



GLOBAL *Resources* INVESTING

Global Resources: Energy Industries

In the first installment of this series, we addressed one of the structural differences between investing in natural resources via commodity futures and the equities of companies in these sectors. We highlighted how the structure of the futures markets can cause divergence between the returns earned by “spot market” investing and returns earned by rolling futures contracts. We concluded by suggesting that investments in natural resource companies may provide returns more consistent with “spot market” investing, especially when futures markets are in *contango*.

This paper will explore a significant aspect of the commodity related equity market: the diversity of related industries comprising the natural resources, and especially the energy sectors. Though each industry is vital to the ultimate consumption of the resource, changes in resource prices affect each industry differently. Equity investors can benefit from the different risk and return patterns for each industry.

The energy sector, especially oil-related companies, have the most clearly defined and segmented roles across different subsets of companies, though other sectors have similar divisions of labor. As a result, this article focuses primarily on the oil sector and its related industries.

THE IMPORTANCE OF VALUE. Investors who access the natural resource market through futures contracts express a unitary viewpoint – changes in supply and demand balances will be reflected in resource prices. If supplies increase, the price will fall, if they decrease, the price will rise. However, the changes in the resource markets that have sparked the renewed interest in this sector have impact beyond the price of the resource. Increasing demand for natural resources has increased demand for the services required to create usable products. We do not consume crude oil in the ground, we buy refined gasoline at a pump near our homes. Natural resources need to be discovered, extracted, transported and refined in order to

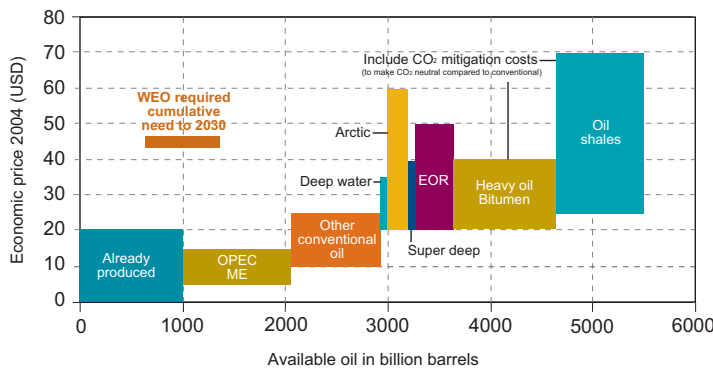
be valuable. Minerals in a place forever inaccessible have little or no value.

A significant difference between natural resource investing through underlying commodities and through equities of companies is the notion of value. For commodities, price = value. The value of a barrel of oil is whatever its price is on the exchange. Someone may think the price will go higher or lower, but there can be little debate on its underlying value. Equity investing has value inherent in the process. More importantly, value does not always equal price. This value/price discrepancy can come from several factors, including:

- Different companies have different implied prices for the same resource. Gold company X may have an implied gold price of \$625/oz, while Gold company Y has an implied price of \$650/oz. All else equal, Company X is a better value.
- Stocks of natural resource related companies will react to price changes in the underlying commodity. However, they may also under or over react to these price changes. These inefficient price movements can yield extra return for value investors.
- Stocks of natural resource companies may “time shift” (that is, lead or lag) with respect to price changes in the underlying resource. Such time shifts may lead to investment opportunities, assuming a correct view on the permanence of changes in resource prices.

MEETING DEMAND. Barring a significant change in technology, demand for carbon-based fuels will increase steadily over the next few decades. The world is not running out of hydrocarbons. But the world has depleted a significant portion of its low hanging fossil fuel fruit – close to the surface, easy to process crude oil. Future hydrocarbon demand

Chart 1. Availability of oil resources as a function of price



The x axis represents cumulative accessible oil. The y axis represents the price at which each type of resource becomes economical. Source:IEA

will require drilling deeper wells, the extraction of heavier and dirtier grades of crude, and extracting oil and gas from shale, tar sands and similar unconventional sources. This will require massive infrastructure spending on new drill rigs, new equipment for servicing these wells, and additional refining capacity to transform these substances to usable fuels. Chart 1 shows the potential sources of hydrocarbon fuels to meet future demand.

The supply and demand balances for natural resources themselves have been well researched. Much less attention has been paid to the supply and demand balances for these services that are required for the economic value to be realized from raw crude oil in the ground. Decades of low energy prices have dampened capital expenditures in these industries. Chart 2 shows estimated required expenditures to meet energy demand.

Investors have also largely overlooked the entire production chain when investing in natural resources. Futures contracts focus investor attention

entirely on the raw material; yet the price of crude oil is determined by supply (related to exploration and production, drilling and servicing companies) and demand (influenced by refining and marketing companies). Focusing strictly on the price of crude ignores other opportunities in a complex industry.

INDUSTRIES DEFINED. EXPLORATION AND PRODUCTION (E&P) companies are at the beginning of the energy production chain. These are companies that own (or have legal claim to) oil or natural gas in the ground, and have the right to extract and sell that resource. Profits of these companies are most highly dependent upon the price of the resources themselves. In theory, these companies represent the closest thing to a “pure play” in the natural resource markets.

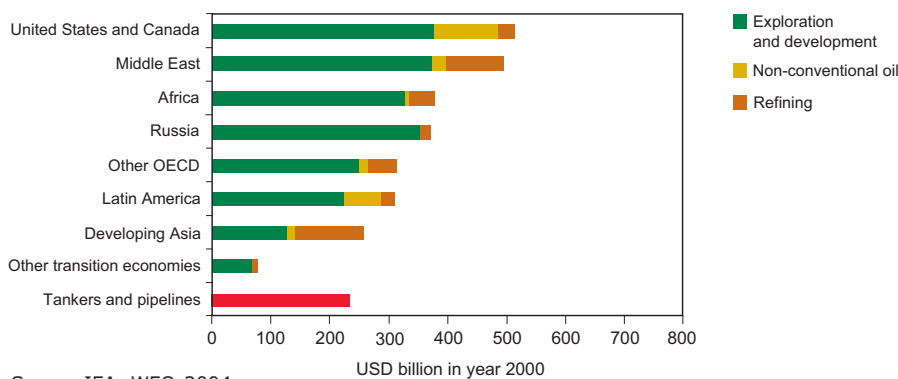
CONTRACT DRILLING companies own and operate the drilling rigs. These rigs are rented out to companies looking for additional resources. Many companies have specialties, either by resource (gas or oil) or by type of drilling (onshore or offshore).

SERVICING companies perform a wide variety of other activities associated with the operation and maintenance of wells and activities done to increase extraction from existing wells. These activities include conducting geological research to direct new drilling, pumping materials (water, specialized chemicals, carbon dioxide) down wells to force out the desired resource, cementing well heads, clearing dirt and mud out of holes and many others.

The current revenues of both drilling and servicing companies are independent of the price of oil or gas. These companies are paid for equipment rental, time of service required, labor and technical experience. They are paid neither on the market price nor the amount of the natural resource extracted. The value of these businesses is related to the price of the resource, but the relationship is complex.

REFINING companies are those that change crude oil, itself unusable, to useful products, including heating oil, gasoline, jet fuel and naphtha, the feedstock for petrochemical and many types of plastics. As with the servicing and drilling companies, the prices of these companies may be highly

Chart 2. Cumulative global oil investment needs, 2003-2030



Source:IEA, WEO-2004

correlated to the price of oil. But consider the business of these companies. For oil refiners, crude oil is an input, a cost of production. All else equal, falling crude oil prices should increase the earnings for refining companies.

PIPELINE companies are companies that ship oil and gas, via pipelines, from wells to major refining and transportation hubs. These companies are often structured as publicly traded partnerships, and pay out the majority of profits earned. Similar to drilling companies, their revenues are derived

the demand and supply for crude oil and finished products has increased. There is effectively no excess capacity in the refining system. As a result, even relatively modest interruptions in global refining can lead to price hikes for finished products like gasoline and home heating oil. Chart 4 shows how refining capacity has changed over the past forty years.

Unlike the production-oriented aspects of the energy industry, which are constrained by the physical availability of the resource, constraints on the refining industry are largely political. Oil refineries are a source of both air and groundwater pollution and are generally undesirable. Ironically, as a region becomes wealthier, environmental awareness increases; yet at the same time, so will demand for gasoline and other refined petroleum products.

Refining presents a rare investment opportunity in that demand for refined products is stable and relatively price insensitive. Even in the summer of 2006, when gasoline prices in most

from royalty payments for use of their pipes. The actual price of the commodity being shipped doesn't have a short term effect on the companies' revenues.

INTEGRATED companies are those that engage in several of these activities. The major global oil companies are classified as integrated energy companies.

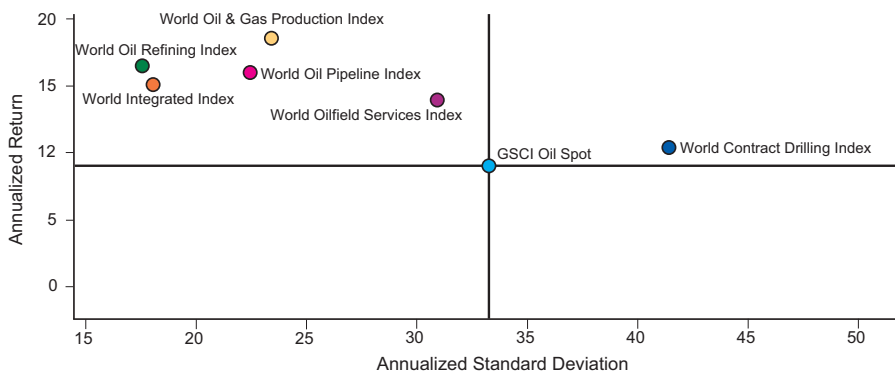
HISTORICAL PERFORMANCE. Each industry in the energy sector has unique risk and return characteristics. In addition, each industry group has its own relationship (correlation) and sensitivity (beta) to the price of crude oil. Chart 3 shows the performance of the major energy industries relative to the spot price of oil.

INDUSTRY OUTLOOK AND OPPORTUNITIES. REFINING. Of all the related energy industries, oil refining receives the most attention. The hurricanes that hit Louisiana and Texas in the summer of 2005 reminded the nation of the *de facto* moratorium on oil refining construction for almost 30 years. Globally, oil refining capability peaked over 25 years ago, even as both

regions in the United States were above \$3/gallon and breached \$4/gallon in select markets, demand for gasoline actually increased slightly. The input for oil refineries is crude oil, which shows great price volatility. However, lower crude prices can actually benefit refining companies, as their input costs are lower.

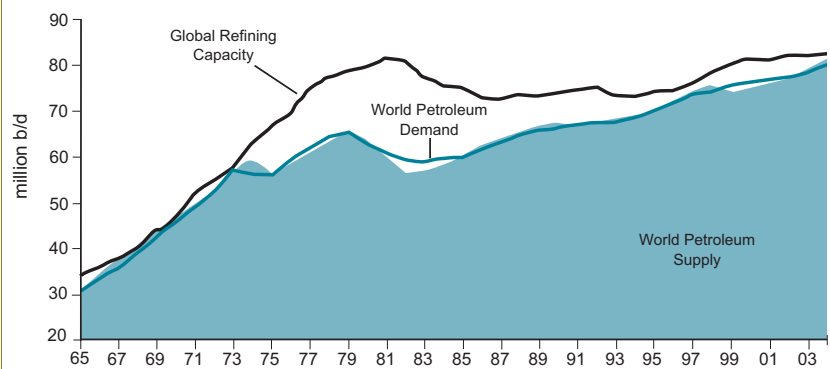
CONTRACT DRILLING AND SERVICING. Over longer periods, it is clear how and why the drilling indus-

Chart 3. Performance of energy industries 01/1997 to 12/2006



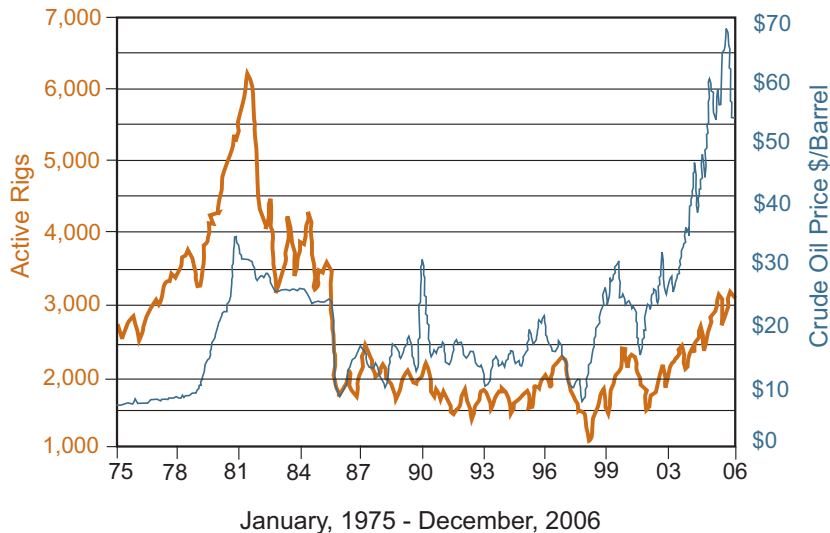
Source: Factset

Chart 4. Oil refining capacity peaked in 1981



Source: IEA and Goldman Sachs commodities research

Chart 5. World rotary rig count: 01/1975 to 12/2006



Source: Baker-Hughes, Energy Information Administration (DOE), WTRG Economics

try relates to the price of oil. Sustained higher oil prices leads to increased exploration as companies become more confident that capital expenditure will be rewarded. Chart 5 displays the relationship between the number of drill rigs employed and the price of oil. Not surprisingly, new energy exploration nearly ceased when oil fell below \$10/bbl in the late 1990s. While the number of drill rigs has increased with the recent rise in oil prices, drill rig count is still below where it was in the mid-80s.

As in the other sub-sectors of the energy industry, flat oil prices (negative in real terms when adjusted for inflation) discouraged the production of new oil rigs. Though rig count has increased, it has proven difficult for the industry to significantly expand additional capacity. Chart 6 details how the current lack of capacity for drill rigs has led to a more than four fold increase in rig rental rates since the beginning of 2004.

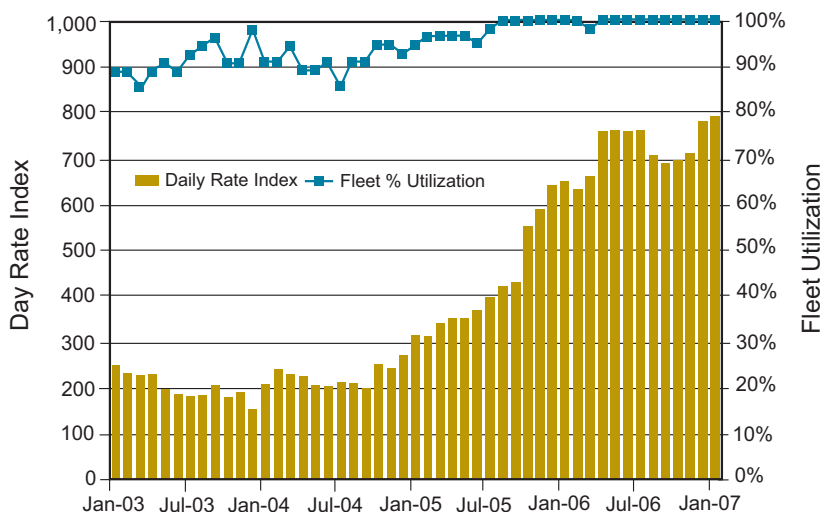
If the world is going to use hydrocarbons to meet energy demand, hundreds, if not thousands of additional drill rigs are going to have to be built

deployed in the field, with wells serviced and maintained.

CONCLUSION. This report has presented the case for incorporating the entire production chain as part of an allocation to natural resources. Assuming oil prices stay high relative to their history, there will be significant additional spending in the drilling, servicing and refining industries. These industries are integral to the production of oil. Without them, there would be no oil market nor available futures contracts. Demand for energy must be felt in the demand for related services. We have also detailed some of the differences with respect to how each industry may react to a change in the prices for energy resources. As a result, we believe that there is opportunity for investors to construct portfolios with attractive risk

and return characteristics. Given the importance of the related industries, it is appropriate for investors to consider them as a portion of their portfolio allocation to commodities. ♦

Chart 6. Worldwide competitive 5,001' + Floating rig day rate index 1994 = 100 Current Month (January 2007) = 787



Source: ODS - Petrodata