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Jodie M. Gunzberg
标普道琼斯指数公司大宗商品部全球主管

Jodie M. Gunzberg 现任标普道琼斯指数公司大宗商品部全球主管，负责标普高盛商品指数和道琼斯—瑞银商品指数等标普道琼斯大宗商品指数的产品管理。这两个全球最权威的商品衡量标准能很好地反应全球商品市场，通常被用于抵抗通胀以及提升股票债券的多样化。

加入标普道琼斯指数公司之前，Jodie Gunzberg 已在投资管理和咨询业务领域内累积十余年的商品分析经验。她的上一份工作是在某投资咨询公司任首席投资策略师，监管超过350 个投资计划，总资产价值超过850 亿美元。她在业界多次就对冲基金和商品投资发表文章，并经常在相关论坛上发表演讲及主持会议。除了时常接受媒体报道，她还担任过Bloomberg、CNBC、FOX Business 和CCTV2 的访谈嘉宾。

Jodie Gunzberg 为特许金融分析师，美国特许金融分析师协会及纽约证券分析师协会会员，并曾担任芝加哥特许金融分析师协会理事。她毕业于艾默理大学，获得数学学士学位，并持有芝加哥大学布斯商学院MBA 学位。

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Commodity Index Development and Innovation

May 2014

INTRODUCTION

01 COMMODITIES AS AN ASSET CLASS

02 SOURCES OF RETURN

03 INDEXING INNOVATIONS

04 CURRENT MARKET

COMMODITIES ARE AN IMPORTANT ASSET CLASS

Commodities offer an inherent or natural return that is not conditional on skill. Coupled with the fact that commodities are the basic ingredients that build society, commodities are a unique asset class and should be treated as such.

Source: Ibbotson Associates 2006, Strategic Asset Allocation and Commodities, Commissioned by PIMCO and Prepared by Thomas M. Idzorek.
http://corporate.morningstar.com/ib/documents/MethodologyDocuments/IBBAssociates/Commodities.pdf

FUNDAMENTAL SOURCES THAT DRIVE THE COMMODITY ASSET CLASS RETURNS

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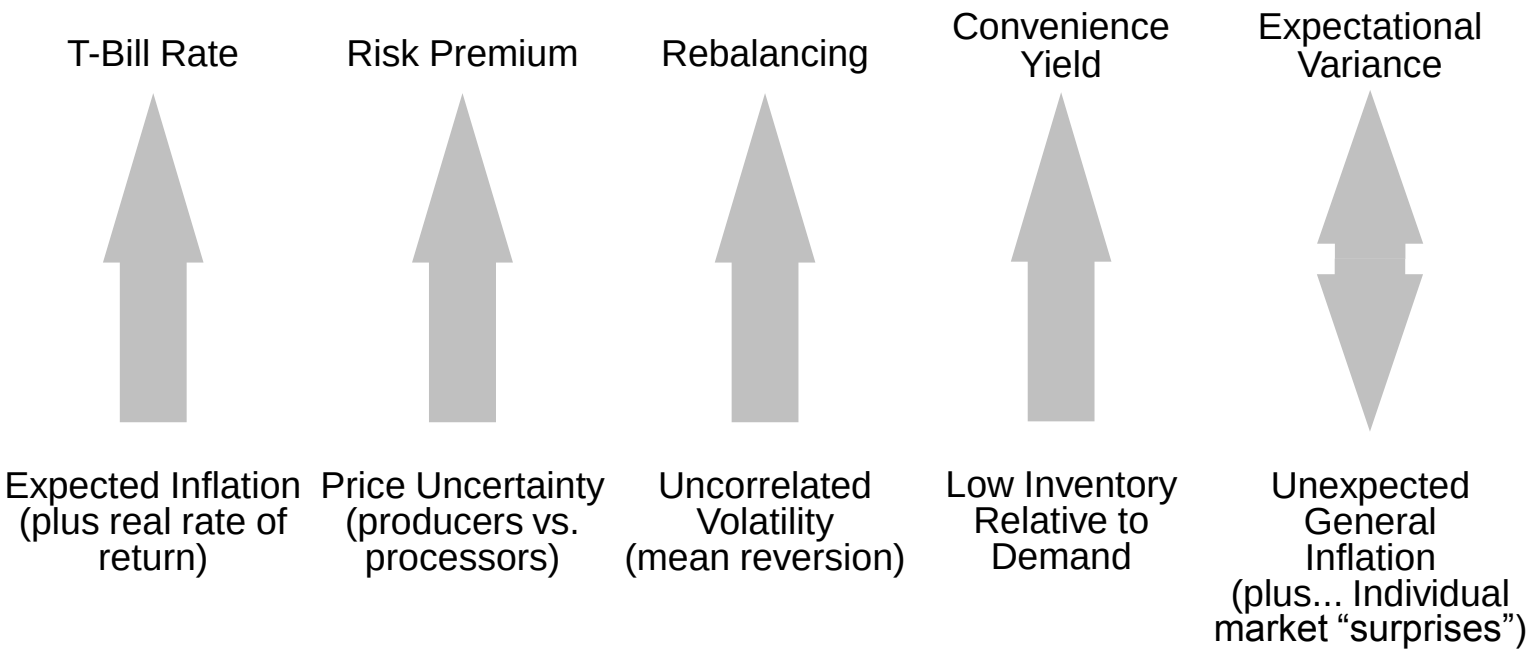
Components of Return



Causes of Return

Source**:** Greer, Robert J., Editor. The Handbook of Inflation hedging Investments, Enhance Performance and Protect Your Portfolio from Inflation Risk. Greer, Robert J. Author, Chapter 5: Commodity Indexes for Real Return. Published by McGraw Hill, January 2006.
Sample for illustrative purposes only.

COMMODITY INDEXING CAPTURES THE ASSET CLASS RETURN

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In order to obtain the market return or beta from commodities, index investments should measure returns from a process that:

- Constructs and calculates with a passive, specified method
- Considers only exchange-traded futures contracts on physical commodities
- Assumes only long positions
- Collateralizes each position fully

S&P GSCI®

The first major investible commodity index. It is one of the most widely recognized benchmarks that is broad-based and production weighted to represent the global commodity market beta.

- Constituents (currently 24)
  - Must meet eligibility criteria on an annual basis
  - Futures contracts on physical commodities
  - Total Dollar Value Traded (TDVT) minimums
  - Reference Percentage Dollar Weight minimums
  - Denominated in USD and Trading Facility Organization for Economic Cooperation and Development (OECD)
  - Pricing and volume availability
- Sectors (currently 5 groups)
  - Agriculture, Energy, Livestock, Precious Metals, Industrial Metals
- Weight
  - World production-weighted
- Rebalance
  - Annual rebalance, Monthly review
- Roll
  - 20% each day of the 5th through 9th S&P GSCI Business Days of each month
  - Next nearby most liquid contract

Information as of December 31, 2013

COMMODITIES HAVE PROVIDED DIVERSIFICATION FROM STOCKS AND BONDS

S&P DOW JONES INDICES
McGRAW HILL FINANCIAL

Diversification

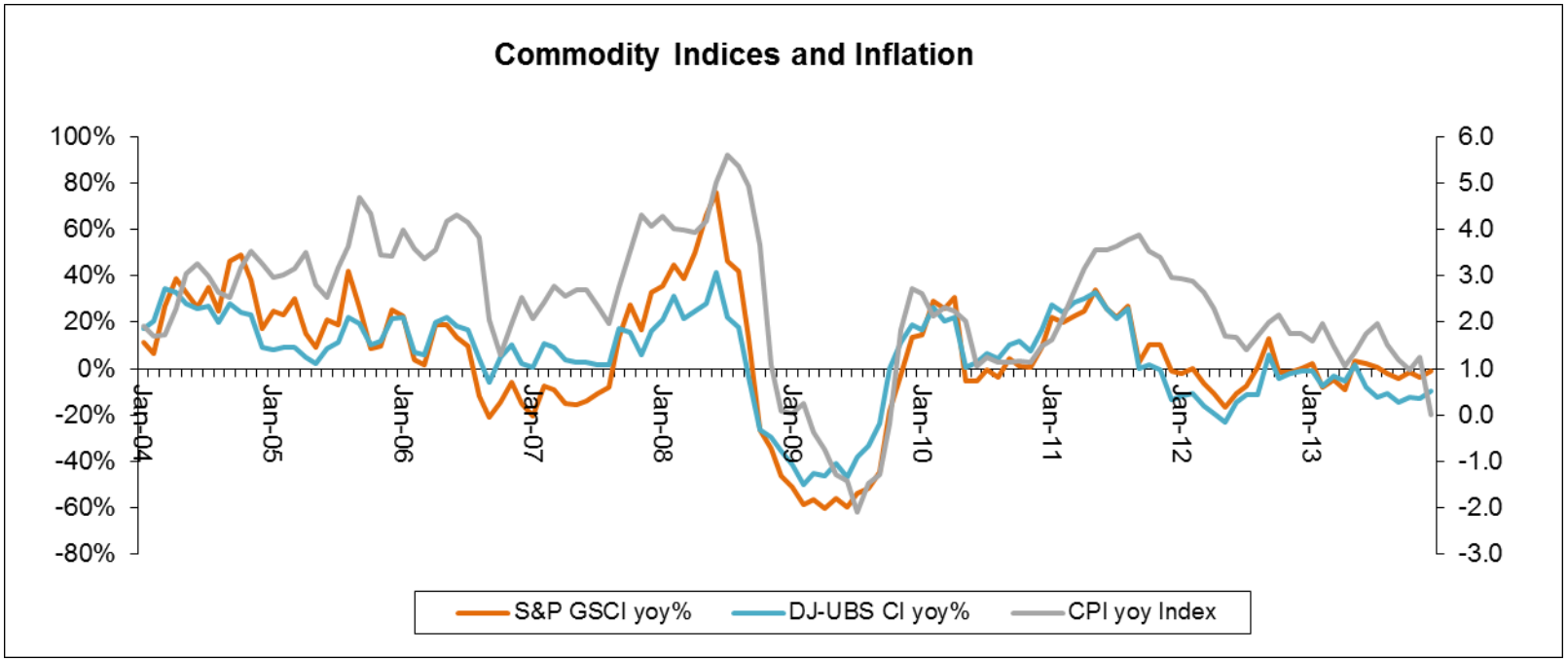
- Low correlations *using monthly data from 1/76-12/13
  - BarCap US Agg = -0.02
  - S&P 500 = 0.18
- In only 4 years from 1970 through 2013 did both the S&P 500® and the S&P GSCI drop in value.
  - 1981, 2001, 2008, 2011
- From 1991-2013, when the S&P 500® lost, it dropped 14.4% on average while the S&P GSCI gained 125 basis points.

Source: S&P Dow Jones Indices. S&P 500, BarCap US Agg , and S&P GSCI represent Stocks, Bonds, and Commodities, respectively. Monthly data from 1/76 - 12/13. Charts and graphs are provided for illustrative purposes only. Indices are unmanaged statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities the index represents. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not an indication of future results. The inception date for the S&P GSCI and S&P GSCI Energy was May 1, 1991, at the market close. All information presented prior to the index inception date is back-tested. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

INFLATION PROTECTION

Greater energy exposure has increased correlation to inflation

10-year correlation to CPI yoy Index based on monthly data 1/04-12/13:
S&P GSCI yoy% = 0.77
DJ-UBS CI yoy% = 0.68



Source: S&P Dow Jones Indices and/or its affiliates and ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt Data from Jan 2004 to Dec 2013. Past performance is not an indication of future results. This chart reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with backtested performance.

COMMODITY INDEX INVESTMENTS MAY PROVIDE A LEVERED RESPONSE TO INFLATION

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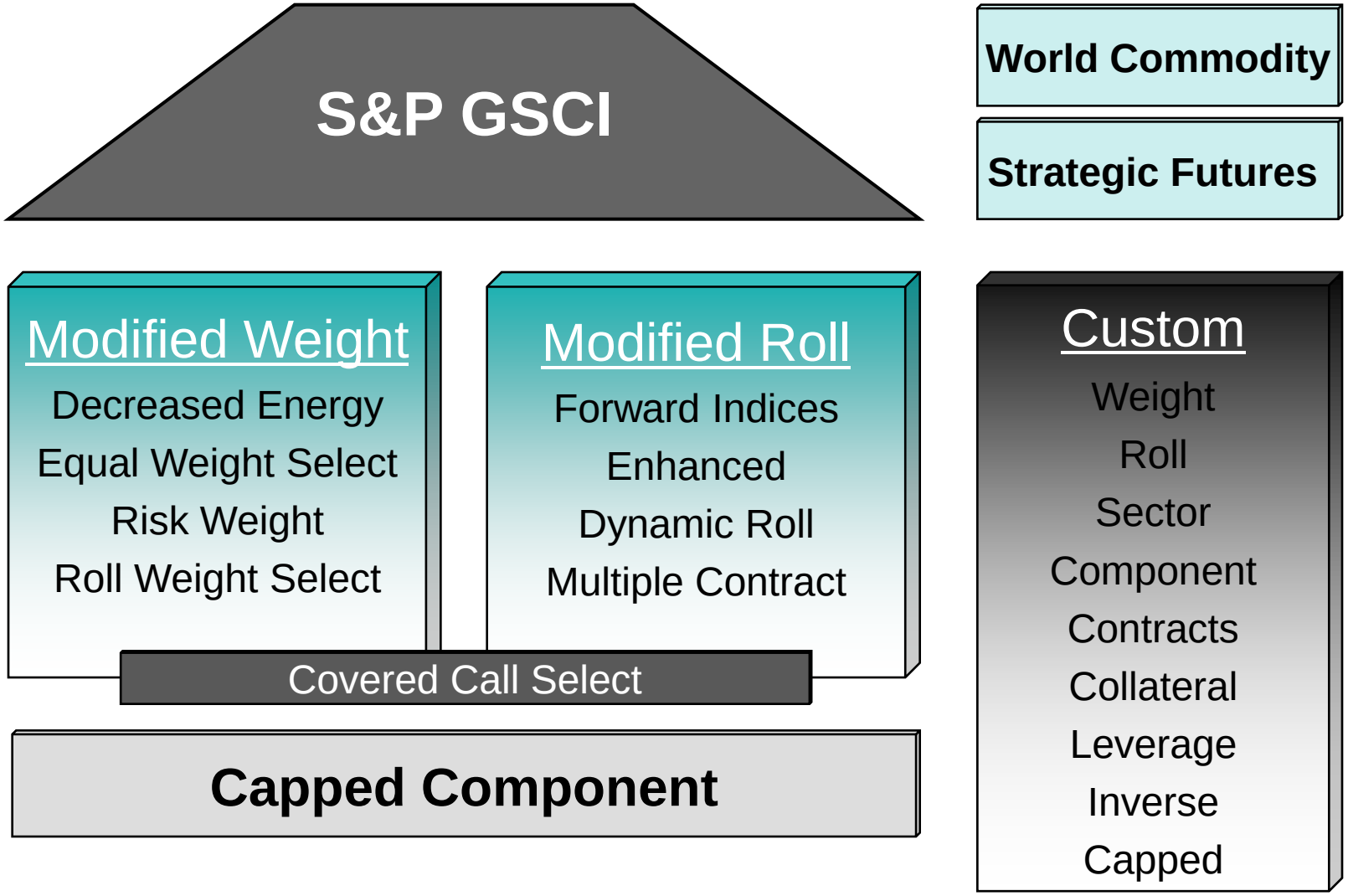
One dollar of commodities may hedge more than one dollar of the portfolio from inflation

	Inflation Beta		R-squared	
Dates	**S&P GSCI**	**DJ-UBS CI**	**S&P GSCI**	**DJ-UBS CI**
1971-2013	2.8		0.12	
1987-2013	12.9		0.48	
1992-2013	15.6	10.3	0.46	0.41
2003-2013	13.8	9.1	0.55	0.43
2008-2013	15.2	9.6	0.71	0.50

SOURCE: S&P Dow Jones Indices (rolling 12-month calculations)
Inflation beta data are measured by CPI-U as listed on the website: ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt
R-squared signifies the percentage that inflation explains of the variability in commodity index returns
Inflation beta can be interpreted as: (using DJ-UBS CI 1992-2013 as an example) A 1% increase in inflation results in 10.2% increase in return of the DJ-UBS CI during the period from 1992–2013
Time periods shown reflect first full year of returns for the S&P GSCI (1971), first year crude oil was included in the S&P GSCI (1987), first full year of returns for the DJ-UBS CI (1992), 2003 a and 2008 are 5-years and 10-years.

The inception date for the S&P GSCI was May 1, 1991, at the market close. The inception date for the DJ-UBS CI was July 14, 1998, at the market close. All information presented prior to the index inception date is back-tested. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.
S&P acquired the GSCI from Goldman Sachs on February 2, 2007 and it was subsequently renamed the S&P GSCI. Goldman Sachs first began publishing the GSCI related indices in 1991 but has calculated the historical value of the GSCI beginning January 2, 1970 based on actual prices from that date forward and the selection criteria, methodology and procedures in effect during the applicable periods of calculation (or, in the case of all calculations periods prior to 1991, based on the selection criteria, methodology and procedures adopted in 1991. The GSCI has been normalized to a value of 100 on January 2, 1970, in order to permit comparisons of the value of the GSCI to be made over time.

COMMODITY INDICES EVOLUTION

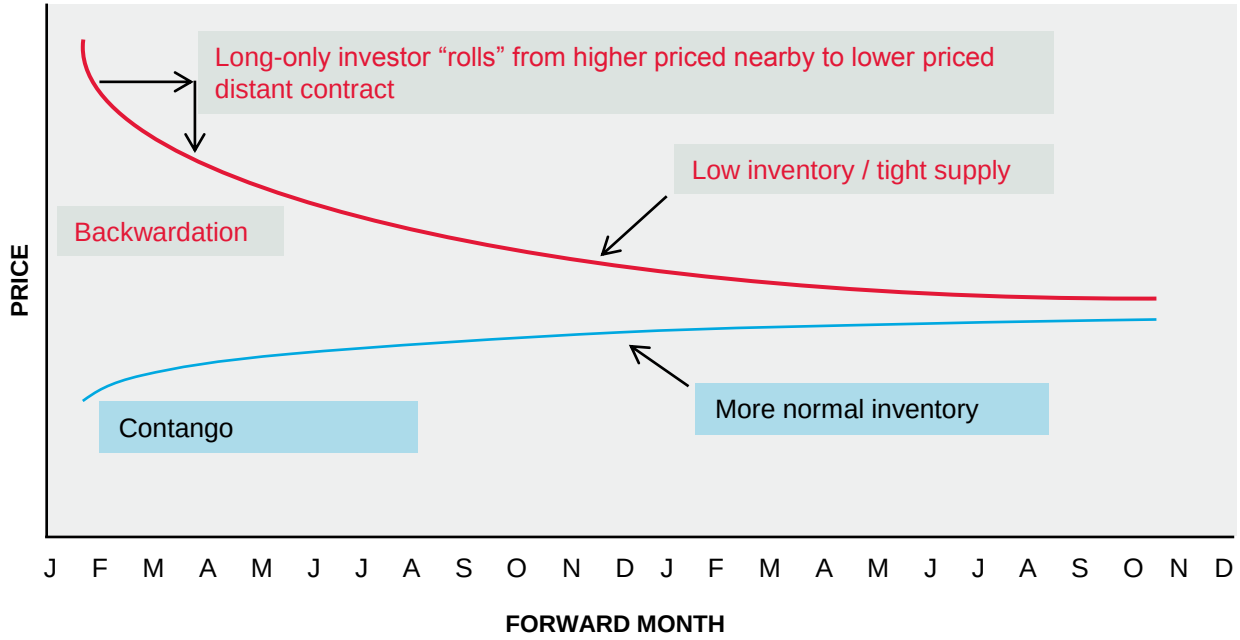


Information as of December 31, 2013

FORWARD CURVE SHAPES IMPACT RETURNS

The collection of futures contracts with the same underlying commodity but different expiration dates make up a forward curve.

Storage situations drive the relationship between futures contracts with different expiration dates.



Backwardation is profitable and occurs when there is a shortage and no value to storage.

Contango is losing and occurs when there is normal inventory and a value for storage.

Source**:** Greer, Robert J., Editor. The Handbook of Inflation hedging Investments, Enhance Performance and Protect Your Portfolio from Inflation Risk. Greer, Robert J. Author, Chapter 5: Commodity Indexes for Real Return. Published by McGraw Hill, January 2006.
Sample for illustrative purposes only.

Minimizing Rolling Costs

Rank Order

- Applied *before* the Dynamic Roll Algorithm
- Determines the number of contracts in the optimal set
  - 1,2,3 or 4 contracts
- Based on performance of contracts with highest implied roll yields*

For example, a commodity with a rank order of 3 means the top three contracts ranked on the implied roll yields will be considered when determining the new contract month

* Rank Order is based on the performance results of models using data from 1995 through 2010.

COMMODITY INDEX INNOVATIONS
S&P GSCI DYNAMIC ROLL

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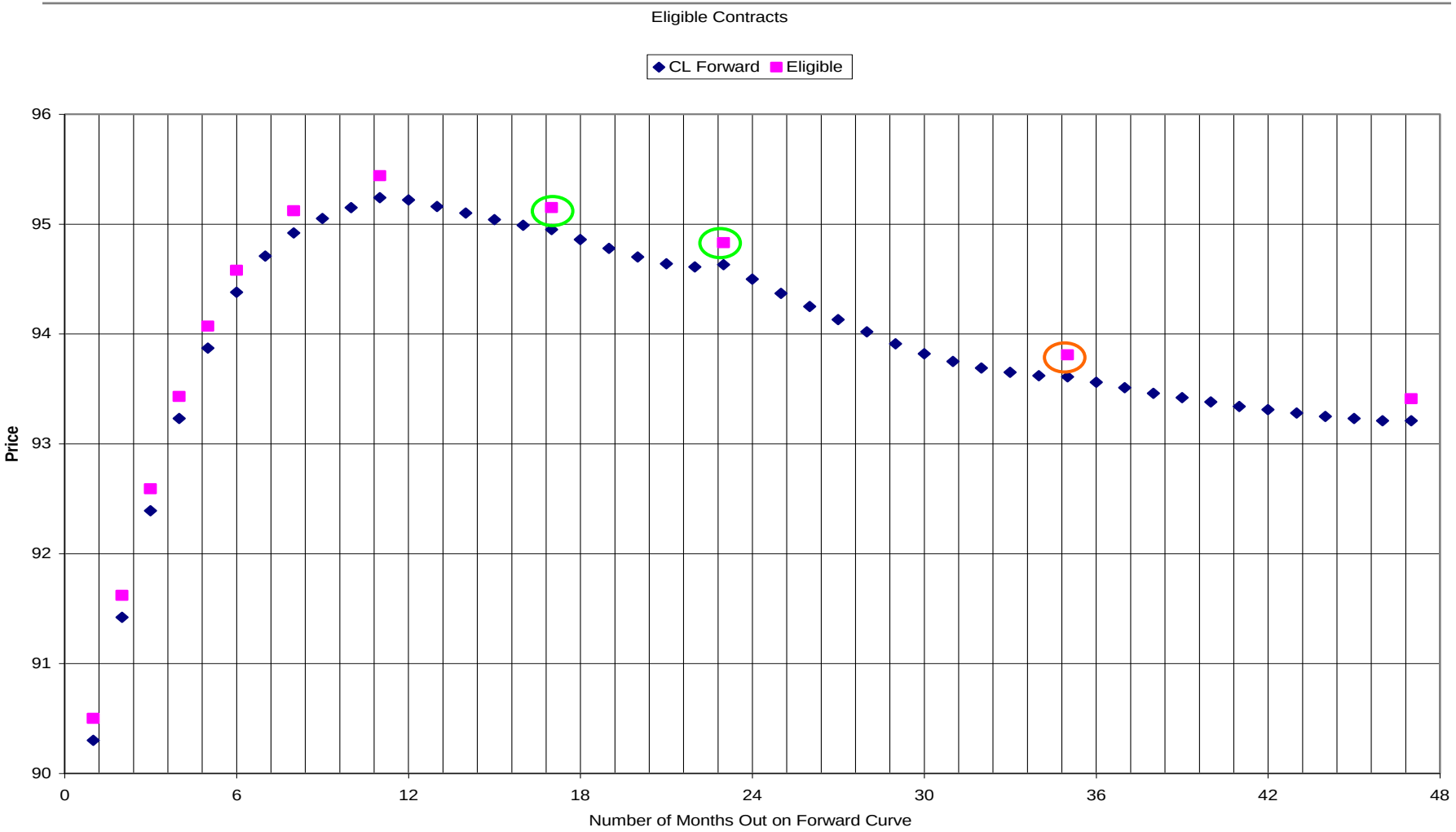
Optimizing Roll Yield

Dynamic Roll Algorithm

- Run monthly to determine new contract
- Eligible contracts
  - Dollar Value of Open Interest
  - 11 contracts or less
  - 48 months or less

- Stage 1
  - Determines the optimal set
    - Based on rank order and implied roll yield*
- Stage 2
  - Test whether index is currently holding a contract in the optimal set
    - If yes, continue to hold
    - If no, contract will be selected based on implied roll yield

EXAMPLE – CONTRACT SELECTION
CRUDE OIL FORWARD CURVE



Crude Oil Forward Curve 1/5/2011 taken from Bloomberg on 2/14/2011.

IMPLIED ROLL YIELD CALCULATION

- The Implied Roll Yield between two adjacent contracts, Si-1 and Si, in the Roll Matrix for a given month is calculated as follows:
- IRY(Si) = ((Pi-1/Pi) - 1)/d,
- Where d is the number of months apart between Si-1 and Si, for i=1 to m, and Pi-1 and Pi are the contract prices for Si-1 and Si.

Example:

Contract	**Price**	Contract 2		Contract 3	
S1 Current mo.	P1 = 100	**D**	1	**D**	1
S2 Next mo.	P2 = 110				
S3 2-mos. out	P3 = 120				
		P1	100	**P2**	110
		P2	110	**P3**	120
		IRY(S2) =	-9.1%	**IRY(S3) =**	-8.3%

WEIGHT MODIFICATIONS HAVE BEEN IN HIGH DEMAND

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In order to preserve more liquidity while managing risk both from volatility and rolling, new strategies that focus of modifying weights are at the forefront.

- Forward curves states tend to be persistent when measured by the realized roll yields
- Relative steepness has also been persistent

The possible reason for the persistence in realized roll yield may be, as discussed in Till and Eagleeye (2005), "if there are inadequate inventories for a commodity, only its price can respond to equilibrate supply and demand, given that in the short run, new supplies of physical commodities cannot be mined, grown, and/or drilled. When there is a supply/usage imbalance in a commodity market, its price trend may be persistent…."

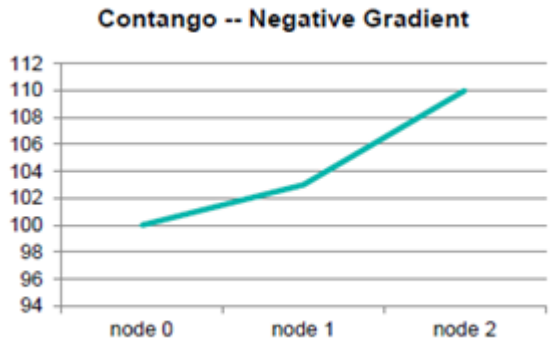
Given the logic behind the persistence of term structures of commodity futures, the change in realized roll yield is a reasonable choice as an indicator to determine weight. It is an extension of implied roll yield, the signal for contract selection in the S&P GSCI Dynamic Roll.

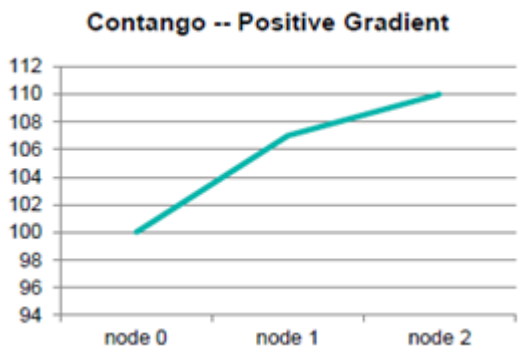
Another indexing innovation afforded by the change in realized roll yield is that for the first time, a term structure measurement can be made on a broad basket or sector rather than only a single commodity.

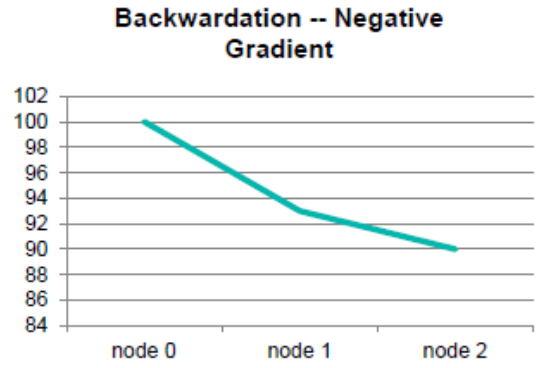
S&P GSCI ROLL WEIGHT SELECT CHANGE IN REALIZED ROLL YIELD

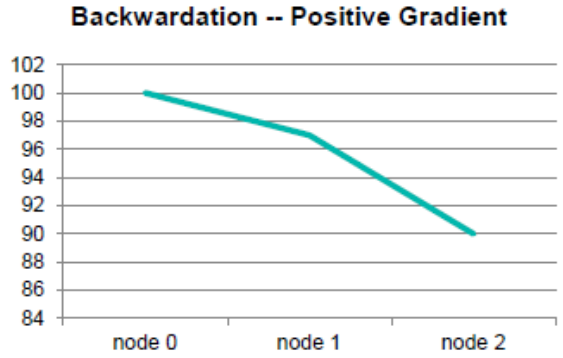
The difference between the interpolated front and 1-month forward realized roll yield represents a measure of the curvature of the forward curve at the front end.

The highest gradient indicates greater contango









Hypothetical example, for illustrative purposes only.

CTA'S USE MORE THAN JUST COMMODITIES

A Commodity Trading Advisor (CTA) is an individual or organization which, for compensation or profit, advises others as to the value of or the advisability of buying or selling futures contracts, options on futures, or retail off-exchange forex contracts.[1]

What does this mean?

A CTA registers with the National Futures Association (NFA) so that it is regulated by the U.S. Commodity Futures Trading Commission.

WHY IS THIS SO CONFUSING?!

The word "commodity" in CTA doesn't reflect what the strategies are trading! The CTA's are trading any futures contracts including ones on stocks, currencies, interest rates, fixed income, and commodities.

S&P SGMI

The S&P SGMI intends to reflect price trends of the global futures markets by going long or short in each constituent monthly based on the direction of the constituent's historical price trend.

Time-series regression run on each component to find historical price trend

- Iterative process to find the most current, statistically relevant trend
  - Begin with the most recent 22 days of data and add 5 more historical days progressively until trend is detected
- **The trend is set when the F-test shows variance of the historical prices are different from the variance of the residuals of the OLS**

Monthly signals based on slope of the regression

- Positive slope generates long signal
- Negative slope generates short signal
- Flat if slope is exactly equal to zero*

S&P SGMI : POSITION DIRECTION EXAMPLE

Linear regression of constituent returns against time

The cumulative return daily is calculated, but autocorrelation may be present so return data alone is not sufficient to produce a valid model with a constant mean and variance.

To check for stability, the hypothesis that two variances are equal is tested by an F-test.

(1) the variance of the daily returns

(2) the variance of residuals of an OLS linear regression of the cumulative return on time.

Equality of variances indicates that the linear regression model is a good fit for the data.

To correct for oversensitivity, the variance of the residuals are adjusted by a factor of (1-ρ^2), where ρ is the autocorrelation lag at 1.

The autocorrelation of residuals is calculated as follows:

$$\rho = \frac{\frac{1}{(n-1)}\sum_{t=1}^{n-1}(y_t - \mu)(y_{t+1} - \mu)}{Var(y_t)} + (1/n)$$

$$F = \frac{Var(residuals) * (1 - \rho^2)}{Var(FD)}$$

where:

y_t = the residual at time t

μ = the mean of the residuals (*1.., n*), and

n = the number of days in the relevant period.

1/n is included to correct for a negative bias in the autocorrelation of a short time series. As the time series gets longer, this term becomes less relevant.

where

FD = the first differences of the daily cumulative percentage return series used in the regression.

residuals= residuals of the OLS.

S&P SGMI : POSITION DIRECTION EXAMPLE

The iterative process is as follows:

Based on a 95% confidence interval and continuous cumulative component returns, the iterative testing process is run to establish a slope.

The F-Inverse function (F_{inv}) starts at the present and works backwards until:

$$F > F_{inv}(95\%, n-3, n-2)$$

where n = the number of days looking back

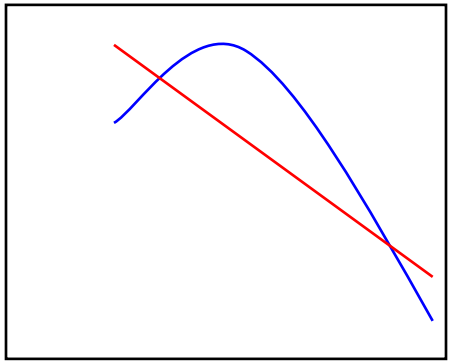
note: the F-Inverse function is rounded to 2 decimal places to assure that the algorithm is easily repeatable.

Once $F > F_{inv}$ (*95%,n-3,n-2*), the sign of the slope determines the market position. If the slope is negative (downward sloping) then the market position for that component is short. Conversely, if the slope is positive (upward sloping) then the market position for that component is long.

S&P SGMI : AN ILLUSTRATION

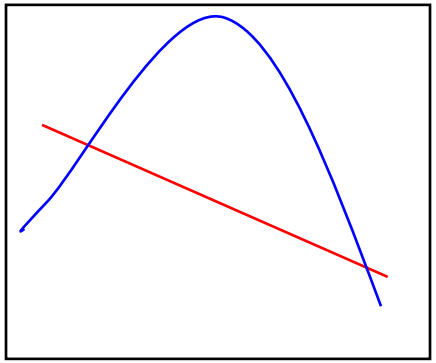
Iteration 1 - 22 Days Historical Data

Shows Negative Trend



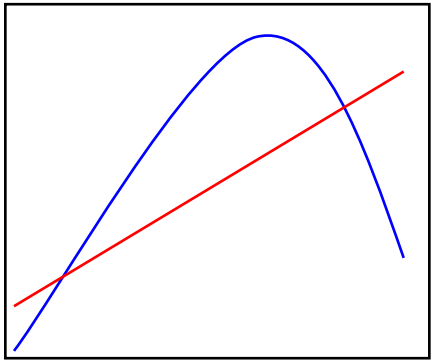
Iteration 2 - 27 Days Historical Data

Still Shows Negative Trend



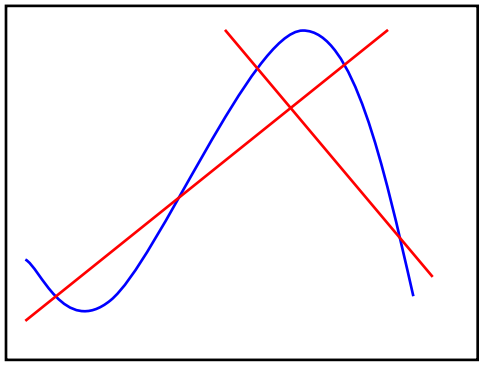
Iteration 3 - 32 Days Historical Data

Shows Positive Trend



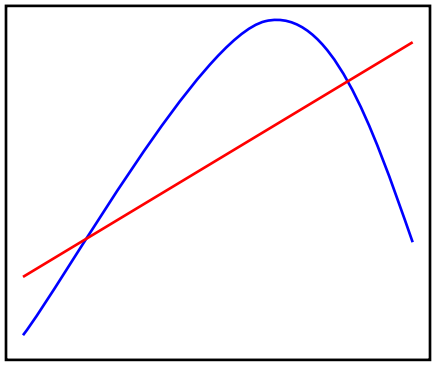
Iteration 4 - 37 Days Historical Data

Trend is Unstable – 2 lines describe the trend better than 1 line



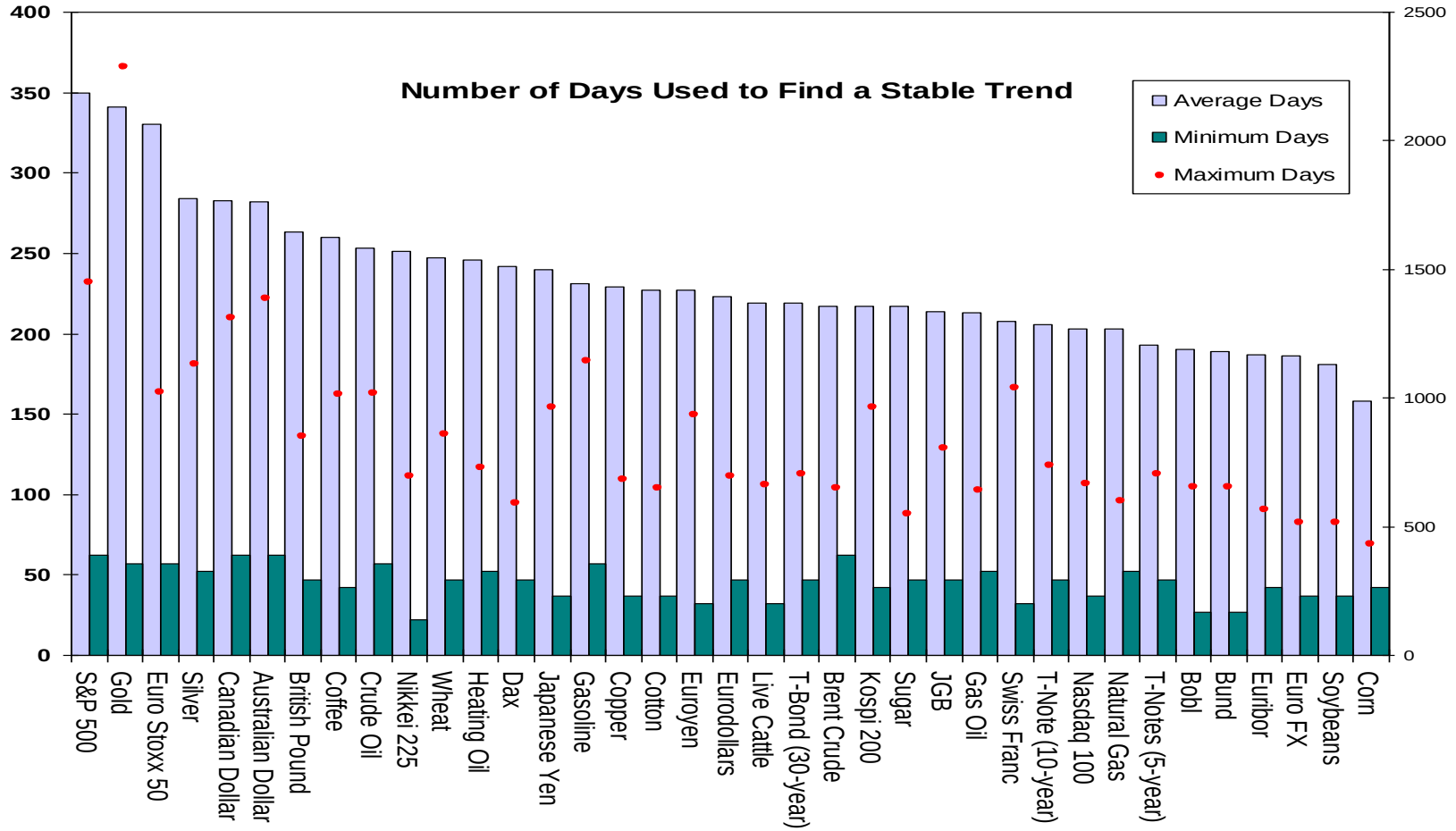
Result – Use Iteration 3 of 32 Days Historical Data

Longest Stable Trend is Positive



S&P SGMI : POSITION DIRECTION EXAMPLE

Average number of days ranges from 158 (Corn) – 350 (S&P 500)
Maximum number of days ranges from 432 (Corn) – 2287 (Gold)
Minimum number of days ranges from 22 (Nikkei 225) – 62 (AD,CD,CO,SP)



MAIN FACTORS DRIVING COMMODITIES TODAY

Fed tapering and a turn in the global liquidity cycle

- Gold and silver to remain under pressure
- Dollar strength is a headwind for industrial metals

China slowdown and changing growth drivers

- Base metals demand and import growth at risk due to slowing growth
- Auto sector strength favors markets like gasoline and palladium

Return of geopolitics to the forefront of oil market concerns

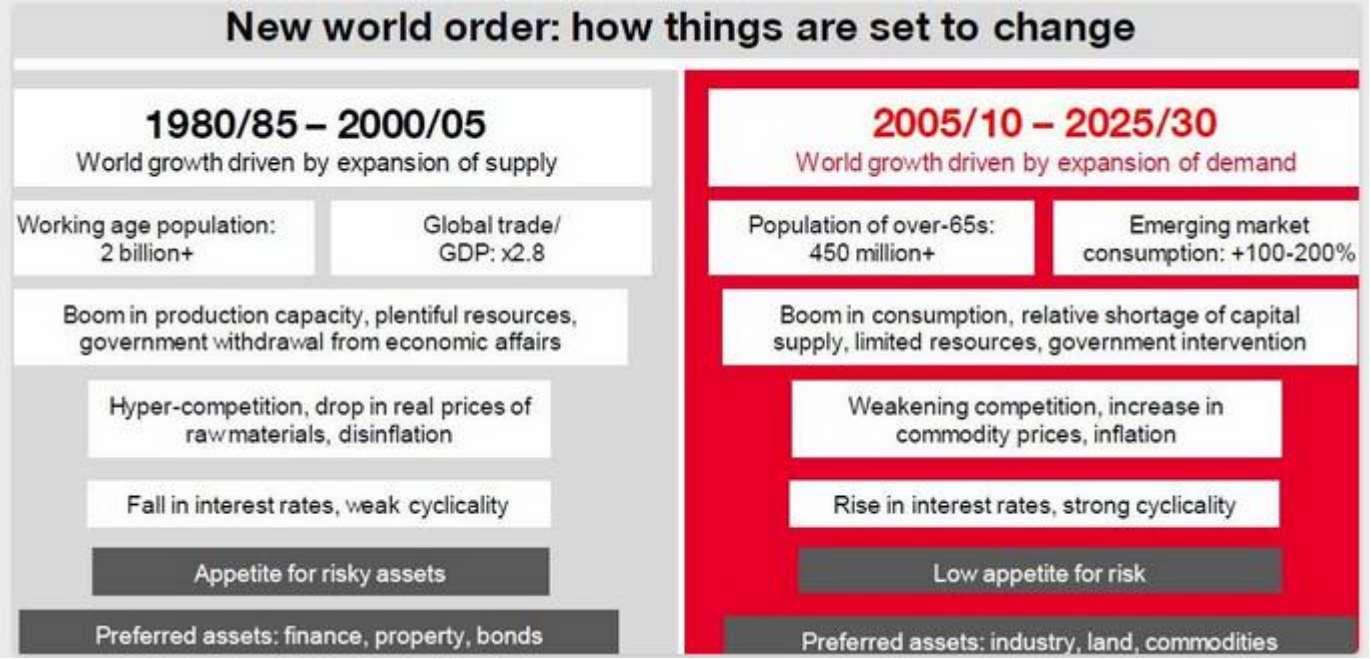
- Syrian conflict & involvement of competing regional players
- Spare crude oil production capacity remains low at 2-3m bpd

Source: Barclays Presentation, S&P Dow Jones Indices Commodity Seminar 2013, London

SHIFTING WORLD ECONOMY?

A possible change in the world economy from one driven by expansion of supply to expansion of demand may be causing the following:

- More persistence of backwardation
- Greater instability of term structure
- Lower correlation between commodities

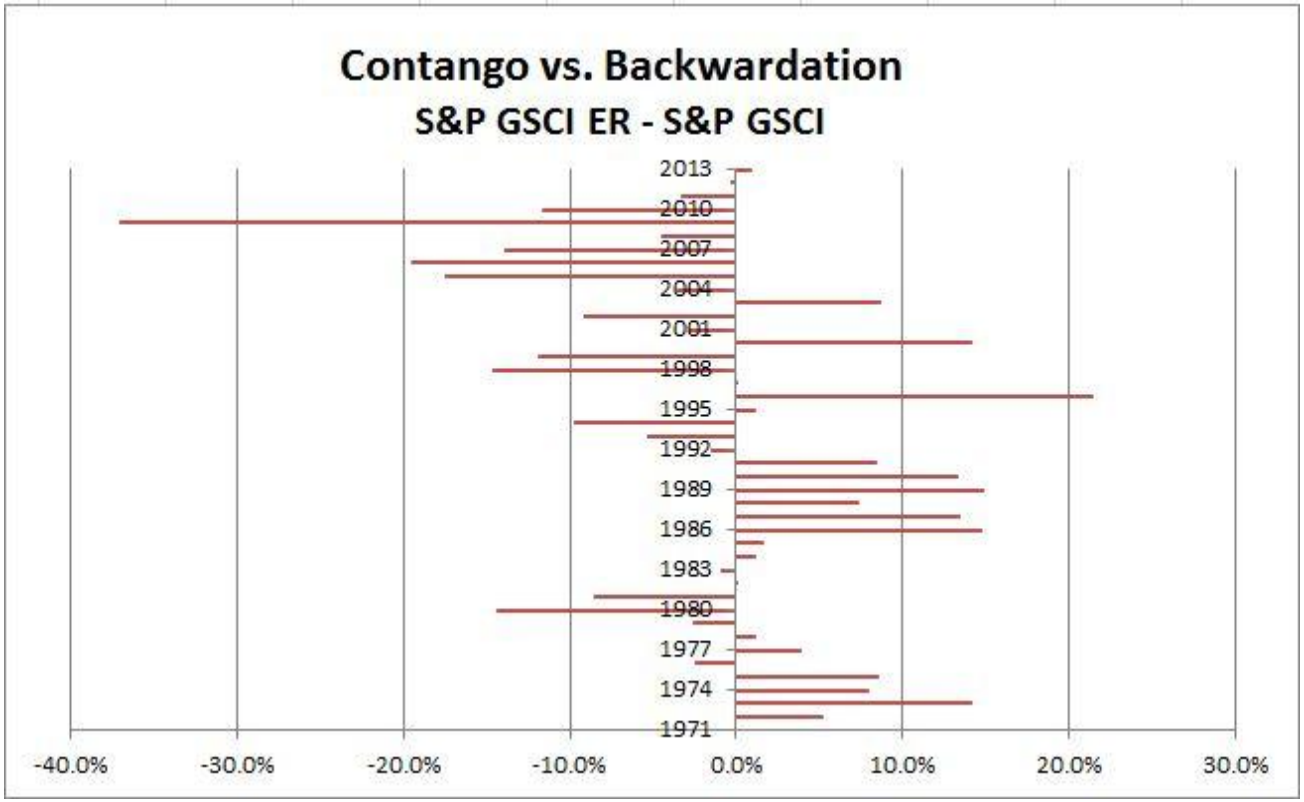


Source: Societe Generale 2011

BACKWARDATION IS RETURNING

Shortages caused backwardation more frequently since 2011, which may be a result of the shifting economy.

- From 2005-2011, commodities were in contango 93% of months
- In 2012 and 2013 each, 5 of 7 months were in backwardation



https://www.indexologyblog.com/2014/01/03/backwardation-is-back/

IMPACT OF SLOWING CHINESE DEMAND MAY NOT BE VERY POWERFUL

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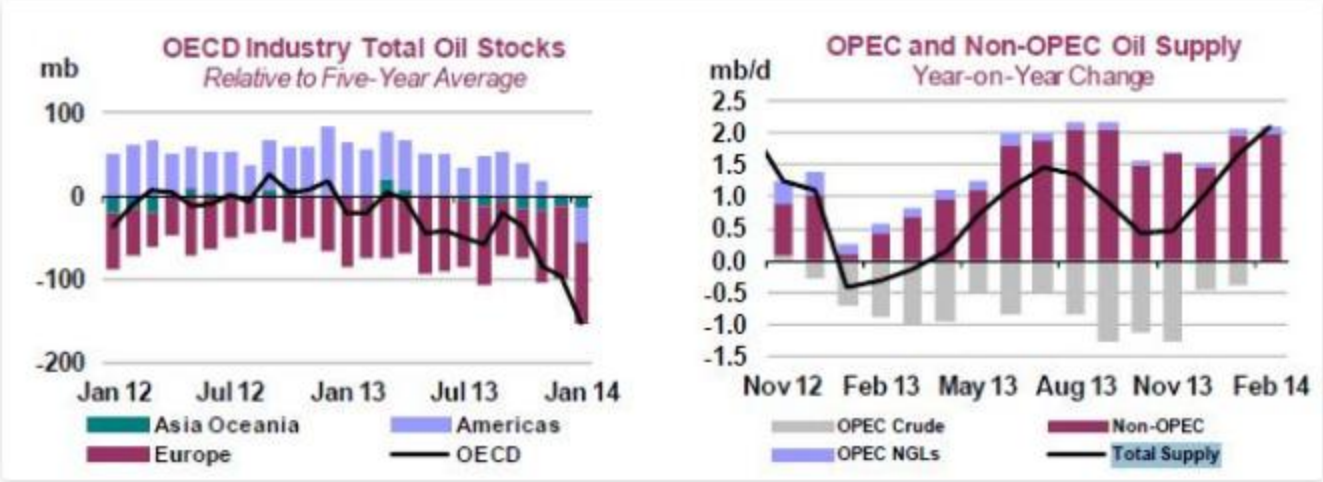
S&P GSCI Energy is up 2.4% YTD as of May 19, 2014.

SUPPLY

- Oil stock deficit is its widest in more than a decade
- Record April stock build of 1.4 mb/d may indicate that China is filling its strategic petroleum reserve facilities



International Energy Agency (IEA) March 2014 Oil Market Report.

DEMAND

- Enormous Chinese consumption with growth at 344 kb/d in 2014 vs 278 kb/d in 2013
- India, Russia, Brazil and Saudi Arabia together have a bigger impact than China with a total of an additional 364 kb/d projected in 2014 by the IEA

https://www.indexologyblog.com/2014/04/08/what-is-so-super-about-chinese-demand/

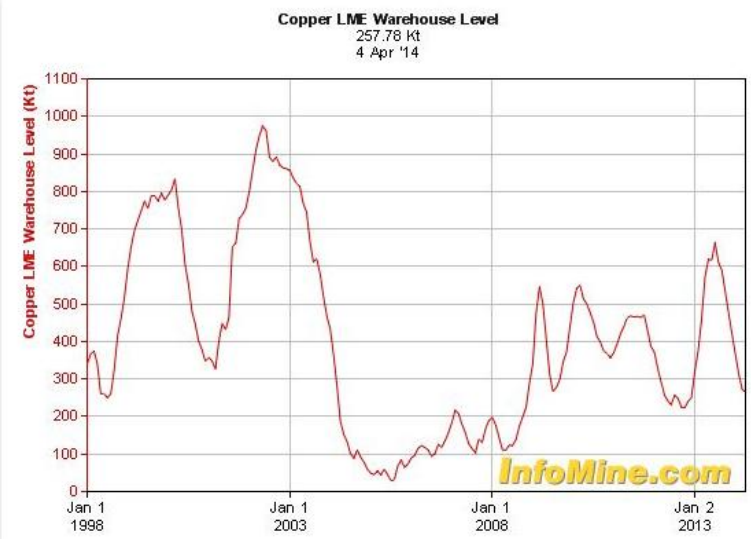
IMPACT OF SLOWING CHINESE DEMAND MAY NOT BE VERY POWERFUL

S&P DOW JONES INDICES
McGRAW HILL FINANCIAL

S&P GSCI Copper is down 5.2% YTD as of May 19, 2014.

SUPPLY

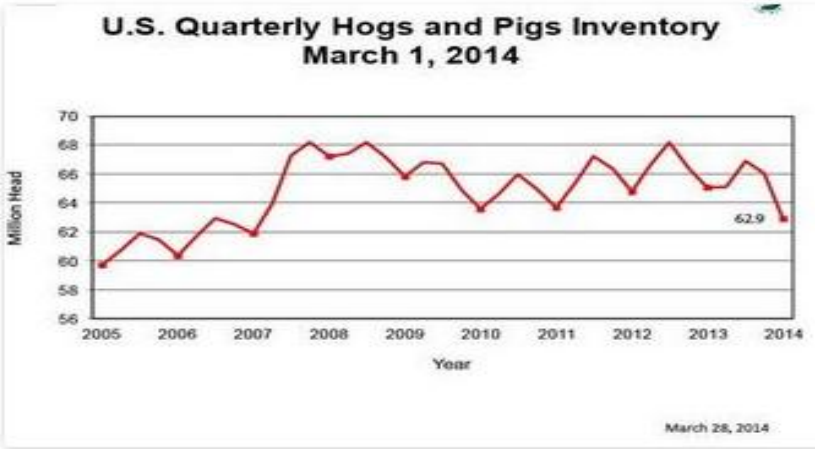
- Indonesian export bans on copper concentrates
- Copper used for loan collateral
- Questions around whether producers can deliver the planned supply



S&P GSCI Lean Hogs is up 25.2% YTD as of May 19, 2014.

SUPPLY

- Indonesian export bans on copper concentrates
- Copper used for loan collateral
- Questions around whether producers can deliver the planned supply



USDA National Agricultural Statistics Service.
http://www.nass.usda.gov/Newsroom/2014/03_28_2014.asp

https://www.indexologyblog.com/2014/04/08/what-is-so-super-about-chinese-demand/

COMMODITY CORRELATIONS HAVE FALLEN

A return to pre-crisis levels of correlations:

Between individual commodities

12-month rolling average correlation between front-month excess return indices across 29 major commodities. As of October 1st 2013. Source: S&P Dow Jones 2013.

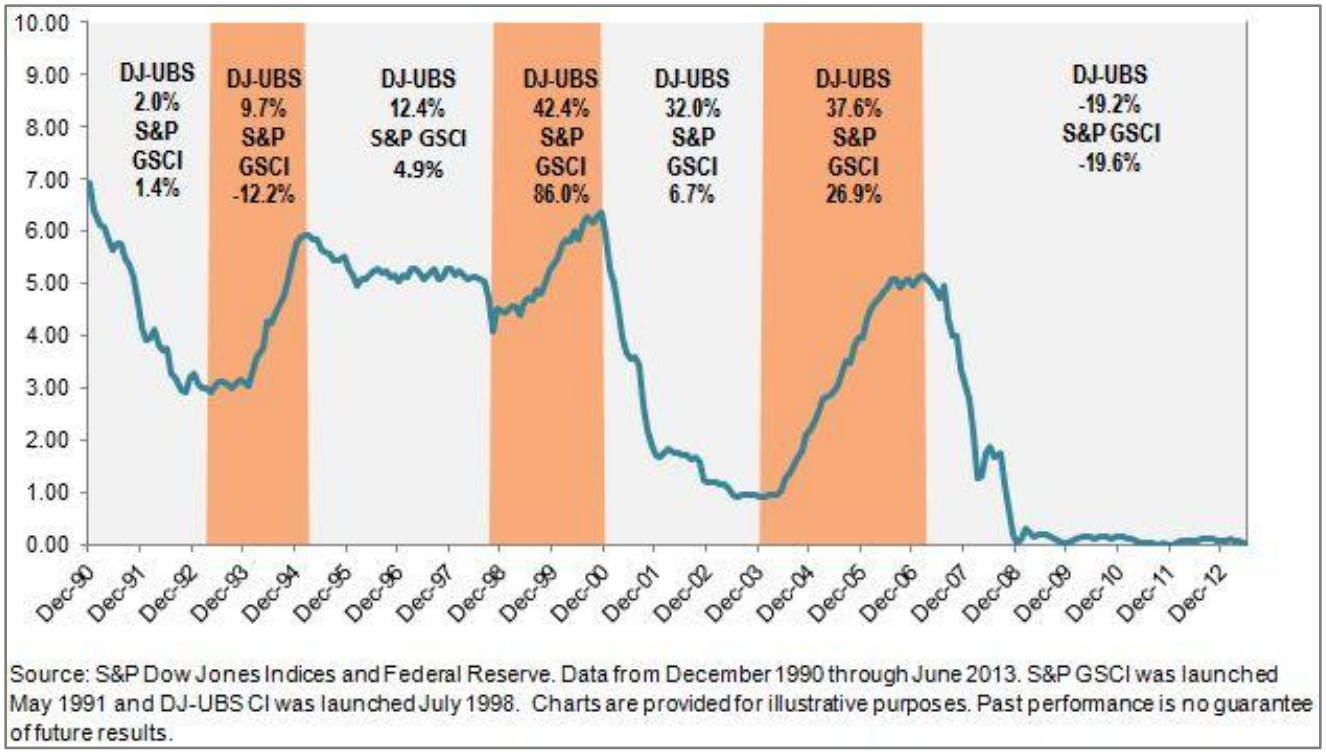
… and to other asset classes

Average of absolute 12-month correlations between DJUBS and hedge funds (HFRX), S&P Global 1500, the US Dollar (DXY), 7 Year US treasuries, Case-Schiller 20 City House Prices and the VIX. As of October 1st 2013.Source: S&P Dow Jones 2013, HFR.

RISING INTEREST RATES IMPACTS ON COMMODITY INDICES

Mathematically, rising interest positively impact commodity futures returns in two ways *but that is only if all else is equal*.

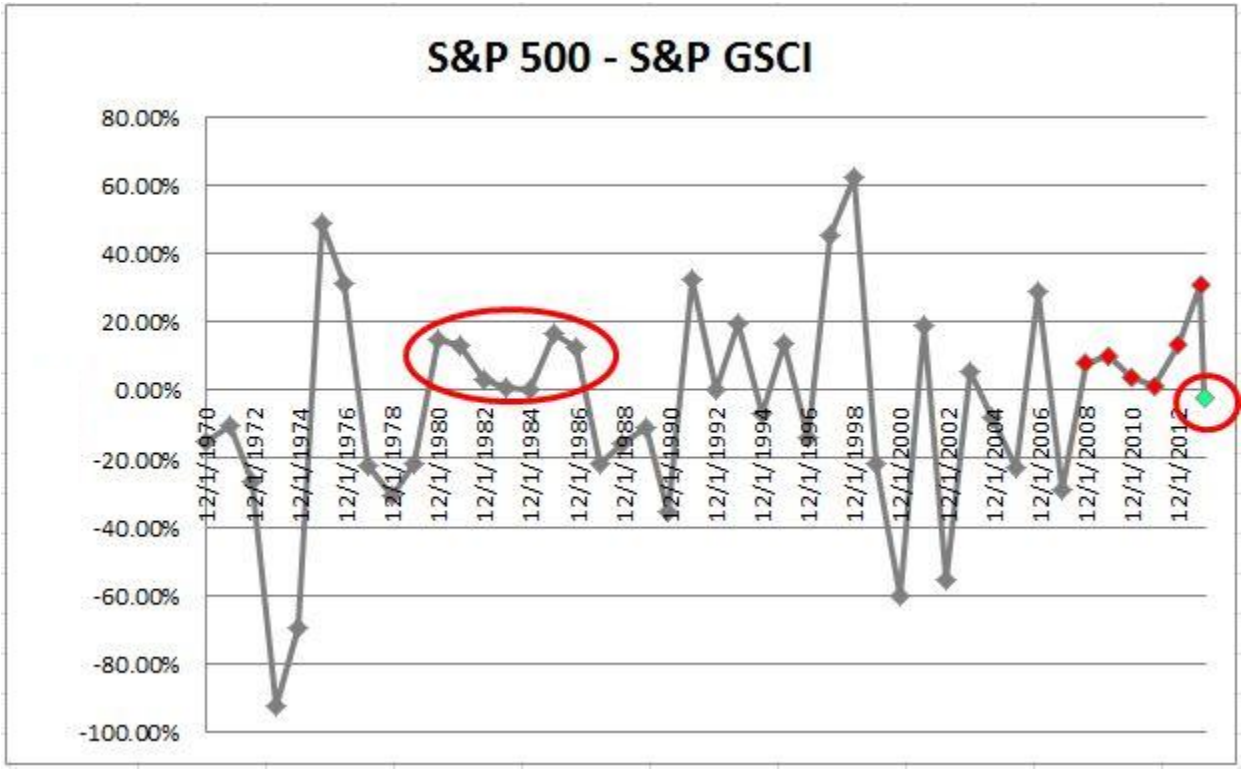
1. Theory of Storage Equation
   - $F_{0,T} = S_0 \exp[(r+c-y)T]$
2. Total Return Includes Interest on Collateral
   - S&P GSCI TR_d = S&P GSCI TR_{d-1}* (1 + CDR_d + TBR_d)* (1 + TBR_d)^{days}



Source: S&P Dow Jones Indices and Federal Reserve. Data from December 1990 through June 2013. S&P GSCI was launched May 1991 and DJ-UBS CI was launched July 1998. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

http://www.indexologyblog.com/2013/11/26/the-exponential-power-of-interest-rates-on-commodities/

EQUITY / COMMODITY CYCLE MAY BE SWITCHING



Source: S&P Dow Jones Indices. Data from Jan 1970 to Feb 2014. Past performance is not an indication of future results. This chart reflects hypothetical historical performance. Please note that any information prior to the launch of the index is considered hypothetical historical performance (backtesting). Backtested performance is not actual performance and there are a number of inherent limitations associated with backtested performance, including the fact that backtested calculations are generally prepared with the benefit of hindsight - See more at: http://www.indexologyblog.com/2014/03/03/commodity-comeback/#sthash.80QtEXkp.dpuf

COMMODITY INDICES WITH FLEXIBLE SIGNALS HAVE OUTPERFORMED

S&P DOW JONES INDICES
McGRAW HILL FINANCIAL

INDEX PERFORMANCE SORTED BY MTD (All data is * through May 19, 2014)					
	MTD	YTD	12-Months	3-Years	5-Years
S&P GSCI Roll Weight Select	1.66%	8.91%	5.56%	-5.52%	28.76%
S&P GSCI Risk Weight	0.01%	8.77%	7.11%	-4.38%	30.63%
S&P GSCI Light Energy	-0.61%	6.43%	3.99%	-9.62%	22.46%
S&P GSCI Dynamic Roll	0.96%	4.49%	6.46%	-1.77%	33.42%
S&P GSCI Enhanced Commodity	0.66%	4.22%	6.63%	-2.45%	34.64%
S&P GSCI Multiple Contract	0.54%	4.20%	6.89%	-2.57%	29.56%
S&P GSCI	0.46%	4.19%	6.20%	-2.86%	27.46%
S&P GSCI 3 Month Forward	0.60%	3.70%	7.41%	-3.01%	35.72%

Source: S&P Dow Jones Indices. Charts and graphs are provided for illustrative purposes only. Indices are unmanaged statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities the index represents. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not an indication of future results.

Source: S&P Dow Jones Indices. Charts and graphs are provided for illustrative purposes only. Indices are unmanaged statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities the index represents. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not an indication of future results. *S&P GSCI Dynamic Roll Alpha Light Energy is Excess Return since the market neutrality negates collateral return.

PERFORMANCE DISCLOSURE

All information presented prior to the launch date is back-tested. Back-tested performance is not actual performance, but is hypothetical. The back-test calculations are based on the same methodology that was in effect when the index was officially launched. Complete index methodology details are available at www.spdji.com. It is not possible to invest directly in an index.

S&P Dow Jones Indices defines various dates to assist our clients in providing transparency on their products. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the Index is set at a fixed value for calculation purposes. The Launch Date designates the date upon which the values of an index are first considered live: index values provided for any date or time period prior to the index's Launch Date are considered back-tested. S&P Dow Jones Indices defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company's public website or its datafeed to external parties. For Dow Jones-branded indicates introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed "Date of introduction") is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index's public release date.

Past performance of the Index is not an indication of future results. Prospective application of the methodology used to construct the Index may not result in performance commensurate with the back-test returns shown. The back-test period does not necessarily correspond to the entire available history of the Index. Please refer to the methodology paper for the Index, available at www.spdji.com for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Another limitation of using back-tested information is that the back-tested calculation is generally prepared with the benefit of hindsight. Back-tested information reflects the application of the index methodology and selection of index constituents in hindsight. No hypothetical record can completely account for the impact of financial risk in actual trading. For example, there are numerous factors related to the equities, fixed income, or commodities markets in general which cannot be, and have not been accounted for in the preparation of the index information set forth, all of which can affect actual performance.

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THANK YOU

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