

Intelligent Commodity Trading and Risk Management

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This article will discuss intelligent risk-management techniques and new product innovation in the commodity futures markets. But first, it may be useful to review the century-plus debate on the role of commodity speculators, given the prevalent concerns that this activity may have a destabilizing impact on commodity prices.

This article is based on a presentation that Ms. Till gave to the Calgary (Canada) chapter of the Professional Risk Managers' International Association (PRMIA) meeting on 22 February 2011.

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The Role of Speculators

Historical Controversy

One could argue that our current era bears a number of similarities to the last great era of globalization in the late nineteenth century.

For example, the period from 1880 to 1914 "first harnessed the powers of global communications and swift transport to link the world economically," noted Sesit (2005). "Other parallels ... include deregulated and integrated global capital markets, expanding international trade, strong foreign-direct investment flows and the search for new markets," continued Sesit (2005) in citing George Magnus of UBS. See Exhibit 1.

Exhibit 1: Similarities between the first and present eras:

	1880 - 1914	NOW
Deregulated capital markets	√	√
Low inflation	√	√
Rising commodity prices	√	√
New regional powers with global aspirations	√	√
State-sponsored terrorism	√	√
Shrinking bond spreads	√	√
Growing great power rivalry	√	√
Financially overstretched dominant power	√	√
Expansion of democracy	×	√
Proliferation of war	√	×

Chart based on Sesit (2005), quoting Niall Ferguson, history professor, Harvard University; and George Magnus, senior economic adviser at UBS.

A US Congressional testimony from 1892 shows just how extremely unpopular grain futures trading had been, given the competitive dislocations that were occurring at the time.

Sanders, Irwin, and Merrin (2008) discuss a more recent period that also has similarities to the present, the mid-1970s: "U.S. and international commodity markets experienced a period of rapid increases from 1972-1975, setting new all-time highs across a broad range of markets." These price increases were blamed on speculative behavior associated with the "tremendous expansion of trading in futures in a wide range of commodities," according to Cooper and Lawrence (1975), as cited by Sanders *et al.* (2008).

Not surprisingly, "public pressure to curb speculation resulted in a number of regulatory proposals," wrote Sanders *et al.* (2008) while "in hindsight, economists generally consider this a period marked by rapid structural shifts such as oil embargoes, Russian grain imports, and the collapse of the Bretton Woods fixed exchange-rate system," according to Cooper and Lawrence (1975).

A review of the politics around futures trading since the 1890s does give one a sense of *déjà vu*.

Holbrook Working

The historical writings of Holbrook Working frequently provide insight and a sense of constancy in how to frame the ongoing (tumultuous) debate on futures trading.

Holbrook Working was a Stanford University professor whose writings on the economic role of futures trading are considered fundamental to our present understanding of these markets. His work spanned the 1920s through the 1970s.

In 1970, Working described how fragile the existence of the futures-trading business in Chicago had been since its inception in the nineteenth century.

Working (1970) wrote that there were a handful of conditions for a futures market to survive and prosper. We are finding out yet again how important one of these principles is, and that is that:

"There must exist adequate public recognition of the economic usefulness of futures markets."

According to Working, the economic purpose served by commodity futures markets is to allow commercial participants to hedge prohibitively expensive inventories. The role of the speculator, then, is to take on and manage this risk. If one accepts this framework, then one does not see futures exchanges as casinos.

Working's T Index

In 1960, there was actually an inadequacy of speculation in the agricultural futures markets. In other words, there was insufficient risk capital for managing commercial-hedging risk. A U.S. federal agency (which preceded the CFTC) provided data that classified market participation as either hedging or speculation. With this data, one could construct ratios to see how much excess speculation (if any) there was over hedging needs. Holbrook Working created a simple ratio to do just that. This is Working's Speculative T index.

In a University of Illinois paper, Sanders *et al.* (2008) studied whether there was excessive speculation in the agricultural futures markets, updating previous studies that began with Working (1960), and using Working's T index.

Working's speculative index specifically "reflects the extent by which the level of speculation exceeds the minimum necessary to absorb long and short hedging, recognizing that long and short hedging positions could not always be expected to offset each other[,] even in markets where these positions were of comparable magnitudes," explained Peck (1980), as cited by Sanders *et al.*(2008).

After calculating Working's T index across agricultural futures markets, the University of Illinois economists found no pervasive evidence that recent speculative levels were in excess of those recorded historically for agricultural futures markets, even after accounting for index trader positions.

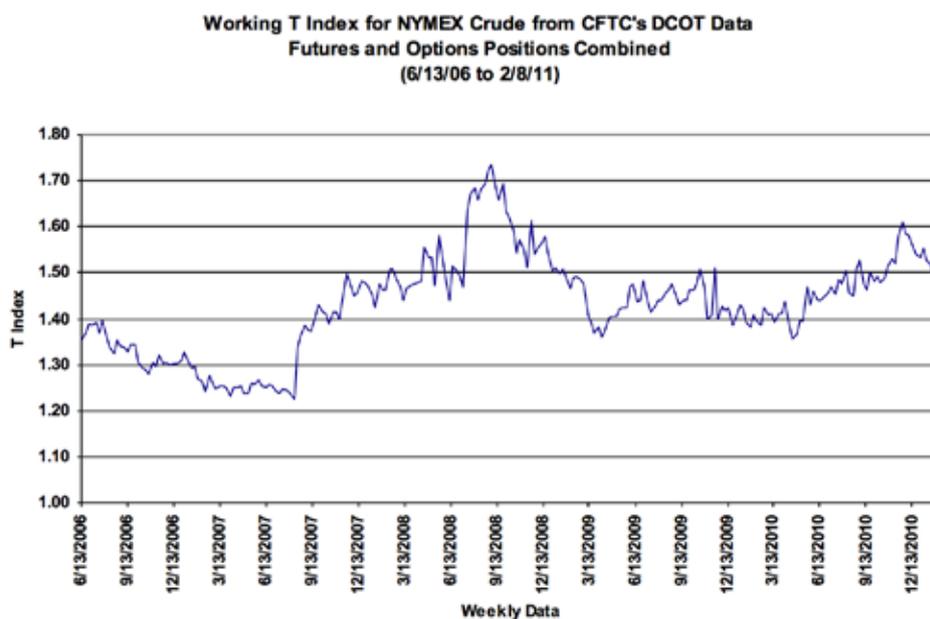
On October 20th, 2009, the U.S. Commodity Futures Trading Commission (CFTC) released three years of enhanced market-participant data for 22 commodity futures markets in a new "Disaggregated Commitments of Traders" (DCOT) report.

The release of this data was important because one could then evaluate whether the balance of outright position-taking in the U.S. exchange-traded *oil* derivatives markets had been excessive relative to hedging demand during the previous three years. One could do so by calculating T indices for the US crude oil market.

Using this data and with some notable caveats, one could conclude that speculative position-taking in the US oil futures markets did not appear excessive when compared to the scale of commercial hedging at the time, according to Till (2009). One has to be careful with how strongly one states this paper's conclusions since, for example, the paper did not examine whether there was excessive speculation in the oil markets in other venues besides the US oil futures markets.

Exhibit 2 provides an updated chart of the levels of Holbrook Working's Speculative T index for US oil futures markets through February 2011.

Exhibit 2:



Data Source: Bloomberg.

Abbreviations:

NYMEX stands for the New York Mercantile Exchange.

CFTC stands for the U.S. Commodity Futures Trading Commission.

DCOT stands for the CFTC's Disaggregated Commitments of Traders report.

Commodity Index Activity

In addition to the CFTC's Disaggregated Commitments of Traders report, one can also directly examine CFTC data on index investment.

Did commodity index investments in 2008 cause the 7-month oil-price rally that culminated in July of 2008? According to data released by the CFTC on September 11th, 2008, this is an unlikely cause, given that total over-the-counter (OTC) and on-exchange commodity index investment activity in oil-futures-contract-equivalents actually *declined* from December 31st, 2007 through June 30th, 2008.

Exhibit 3:

**Excerpt From
Staff Report on Commodity Swap Dealers & Index Traders
With Commission Recommendations**

Total OTC and On-Exchange Commodity Index Investment Activity

	<u>12/31/07</u>	<u>3/31/08</u>	<u>6/30/08</u>
Crude Oil Index Values Measured in Futures [Contract] Equivalents	408,000	398,000	363,000

Source: CFTC (2008).

No Smoking Gun

In early 2010, a futures exchange spokesman stated that the regulatory attention on oil markets had shifted to a focus on "market concentration and not about speculation" because the evidence on excessive speculation did not bear out. "There was no smoking gun," reported Collins (2010).

Risk Management

Besides the challenges of defending the economic role of commodities derivatives trading, market participants also face striking risk-management challenges.

The following section briefly draws from Till (2008) in discussing the apparent risk-management lapses at three large institutions and summarizes what the lessons from these debacles are.

International Oil Company

In 2007, an International Oil Company in the Chicago suburbs ran afoul of market-conduct laws and rules, as enforced by the Commodity Futures Trading Commission and by the U.S. Department of Justice, for trading activities of the previous five years.

In one particular case, the civil and criminal fines *far* exceeded the market-risk of the activities, illustrating where the risk-management priorities need to be for large participants in the commodity markets.

The key risk-management lesson from that debacle was to establish clear-cut compliance and ethics programs, not just for the trading staff but also for senior management. Also, prospective traders entering into large-scale derivatives trading operations need to be as (or more) knowledgeable about regulatory rules and laws, as they are with sophisticated market risk-management techniques.

Canadian Bank

At the end of April 2007, a Canadian bank announced trading losses of \$350 to \$400 million Canadian dollars. These losses were later revised upwards to \$680-million Canadian dollars, which was higher than the bank's revenue from trading during the previous year, according to *The Desk* (2007a).

Unfortunately, the bank's auditors had found that the bank's over-the-counter natural-gas book had been seriously mismarked. The auditors reported that they had never seen such a large discrepancy between the marks that were used, and market value, according to Mavin (2007).

According to *The Desk* (2007b), the lessons for energy-trading participants from this particular debacle were as follows:

- "... [A]lways get your marks from ... [large,] legitimate, established brokers, publishers, or exchanges."
- "... [M]ake sure that one's code-of-conduct document for traders is ... [sufficient,] and that ... [all traders] have signed it."
- Include in the code-of-conduct document what sort of broker "perks" are unacceptable for traders, and "let nothing be left to common sense."
- Ensure that one's trading activity is diversified across more than one broker.

We have to conclude that for large-scale commodity-trading efforts, the complexity may not be in market-risk monitoring, but in relatively-simply described operational controls, which must be rigorously applied throughout a large organization.

FCM

On February 28th, 2008, a large Futures Commissions Merchant (FCM) revealed an unexpectedly large \$141.5-million loss from a wheat-futures trading position taken by one of its registered representatives in Memphis, Tennessee for the representative's proprietary (own) account.

The representative had amassed more than 15,000 futures contracts covering 75 million bushels of wheat on the Chicago Board of Trade, between midnight and 6 a.m. on February 27th, reported Smith and Scheer (2008).

According to Cameron and Lucchetti (2008), "The futures brokerage blamed the loss on a failure in its systems." Apparently, the clearing firm did not have automatic limits in the sizing of futures trades executed electronically, when the operator was a registered representative of the firm.

As a consequence of the wheat loss, the FCM's CEO stated that "the company would introduce limits on positions taken by all customers and traders," reported Cameron and Lucchetti (2008). The FCM also took other remedial actions to restore customer and shareholder confidence in its risk-management infrastructure.

The lessons we learn from this trading mishap are to impose strict position limits in all electronic trading systems and to restore customer confidence by taking immediate action.

None of these three examples involve complex mathematical issues; they can each be summarized briefly and simply as fundamental control problems. That said, this statement is admittedly not fair to individuals at large organizations. Employees at large companies operate in *extremely* complex social environments. Frequently, for individuals working at large companies, one can liken employment to a sumo-wrestling match. From the outside, it does not look like anything much is getting done, but just staying in the ring is actually the accomplishment.

The real conclusion from this section might be an insight from a textbook, which is not considered a risk-management primer: **Good to Great**. In the main, a large organization can only do well when it implements a handful of simple concepts, which it consistently applies in scale, and across time, by individuals who all share common business values. In the case of large commodity derivatives trading companies, an emphasis on:

- complying with regulatory rules and laws;
 - valuing instruments based on pricing sources genuinely independent of the trading team; and
 - imposing strict position limits in all electronic trading systems
- are clearly core principles that all stakeholders in institutionally-sized commodity trading firms should embrace.

Commodity Indices

Commodity investors have had their own set of challenges in dealing with the complexities of the commodity markets. This has resulted in the design of new types of commodity indices.

Commodity futures investments can potentially be a store-of-value hedge for portfolios that have concentrated risk to the fortunes of US-dollar-denominated financial assets. The issue has been how to structure one's commodity futures investments so as not to have a massive amount of negative carry in doing so.

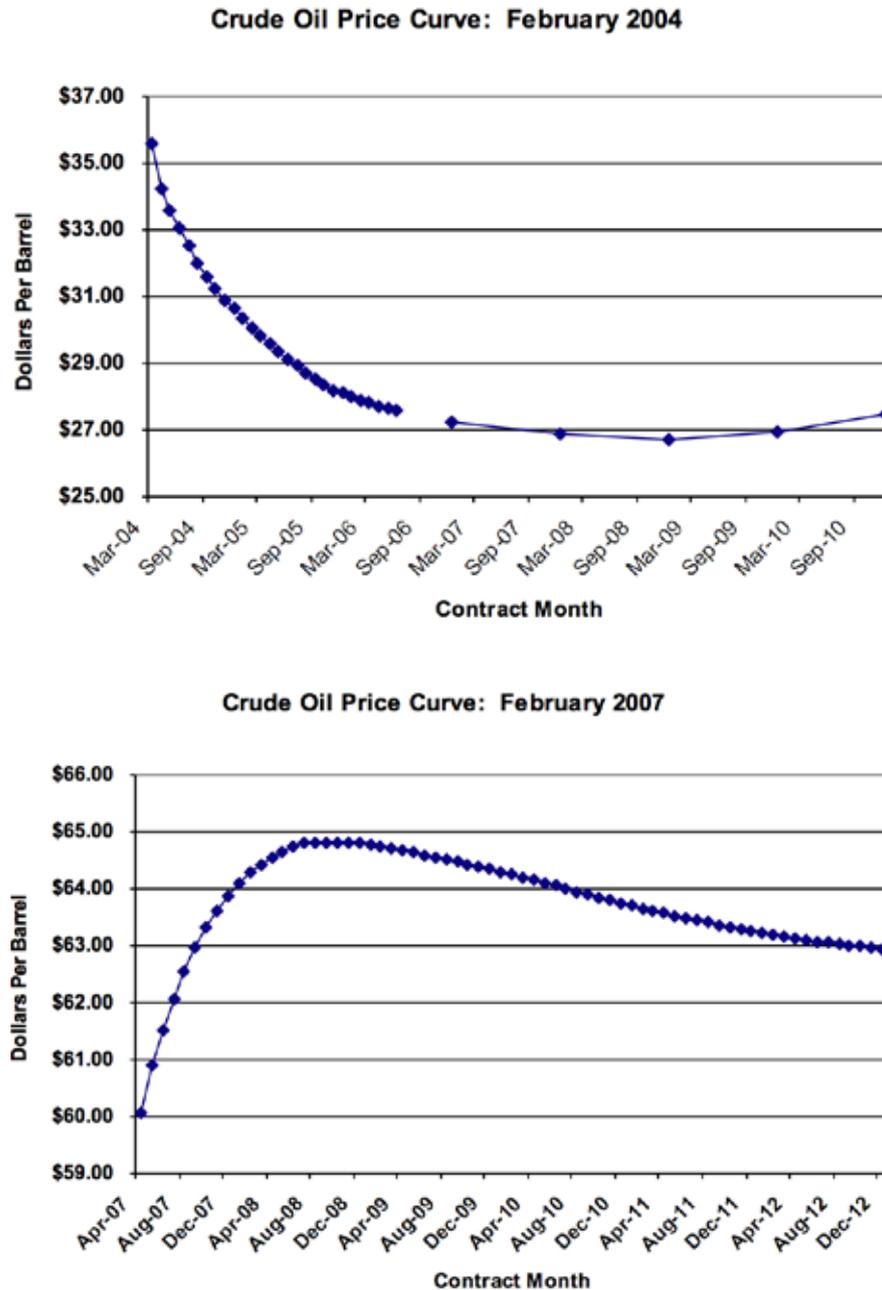
For example, in 2006, NYMEX crude oil futures contracts traded persistently in deep contango. As a result, even though spot crude oil prices barely moved from \$61.04 at the end-of-2005 to \$61.05 at the end-of-2006, a passive investor in crude oil *futures* would have lost 30% in 2006.

This is plainly too expensive a hedge.

A number of commodity-index providers have created a new generation of indices, which attempt to methodically provide exposure to spot commodity prices while minimizing the carry costs of such investments, particularly in the energy sector.

Exhibit 4 shows how volatile the crude oil futures curve can be.

Exhibit 4:



Data Source: The Bloomberg.

The top graph of Exhibit 4 shows that in February 2004, even if the spot price of crude oil stayed flat, there were potentially significant returns from buying deferred crude oil contracts and rolling up the curve. The bottom graph of Exhibit 4 shows that the curve effect was exactly the opposite in February 2007. One would have had to rely on large spot price increases to overcome the negative roll returns.

In 2007, index providers came up with different ways of handling these issues, including launching constant-maturity indices, where one's exposure would be concentrated in the presumably more stable back-end of the curve. Index providers also created new futures roll strategies that explicitly took into consideration how to maximize positive roll returns or at least minimize negative roll returns.

Each generation of new indices has converged to what are essentially rule-based strategies rather than actually being straightforward indices, which leaves open the question: is it possible to have "an active index"?

A natural question in viewing the proliferation of commodity indices is to ask: which approach is best? This depends on an investor's underlying rationale for investing in commodities.

If the rationale is solely absolute returns, then investors need to be very careful about the term-structure properties of the commodity index. Over the long term, commodities with positive returns have been structurally backwardated.

One also needs an appropriate rebalancing routine to capture the portfolio-level effects arising from the mean-reverting properties of spot-commodity prices.

But if an investor's primary purpose for investing in commodities is for diversification and to specifically protect one's portfolio against an oil shock, then one needs to ensure that the commodity investment has a healthy, structural weighting to the petroleum complex.

Some investors use commodity investments as a call option on Asian growth. In this case, the metals component of the commodities portfolio should be heavily weighted.

If instead the objective is short-term gains without regard for a fundamental view or for diversification, then the best tools have been long/short algorithms based on momentum rules.

Fuertes, Miffre, and Rallis (2010) describe a further enhancement to this idea. In their strategy, they double-sort on both momentum and term-structure signals to decide upon which commodities to invest in, given that both, individually, signals have been historically profitable.

Commodity Structured Products

One can keep up with commodity-product innovation by periodically checking the U.S. Securities and Exchange Commission's (SEC's) website, EDGAR, on what new commodity structures are being launched. For example, see Exhibit 5 for an excerpted description of a Deutsche Bank commodity structured note.

Exhibit 5:

Term Sheet No. 210R
To prospectus dated October 10, 2006,
prospectus supplement dated November 13, 2006 and
product supplement R dated April 4, 2007

Registration Statement No. 333-137902
Dated October 18, 2007; Rule 433

Deutsche Bank 
Deutsche Bank AG, London Branch
\$

Double Opportunity Securities Linked to the Deutsche Bank Liquid Commodity Index – Mean Reversion™ Excess Return (Non-Principal Protected) due November 28, 2008

General

- The securities are designed for investors who seek a return of two times the appreciation of the Deutsche Bank Liquid Commodity Index – Mean Reversion™ Excess Return up to a maximum return at maturity of between 27.00% and 29.00% to be determined on the Trade Date. Investors should be willing to forgo any coupon payments and, if the Index declines, be willing to lose some or all of their initial investment.
- Senior unsecured obligations of Deutsche Bank AG due November 28*, 2008.
- Minimum denominations of \$10,000, and increments of \$1,000 in excess thereof.
- The securities are expected to price on or about October 24*, 2007 and are expected to settle on or about October 29*, 2007.

Key Terms
Issuer: Deutsche Bank AG, London Branch

Term sheet reproduced from EDGAR [<http://www.sec.gov/edgar.shtml>] download.

Abbreviation: EDGAR stands for the "Electronic Data Gathering, Analysis and Retrieval" system.

Metals-Backed ETFs

The launch of several exchange-traded funds (ETFs), backed by a variety of physical metals in addition to gold, has provided commodity investors with new investment options. It appears that retail investors are intuitively re-creating the Bretton Woods accord: by holding metals-backed financial instruments. The US dollar had been precisely that until the Bretton Woods system collapsed in 1971.

Oil Investment Proxies

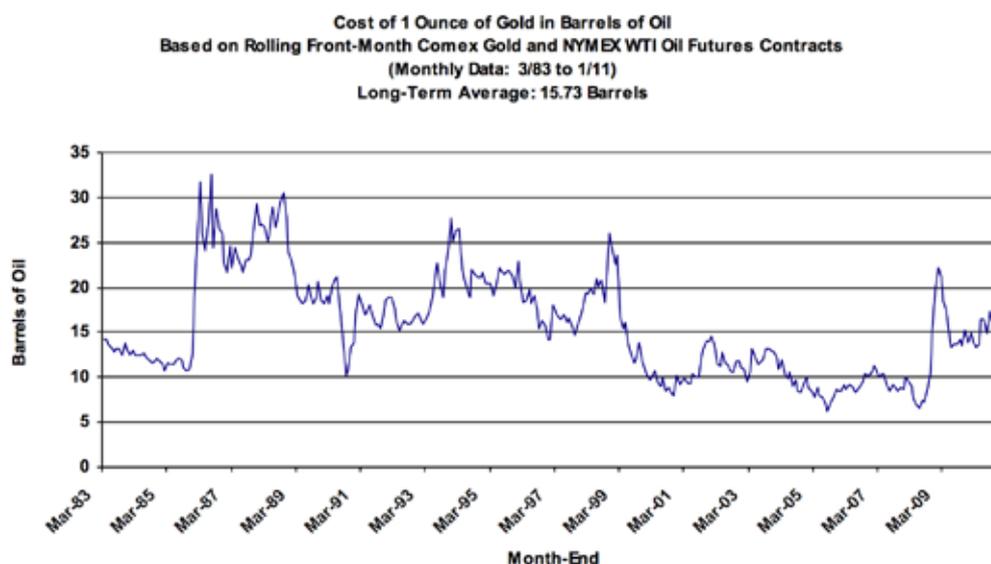
In addition to directly investing in oil futures, one has further alternatives with various oil proxies. The following are the returns for several of these proxies during 2009. Exxon Mobile declined by about -13%; buying and rolling oil futures contracts returned +13%; while the currencies of oil-exporting countries outperformed an oil futures investment. The Canadian dollar rallied 16%, and Norway's currency returned 20%, each with respect to the U.S. dollar.

If regulation regarding commodities futures trading ever does become draconian, one consequence may be that investors will have to switch from the futures markets to physical-commodity-backed ETFs and/or commodity currencies in order to express directional views on commodity markets. But at this time, there is no indication that this will need to be the case.

Outlook

In making predictions and observations about the commodity markets, it is admittedly difficult to do so during times of currency revaluations. For example, at the time of writing this article, the price of crude oil was above \$80 per barrel. This dollar price may look high, but in gold terms, the price of oil was roughly equal to its long-term average, which is shown on Exhibit 6.

Exhibit 6:



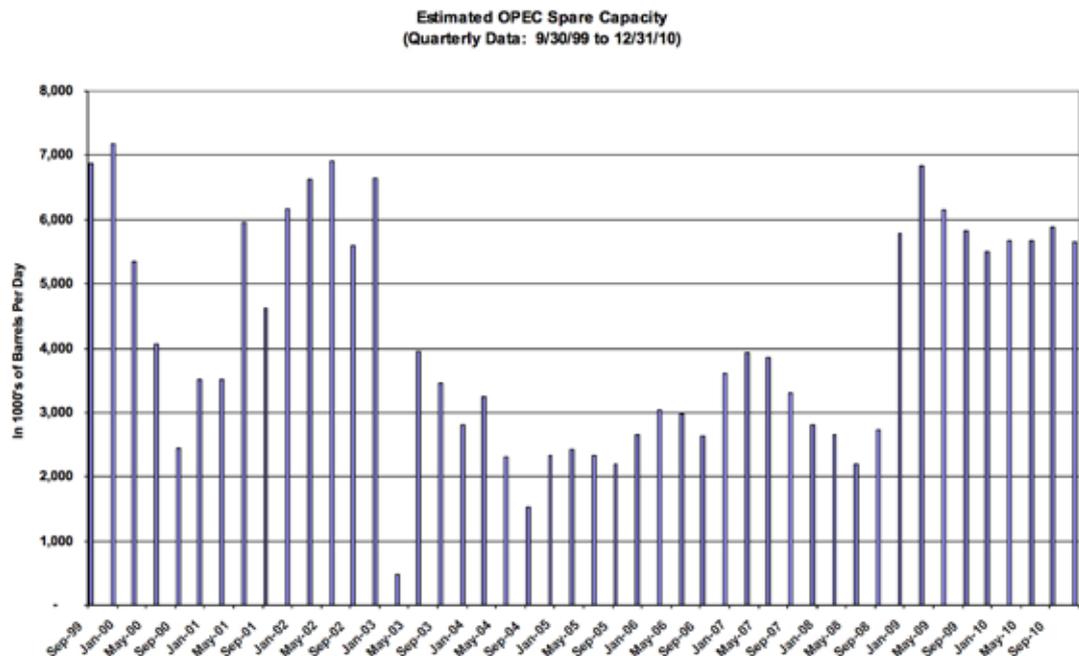
Data Source: The Bloomberg.

As of 17 February 2011, 15.86 barrels of oil could buy one ounce of gold.

In examining how much spare capacity OPEC has, it does not appear that oil prices will have the propensity to spike, so any rallies may have to be based on currency shifts. See Exhibit 7.

In reviewing the content of this article, a reader may note that successfully navigating the commodity markets' challenges relies on knowledge of political history, risk-management principles, quantitative techniques, currency trends, and fundamental analysis. In summary, those are the keys to intelligent commodity trading.

Exhibit 7:



Data Source: The Bloomberg.

Constructed from the Bloomberg Tickers:

OPCRECTO <index> - OPCRTOTL <index>.

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In 2012, EDHEC-Risk Institute signed two strategic partnership agreements with the Operations Research and Financial Engineering department of Princeton University to set up a joint research programme in the area of risk and investment management, and with Yale School of Management to set up joint certified executive training courses in North America and Europe in the area of investment management.

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