



## **Commodities and Natural Resource Scarcities**

*March 25, 2008*

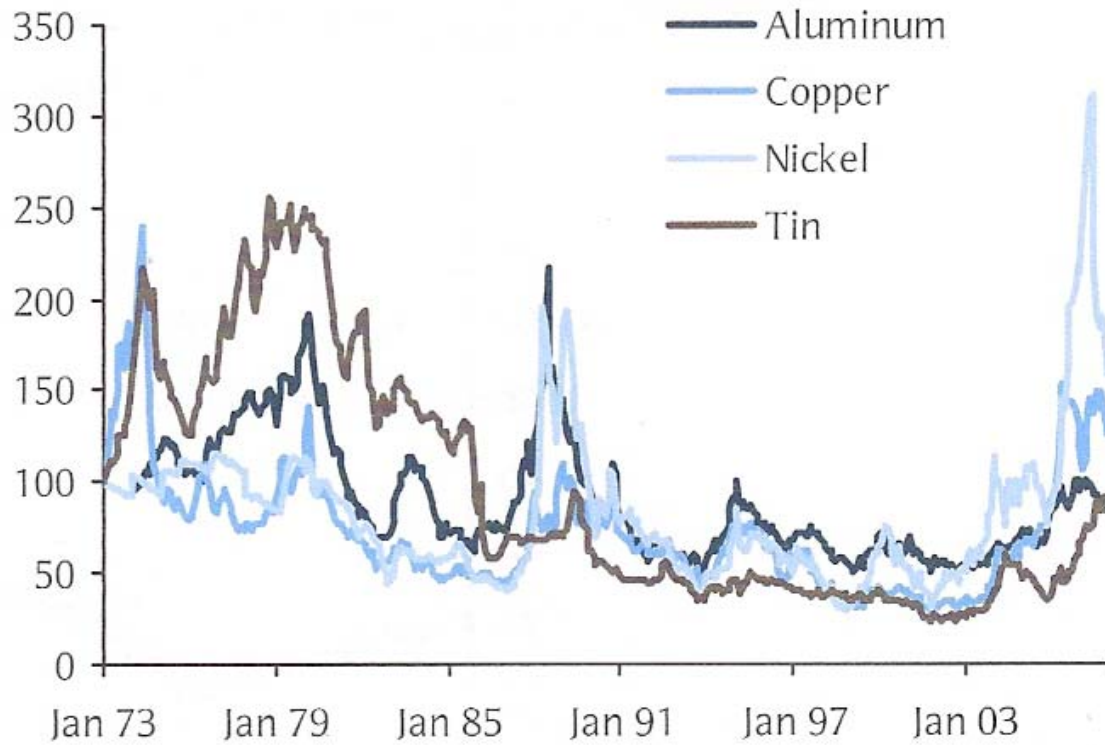
The surge in commodity prices has abated, perhaps temporarily. But for advisors and investors looking long-term, the question remains – what role do commodities play in the asset allocation for long-term investors?

Tim Bond and Nicholas Snowdon of Barclay's Capital provide part of the answer in their study, "For richer, for poorer," which appeared in Barclay's Capital 2008 *Equity Gilt Study*.

For many commodities, demand is outstripping supply at an accelerating pace. With scarcity becoming a real possibility in 20 or 30 years, investors can benefit from long-term imbalances.

In his recent [article](#), Craig Israelsen documented the benefit offered by diversification with commodities. Bond and Snowdon provide compelling data that commodities will be the driving force in world economies over the next several decades.

Over the last 35 years, commodities have fared poorly, generally breaking-even against inflation. Below is the inflation-adjusted data for several major physical commodities, as well as oil:





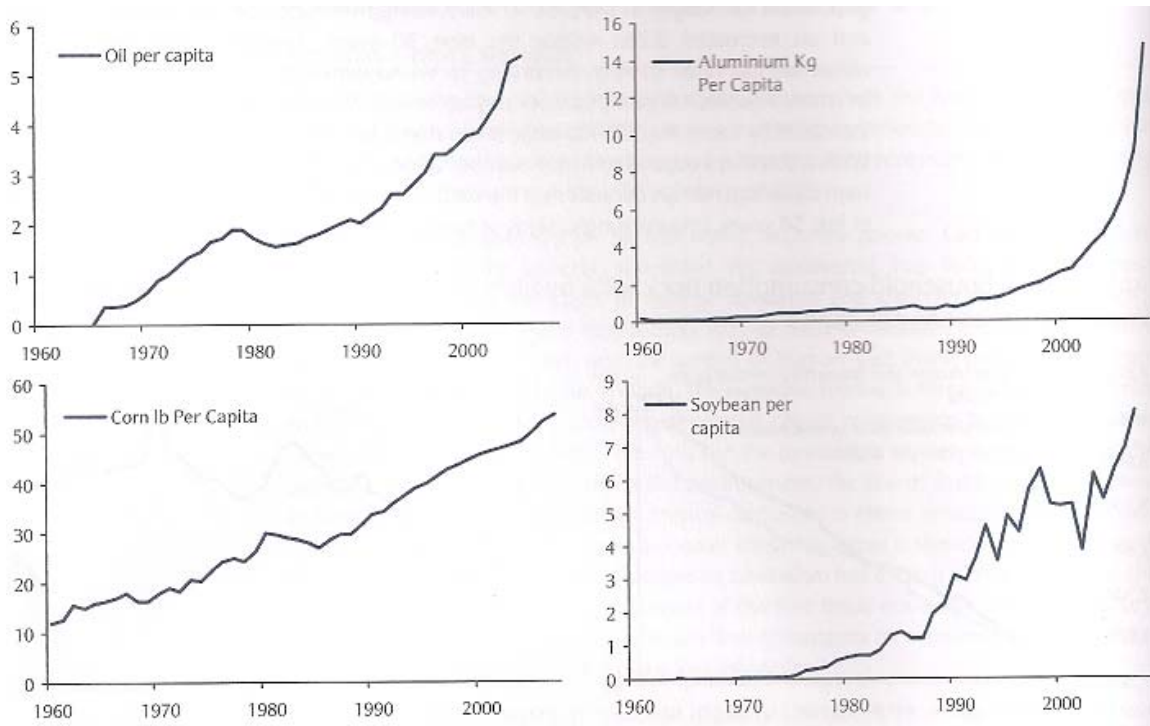
Underlying poor commodity performance over this time period has been a general balance between supply and demand. Commodity prices increases led to new investment and technology advances, spurring additional exploration, increasing supplies and driving prices down. But Bond and Snowdon claim that “the yield from exploration efforts is in decline, a condition compatible with the idea that the most easily exploitable and fruitful raw material deposits have either already been exhausted or are already in production.”

Global demand, fueled primarily by China and India, is on a pace to outstrip supply for many key commodities, leading to escalating prices and irreversible damage to the ecosystem. In their words, “as the world becomes richer, so the world becomes poorer.” Unrestrained economic growth is pushing up against physical limitations, and we are seeing the effects in CO2 levels, falling fish stocks, increase desertification and the shrinkage in tropical forests.

Global population increased from 2.5 billion in 1950 to 6.7 billion currently, and is projected to be 9.2 billion within 30 years. World Bank data indicates that, from 1960 to 2004, inflation-adjusted consumption per capita for middle and upper income economies grew by more than 200%, and by 60% for lower income economies. Bond and Snowdon conclude that “human demands on the earth’s resources have risen by four to five times in just 50 years. Unsurprisingly, signs of stress are beginning to proliferate.”

### **The World Oil Markets**

The growth of the Chinese economy has been accompanied by a surge in per capita demand for several key commodities. Bond and Snowdon document the growth in per capita consumption for four key commodities since 1970:



China has been responsible for 50% of the increase in global primary energy demand since 2000. As a result, China has now passed the US as the world's largest emitter of CO<sub>2</sub>, which Bond and Snowden assert is a "direct result of rising per capita income and consumption."

To put this growth in perspective, U.S. per capita energy consumption is now roughly seven times that in China and India. If Chinese and Indian per capita energy consumption rises to the level of the US, the oil consumption *from these two countries alone* would be 160 mbd (million barrels per day), approximately *twice today's global oil consumption* (of 85 mbd). This would deplete the world's proven oil reserves in just 15 years.

But even a modest increase in oil demand does not appear feasible. [IEA](#) data shows that even if Chinese and Indian demands rise to levels well below those seen in developed economies, world oil demand will increase 55% over the next 23 years. The oil industry would need to invest \$5.4 trillion (in constant prices) to keep pace with demand. Most of this supply will come from OPEC, increasing their market share from 42% to 52%, and would, according to Bond and Snowden, "clearly increase the cartel's ability to extract higher rents from oil production," provided OPEC can manage increase supply fast enough.



Bond and Snowdon cite data suggesting an oil crunch could come sooner. Today, total spare production is approximately 1.5 mbd, perilously close to estimates of increased demand for 2008, which range from 1.6 to 2 mbd. Ability to meet this and projected 2009 demand hinges on non-OPEC supply, “a sector that has consistently disappointed supply expectations,” and a lack of supply disruptions (i.e., natural disasters or project delays). Bond and Snowdon say “the oil market has reached a juncture at which the supply-demand balance is starting to teeter on the brink of a crunch.”

The cause of the imbalance is the depletion of non-OPEC (US, UK, Norway, and Mexican) supply, increased demand from developing economies (primarily China and India), and the increased cost of capital equipment and labor required for exploration and mining. Taking into consideration projected CO2 emissions, Bond and Snowdon say the “current hydrocarbon dependency is not a feasible path” if per capita consumption continues at its current pace in developed economies.

### **Industrial Metals**

The scenario in the oil market - dwindling supplies, an increasing marginal cost of extraction, and surging demand fueled by increased per capita consumption from developing economies - is being replicated in the industrial metals market. Bond and Snowdon look at supply data for five base metals (copper, zinc, nickel, lead, and tin), showing that known supply (technically defined as the “reserve base”) ranges from 23 to 38 years at current demand levels, a result they characterize as “suggestive of distinct scarcity.” As with oil, estimates of additional hypothetical supply vary widely and are many times greater than the reserve base, which may ease pressure on the market, but these supplies will almost certainly have higher marginal extraction costs.

On the demand side, using copper as an example, Bond and Snowdon show that a rise in per capita Chinese consumption to levels of other industrialized Asian economies (Taiwan, South Korea, and Japan) would push Chinese demand to 177% of current global production. Making the same assumption for Indian consumption pushes the combined Chinese and Indian demand to 2.5 times global production, exhausting the reserve base of copper supplies in less than a decade.

Bond and Snowdon estimate it will take ten to twenty years for Chinese demand to reach the levels of other Asian economies. Indian per capita consumption is lower than in China (e.g., oil consumption is 40% of Chinese levels) and growing at a slower rate. But they claim “competitive pressure in the Asian region” could push demand in India to higher growth rates.



Copper prices, as with many other commodities (including oil) are now at inflation-adjusted prices comparable to levels in the early 1970s. However, this increase in real prices has not stimulated an increase in supply. Real prices began their rise in 2002, and we believe it is premature to conclude that market forces will fail to stimulate additional supply. Bond and Snowdon disagree, describing the situation as one where “yield from exploration efforts is decline, a condition compatible with the idea that the most easily exploitable and fruitful raw material deposits have either already been exhausted or are already in production.”

Ecological and social factors will ultimately mitigate price increases stemming from supply-demand imbalances in the commodity prices. Per capita energy consumption dropped in developed economies as a result of the 1970s energy crisis, and there is evidence the same is happening now. Compromises in our standard of living, from driving smaller cars to resetting thermostats, spurred by ecological degradation from resource consumption, will dampen per capita consumption.

### **Implications for Advisors**

For advisors, Bond and Snowdon believe the inevitable outcome will be a rationing of commodity supplies through higher prices, saying that “the outlook is reasonably clear, favoring a lasting secular rally in real natural resource prices.” Cyclical effects, including the current economic slowdown, will soften prices, but “the long-run trajectory for raw material and energy prices is firmly upward.”

More specifically, Bond and Snowdon offer six predictions for global economies:

- (1) Rising commodity prices will be inflationary on a global level, and higher interest rates will result in lower P/E ratios in all markets, as compared to the last 20 years
- (2) Inflationary pressure will increase volatility in output, growth, and employment.
- (3) In response to this macroeconomic volatility, the risk premia embedded in the equity markets will increase. Investors will require higher returns for an increased level of risk, creating downward pressure on prices.
- (4) Increasing interest rates will force households to reduce their debt levels. This de-levering may reduce per capita consumption levels and decrease the strain on natural resources. The United Kingdom, where Barclays is based, has the highest household debt in the world, according to a recent *New York Times* [article](#).



- (5) The natural resource sector will receive an increasing share of economic activity and investment.
- (6) Certain industries are likely to suffer. Auto manufacturers will continue to struggle unless they adapt to higher oil prices, tighter regulation, and shifts in consumer taste toward more efficient cars. Airlines may be the biggest losers, with the demand for air travel reducing as higher oil prices are passed on to customers.

The classic argument against commodities, as an asset class in a portfolio, is that, unlike businesses, they do not generate intrinsic cash flow. For most of the last 40 years, the empirical data supported this view, and commodities offered returns roughly paralleling inflation, with trading driven by speculation and short-term demand-supply imbalances. We concur with Bond and Snowden, and believe the next 40 years will be a lot different. Growth in developing economies will create resource scarcity in many commodities, and advisors with long term time horizons should adjust their asset allocation models to take advantage of these dynamics.

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