

# INSIGHTS

GLOBAL MACRO TRENDS

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## Natural Resources: A Step Further

KKR

# Natural Resources: A Step Further

*The recent macro backdrop of historic quantitative easing, intensifying globalization, and geopolitical supply threats has increasingly informed our positive stance on real assets, energy and natural resources in particular, as compelling investment opportunities. In this report, however, we go a “step further,” detailing the specifics of why we believe that at least a 6-8% allocation towards energy and natural resources investments is likely the most appropriate level to both maximize a typical portfolio’s Sharpe Ratio and neutralize its inflation sensitivity. Also, as we describe below in greater detail, we think that there are some compelling vehicles to generate alpha beyond the traditional commodity benchmarks.*

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Legendary hockey player Wayne Gretzky once said, “You miss 100% of the shots you never take.” These days I find that advice somewhat misguided as I actually feel like I now miss 100% of the shots I do take when I play sports, given my age, fitness, and overall athletic prowess. In all seriousness, though, I do agree with the ‘Great One’ that you can’t succeed if you don’t try – and that attitude pervades every aspect of life, including even macroeconomic research.

The good news is that my colleague Dave McNellis has built a system that allows us to take multiple “shots on goal” when it comes to macro analysis. Specifically, Dave has built a large macro dashboard that lets us experiment with lots of variables for a variety of potential investments, including those in the natural resources sector as well as macroeconomic factors that might influence commodity prices.

So, given the unique confluence that we now see among increased demand for energy and natural resources from the emerging markets, unprecedented monetary stimulus from global central banks, and revolutionary changes in drilling technology, we recently felt compelled to harness Dave’s dashboard to build our own proprietary framework for thinking about commodity performance and corresponding allocations in the real asset<sup>1</sup> arena. See below for more details of our analysis, but our primary conclusions are as follows:

- **Our Proprietary Macro Forecasts Point Towards an 8% Annualized Expected Return for Commodities<sup>2</sup> Over the Next Five Years.** As we detail below, an investor should break down any commodity outlook into the real return component and the inflation return component. We do both, and using our base case forecast of economic/macro inputs, we think about a 8.4% annualized return makes sense over the next five years. Embedded in this forecast is our belief that global growth can drive a 5.8% annualized return *on a real basis* in the commodity asset class, with the other 2.6% of the annualized return coming from the *inflation component*. While an 8% annualized return might appear optimistic to some, we would note that our forecast actually represents a 400 basis point deceleration compared to the 12% annualized GSCI Spot returns recorded during the 1998-2012 period.
- **Our Commodity Forecast Is Primarily a Function of Our Outlook for Global Growth and U.S. Inflation.** While there is no infallible ‘rule of thumb,’ we found that commodities have historically appreciated in *real* (i.e., inflation-adjusted) terms when our global GDP proxy (made up of U.S., Eurozone, UK, Japan, and BRICs) grew faster than 3% and depreciated when growth fell below 2%. In our base case we are calling for global GDP growth in the 2%+ range over the next two years, accelerating above 3% in 2015. We also see U.S. inflation ticking up to 3% by 2015. Details below.

<sup>1</sup> Unless otherwise noted, “real assets” is shorthand here for commodity futures and energy and natural resources direct investments. For the purposes of this report, real estate is treated as a separate asset class.

<sup>2</sup> We use the GSCI Spot Index, not the GSCI Total Return Index, as a benchmark for real asset returns. The Total Return index is compromised, in our view, by its systematic underperformance versus the Spot index when futures are in contango, as has been the case for many important GSCI commodities since 2004.

- **We Would Allocate At Least 6-8% to Energy and Natural Resources.** Consistent with the approach taken by most endowments, we think that at least a 6-8% exposure to energy and natural resources investments is sufficient to neutralize the CPI correlation of a typical diversified portfolio under what we would deem ‘normal conditions.’ Such an allocation would also improve a typical portfolio’s Sharpe Ratio. If we are right, then we believe that many traditional pension investors appear under-allocated to the asset class. Details below.
- **We Think There Are Multiple Ways to Generate Alpha Outside of the GSCI Total Return Benchmark.** Given that the GSCI Total Return product that most folks now use has woefully underperformed actual commodity prices in recent years (*Exhibit 19*), we continue to look for new and innovative ways to gain commodity exposure. At the moment, we think private commodity-related investments probably make sense, particularly if they can be structured to deliver ongoing yield/income distribution, inflation hedging, and reasonably-priced growth. For investors who need to retain 100% liquidity, we do think master limited partnerships (MLPs) make sense in some instances, including those focused on recurring revenue streams.
- **Risks: Supply Side is a Risk Worth Monitoring.** In the commodity world, we believe that history has repeatedly shown that structural breaks in prices of oil, copper, and natural gas often occur because of supply additions, not demand shifts. Right now we think supply is more than manageable, but the drilling technology in crude oil, which comprises 64% of the GSCI, is allowing it to be extracted in previously unimaginable places. So, we think watching the pace of oil production in places like the U.S. and Brazil is definitely warranted, given heavy spending and enhanced technological drilling procedures.

Looking at the big picture, we continue to use our target asset allocation portfolio to reflect some of our key macro themes. As we outlined in our recent piece *Outlook for 2013: A Changing Playbook*, we have begun to position the portfolio for the conclusion of the secular decline in interest rates. To this end, we have taken capital from high-grade debt and added it to bank debt that is more floating rate in nature. In addition, we have increased our equity exposure, moving from an underweight to an overweight position. Separately, we believe that the dramatic downsizing of Wall Street balance sheets is creating a significant near-term opportunity in ‘spicy’ credit instruments like direct lending, special situations, and mezzanine financing. Finally, as we describe below in more detail, we continue to favor real assets that can provide yield, growth, and inflation-hedging capabilities. At the moment, we favor opportunistic real estate and certain private energy investments over publicly-traded REITs and traditional GSCI commodity notes/swaps.

## Details

In the following sections we provide a roadmap for how we think investors should think through investing in energy and natural resources, including understanding the drivers of our aggregate commodity forecast (Section I), expected returns (Section II), target allocation levels (Section III), considerations on benchmarking and a framework for allocating between private direct investments and

liquid investments, including commodity futures and Master Limited Partnerships MLPs (Section IV), and finally a review of the risks to our commodity outlook (Section V).

**Section I: Understanding the Drivers of Commodities – Global GDP and U.S. Inflation**

I think it was Albert Einstein who said, “Anyone who has never made a mistake has never tried something new.” This was certainly true throughout my academic career, including my statistics course at Wharton Business School. And today as I sit in my seat at the helm of KKR’s Global Macro and Asset Allocation effort, Einstein’s old adage probably rings most true in understanding the direction of commodity prices, which can – at times – appear unpredictable.

So, as we mentioned above, we turned to Dave McNellis’ macro dashboard to see what we could learn. See *Exhibit 1* for more details, but the punch line from Dave’s analysis is that global commodity prices are highly sensitive to GDP growth, such that commodities have appreciated in real terms historically when our global growth proxy was above 3% and depreciated when it was below 2%. Intuitively we believe it makes sense that faster economic growth increases the call on commodity inputs.

We also know that crude oil is by far the most important commodity globally, representing almost half of all commodity spending in dollar terms<sup>3</sup>, and as such we think it’s a good proxy for overall commodity demand trends. *Exhibit 2* illustrates that when real global GDP has grown in the 2-3% range, oil demand has grown essentially in line with the long-term production trend of 1.4%. In an environment where supply and demand hold roughly in balance, it makes sense that prices also hold steady in real terms. It also makes sense that when demand surges above production growth (typically when GDP is > 3%) that a surge in real prices would be required to keep the market in balance, and the opposite when demand undershoots supply (typically when GDP is < 2%).

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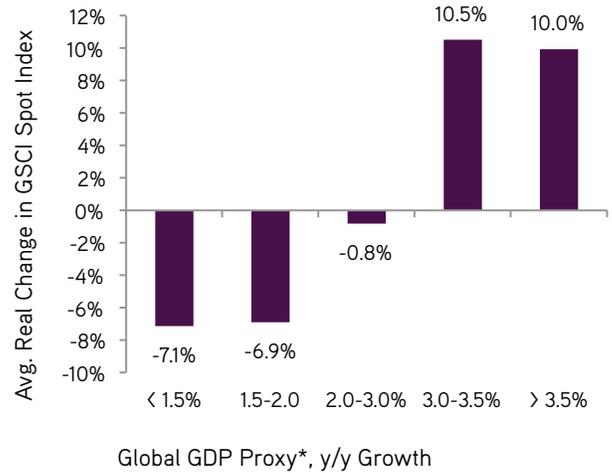
**We continue to favor real assets that can provide yield, growth, and inflation-hedging capabilities.**

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<sup>3</sup> See *Exhibit 15* for details.

**EXHIBIT 1**

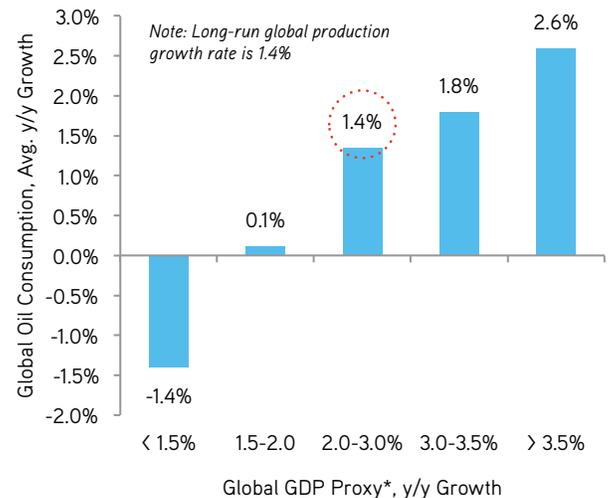
Since 1970, We See a Pattern of Real Commodity Price Appreciation When Global GDP\* Exceeds 3%, and Real Commodity Price Depreciation When Growth is Less Than 2%



\* Weighted average of U.S., Eurozone, UK, Japan, and BRICs. Analysis based on annual data from 1970-2011. U.S. GDP deflator used to deflate nominal GSCI returns. Source: GSCI, World Bank, KKR Global Macro and Asset Allocation analysis. Data as at January 31, 2013.

**EXHIBIT 2**

Similarly, Oil Demand Growth Typically Outstrips Production When Global GDP\* Is Above 3%, and Undershoots When Global GDP Is Below 2%



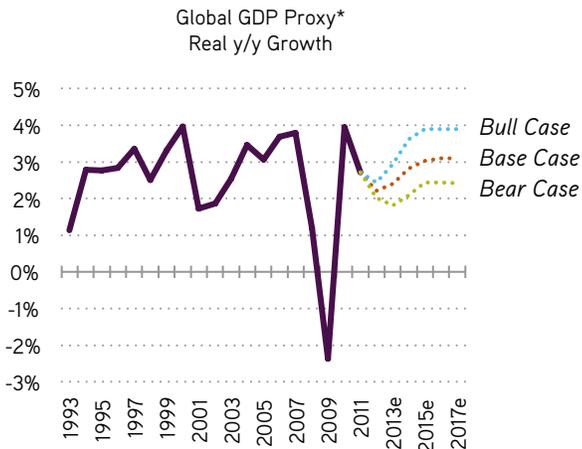
\* Weighted average of U.S., Eurozone, UK, Japan, and BRICs. Memo: Analysis based on annual data from 1970-2011. Source: BP Statistical Review of World Energy (June 2012), World Bank, KKR Global Macro and Asset Allocation analysis. Data as at January 31, 2013.

The aforementioned relationships certainly matter for our commodity outlook, which we detail in Section II, as we specifically forecast global growth to accelerate to 3.0% by 2015 from an estimated 2.2% growth in 2012. One can see this in Exhibits 3 & 4. Consistent with

this forecast, we see the U.S. cyclical sectors, including autos, housing, energy, and manufacturing, driving stronger growth. In China, we see urbanization and economic, financial, and government reforms as the primary drivers of growth, while the country's export sector now faces increasing challenges. All told, we expect China to account for a third or more of incremental global growth over the next few years. On the other hand, we expect austerity in Europe and ongoing infrastructure limitations in India and Brazil to keep overall global growth from really breaking out to high 3% range over the next couple of years in our base case.

**EXHIBIT 3**

Under Our Base Case, Austerity in U.S. and Europe and Infrastructure Limitations in India and Brazil Continue to Curb Growth in 2013...



\* Weighted average of U.S., Eurozone, UK, Japan, and BRICs.  
e = KKR Global Macro and Asset Allocation estimates. Source: World Bank, IMF, KKR Global Macro and Asset Allocation analysis. Data as at January 31, 2013.

**EXHIBIT 4**

...But Global Economies Re-Accelerate Steadily Thereafter Above the Important 3% Threshold

|       | GLOBAL PROXY* |      |      | MEMO: IMF |
|-------|---------------|------|------|-----------|
|       | BASE          | BULL | BEAR |           |
| 2011A | 2.7%          | 2.7% | 2.7% | 2.7%      |
| 2012E | 2.2%          | 2.4% | 2.0% | 2.3%      |
| 2013E | 2.4%          | 3.0% | 1.8% | 2.5%      |
| 2014E | 2.8%          | 3.6% | 2.1% | 3.2%      |
| 2015E | 3.0%          | 3.9% | 2.4% | 3.5%      |
| 2016E | 3.1%          | 3.9% | 2.4% | 3.6%      |
| 2017E | 3.1%          | 3.9% | 2.4% | 3.5%      |

\* Weighted average of U.S., Eurozone, UK, Japan, and BRICs.  
e = KKR Global Macro and Asset Allocation estimates. Source: World Bank, IMF, KKR Global Macro and Asset Allocation analysis. Data as at January 31, 2013.

In addition to forecasting global growth, we also forecast U.S. inflation, which is the second key factor in the commodity forecast framework which we detail in Section II. Not surprisingly, the critical relationship we continue to focus on is the current extremely low setting of interest rates relative to the rate of nominal GDP growth, which historically has led to percolating inflationary pressures approximately two years later. One can see in *Exhibit 5* that immediately preceding the surge of inflation in the late 1970s and early 1980s (remember CPI peaked at 14.8% y/y in 1980!), the Fed had been running a monetary policy that was historically loose relative to the rate of nominal GDP growth. Thereafter, as the same chart shows, Fed policy tightened dramatically after Paul Volcker took over the Chairmanship in 1979, which we believe was key to the trend of moderating inflation that took hold starting in the early 1980s.

Fast forward to recent history, however, and you can see that monetary policy is once again close to the extremely low levels that prevailed in the 1970s (*Exhibit 5*). Our indicator hit an intermediate low in 2005, not long before inflation surged to 5.6% y/y in 2008. Since 2012, Fed Funds has been once again at extremely low levels relative to the rate of nominal GDP growth, suggesting that inflation may again rise starting in 2014 or 2015. We are not looking for a late 1970s-style inflation bonanza, but we do think that inflation trends will move ahead of Fed expectations over the next few years. Specifically, our base case forecast is that *inflation rises from the current 2% range to 2.5% in 2014 and 3.0% in 2015*. Thereafter, we model in a gradual moderation as Fed tightening in the back half of the decade brings inflation under control. All told, our base case forecast incorporates 2.6% average annual inflation over the next five years (see *Exhibit 9*).

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**An investor must break down the commodity outlook into**

**1) the real return and**

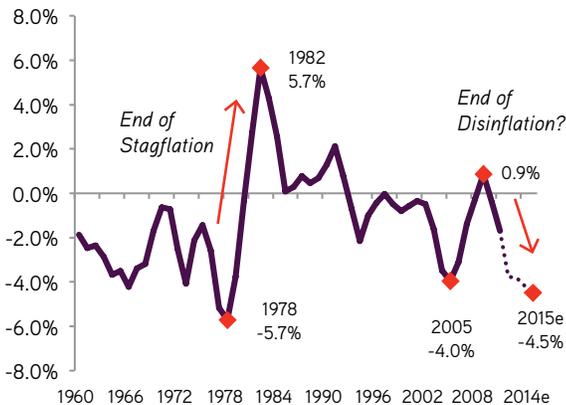
**2) the inflation return components.**

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**EXHIBIT 5**

The Fed Has Pinned Rates Far Below Nominal GDP Growth, Which Helps Stimulate Growth and Control Gov't Financing Costs...

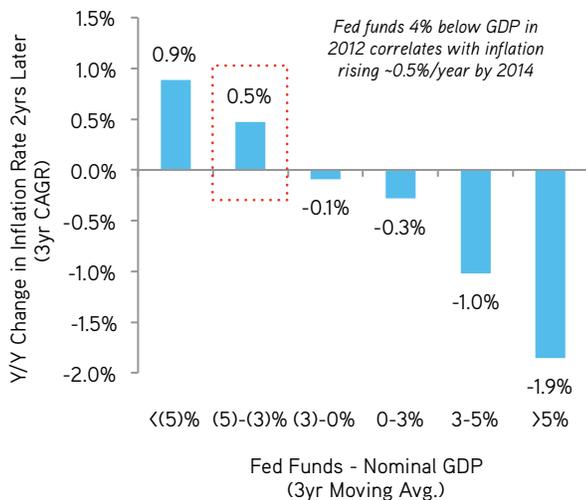
Fed Funds - Nominal GDP Growth  
3yr Moving Avg.



e = KKR Global Macro and Asset Allocation estimate. Our estimate assumes the Fed does not tighten until mid-2015 and that nominal GDP growth averages approximately 5% annually between 2013 and 2015. Data as at February 11, 2013.

**EXHIBIT 6**

...But Over the Long Run, History Shows Pinning Fed Funds Far Below GDP Growth Leads to Rising Inflation



Observation period = 1958-2011. Source: KKR Global Macro and Asset Allocation analysis of Federal Reserve and Bureau of Economic Analysis data. Data as at February 11, 2013.

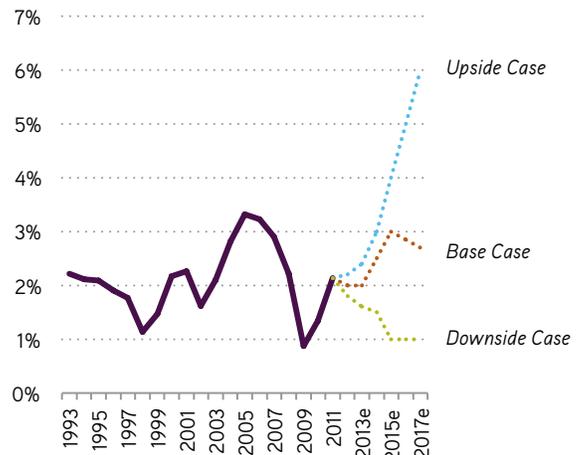
Our upside case for inflation assumes that the economy is a little stronger than expected in the coming years and may lead to an even faster rise in inflation, putting the central bank further 'behind the curve' and forcing it to raise rates further and faster than expected to control inflation. In this scenario we forecast inflation to reach 6.0% by 2017 (*Exhibits 7 & 8*). Conversely, we also model in a downside case where growth is slower than expected and the inflation-

ary impulse from monetary stimulus never surfaces. Specifically, we model out that inflation reaches just 1.0% by 2017 as ongoing deleveraging creates a significant disinflationary backdrop.

**EXHIBIT 7**

Under Our Base Case, the Fed Begins to Control a Rise in Inflation After It Hits the 3% Mark...

U.S. Inflation  
Measured via GDP Deflator



e = KKR Global Macro and Asset Allocation estimates. Estimates as at January 31, 2013. Source: Bureau of Economic Analysis, KKR Global Macro and Asset Allocation analysis.

**EXHIBIT 8**

... But Under Upside Case, Fed Gets Behind the Curve and Inflation Rises Unchecked

|       | U.S. INFLATION FORECAST* |      |      | MEMO: IMF |
|-------|--------------------------|------|------|-----------|
|       | BASE                     | BULL | BEAR |           |
| 2011A | 2.1%                     | 2.1% | 2.1% | 2.1%      |
| 2012E | 2.0%                     | 2.2% | 1.8% | 2.0%      |
| 2013E | 2.0%                     | 2.4% | 1.6% | 1.8%      |
| 2014E | 2.5%                     | 3.0% | 1.5% | 1.8%      |
| 2015E | 3.0%                     | 4.0% | 1.0% | 1.8%      |
| 2016E | 2.9%                     | 5.0% | 1.0% | 2.0%      |
| 2017E | 2.7%                     | 6.0% | 1.0% | 2.1%      |

\* Measured using GDP deflator. e = KKR Global Macro and Asset Allocation estimates. Estimates as at January 31, 2013. Source: Bureau of Economic Analysis, KKR Global Macro and Asset Allocation analysis.

## Section II: Using Our Drivers to Formulate a Basic Framework for Commodity Expected Returns

As we mentioned in our original launch piece in October 2011 (See report titled *Phase III: The Last Stage of a Bumpy Journey*, available at [www.kkrinsights.com](http://www.kkrinsights.com)), we try to counter the uncertainties inherent in making predictions through consistency of process, meaning, for example, that we tend to look at the same data series month-in and month-out—rather than jump from one data point to the next simply because it may support our existing thesis. We also try to forecast specific macro subcomponents rather than just relying on complex aggregate numbers.

Given this approach, folks should not be surprised that we consistently try to break down our commodity outlook into its components: 1) the real return and 2) the inflation return. In terms of the real return component, our outlook is linked largely to the pace of global growth, which we detailed in Section I of this report. Simply stated, the faster the world is growing, the more intense the demand will be for resource inputs, and the more pressure will be put on prices to balance supply with demand — and vice versa.

The inflation outlook, which we also described earlier in this report, is the second piece of the commodity return profile puzzle. It too is important, particularly given that most investors own commodities as an inflation hedge. See *Exhibit 9* for details, but we forecast inflation based on the setting of central bank policy rates relative to the nominal GDP growth, such that low rates relative to high nominal growth tends to create rising inflation a couple years down the line. For the purposes of commodities forecasting, we concentrate on U.S. inflation, since – to state the obvious – most global commodities are priced in U.S. dollars.

”  
**As U.S. inflation starts accelerating later this decade, the inflation-hedging power of real assets will look increasingly attractive.**  
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### EXHIBIT 9

#### Implied GSCI Spot Price Return Under Various Base, Bull and Bear Scenarios

|             | GLOBAL GDP PROXY <sup>1</sup> |      |      | REAL GSCI BUCKET <sup>2</sup> |       |       | INFLATION FORECAST <sup>3</sup> |      |      | IMPLIED GSCI PRICE RETURN |       |       |
|-------------|-------------------------------|------|------|-------------------------------|-------|-------|---------------------------------|------|------|---------------------------|-------|-------|
|             | BASE                          | BULL | BEAR | BASE                          | BULL  | BEAR  | BASE                            | BULL | BEAR | BASE                      | BULL  | BEAR  |
| 2013E       | 2.4%                          | 3.0% | 1.8% | -0.8%                         | 10.5% | -6.9% | 2.0%                            | 2.4% | 1.6% | 1.2%                      | 12.9% | -5.3% |
| 2014E       | 2.9%                          | 3.7% | 2.2% | -0.8%                         | 10.0% | -0.8% | 2.5%                            | 3.0% | 1.5% | 1.7%                      | 13.0% | 0.7%  |
| 2015E       | 3.0%                          | 3.9% | 2.4% | 10.5%                         | 10.0% | -0.8% | 3.0%                            | 4.0% | 1.0% | 13.5%                     | 14.0% | 0.2%  |
| 2016E       | 3.1%                          | 3.9% | 2.4% | 10.5%                         | 10.0% | -0.8% | 2.9%                            | 5.0% | 1.0% | 13.4%                     | 15.0% | 0.2%  |
| 2017E       | 3.1%                          | 3.9% | 2.4% | 10.5%                         | 10.0% | -0.8% | 2.7%                            | 6.0% | 1.0% | 13.2%                     | 16.0% | 0.2%  |
| 13-17E CAGR | 2.9%                          | 3.7% | 2.3% | 5.8%                          | 10.1% | -2.1% | 2.6%                            | 4.1% | 1.2% | 8.4%                      | 14.2% | -0.8% |

Note: Our out-year (2015-2017) expected real returns are actually slightly lower in our bull case (10.0%) compared to our base case (10.5%). Historically, this is because real returns have been slightly lower when GDP growth is greater than 3.5% as compared to when it is in the 3.0-3.5% range. We believe this happens because the market begins discounting that the economy is overheating, inflation is rising, and monetary policy is going to become a headwind. It is also worth noting that our bull case is slightly lower in 2015-2017 only in real terms. In nominal terms, it is still 60-280bp above the base case in every year. <sup>1</sup>Weighted average of U.S., Eurozone, UK, Japan, Brazil, Russia, India, and China. <sup>2</sup>Based on average real return of the GSCI Spot Index when global GDP proxy is, respectively, under 1.5%, 1.5-2.0%, 2.0-3.0%, 3.0-3.5%, or over 3.5%. <sup>3</sup>U.S. inflation measured via GDP deflator. Please see *Exhibit 26* for details. Sum of real GSCI bucket and inflation forecast. e = KKR Global Macro and Asset Allocation estimates. Data as at January 31, 2013. Source: GSCI, World Bank, OECD, IMF, Bureau of Economic Analysis, KKR Global Macro and Asset Allocation analysis.

So when we combine our forecasts for global GDP growth and U.S. inflation, what does our framework suggest for commodity returns? See *Exhibit 9* for our detailed year-by-year estimates, but our conclusions in brief are as follows:

- Under our **base case**, our global GDP proxy (made up of U.S., Eurozone, UK, Japan, and BRICs) improves slightly in 2013 and accelerates above the critical 3.0% threshold starting in 2015. We expect this would kick off a cycle of robust commodity price appreciation from 2015-2017. Inflation would tick up to 3% by 2015 before the Fed steps in to tame prices. **Under this scenario the CAGR of the GSCI Spot Index would be approximately 8% over the next five years.** Embedded in this forecast is our belief that global growth can drive a 5.8% annualized return *on a real basis* in the commodity asset class over the next five years, with the other 2.6% of the annualized return coming from the *inflation component*.
- Under our **bull case**, the U.S. and Europe pursue more growth-oriented fiscal policies, which kicks off a re-leveraging process that also spurs growth in emerging markets. Our global GDP proxy would exceed the 3% threshold in every year of the forecast horizon starting in 2013. The Fed would be unwilling or unable to raise rates sufficiently to get back ahead of the curve, and inflation would accelerate all the way to 6% by 2017. **Under this scenario the CAGR of the GSCI Spot Index would be approximately 14% over the next five years.** Embedded in this forecast is our belief that global growth can drive a 10.1% annualized return *on a real basis* in the commodity asset class over the next five years, with the other 4.1% of the annualized return coming from the *inflation component*. We think it is worth mentioning to folks that our out-year (2015-2017) expected real returns are actually slightly lower in our bull case (10.0%) compared to our base case (10.5%). This is because, historically, real returns have been slightly lower when GDP growth is greater than 3.5% as compared to when it is in the 3.0-3.5% range (see *Exhibit 1*). This actually makes sense to us, because what we think happens is that the market begins discounting that the economy is overheating, inflation is rising, and monetary policy is going to become a headwind. It is also worth noting that our bull case is slightly lower in 2015-2017 only in real terms. In nominal terms, it is still 60-280bp above the base case in every year
- Under our **bear case**, the West remains mired in a cycle of crisis and austerity, while economic rebalancing in China proves a surprisingly strong headwind, and Brazil is constrained by persistently low productivity. Our global GDP proxy would dip below 2% in 2013, creating a transitory air pocket in commodity prices. Maybe even more important, growth would be insufficient to create any price pressures, so inflation would drift down to just 1.0%. **Under this scenario the GSCI Spot Index would fall at a 1% annualized rate over the next five years.** Embedded in this forecast is our belief that global growth can drive a negative 2.1% annualized return *on a real basis* in the commodity asset class over the next five years, somewhat offset by a 1.2% annualized return coming from the *inflation component*.

We certainly acknowledge that predicting the return of the GSCI on a five-year basis is a tough assignment, but we do think our framework provides a reasonable and effective way of thinking about the long-term drivers of the asset class. And it is relatively intuitive. Indeed, given where we are in the monetary and economic cycles, our scenario analysis seems to confirm our more subjective view that the return profile is likely to surprise to the upside, not the downside. Finally, because the model incorporates both developed and developing economies, we believe it accounts for the rapidly changing growth dynamics that we are now seeing in the global economy.

### Section III: Translating Our GSCI Outlook to a Target Allocation

Creating return profiles for the GSCI Spot Index is certainly helpful, but we must also answer another important question: do commodity exposures actually help or hurt a portfolio's overall performance and sturdiness when it is combined with other asset classes like equities and fixed income? Put another way, can energy and natural resources investments enhance the risk/return profile of a portfolio while also fulfilling their mission as inflation hedges? We think the answer is yes on both counts, but it is important to calibrate roughly how much one should allocate to the asset class.

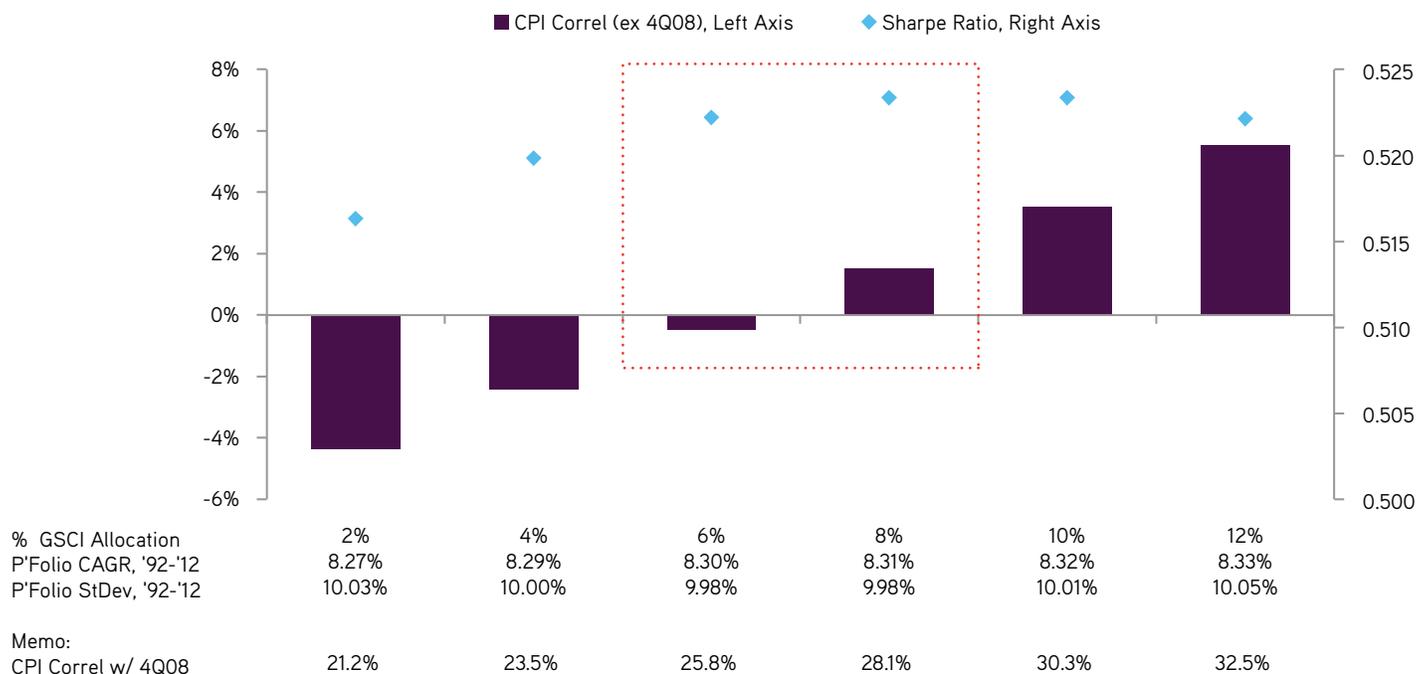
To this end, we created an analysis that looks back over the past 20 years and examines the returns, volatility, and inflation sensitivity of a hypothetical institutional portfolio at various levels of allocation to real assets. *Our results are outlined in Exhibit 10, which shows that a 6-8% position has been the most appropriate to both maximize a global, multi-asset class portfolio's Sharpe Ratio and drive the correlation to the consumer price index (CPI) close to zero.*

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**Global commodity prices are highly sensitive to GDP growth, and have appreciated in real terms historically when our global growth proxy was above 3% and depreciated when it was below 2%.**

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## A 6-8% Energy and Natural Resources Allocation Has Neutralized Portfolio<sup>(1)</sup> Inflation Sensitivity and Maximized Sharpe Ratio In Normal Environments for a Generic Pension Portfolio



(1) Portfolio modeled according to the asset class weights in *Exhibit 11*. Analysis based on 20-year performance from Dec-92 through Dec-12. Public equities represented as a blend of 60% U.S. equities (Russell 3000), 30% international developed (MSCI EAFE), and 10% emerging markets (MSCI EM). Other asset class proxies are as follows: Real Assets (GSCI Spot Index), Private Equity (Cambridge Associates Global PE Index), Real Estate (NCREIF ODCE), Hedge Funds (HFRI Fund of Funds Composite), Cash (Citi 3mo Treasury Index), Fixed Income (Barclays Aggregate). CAGR = Compound Annual Growth Rate. StDev = Annualized standard deviation of quarterly returns. Sharpe Ratio calculations use 3mo Treasury to approximate risk free rate. Source: KKR Global Macro and Asset Allocation analysis, Bloomberg, Cambridge Associates, NCREIF. Data as at January 31, 2013.

Looking at the details, we began our analysis using a portfolio invested according to the asset class weights in *Exhibit 11*, which shows the average allocations of U.S. state pensions in 2011. We think this is a reasonable approximation of U.S. pension fund investments overall. As shown, they currently allocate about 2% to real assets. *Exhibit 10* shows that at this level (using the GSCI Spot Index as a performance proxy<sup>4</sup>) institutional portfolios would have generated an 8.27% compound annual return over the last twenty years, a 0.516 Sharpe Ratio, and a -4.3% correlation with the U.S. CPI in normal environments (as explained below). Measuring these same performance statistics at different levels of allocation to non-real estate related real assets<sup>5</sup>, we found that the CPI correlation approaches zero and the Sharpe Ratio of return-to-risk is maximized when the real asset allocation is lifted to 6-8%. Put another way, many pensions could have actually both boosted their return and lowered their risk profile by having increased their energy and natural resources portfolio above the current average of two percent.

As mentioned above, we have measured CPI correlations in “normal environments,” which in this case means specifically that we excluded 4Q08. As most investors remember too well, this period

immediately following the Lehman bankruptcy was one of extreme deflation and deleveraging. In a single quarter, the U.S. CPI plummeted 13% at an annualized rate, which is by far the worst quarterly deflation since 1950 (the second-worst was a mere -1.9% in 3Q54). At the same time, most other asset classes fell by similarly alarming orders of magnitude. *Exhibit 12* shows that every major risk asset class posted a double-digit decline, including those that were traditionally understood to be relatively stable (e.g., hedge funds) and those that were traditionally understood to normally show negative correlations with inflation (e.g., U.S. equities) during this time period. It's certainly worth mentioning that commodities posted the worst 4Q08 performance of all the asset classes we looked at, which makes sense given that commodities are both highly volatile and highly inflation sensitive. Even with that poor one-quarter performance, however, one can see from *Exhibit 10* that real assets still aided returns over the longer term.

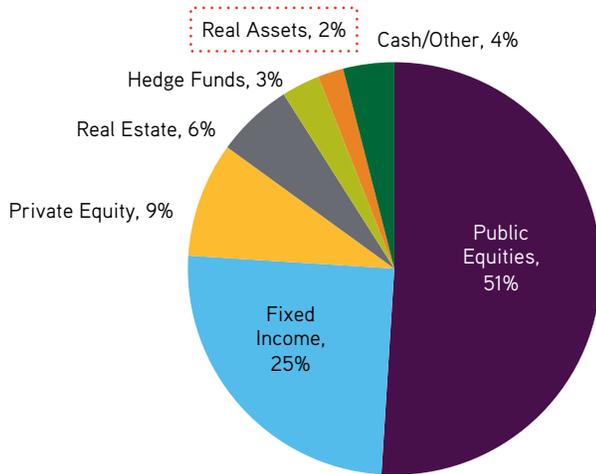
Our bottom line: we see no reasonable way to neutralize the inflation sensitivity of a portfolio during a deflationary seize-up like 4Q08, other than massively overweighting government bonds, which we do not view as an attractive option starting from today's low rate environment. Maybe even more importantly, with U.S. banks having substantially de-risked and re-equitized their balance sheets in recent years, we think most of the deflationary risk has now passed and—as outlined in the prior section—the more important future risk to solve for is that of rising long-term inflation.

4 See next section for details, but we think the GSCI Spot Index is the most appropriate benchmark for the performance of Energy & Natural Resources real assets.

5 To add to the real asset allocation, we withdrew weight from all other asset classes on a *pro-rata* basis.

EXHIBIT 11

U.S.State Pensions Average Asset Allocation (2011)



Source: "Trends in State Pension Asset Allocation and Performance," Cliffwater LLC, June 2012.

EXHIBIT 12

Almost Every Major Risk Asset Class Posted Double-Digit Declines in 4Q08



Source: Bloomberg, KKR Global Macro And Asset Allocation analysis as at 4Q08. Asset class proxies as follows: Real Assets (GSCI Spot Index), Emerging Markets (MSCI EM Index), US Equities (Russell 3000), Non-US Developed (MSCI EAFE), Private Equity (Cambridge Associates Global PE Index), Real Estate (NCREIF ODCE), Hedge Funds (HFRI Fund of Funds Composite), Cash (Citi 3mo Treasury Index), Fixed Income (Barclays Aggregate).

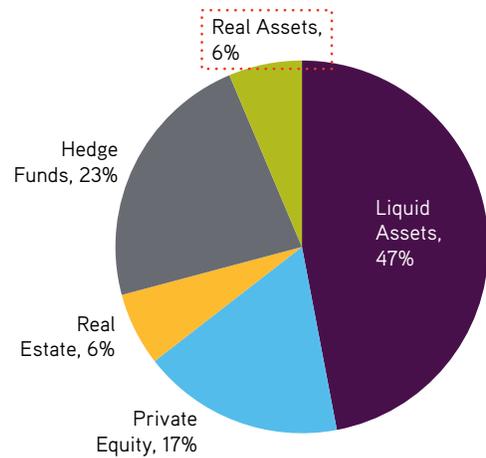
From all the above, theory tells us that 6-8% is a sound target allocation for energy and natural resources in a global, multi-asset class portfolio. But is that reasonable in practice? We ran a quick 'sanity check' to determine whether some investors are committing as much to the asset class as we are targeting for our allocation.

It turns out quite a few are, particularly in the endowment world where mandates are often very long term in nature and where quarter-to-quarter liquidity demands are typically lower. *Exhibit 13* below shows that endowments allocate 6% to real assets on average, essentially in line with our target allocation. To further validate our work, we looked at the specific target allocations of a handful of respected institutional investors. *Exhibit 14* shows that Harvard allocates fully 15% to real assets ex-real estate, while Stanford, Yale, and University of Texas all fall within our 6-8% allocation band towards energy and natural resources.

If we had to comment today about tomorrow, our view is that pension fund allocations to energy and natural resources will converge towards endowment-like levels. Many investors we speak with are planning to rotate allocations away from long-term government bonds in coming years, and we think that reflation beneficiaries like energy and natural resources likely represent a compelling new destination for this capital. Furthermore, if we are correct that U.S. inflation will start accelerating later this decade, then the inflation-hedging power of real assets will look increasingly attractive.

EXHIBIT 13

In 2011, Endowments Allocated 6% to Real Assets Ex-Real Estate, On Average



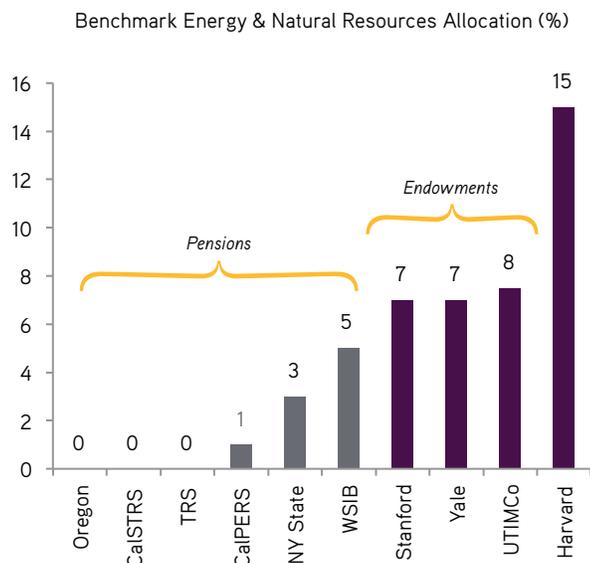
Source: 2011 NACUBO-Commonfund Study of Endowments.

"

**We continue to focus on the current low setting of interest rates relative to the rate of nominal GDP growth, which historically has led to inflationary pressures approximately two years later.**

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### The Divide Between Pension and Endowment Allocations to Real Assets Ex-Real Estate Is Substantial

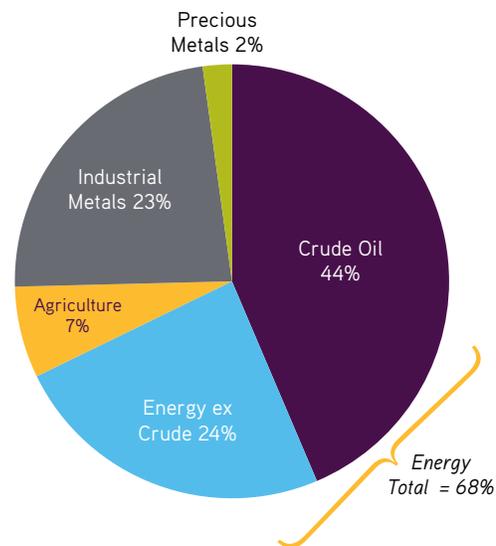


Source: California Public Employees’ Retirement System Statement Of Investment Policy For Benchmarks dated October 10, 2012; Report on Investment Activity Prepared by the Washington State Investment Board for the period ended June 30, 2011; Comprehensive Annual Financial Report Oregon Public Employees Retirement System An Agency of the State of Oregon For the Fiscal Year Ended June 30, 2011; TRS Investment Policy Statement dated September 13, 2012; Yale, Stanford, New York State, University of Texas Investment Management Company and Harvard websites.

#### Section IV: How Should One Benchmark Real Assets (Ex-Real Estate), and How Can One Invest Against that Benchmark?

There are several reasons investors have traditionally liked the GSCI Spot Commodity Index—a diversified, unleveraged, long-only gauge of commodity returns—as a *theoretical* benchmark for real assets investments to try to beat. First, of all the commodities indexes out there, the GSCI Spot comes closest to reflecting the actual composition of global commodity consumption. See Exhibits 15 and 16 for details, but energy accounts for almost 70% of all commodity spending in dollar terms, and that is exactly the weight the GSCI puts on it. In addition, based on conversations with institutional investors, we believe that the universe of direct investment opportunities in energy and natural resources tracks fairly closely to GSCI weights, which suggests that the GSCI is a reasonable ‘all purpose’ benchmark to track real assets investments in both the public and private markets. Finally, it has a long record of historical performance available, which is also helpful for the back-testing of strategies relative to the benchmark.

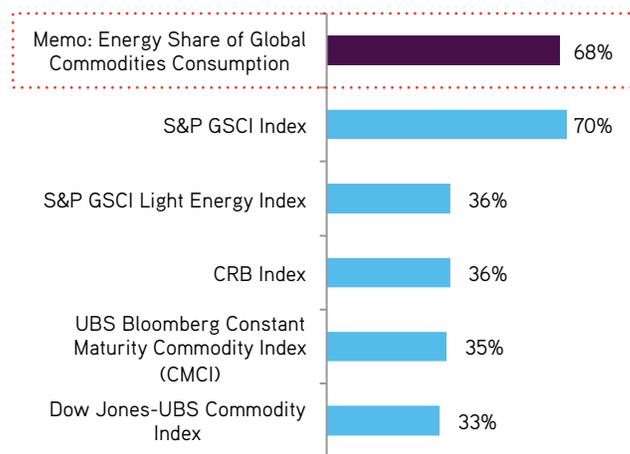
### Estimated 2011 Global Commodity Consumption Share



Latest available data as of December 31, 2012. Source: Morgan Stanley Commodities Research, BP Statistical Review, Platts, WBMS, ITRI, GFMS, WSI, Johnson Matthey, CRU, USDA, Thomson Reuters, Bloomberg.

### We Think the GSCI Spot Index Comes Closest to Reflecting Economic Reality

Energy Weightings of Various Commodity Indexes



Benchmark weights are latest available as of December 31, 2012. Source: Bloomberg, www.djindexes.com, www.bloomberg.com, www.thomsonreuters.com, www.spindices.com.

While the virtues of the GSCI Spot as a benchmark are hopefully clear, what is up for debate is whether the GSCI Total Return Index, which reflects the actual returns of a futures-based investment strategy that attempts to track the commodities underlying the GSCI Spot, is the most efficient vehicle for getting commodity exposure. We think not. As one can see in Exhibit 19, the GSCI Total Return has woefully underperformed the GSCI Spot Index since 2004. The

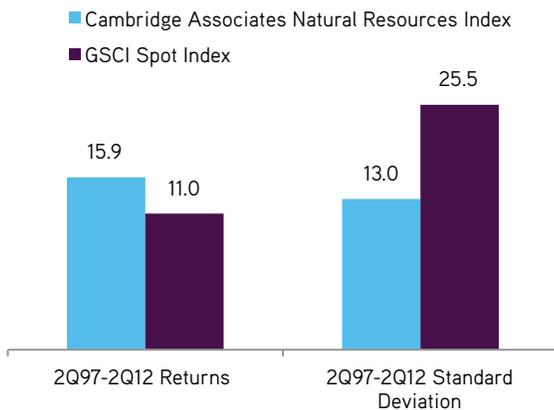
combination of fees and periodic contango pricing (i.e., when commodity contracts are 'rolled' forward, an investor ends up paying more tomorrow to own something he or she already owns today) have led to significant challenges in the total returns of futures-based strategies relative to the theoretical GSCI Spot Index.

But it has not always been this way. In fact, as we show in *Exhibit 18*, a futures-based strategy did a reasonably good job of keeping up with direct real asset investments until the early 2000s. When the GSCI started going mainstream in 2004, however, many of the important commodities represented in the index went into contango as commodity investing went more mainstream. As a result, we believe that the GSCI Total Return index has created no value for clients over the past eight years. In fact, between August 2004 and the end of 2012, whereas the GSCI Spot Index gained a solid 119% in aggregate, over the same period the GSCI Total Return Index actually fell 7%.

Not surprisingly, our advice is that, in situations where illiquidity is not a major obstacle, certain investors may wish to migrate towards private investments because they tend to outperform not only the GSCI Total Return but also the GSCI Spot return. In fact, over the past fifteen years, the Cambridge Natural Resource index has had an average annualized return of 15.9% while the GSCI Spot has averaged 11.0% (*Exhibit 17*). Moreover, the annualized standard deviation of returns for the Cambridge Natural Resource index is 13.0% versus 25.5% for the GSCI Spot Index.

**EXHIBIT 17**

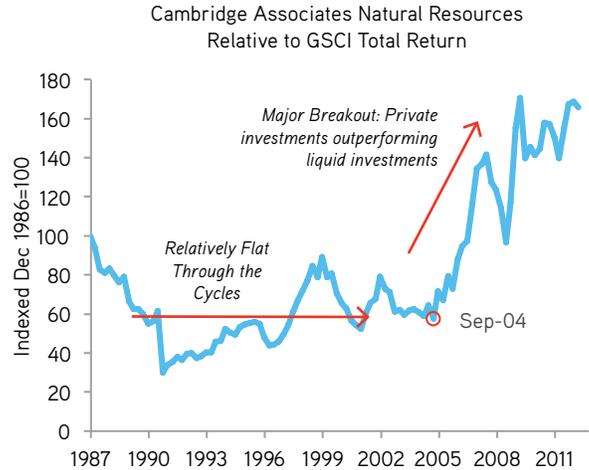
We Believe the Cambridge Associates Natural Resource Index Can Hold Its Own Against the GSCI Spot Index, With Higher Returns and Half the Volatility



Past performance is no guarantee of future results. Data as at 2Q12. Annualized average quarterly returns, and annualized standard deviation of quarterly returns. Source: Cambridge Associates, Bloomberg.

**EXHIBIT 18**

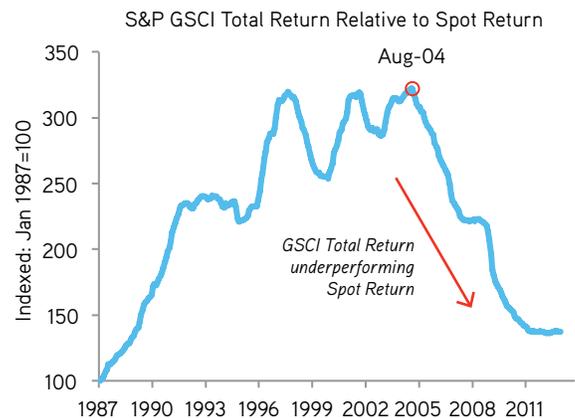
Private Versus Public Market Returns Were Similar Until 2004...



Data as at 2Q2012. Source: Cambridge Associates, Bloomberg.

**EXHIBIT 19**

...When Futures-Based Investments Began Severely Underperforming the GSCI Spot Index



The GSCI total return index measures the returns accrued from investing in fully-collateralized nearby commodity futures, while the GSCI Spot Index measures the level of nearby commodity prices. Data as at December 31, 2012. Source: Bloomberg.

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**If we had to comment today about tomorrow, our view is that pension fund allocations to energy & natural resources will converge towards endowment-like levels.**

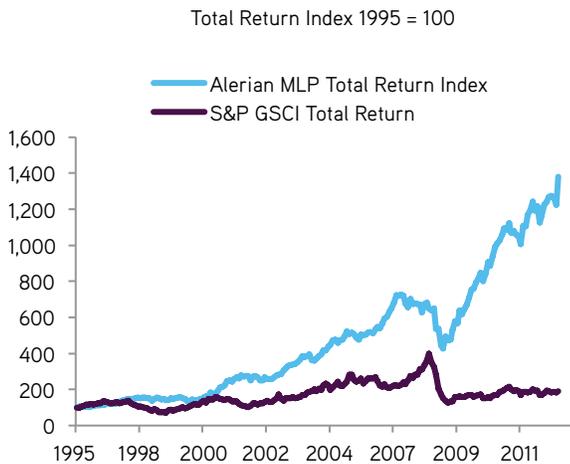
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At the moment, we see a variety of interesting opportunities in private market for energy. Importantly, most are actually *not* at the corporate level. Rather, they are at the well or infrastructure level. For example, in terms of upstream energy, we currently see significant opportunity across multiple sub-sectors including oil & gas development, minerals & royalties, and mature (proved, developed, producing) assets. Meanwhile, on the infrastructure side, contracted energy (G&P, power generation, storage, etc.) and renewables in both North America and Europe all seem to make sense to us at this point in the cycle.

For commodity investors who need to be 100% in liquid commodity investments, we continue to target minimal allocations to the GSCI Total Return for many of the reasons we cited earlier. Instead, we think MLPs represent an interesting opportunity. See *Exhibit 20* for details, but like their brethren in the private arena, MLPs have significantly outperformed the GSCI Total Return in recent years too. Within MLPs, our current view is that investors focus on infrastructure and midstream-related assets where there is less discovery and cash flow risk. That said, similar to what we have seen in the pure-play private equity energy arena (i.e., buying energy companies and not energy at the well level), there is now a fair amount of capital chasing ideas in the MLP sector.

**EXHIBIT 20**

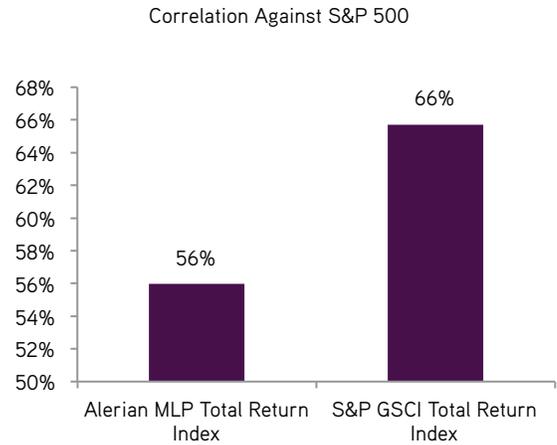
**A Composite of the 50 Most Prominent MLPs Have Outperformed the GSCI Total Return by a Significant Margin...**



The Alerian MLP Total Return Index is a composite of the 50 most prominent energy Master Limited Partnerships (MLPs) that provides investors with an unbiased, comprehensive benchmark for this emerging asset class. The index, which is calculated using a float-adjusted, capitalization-weighted methodology, is disseminated real-time on a price-return basis (NYSE: AMZ) and on a total-return basis (NYSE: AMZX). Data as at January 31, 2013. Source: Bloomberg.

**EXHIBIT 21**

**...And Is Less Correlated Against the S&P 500**



The Alerian MLP Total Return Index is a composite of the 50 most prominent energy Master Limited Partnerships (MLPs) that provides investors with an unbiased, comprehensive benchmark for this emerging asset class. The index, which is calculated using a float-adjusted, capitalization-weighted methodology, is disseminated real-time on a price-return basis (NYSE: AMZ) and on a total-return basis (NYSE: AMZX). Past 60 months rolling correlation as at January 31, 2013. Source: Bloomberg.

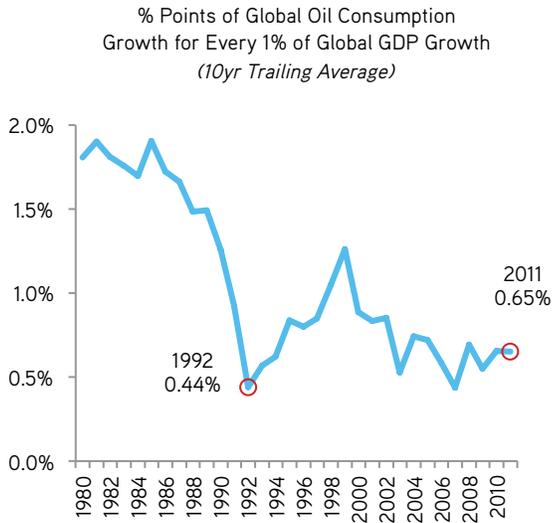
**Section V: There Are Risks Worth Considering**

While we feel strongly about our forecasts, we certainly acknowledge that we are no longer in the early stages of the commodity bull market. The GSCI Spot Index has been on an impressive run for almost 15 years now, appreciating at a 12% compound annual rate between 1998 and year-end 2012. With that in mind, we thought it appropriate to spend some time stress-testing our demand and supply assumptions, particularly for oil, which is the GSCI's largest single component.

On the demand side, there is certainly the risk that a growth shock could undermine our forecast. However, given the global GDP view we shared above, we do not see that as a major risk at this point in the cycle. Probably more realistic is the risk that oil demand fails to keep pace with the historical relationship with GDP that we outlined back in *Exhibit 2*. Is it possible, for example, that the world has become a more efficient place, demanding fewer incremental units of oil for every incremental dollar of GDP? *Exhibit 22* suggests the answer is "no," or at least "not by much." Specifically, it shows that while global oil intensity did decline in the 1980s, since then it has remained essentially stable. For the ten years ending in 2011 (latest available data), we estimate that oil demand grew by 65 basis points for every 1% increase in our global GDP measure, which represents an oil demand 'beta' near the middle of the range observed since the early 1990s.

EXHIBIT 22

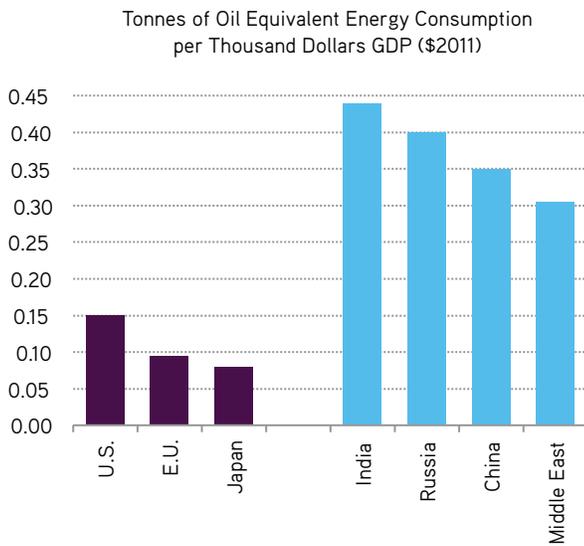
Little Evidence of Reduced Global Energy Intensity in Recent Years



Global oil consumption growth as per BP Statistical Review of World Energy (as of June 2012). Global GDP growth is weighted average of U.S., Eurozone, UK, Japan, and BRICs. Historical GDP data as per World Bank (as of July 2012).

EXHIBIT 23

Global Growth Now Being Led by More Energy-Intensive Economies

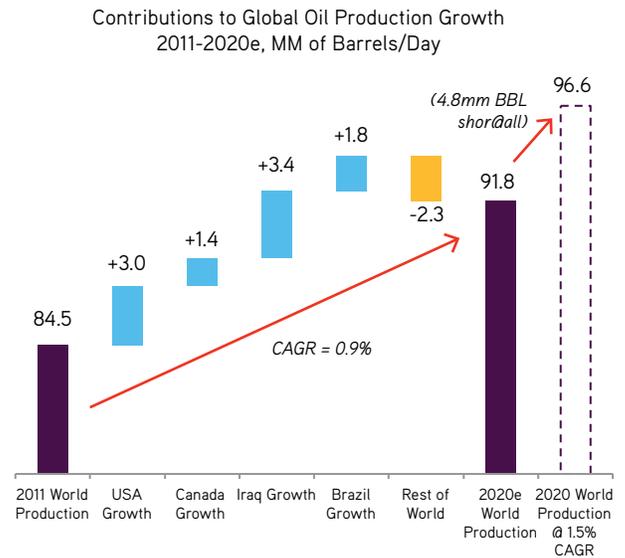


Source: International Energy Agency World Energy Outlook 2012 (released November 2012).

What we believe is happening is a 'tale of two markets,' where the developed markets have become much less energy intensive but those gains have been entirely offset by the rapid growth of emerging market economies which are still highly energy intensive (Exhibit 23). The bottom line is that aggregate global energy intensity has not changed much. Importantly, even if we haircut our global oil demand 'beta' to 0.50 from 0.65, assuming some modest future efficiency gains, it still implies global oil supply would need to grow by just under 1.5% annually over the next five years to fuel the 2.9% five-year global GDP forecast we outlined back in Exhibit 9.

EXHIBIT 24

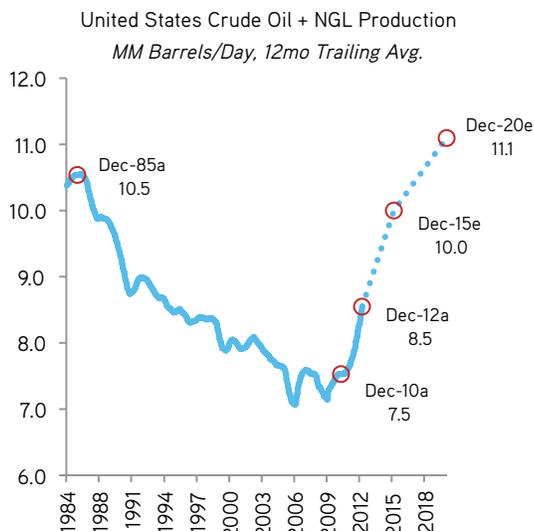
IEA Estimates Oil Supply Will Grow at 90bp Rate Through 2020, But We Think Closer to 1.5% May Be Necessary



Source: International Energy Agency estimates, as per World Energy Outlook 2012 (released November 2012).

“  
**In terms of substituting private energy investments in lieu of GSCI where illiquidity is not an issue, our overwhelming conclusion is that private investments tend to outperform.**  
 ”

## U.S. Oil Production Is Growing Very Rapidly



Data as of January 31, 2013. a = Actual, as per U.S. Energy Information Administration; e = International Energy Agency estimates, as per World Energy Outlook 2012 (released November 2012).

If demand looks set to grow by 1.5%, then the question is: Will supply be able to keep pace? Relying solely on the *World Energy Outlook 2012* prepared by the International Energy Agency, one would conclude the answer is “no.” *Exhibit 24* shows that the IEA forecasts supply to grow by just 0.9% per year over the remainder of this decade. The backdrop they describe is one where rapid growth across a narrow set of regions is offset by production declines around the rest of the world. Areas mentioned in the report seeing rapid production growth include i) North America (*Exhibit 25*), where new upstream technologies are unlocking more light tight oil and shale gas resources, ii) Brazil, which is developing its “pre-salt” deepwater resources, and iii) Iraq, which has embarked on an ambitious investment plan for its energy sector that the IEA estimates will spur production to more than double to 6.1 million barrels per day (MMBPD) by 2020 from 2.7mm in 2011. Offsetting these enhancements, the IEA forecasts a production decline of 2.3 MMBPD throughout the rest of the world over the same period as existing reservoirs are depleted. Important drivers include Europe, where production is expected to decline by 0.9 MMBPD (-24%), and Saudi Arabia, where declines of 0.5 MMBPD (-5%) are expected.

While we think the IEA outlook is potentially plausible, our own research leads us to believe that North American and Brazilian production could end up growing even faster than what the IEA forecasts. The surge of U.S. oil production in recent years is without precedent and has yet to show any signs of decelerating. In addition, Gulf of Mexico production is set to begin recovering in 2013 following a decline of roughly 0.3 MMBPD in the aftermath of the Macondo accident<sup>6</sup>. Meanwhile, investment in Brazil’s deepwater resources has been substantial. While we understand that the

<sup>6</sup> According the Energy Information Administration Short-Term Energy Outlook dated September 2012, Federal Gulf of Mexico Oil Production was estimated to have declined to 1.3 MMBPD per day in 2012 from a peak of 1.6 MMBPD in 2010.

execution of some early projects has disappointed, industry experts we speak with are confident that Brazil’s deepwater should ultimately prove highly productive and that the country has a good shot of exceeding the IEA’s estimate of 1.8 MMBPD growth by 2020<sup>7</sup>.

However, despite these production benefits, the IEA’s production growth forecast falls 4.8 MMBPD short of what would be required to generate the 1.5% production growth we think could be required in coming years (*Exhibit 24*). Even if we assume North American and Brazilian production growth both come in 50% better than what the IEA expects, there would still be a shortfall of 1.7 MMBPD. Moreover, we also see some risk of an Iraqi production undershoot, given what is a highly ambitious investment plan in a notoriously unstable region.

Our bottom line: we acknowledge the risk that an oil demand undershoot or a supply overshoot could undermine the historical relationship between commodity prices and global growth, but overall our work on this topic re-confirmed the constructive stance on commodities that our framework suggests. In particular, on the demand side, we see little evidence of a sea change in the relationship between energy and GDP, as the continued rise of energy-intensive EM economies offsets the efficiency gains being made in developed markets. On the supply side, we acknowledge the potential upside from new upstream technologies in North America and accelerated deepwater investment in Brazil, but believe that gains will be insufficient to overrun demand growth. It is also worth keeping in mind that our oil forecast is not particularly outsized relative to history. In fact, our commodities base case of 8.4% annualized returns over the next five years, if applied pro-rata to WTI crude, would imply a price of \$137.43 per barrel by year-end 2017. That is actually just 5% below crude’s all-time peak price of \$145.29 reached in July 2008.

“  
**What see a ‘tale of two markets,’ wherein the developed markets have become much less energy intensive, entirely offset by the rapid growth of highly energy intensive emerging market economies.**  
 ”

<sup>7</sup> Source: International Energy Agency estimates, as per World Energy Outlook 2012 (released November 2012).

## Summary

As we peer around the corner today to see what tomorrow might look like, we think that investors need to take a fresh look at the potential importance of real assets to one's overall portfolio. As we suggest in this report, we think a 6-8% target allocation towards thoughtful commodity-related investments at this point in the economic and monetary cycles makes sense. And if we are indeed correct that 8% annualized nominal appreciation for commodity-related investments is realistic, then we think that commodities can play an important role as not only an inflation hedge but also as performance vehicle in an environment when one major asset class, developed market government bonds, is unlikely to deliver much return at all over the next five years.

However, not all commodity investments will do well, and we believe asset allocation professionals should do their homework. As we mentioned earlier, we quite remain cautious on the GSCI Total Return. Within the private markets, we currently think the better opportunity is to find investments at the "ground" level (i.e., beyond just corporate ownership of the assets). We also favor public and private energy investments with growth and income characteristics. This 'positive carry' feature of MLPs and private energy is particularly appealing in an environment when you actually have to pay for the right to own inflation protection in more main stream asset classes (i.e., TIPS yields are now negative).

However, we also need to be vigilant when it comes to potential supply responses. History is littered with examples in the commodity arena where it was the changing supply curve, not the demand curve, that negatively impacted return profiles. In particular, Brazil and the U.S. may both likely surprise on the upside. That said, while these supply risks are real, we do not see them overshadowing the constructive demand case for commodities, oil in particular, that we have laid out.

Finally, we expect the commodity arena to remain dynamic. Already, technological advances are creating new and better discoveries in previously unimaginable places, and as a result, new energy infrastructure will be required, new transportation will be necessary, and new logistics tools will be validated. Given this view, we think that investors may wish to think about allocating capital towards not only direct commodity investments but some of the knock-on plays in the sector that too have yield, growth, and inflation-hedging capabilities – all key prerequisites for success in the real asset allocation arena, in our view.

“  
**The surge of U.S. oil production  
in recent years is without  
precedent and has yet to show  
any signs of decelerating.**  
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