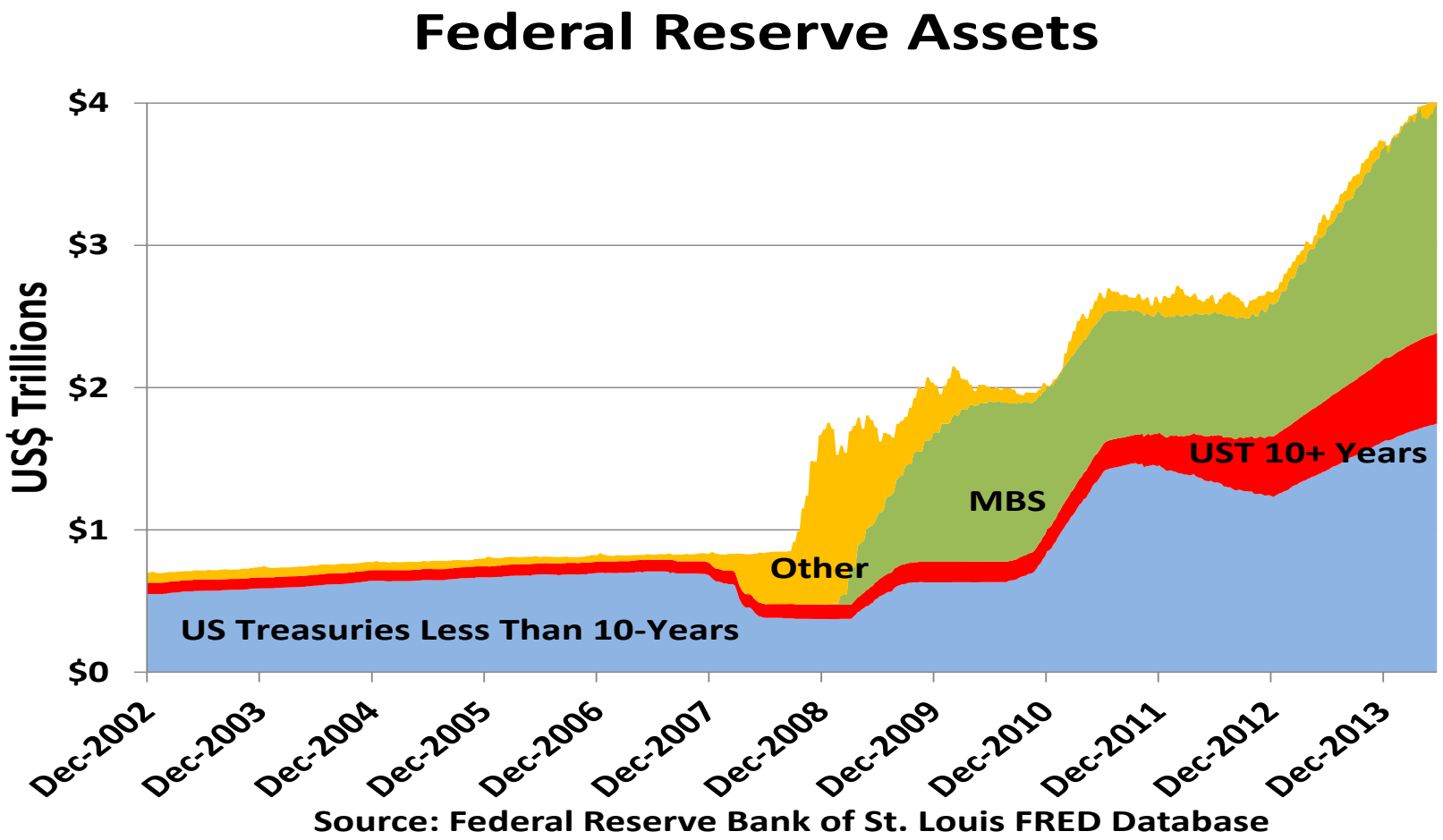
Scenario #3 – US, UK, Euro-Zone, and Japan all disappoint on economic growth. Zero rates remain in all countries. No trends, not much volatility. (10%)

UK & US improving Growth, Japan and Euro-Zone Still Struggling

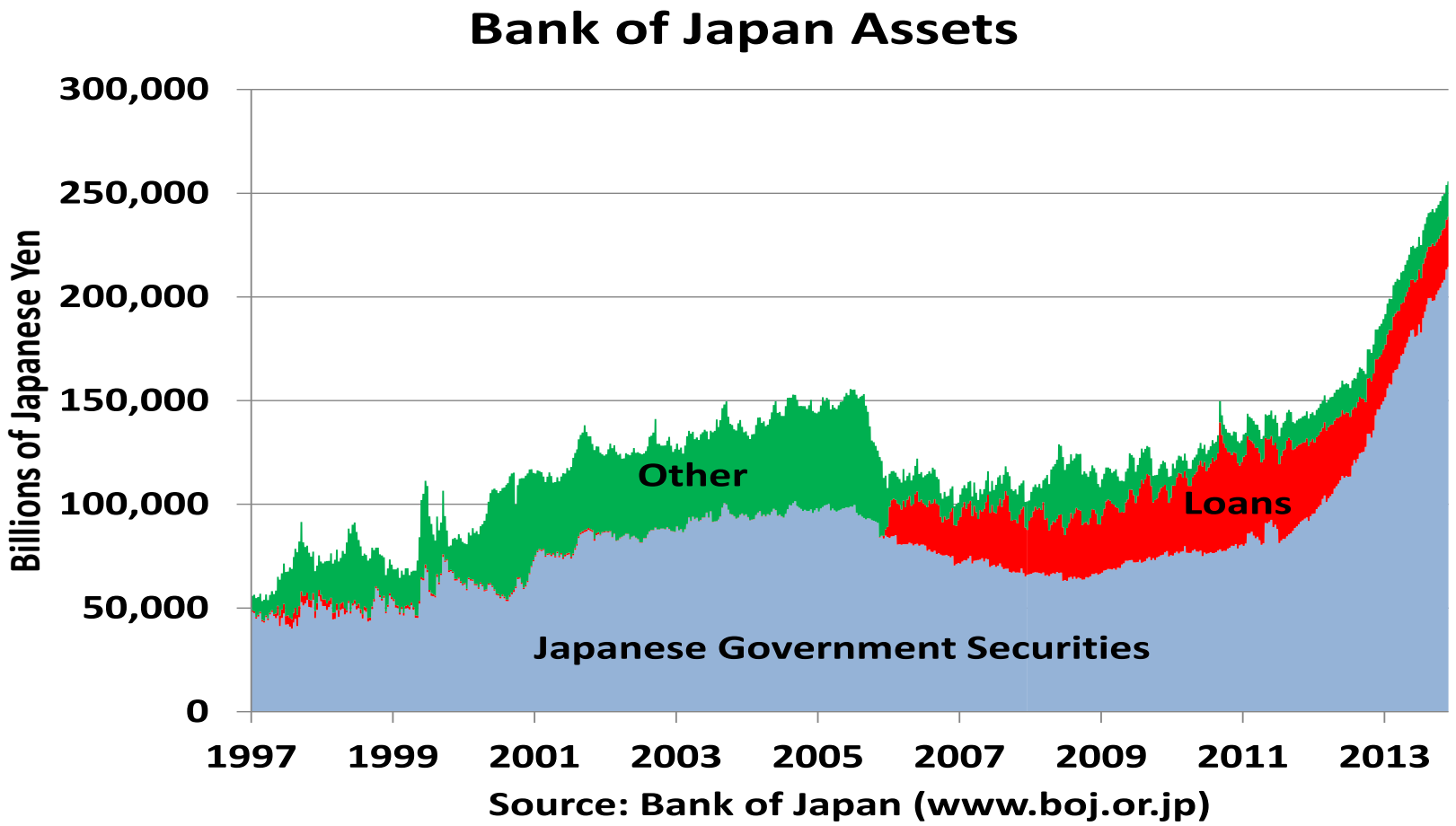


Source: Data from Bloomberg Professional, Projections from CME Economics.

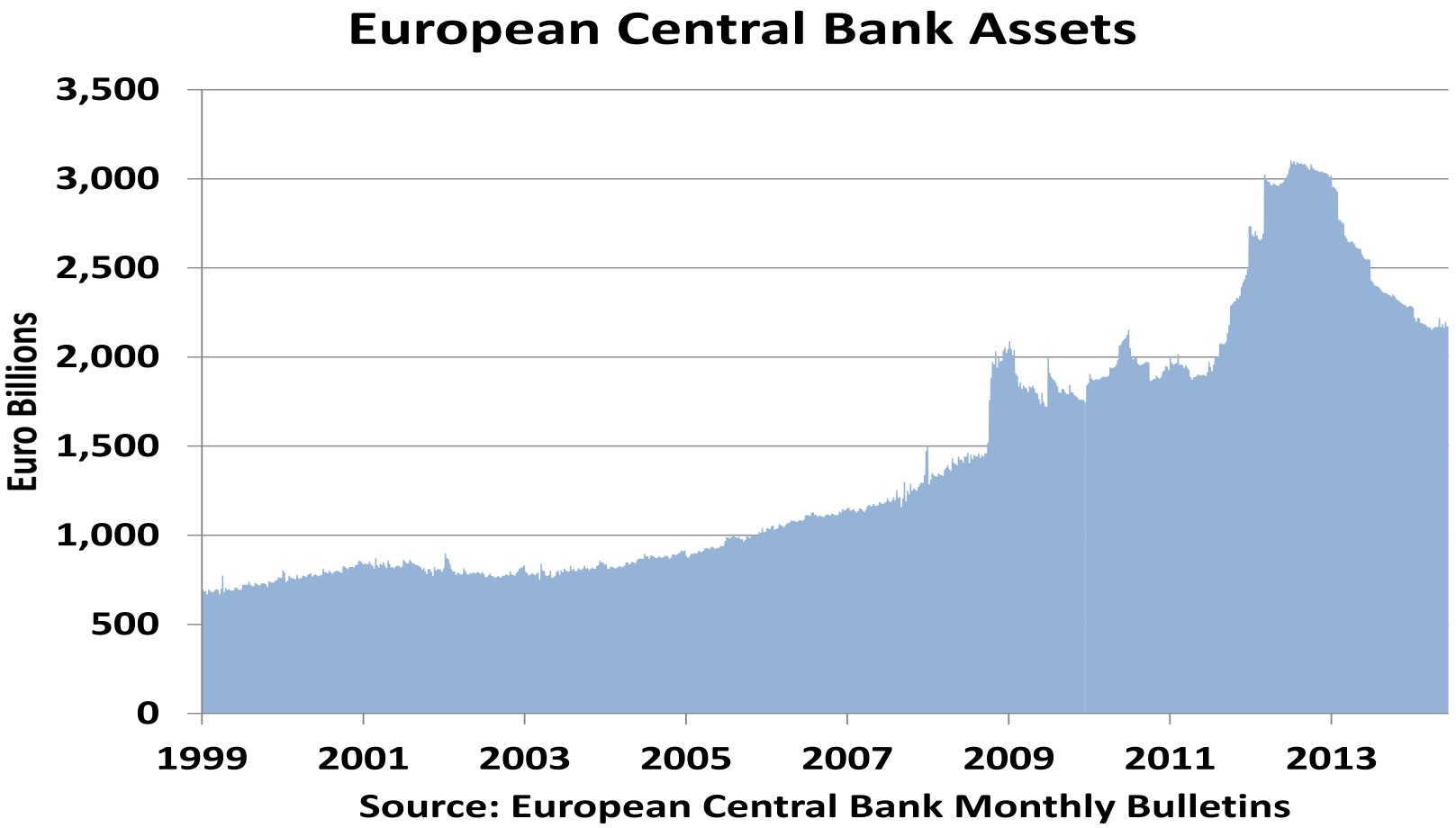
US Fed Ends Quantitative Easing in Q4/2014, Rates the Next Decision



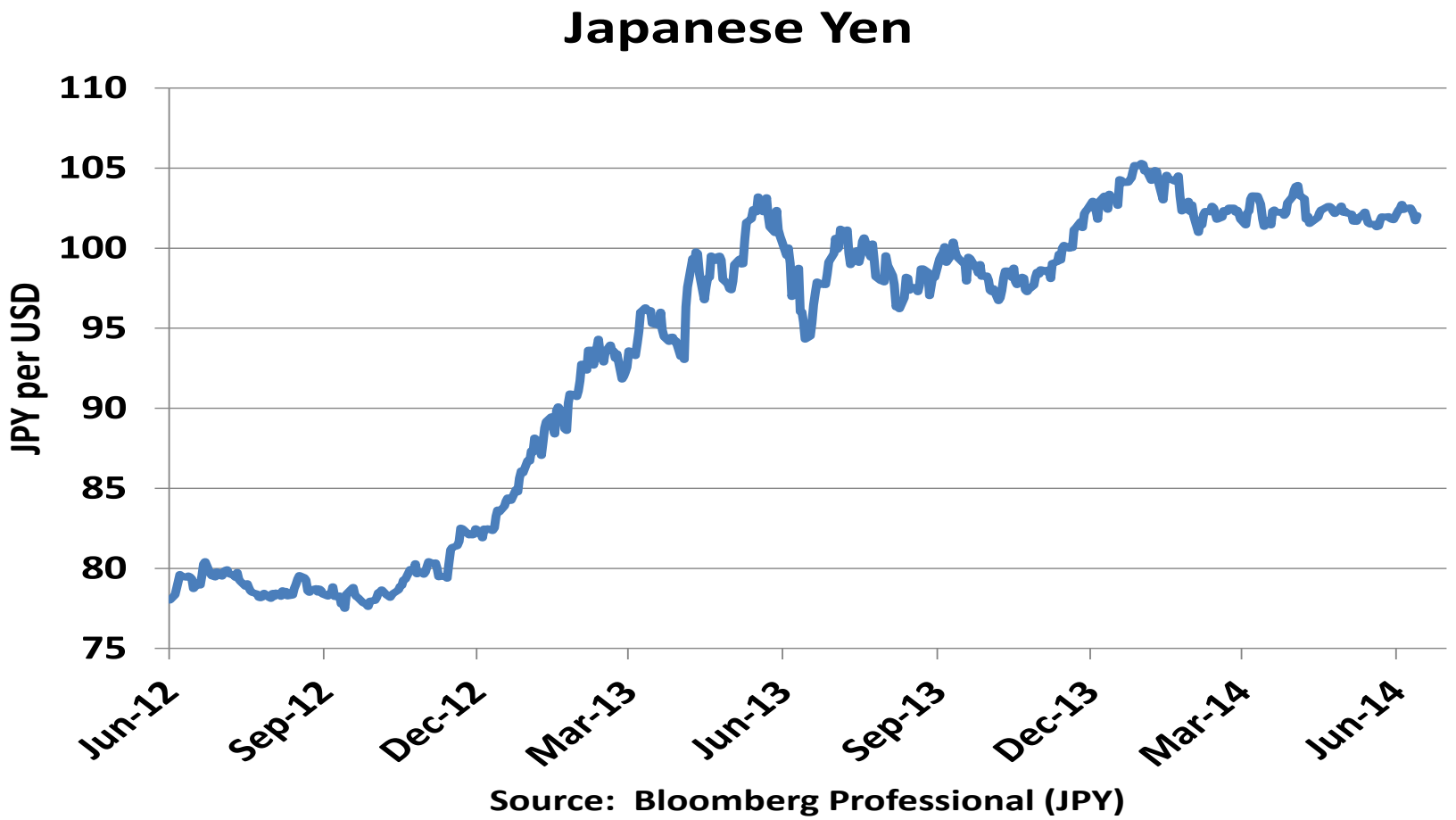
Bank of Japan Remains Committed to Massive Asset Purchases



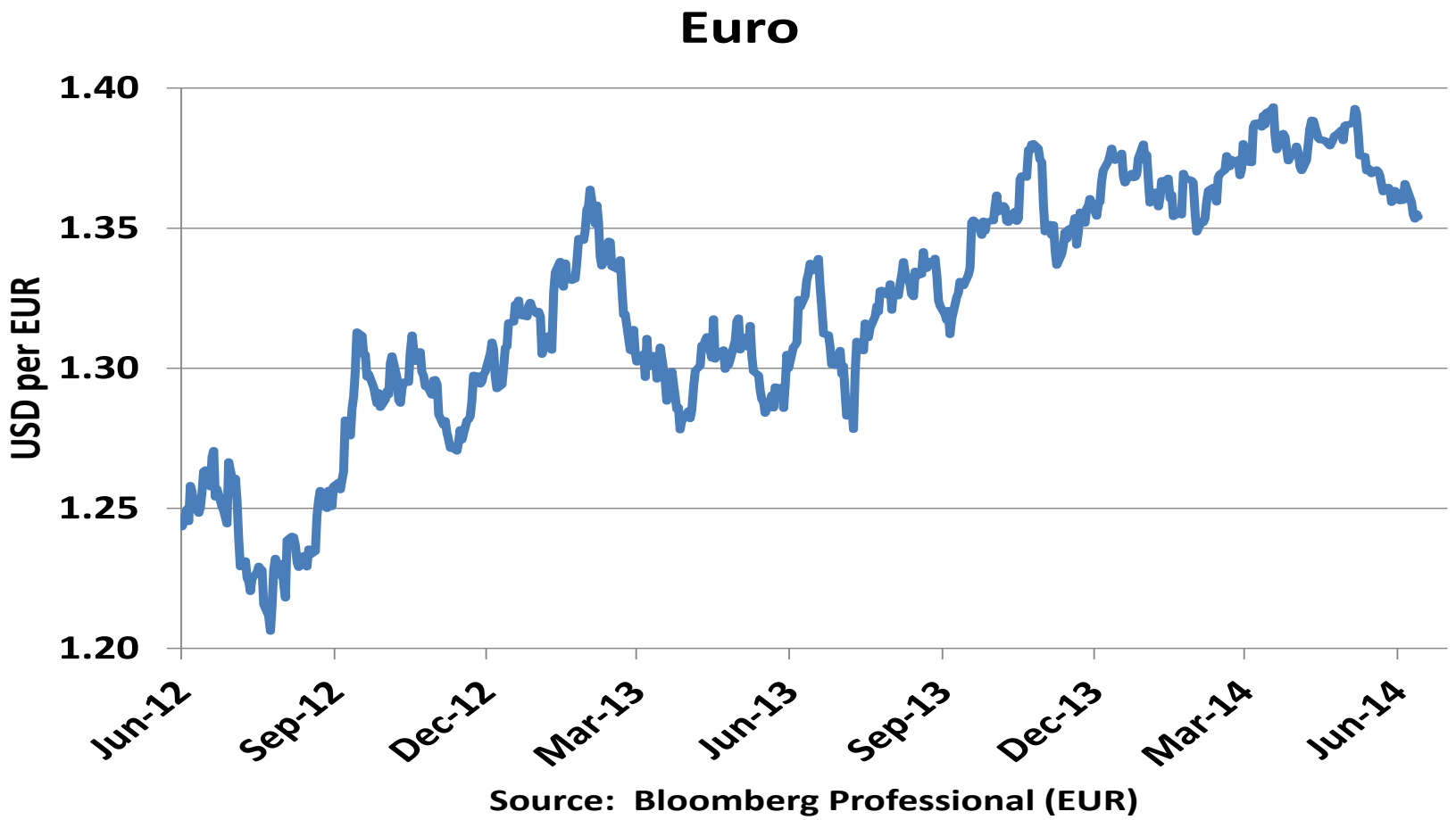
Alone Among the Major Central Banks – ECB Balance Sheet is Shrinking



Japanese yen fell 20% with Abe's Election and has Hardly Moved Since



Euro has Gained Ground Since the Debt Crisis Eased, but May Have Hit its Cap



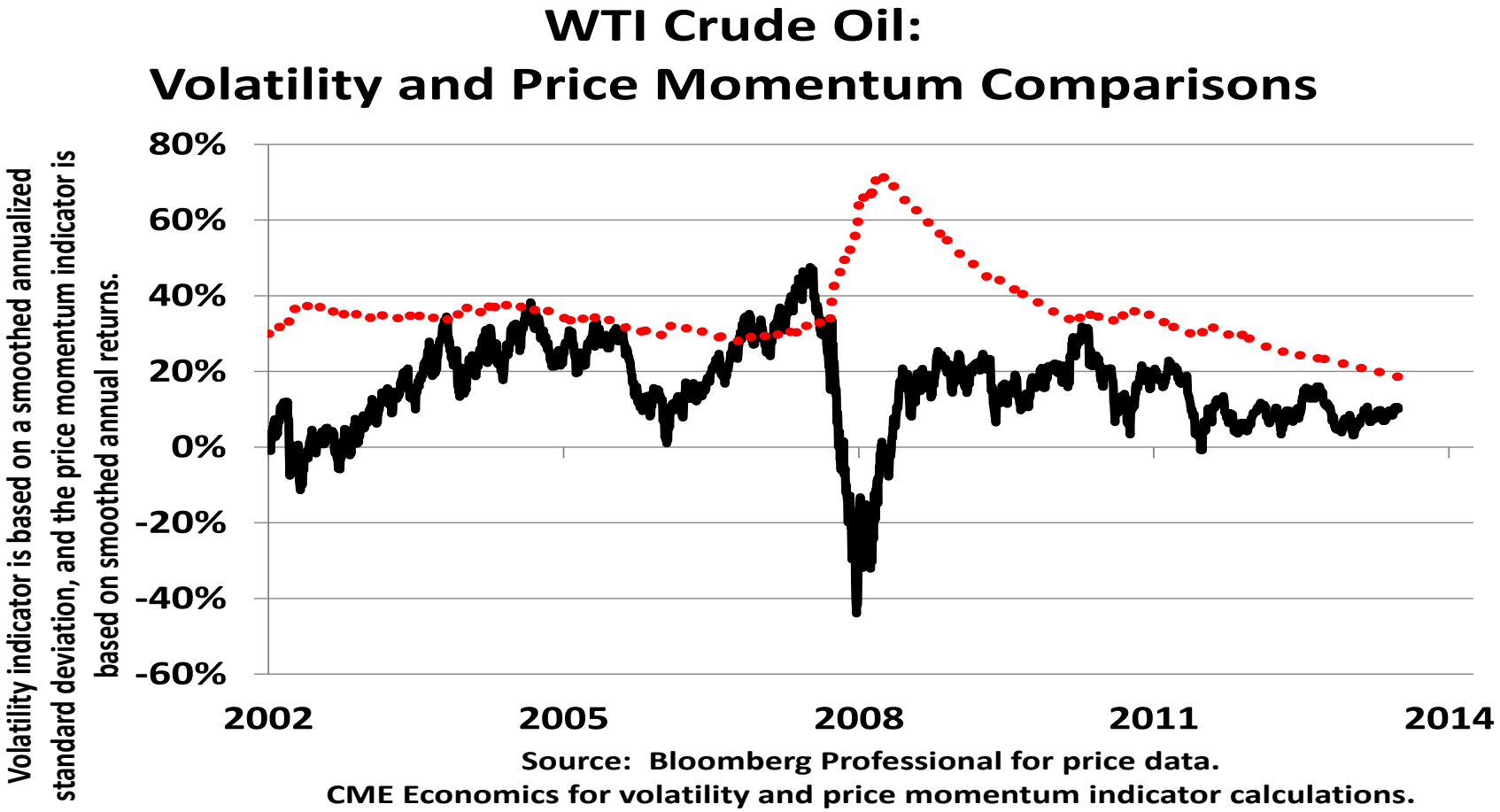
Scenarios for Oil and Natural Gas Diverge

Scenario #1 – Natural gas prices develop a slow yet definitive upward trend based on rising consumption and deceleration of production boom, while crude oil bounces around in a narrow range. (60%)

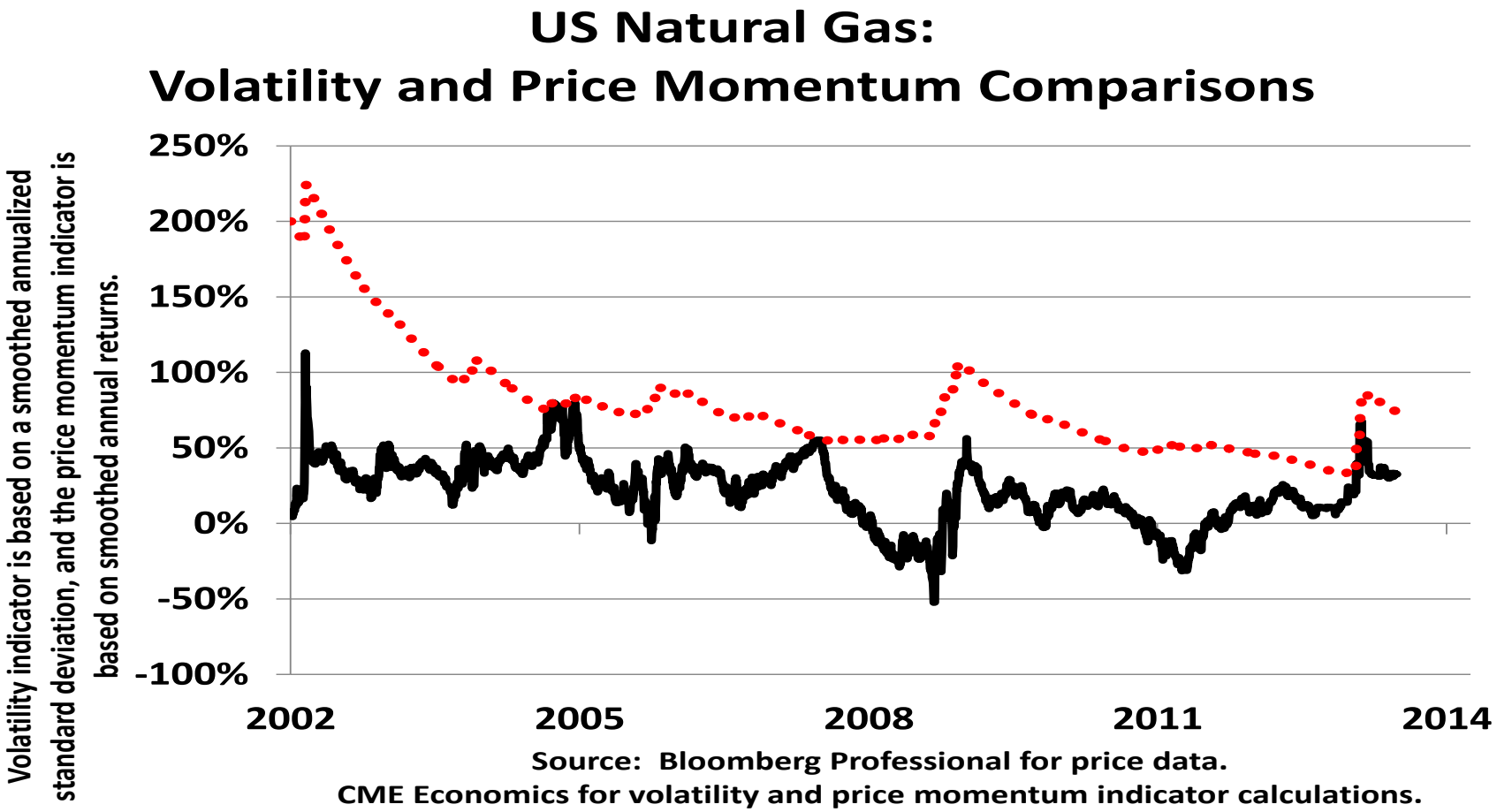
Scenario #2 – No definitive trends in either natural gas or crude oil develop. (20%)

Scenario #3 – More unexpected negative surprises from geo-politics or a total shutdown of Iraqi oil sends crude oil surging higher – toward $150 per barrel. (20%)

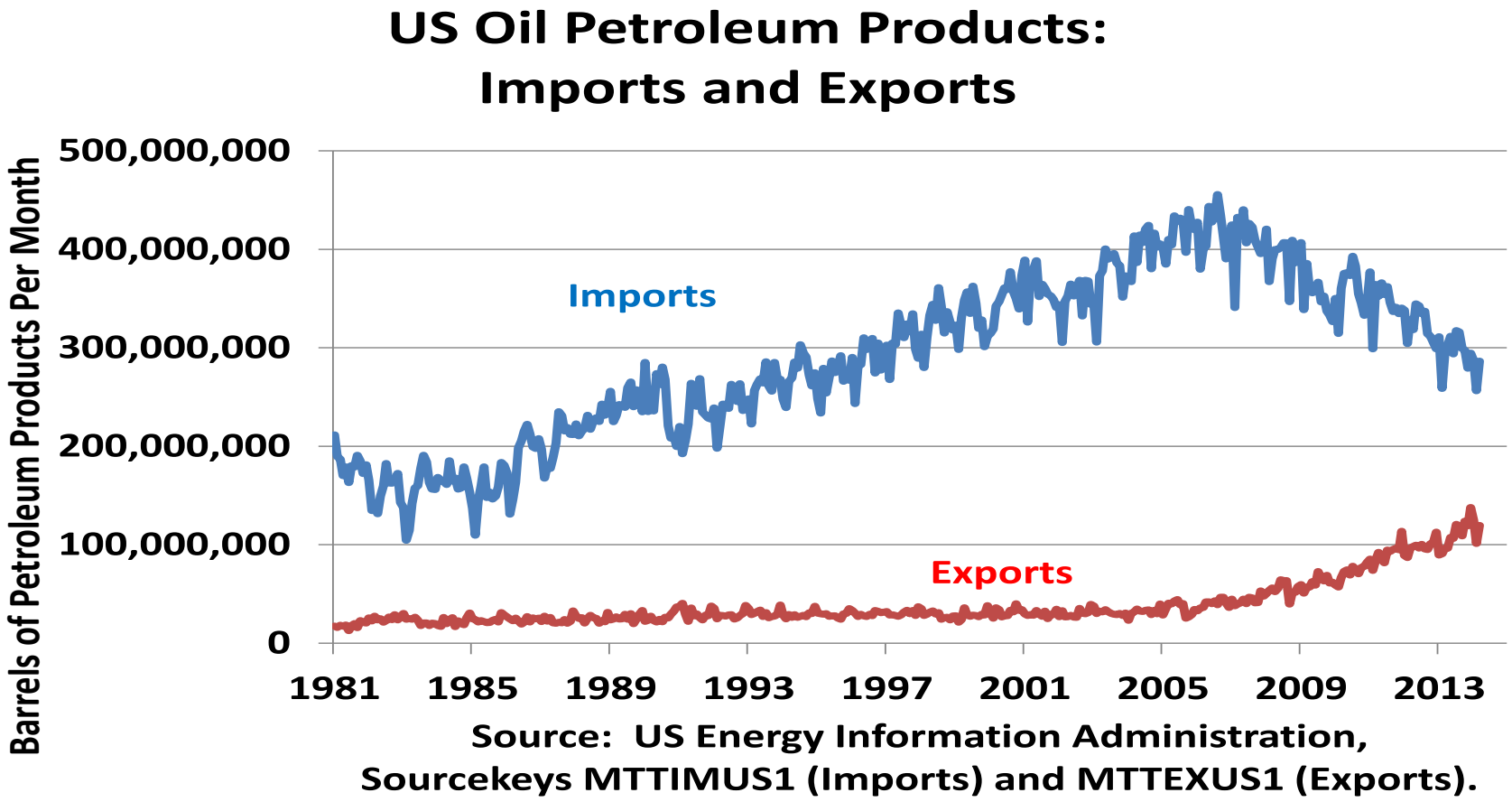
Crude Oil Price and Volatility Momentum



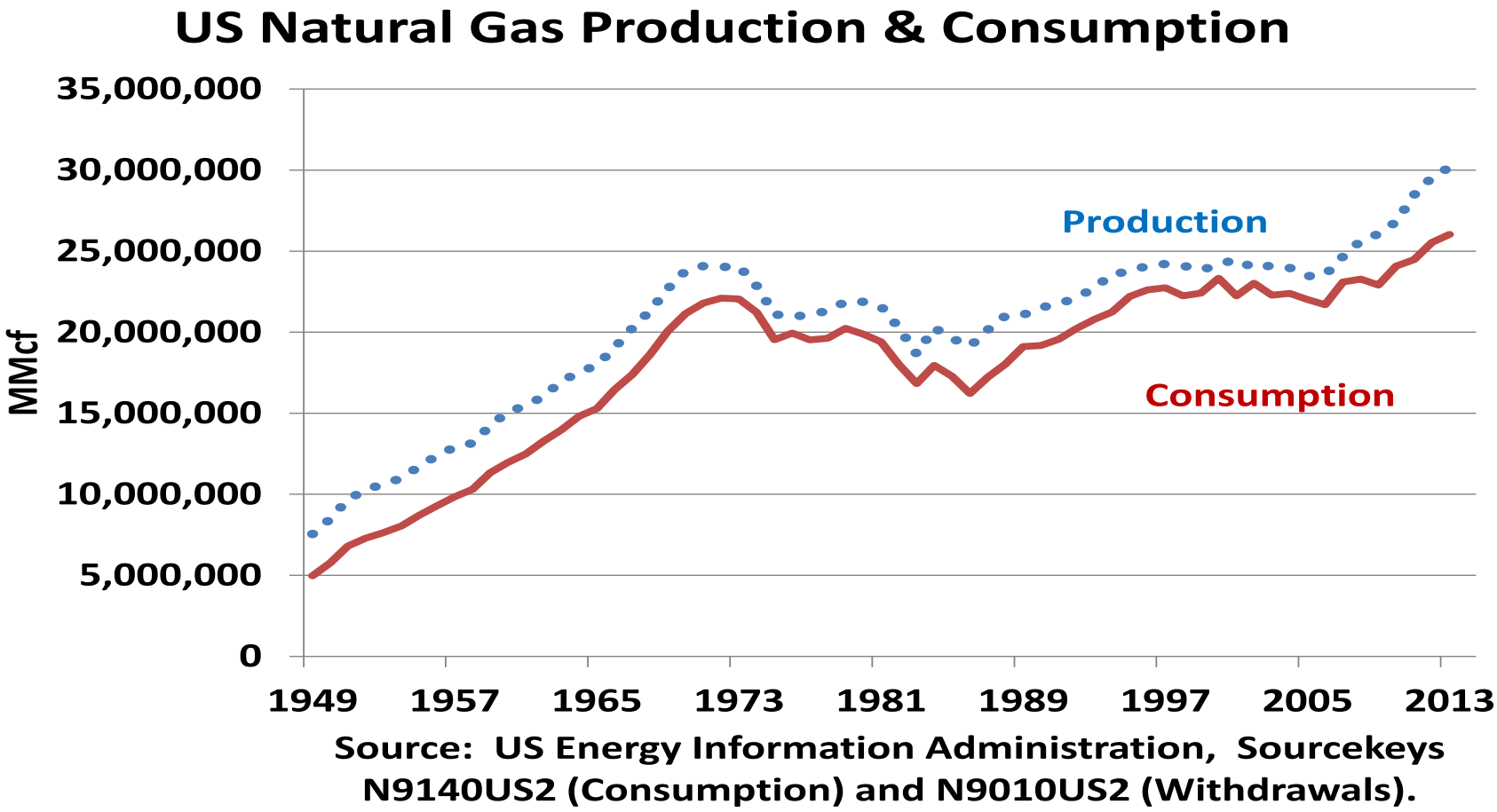
Natural Gas Price and Volatility Momentum



More Petroleum Exports and Less Imports Have Helped US Reconnect to Markets



Rising Consumption, Deceleration of Production = New Nat Gas Price Dynamics



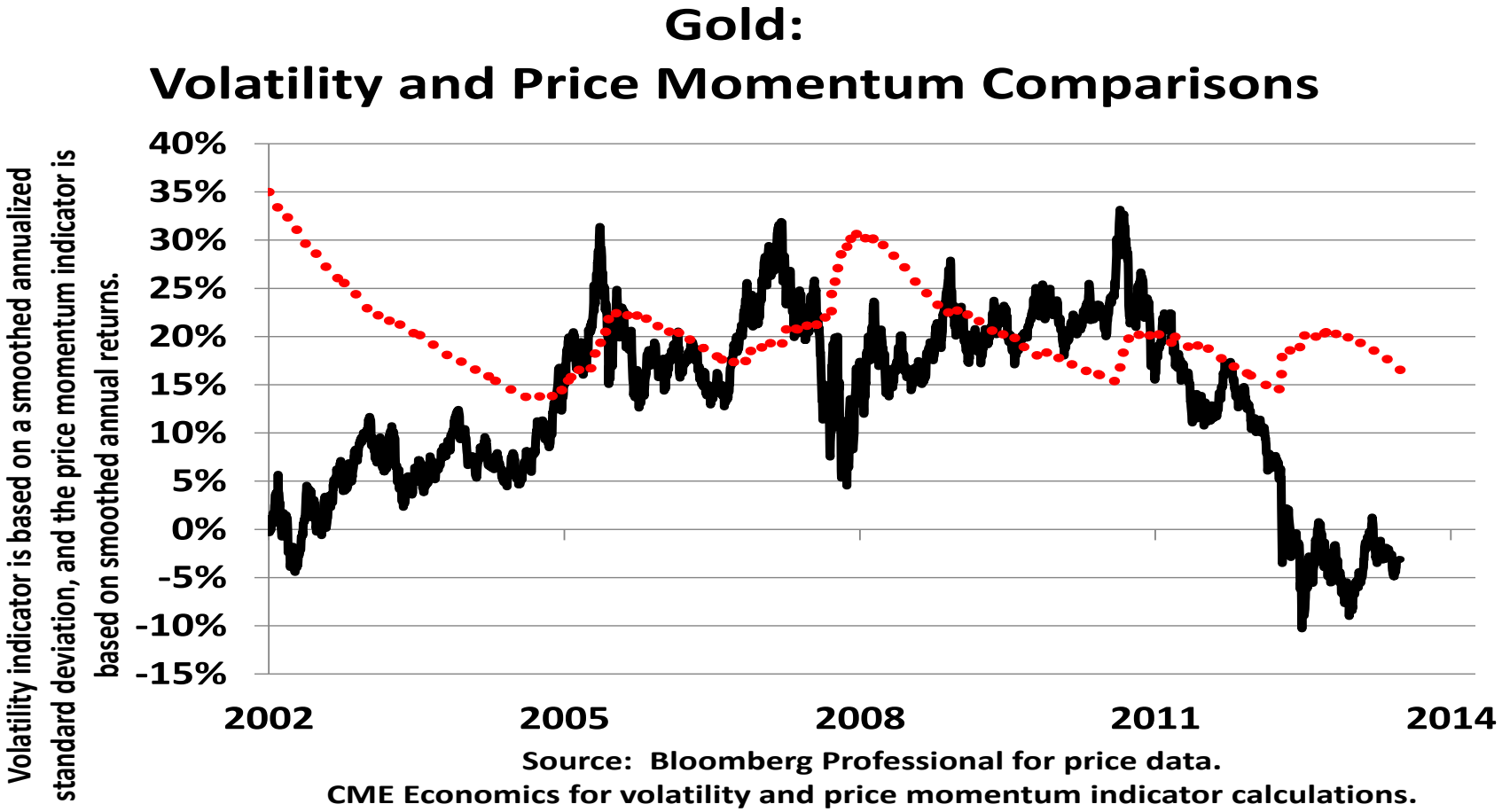
Scenarios for Metals Depend on Inflation and Global Growth

Scenario #1 – No meaningful inflation pressure in the major countries and no financial disasters. US economy improves enough for Fed to tighten. Gold has another price break toward $900 - $1000 per ounce. (60%)

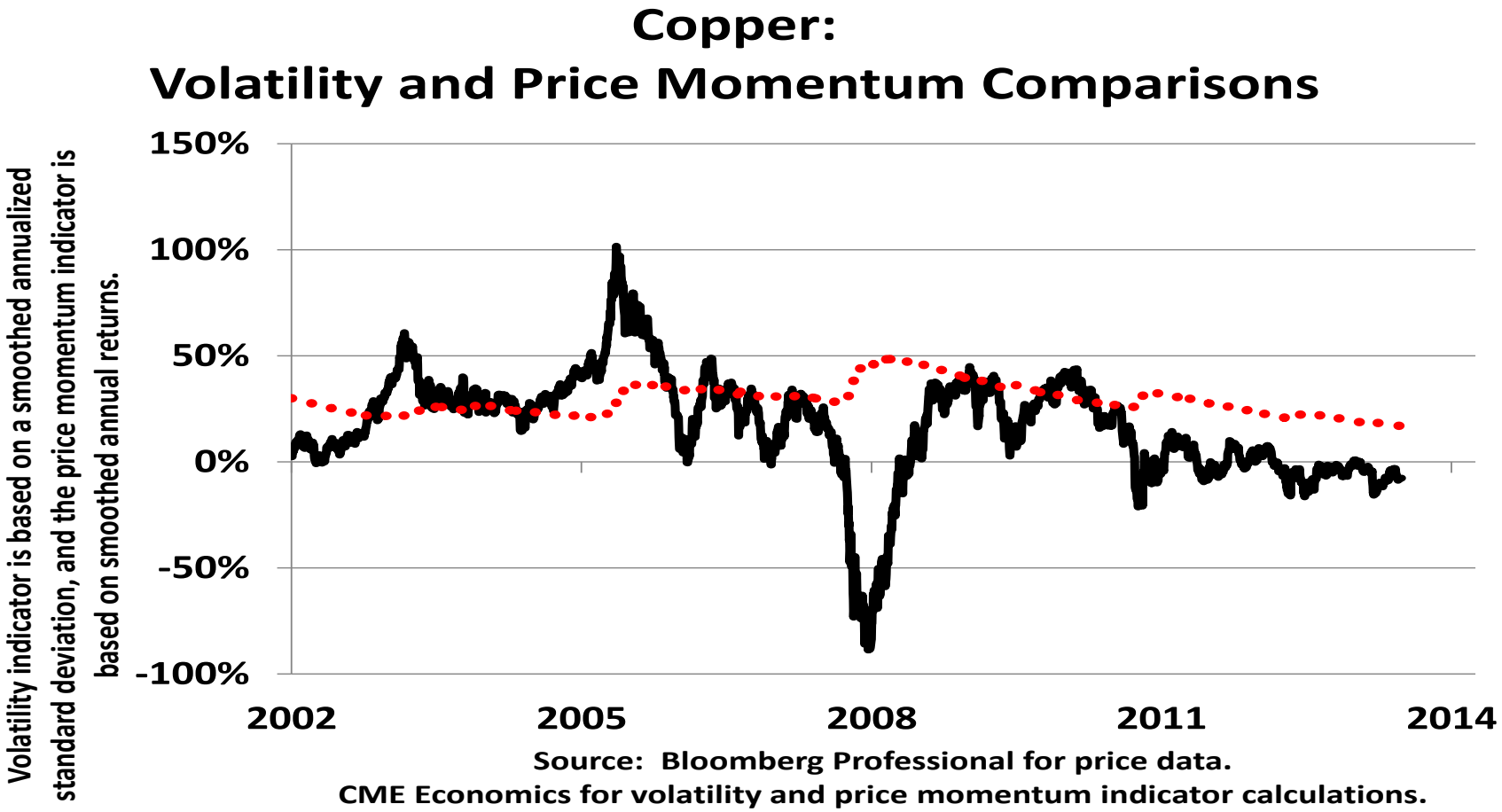
Scenario #2 – Some US inflation pressure develops and Fed is seen as behind the game. Gold rises to $1400+. (30%)

Scenario #3 – US and other economies hit a rough patch and fears of deflation return. Gold has another price break toward $600 - $900 per ounce. (10%)

Gold Price and Volatility Momentum



Copper Price and Volatility Momentum



Gold Has Become Range Bound without Inflation Fears or Financial Panic

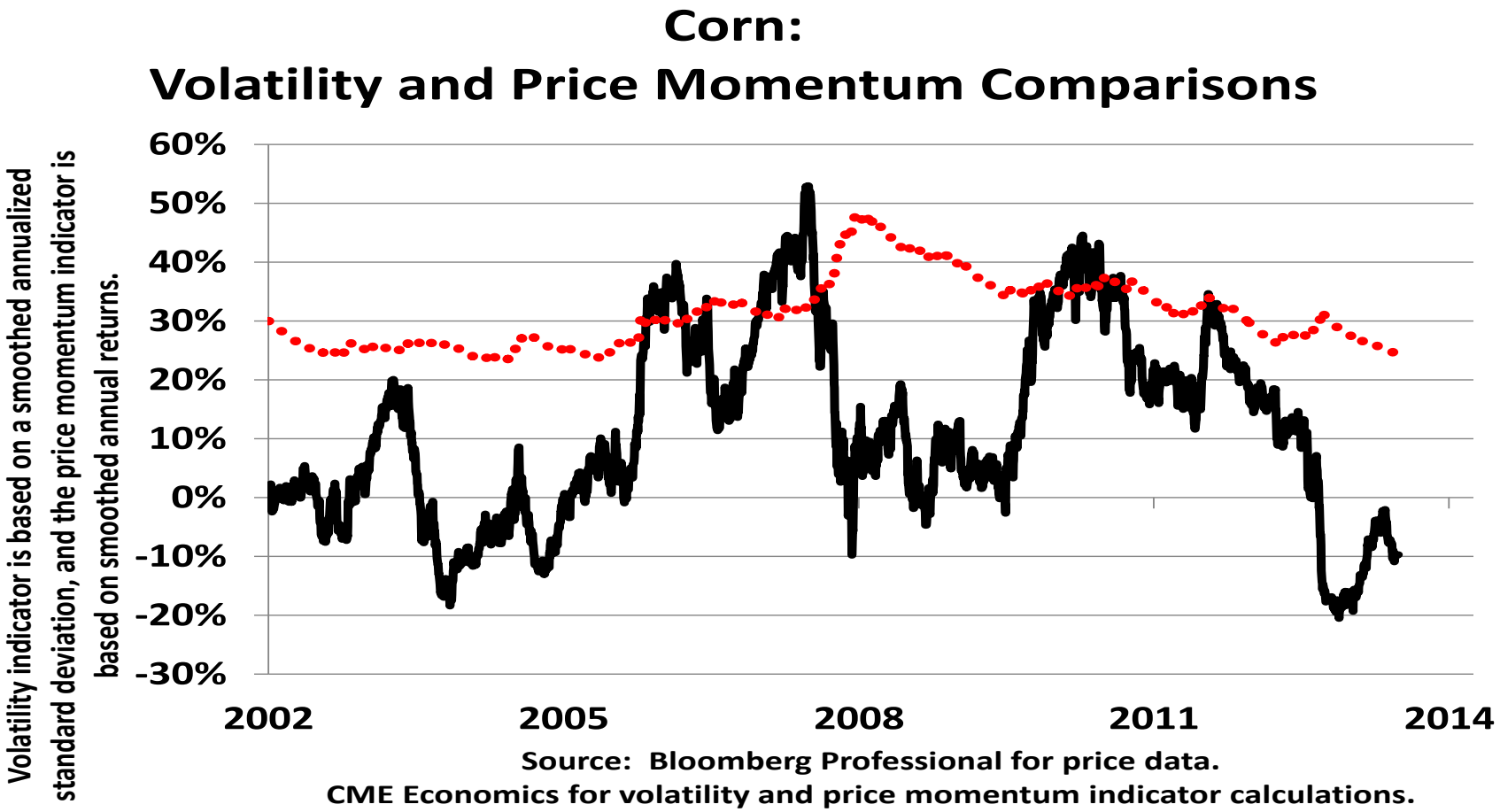
Scenarios for Agriculture are Weather Dependent and Not Mutually Exclusive

Scenario #1 – El Niño returns. Too much rain in Brazil and Argentina. Drought in India and Australia. Rain in the US corn belt. Storms in California in latter stages of El Niño. Benign US hurricane season. Soybeans lead other ag prices higher. (60%)

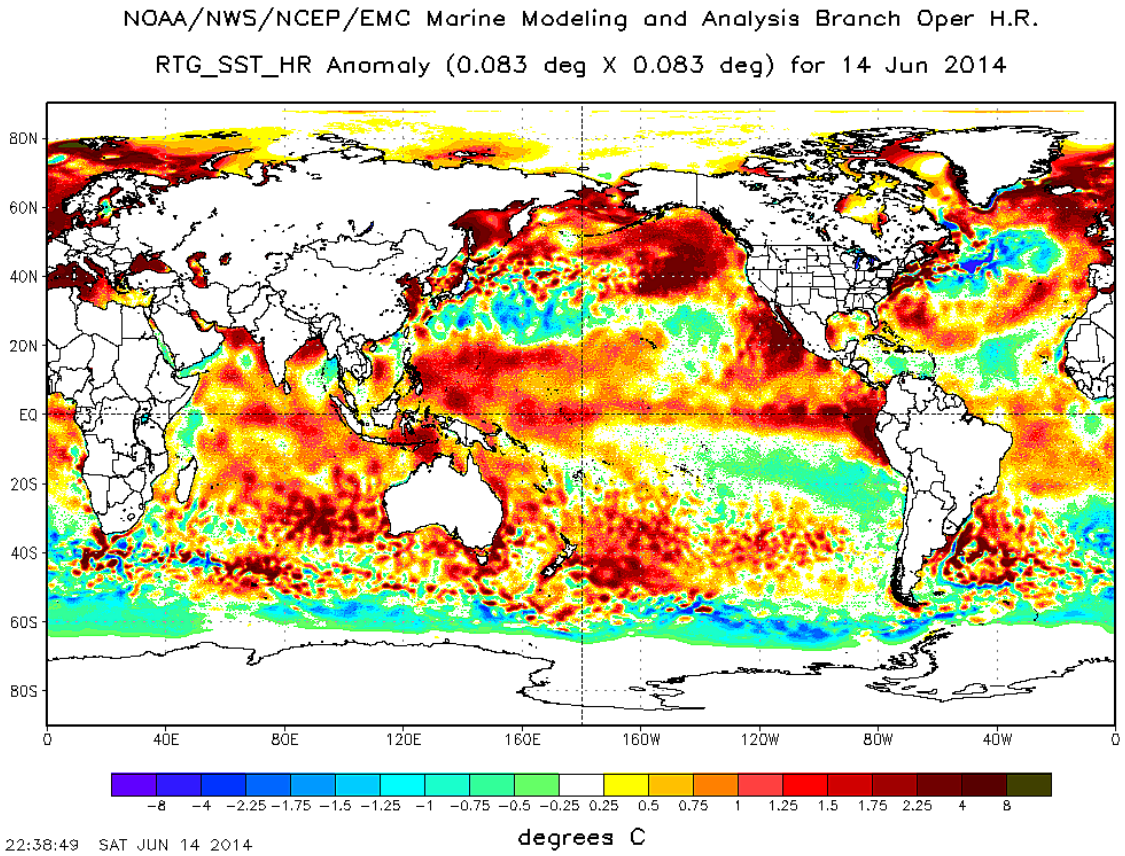
Scenario #2 – Drought in California and Texas/Oklahoma continues through summer, pushing livestock prices higher, as well as US food inflation. (80%)

Scenario #3 – CA, TX, and OK drought ends. No El Niño. But hurricane activity exceeds expectations. (20%)

Corn Price and Volatility Momentum



Warming Trends in Equatorial Pacific Has Increased Fears of an El Niño.



Source: National Oceanic and Atmospheric Administration (NOAA).

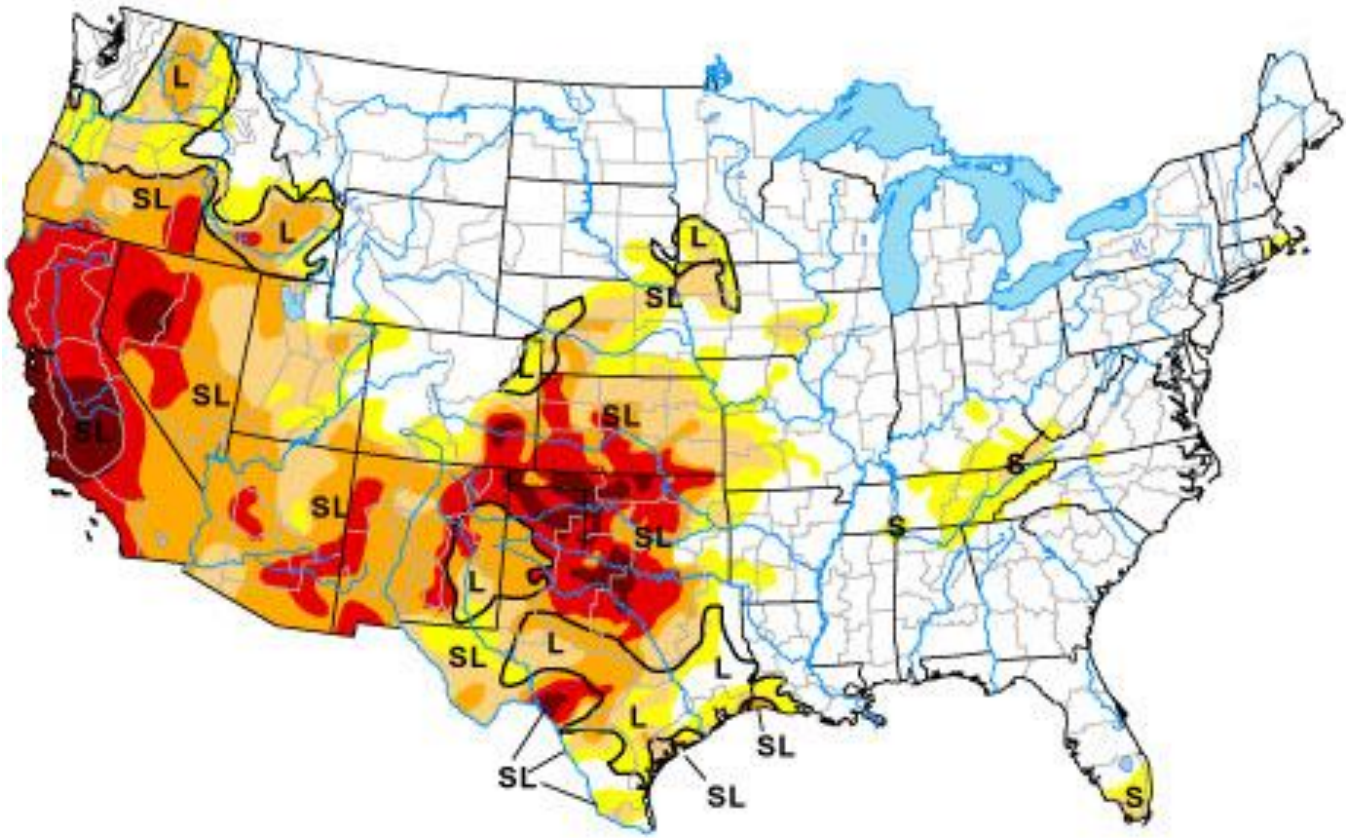
Some Possible El Niño Effects

Scenario #1 – By 2015, warmer waters in the Equatorial Pacific may drift northward and bring severe winter weather to California, ending drought but not without potentially high costs from storm damage.

Scenario #2 – Australia and India may experience higher probability of drought. More rain in Brazil and Argentina.

Scenario #3 – Milder winters in southern Canada and US, fewer hurricanes for the US, among other things.

US Drought in California, and Texas / Oklahoma like to Raise Food Prices



Source: University of Nebraska, US Drought Monitor.

Final Thoughts: Summary of Global Catalysts and Scenarios

Scenario #1 – Lower US unemployment triggers Fed rate decision, equity market uncertainty, differential FX rate patterns, among other effects. (60%)

Scenario #2 – US and UK inflation start to creep higher which further drives the Fed and BoE toward rate rises, while the ECB and BoJ continue to worry about low growth and potential deflation. (30%)

Scenario #3 – China slows more than expected, US economy hits a rough patch, (or a major geo-political event hits global growth), such that equities swoon and Fed postpones rate hikes. (10%)

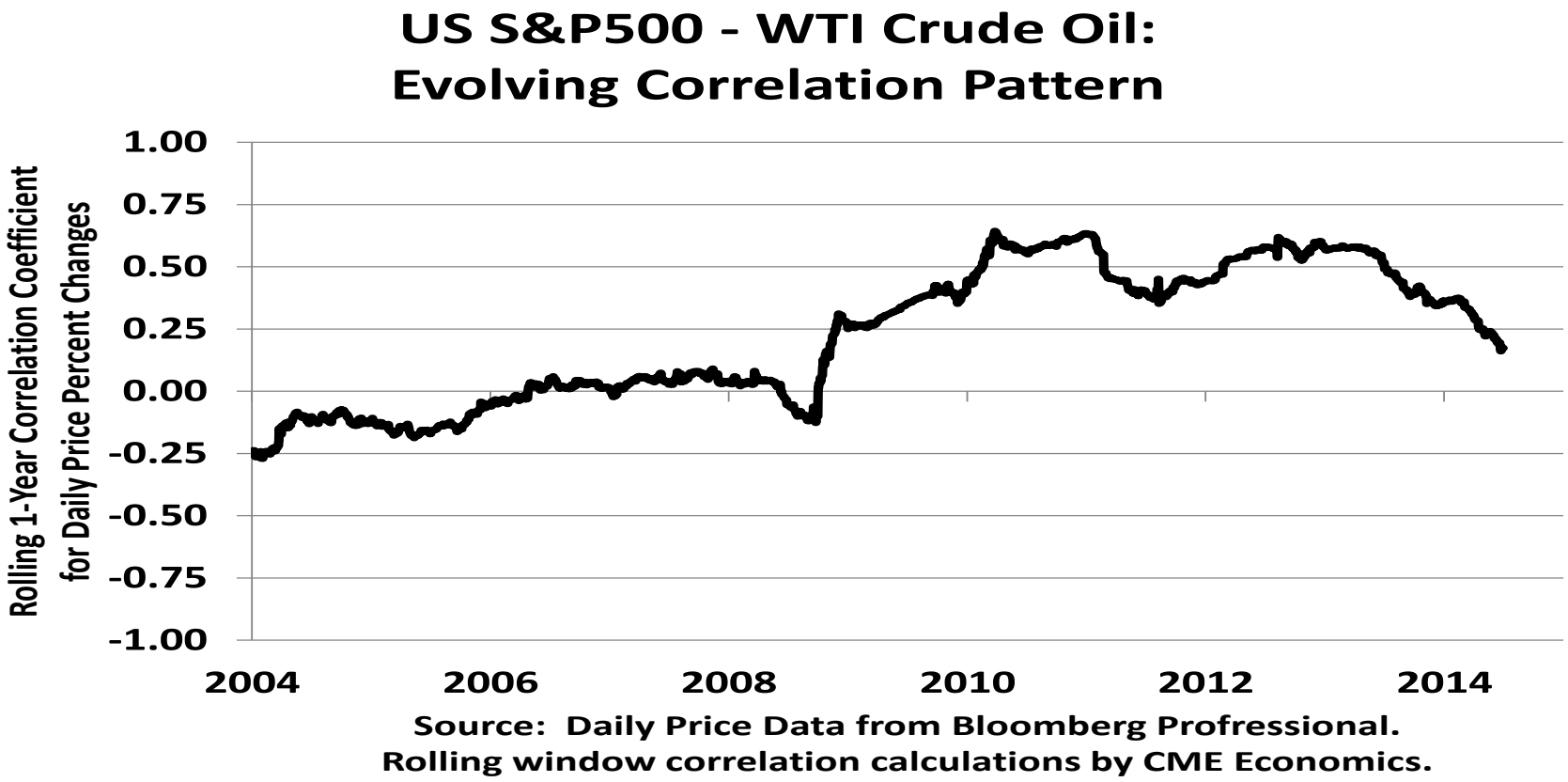
Selected Notes on Energy Correlation Dynamics

#1 – Oil's correlation to the S&P500 rose with the start of the US production boom, and has declined as the infrastructure has caught up with the boom and re-linked US oil to the rest of the world.

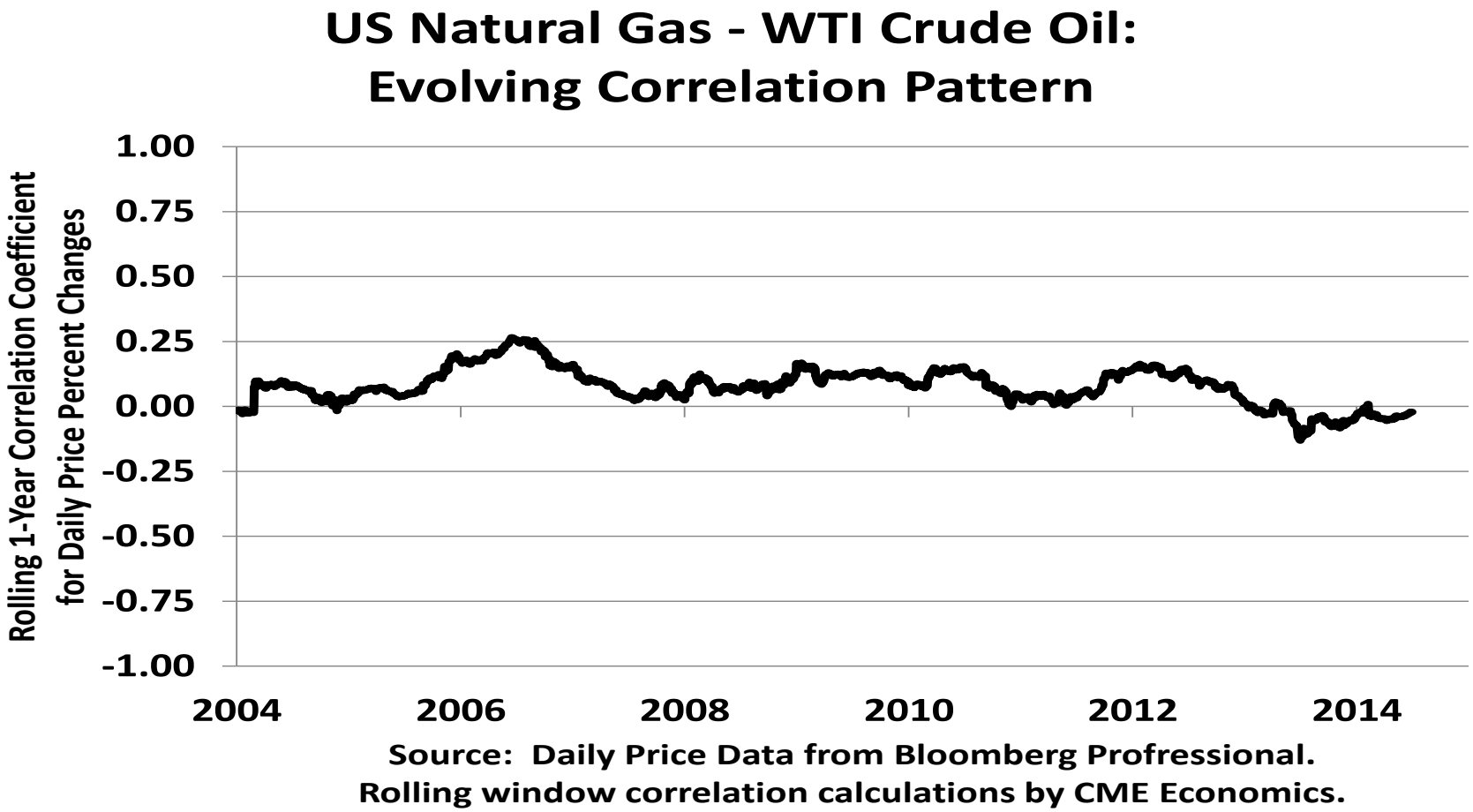
#2 – WTI crude oil and US Henry Hub natural gas dance to totally different drummers. Nevertheless, over time, the differential price of a BTU of energy will drive investment and consumption to the less expensive sector, and then narrow the BTU price gap.

#3 – Oil and gold have occasionally shown a positive correlation, but no inflation trends, energy production booms, and geo-politics appear to be eliminating what correlation is left.

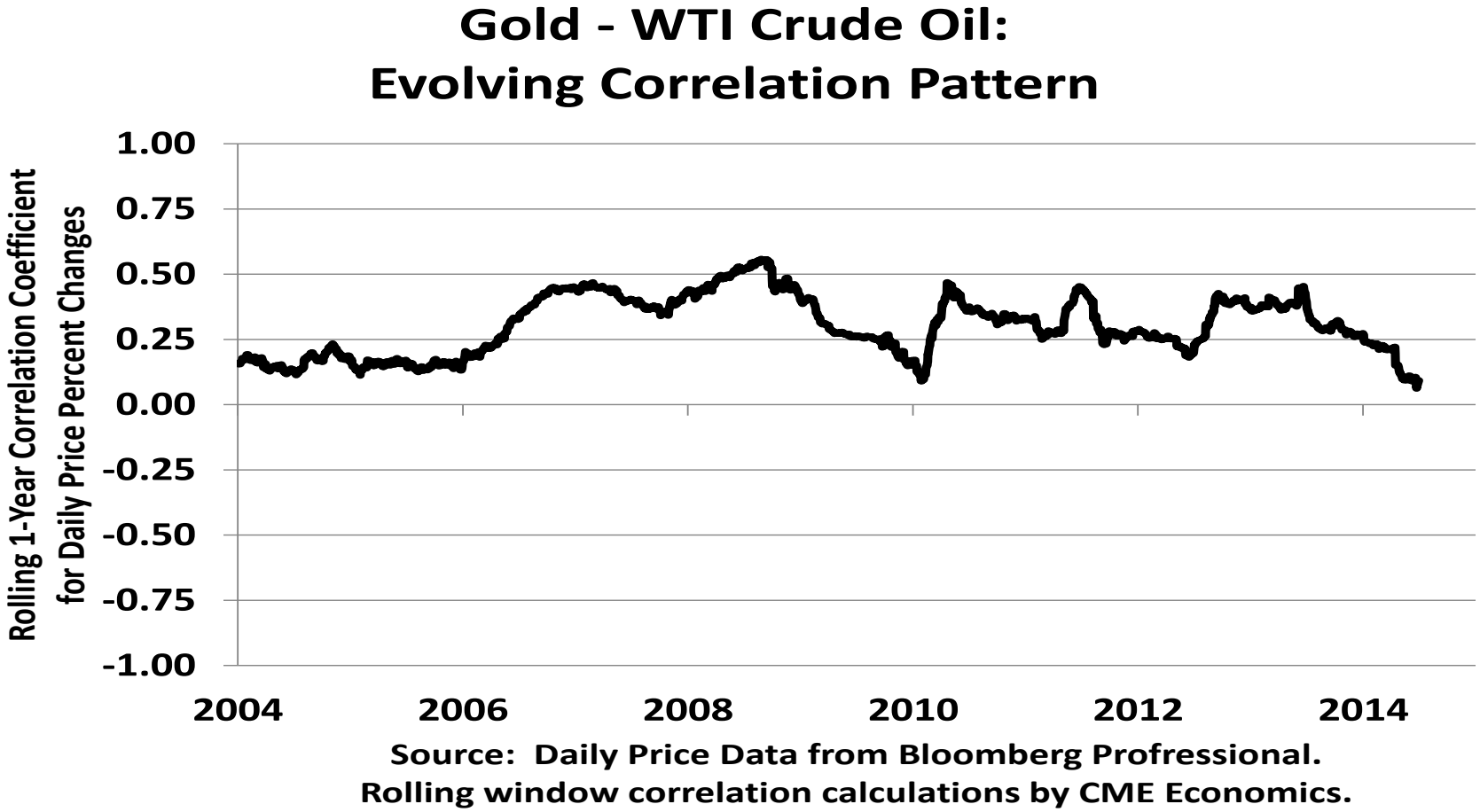
Oil was Correlated to the S&P500 only During the Early Stages of Production Boom Before the Infrastructure Development Caught Up



WTI Crude Oil and US Natural Gas Dance to Totally Different Market Forces



Oil and Gold Were Modestly Correlated in 2006-2008, but No More



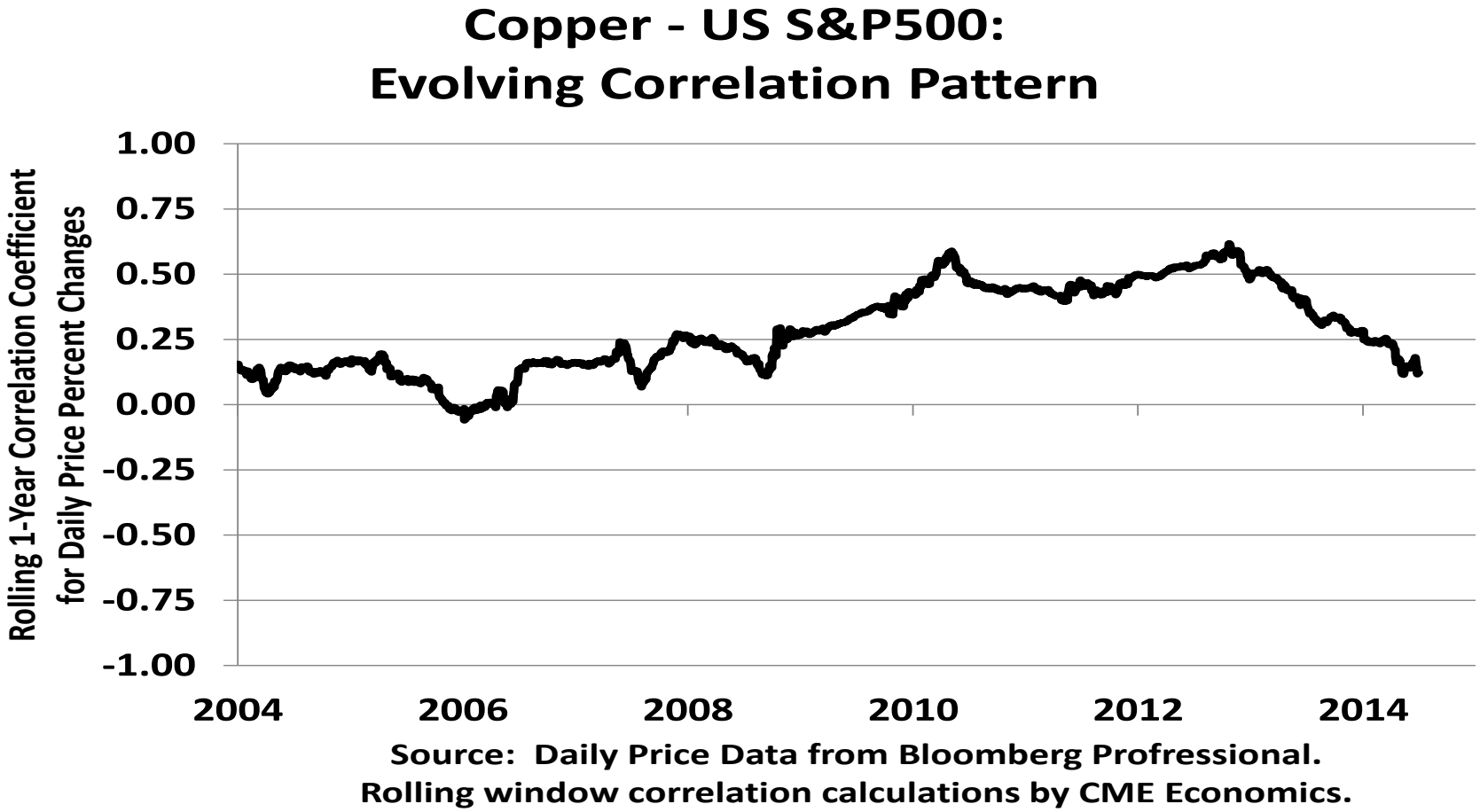
Selected Notes on Other Correlation Dynamics

#1 – Copper's correlation to the S&P500 has been diminishing as China's growth rate has decelerated, reducing the demand growth for copper.

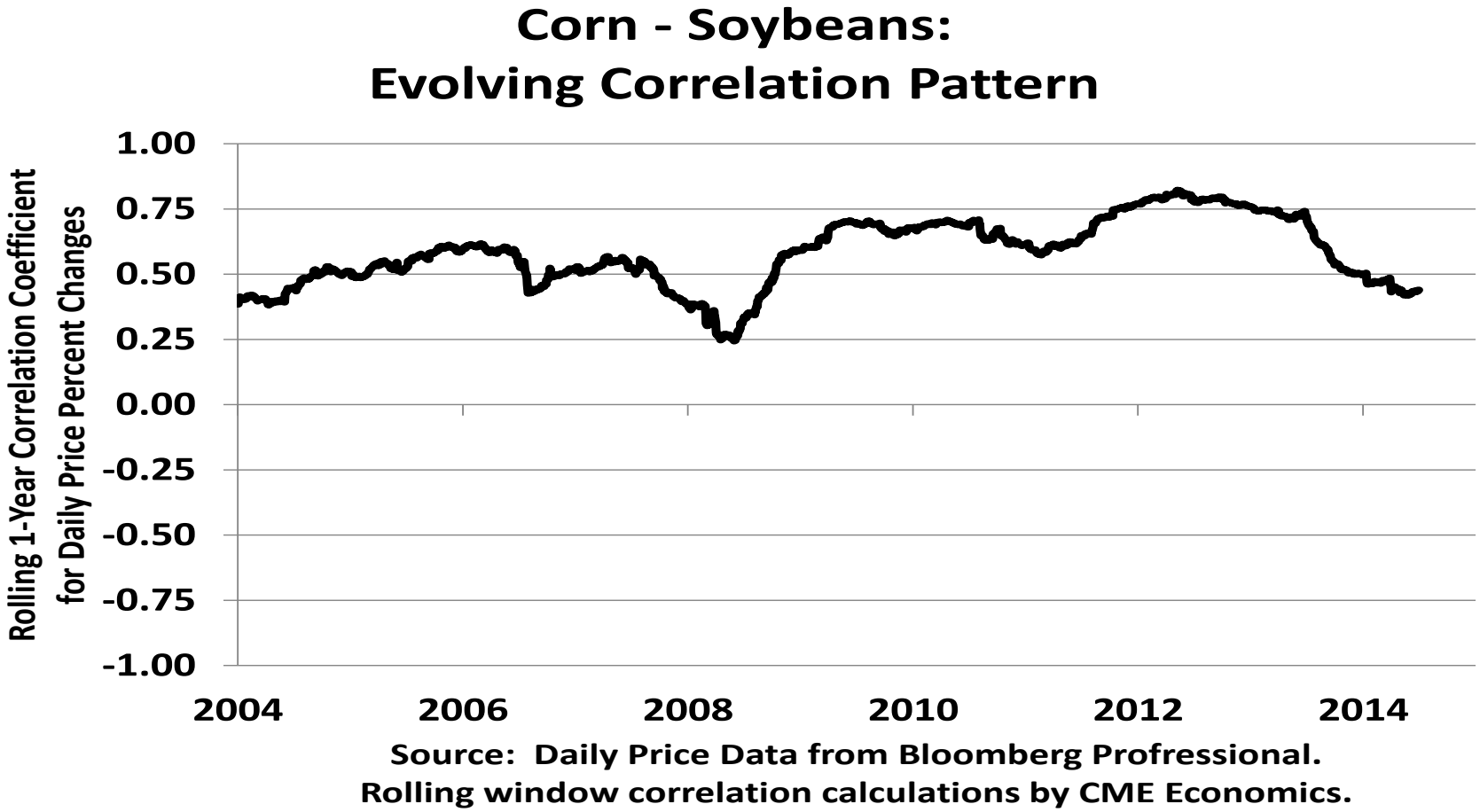
#2– Agricultural products are correlated to each other, but not to much of anything else since weather, not economic conditions dominates price patterns.

#3 – Copper, oil and gold have had the least stable correlation patterns to equities. Multiple drivers, from inflation to China, to production booms have sometimes coordinated but are now pulling in different directions.

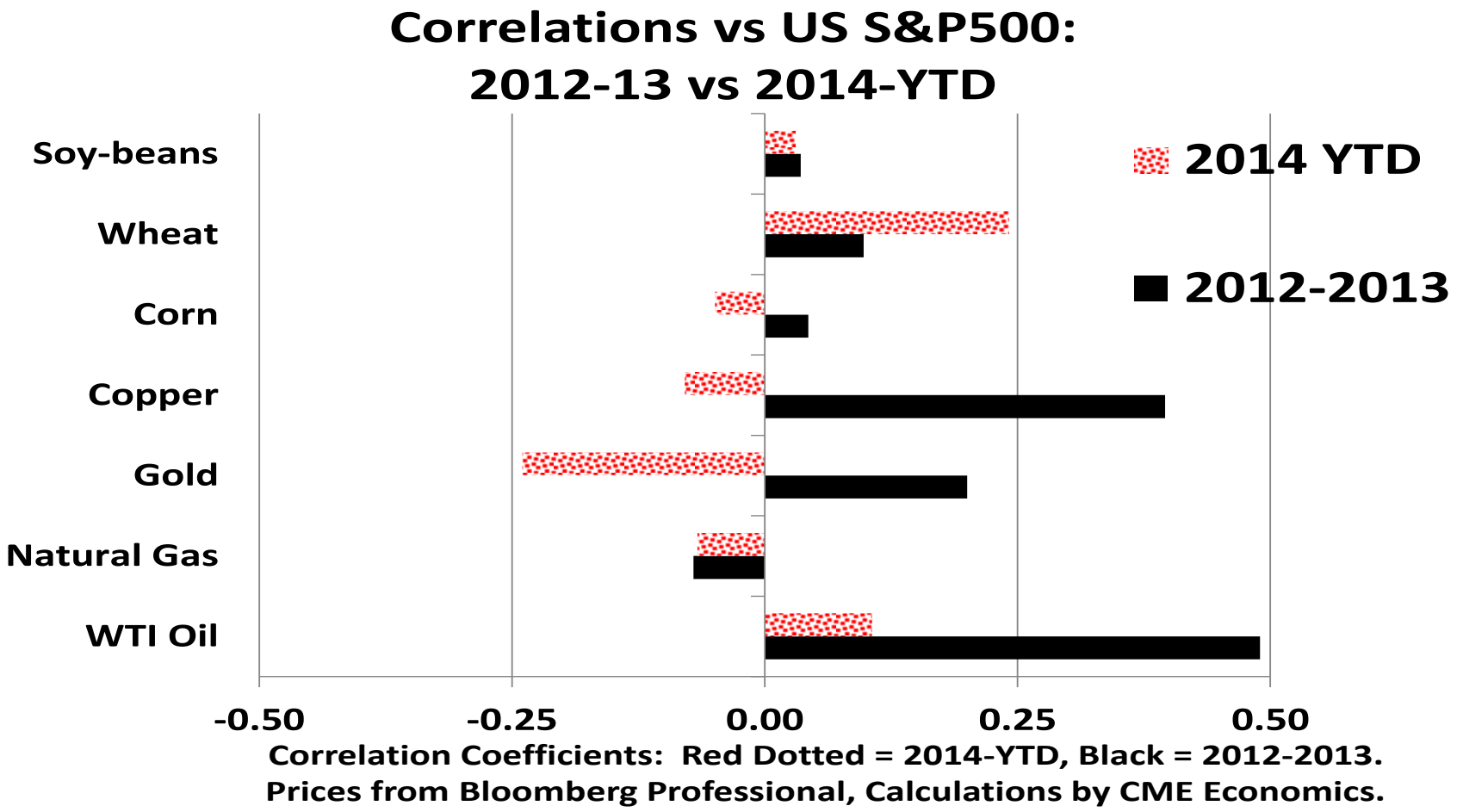
Copper was Increasingly Linked to Equities until the China Growth Deceleration Started



In the Agriculture Sector, Corn and Soybeans Remain Linked



Copper, Gold, and Oil have had the Least Stable Correlation versus the S&P500



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