

THE ROLE OF INSTITUTIONAL INVESTORS IN RISING COMMODITY PRICES

What is Moving Commodity Prices?

Most casual market observers know that commodity prices have increased dramatically in recent years, with grain and energy markets making almost daily headlines amid their march to higher prices. While commodity markets have a diverse and complex set of factors which drive prices, many market participants have started to use terms like speculation and "bubble," often placing blame with institutional investors.

It can be tempting to draw causality between rising commodity prices and rising institutional investment in commodity futures markets. After all, it is estimated that passive commodity investments doubled from 2004 to 2005, and then doubled again from 2005 to 2007.¹ From \$36 billion in 2004 to \$175 billion in 2007, investment flows and capital appreciation have raised institutional investment to over \$240 billion at the end of the first quarter of 2008.

Why are Institutional Investors Attracted to Commodity Futures Investments?

Much of the institutional interest in the commodity space can be traced back to the conclusions of a highly influential article published by Gorton and Rouwenhorst in 2006.² Over a 45-year period, the authors found that fully collateralized commodity futures investments earned returns similar to those generated by the stock market with comparable risk. The main attraction, though, comes from the fact that commodity futures have a low, and sometimes negative, correlation to stock prices. Commodity futures

also offer a low correlation to bond prices. As we have seen so dramatically this year, stock prices have been moving lower as commodity prices move higher. If commodity markets continue to offer their highest returns in times of falling stock and bond prices, portfolios that contain both stock and commodity investments will be less risky than either of those asset classes individually. In times of strong stock markets, such as the 1980s and 1990s, commodities have underperformed stocks. During the inflationary periods of the 1970s and the current decade, commodity prices have outperformed stock prices. The fact that commodity prices are correlated with inflation makes commodity investments especially attractive to pension funds for which the income paid to beneficiaries increases with the rate of consumer price inflation. While commodities may not be an appropriate investment for all pension plans, those plans that choose to invest frequently cite the higher correlation to inflation and the lower correlation to stock and bond prices as the main justification for their investment.

How do Institutional Investors Access the Commodity Futures Markets?

Gorton and Rouwenhorst make the case for institutional investment in commodity markets based on a "fully collateralized commodity futures investment." In a fully collateralized investment, investors don't employ margin in their commodity portfolio, but hold 100% in cash reserves relative to the notional value of the commodity futures contracts. There is little evidence that commodity

¹ Gresham Investment Management, Strategic Commodities Funds 2007 Annual Review

² Gary Gorton and K. Geert Rouwenhorst, *Financial Analysts Journal*, Vol. 62, No. 2: (March/April 2006) 47-68

index investors are trading using the minimum margin allowed by futures exchanges. However, traders in the swaps and structured notes markets may be employing significantly more leverage in their trading. If most institutional investors are closer to fully collateralized than to fully margined, regulatory changes to increase margin requirements will be ineffective in reducing institutional investment in commodity futures. Should institutions be regulated out of the futures markets, it is likely that they would simply move their positions to the unregulated over-the-counter markets, where their trading activity may be relatively unchanged from its current level.

When institutional investors allocate funds to commodity markets, they authorize investment managers to invest in the futures markets on their behalf. While these managers have entered into long positions on billions of dollars in commodity futures investments, investors typically only invest in futures markets, and frequently have no dealings in the physical markets. Every contract of passive commodity futures markets exposure is sold to another market participant before the contract expiration. The end user will choose to store or consume that commodity. This is a key distinction, as it is important to note that institutional investors are neither storing nor consuming commodities.

An investment in a commodity futures index product is implemented through the purchase of futures contracts for the front or second month in each underlying market. Front-month futures contracts have a relationship to the underlying cash commodity markets, as the cash and

futures prices must converge at expiration. Futures contracts held to expiration are typically converted into physical commodity positions. It is important to understand that commodity index funds roll their positions to later months before the expiration date or delivery period, so that institutions do not ever consume or take delivery of physical commodities. Actively-managed funds take positions that can differ from the index, both in timing and the allocation to specific commodity markets. Active funds may take positions in later dated contracts, such as three to six months deferred from the front month contract. If a fund purchases futures contracts in deferred months, those trades have a less direct impact on the market price for physical commodities than when investing in the front month futures contract.

How Much of the World's Commodity Supply is Controlled by Institutional Investors?

In order to estimate the impact of institutional investors on commodity markets, we need to understand the structure of the market. We multiplied the 2008 estimate of \$240 billion institutional investment in commodities by the allocation to various commodity markets in the two most popular commodity futures indices. Taking the average allocation of the S&P GSCI and the Dow Jones-AIG Commodity Index, the futures market investment is allocated as follows on the following page.

	Percentage of Commodity Indices	Institutional Investment (2008)	Institutional Share of World Production (2008)
Energy products: crude oil, heating oil, unleaded gasoline, natural gas	57.7%	\$138.5 billion	3.7%
Precious metals: gold and silver	5.2%	\$12.5 billion	15.1%
Industrial metals: aluminum, lead, nickel, zinc, copper	12.5%	\$30.0 billion	10.4%
Food and fiber: cocoa, coffee, corn, cotton, soybeans, sugar, wheat, cattle, hogs	24.7%	\$59.3 billion	8.1%

Source: S&P GSCI, EnnisKnupp calculations

The institutional share of world production is calculated as the institutional investment of \$240 billion divided by the U.S. dollar production value in each commodity market estimated by Standard and Poor's for the GSCI. As of June 2008, S&P estimates the worldwide production value of all GSCI constituent commodities as \$4.84 trillion. The appropriate denominator is the annual production of each commodity, rather than inventories. The vast majority of energy and food products produced each year are rapidly consumed, which means that ending inventories are small relative to total consumption. Consumption of precious metals, especially gold, is minimal. These statistics tell us that institutional investments in energy products total about 3.7% of worldwide production, while coming in at 8.1% of food and fiber production.

Supply and Demand

Thomas Carlyle once said "Teach a parrot the terms 'supply and demand' and you've got an economist." While that may be an over simplification, the supply and demand dynamics

are clearly driving today's commodity markets. Worldwide demand for many commodities is rising much faster than supply, which leads to higher prices. In economic terms, the key problem is that these markets are inelastic, meaning that demand does not significantly decline during times of rising prices. Ideally, we would hope that higher prices would increase commodity supply, while those same higher prices would decrease commodity demand. Unfortunately, higher prices have not led to significant increases in commodity supply, especially in metals and energy where supplies are difficult to locate buried in the earth. Even in the face of doubling energy prices, demand in North America has fallen less than 1% over the last year. Commodity prices will decline only when one of the following conditions is met: supply significantly increases (such as the discovery of a large new oil field) or demand drops sharply (such as a recession in emerging markets).

The Emerging Markets Story

Much of the commodity story can be traced back to emerging markets. Consumption of all types of commodities has increased as incomes of (especially Asian) consumers have increased. Energy consumption has increased to fuel growing exports and an increased number of automobiles. Upgraded diets feature more meat, which increases the consumption of grain for animal feed. In the U.S., 10% of corn is directly consumed by humans, while 55% of corn is used as animal feed. As Asian consumers increase the amount of meat in their diet, the demand for grain will continue to soar, as it takes 5 to 7 pounds of grain to produce one pound of pork or beef.

As you can see from the table below, consumption has increased more quickly than

production in energy markets from 2002 to 2006. Not only was this trend in place worldwide, but also in the U.S., Asia-Pacific and Middle East, and Africa regions. The decline in production in the U.S. has been especially dramatic, as consumption has grown by over 15% over a five year period in a vast swath of the Eastern hemisphere. The Asia-Pacific region now consumes more energy than North America, and consumption growth is more than three times that experienced in developed markets. China alone increased its share of world energy consumption from 6.4% to 9.0% in just five years. Total institutional investment in the energy markets, at 3.7%, can be viewed as 15.4% of U.S. or 12.5% of Asia-Pacific consumption. Again, it is important to note that institutional investors sell their energy investments to end users instead of consuming or taking physical delivery of the oil.

Energy Markets	World	U.S.	Asia-Pacific	Middle East and Africa	Rest of World
Change in Production	8.6%	-10.7%	0.7%	14.0%	9.8%
Change in Consumption	8.9%	4.8%	15.7%	18.1%	3.9%
Share of World Consumption		24.1%	29.5%	10.6%	35.8%

2002 to 2006, Five year change in production and consumption of commodities by region

Source: U.S. Department of Energy

Where Have All the Exports Gone?

U.S. Department of Energy data shows that worldwide exports of energy products declined by 2.5% from 2006 to 2007, making it more difficult (and expensive) for nations to consume more energy than they produce domestically. Notice from the table above that the Asia-Pacific region, as well as the Middle East and Africa, have been growing consumption much more quickly than production over the last decade. While energy

imports to China increased by 163%, exports from the Middle East and Africa increased by only 12% as production in that region grew more slowly than demand.

In another example, governments across Asia have taken drastic steps to maintain supplies of rice. In some cases, governments have banned rice exports or prosecuted those who are found to be hoarding excess inventories. While demand for rice continues to increase, poor weather has

reduced supplies. Rice is trading at record high prices, even in the absence of institutional investment, as rice is not a component of the most prominent commodity indexes.

The Role of Biofuels

Historically, a key part of the commodity story used to be that the prices of grains, metals, and energy products were uncorrelated with one another. A portfolio of volatile commodity prices, then, would be less volatile than the individual commodities, as the price of agricultural commodities might be increasing while energy products may be declining in value. The commodity markets have changed with the new focus on biofuels, which use agricultural products to generate energy. In this new paradigm, the energy markets have a stronger influence on the price of grains, so the correlation between agricultural and energy prices has risen slightly above its historic level. Even though the correlation has risen, the current level of the correlation is still low enough to allow agricultural products to serve as effective diversification for a portfolio of energy products. As energy prices increase, more food products are used as a substitute for petroleum based energy products, and grain prices move higher from the increased demand. Corn and sugar are used to produce

ethanol, while soybeans are used in the production of biodiesel. While the entire food supply used to be ultimately consumed by people in either the form of grain or meats, a growing portion of the world's food supply is now being diverted into energy production.

There has been a dramatic increase in the use of food products for the production of energy. The demand for grains used in ethanol production has grown at twice the rate of the food demand for grain in recent years. The USDA estimates that 19% of the entire 2006-2007 U.S. corn harvest was consumed in the production of ethanol, which was a growth rate of 30% from the prior year. This vast use of corn, in addition to significant amounts of water and natural gas, creates a supply of ethanol that only satisfies 3% of U.S. gasoline demand. Estimates of the share of the 2008 harvest destined for energy uses are as high as 30%. As more U.S. acreage is planted with corn to satisfy the growing demand for corn-based energy products, the acreage dedicated to other crops, notably wheat and soybeans, has declined. This decline in plantings of other grains has led to dramatically higher prices. Grain prices would likely fall significantly if the portion of the U.S. harvest diverted to energy uses declined.

Wheat	Change in Production	4.0%
	Change in Consumption	5.2%
	Consumption/Production	102.0%

Corn	Change in Production	29.9%
	Change in Consumption	24.0%
	Consumption/Production	101.1%

2001 to 2007, Seven-year change in production and consumption of commodities

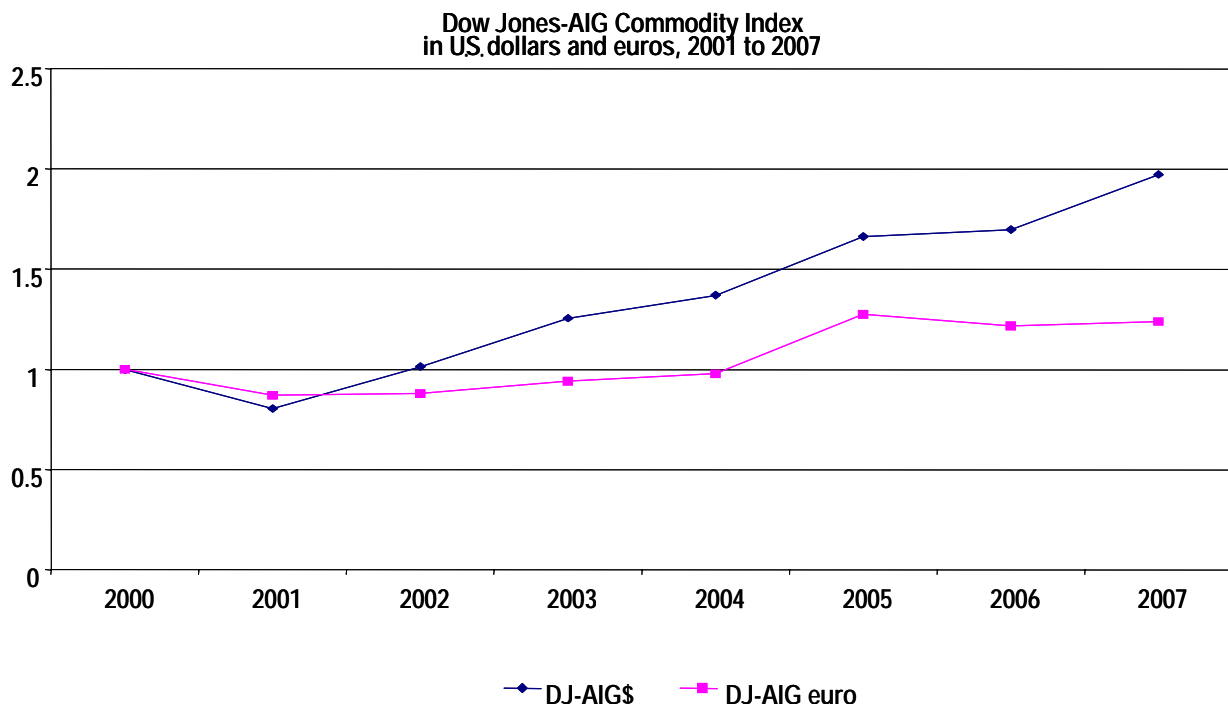
Source: U.S. Department of Agriculture

Notice that while corn production has increased by nearly 30% since 2001, consumption has increased by 24%. Inventories are declining over time, as over 101% of the production over the last seven years has been consumed. Production in 2007 was only 1.2% greater than consumption, so the market is vulnerable to a supply shock, such as early summer flood damage of U.S. corn fields. Should crop yields fall, even slightly, due to adverse weather conditions, demand will once again exceed supply, which usually leads to higher prices. Consumption exceeded production in five of the past seven years, with the remaining two years experiencing consumption of 96% to 99% of production. Commodity prices can rise rapidly during times of low inventories, where increases in demand may not be fully met by the current inventory levels.

It is estimated that both wheat and crude oil may have demand that exceeds supply in 2008. At low inventory levels, demand that exceeds supply can lead to dramatically higher prices.

The Role of the Dollar

While supply and demand conditions set the world price of commodities, the U.S. dollar price of commodities rises more quickly in times of dollar weakness. Consider the five-year return to the Dow-Jones AIG Commodity Index in U.S. dollars relative to euros. From 2001 to 2007, the commodity index priced in US dollars increased by 97.3%, while the same index priced in euros increased by only 23.9%. The doubling of commodity prices, then, is a uniquely American phenomenon, as other countries with stronger currencies have experienced more moderate commodity price increases. A substantial portion of the increase in commodities prices in the U.S. can be directly traced to the weak dollar. Should the dollar increase in value relative to a basket of world currencies, many expect that the dollar price of commodities would decline.



Conclusions

Institutional investors have been drawn to commodities not only for their excellent returns in recent years, but also for the tendency of commodities to hedge against increasing inflation and falling stock prices. Some have asserted that the majority of commodity price increases is due to the increased institutional investment in the commodity futures markets. The empirical truth is much more complex.

In order to understand the entire commodity market, we must look at all determinants of commodity supply and demand. Demand for all types of commodities has soared due to increased income in emerging markets, as well as the trend toward biofuels. In many markets, consumption of commodities exceeds supply, and consumption growth has exceeded supply growth for many years, which has caused declines in the inventory of many commodities to record low levels. When supply closely matches consumption, markets become vulnerable to supply shocks, where supplies can decline quickly due to adverse weather conditions or political changes that make it illegal or dangerous to engage in commodity export activity.

In conclusion, we find that fundamental factors beyond institutional investment are largely responsible for the recent increase in commodity prices. Perhaps the most important fact to consider is this characteristic of institutional investment in commodity futures markets: pension plans neither store nor consume commodities. Pension investment in commodity markets is a small portion of futures trading and world production, and institutional investors routinely sell their holdings to end users. It is

those end users who consume and store the commodities that are ultimately responsible for the recent increase in commodity prices. Supply and demand for physical commodities determine prices. No amount of institutional investment in commodity markets can support the current level of prices if supply increases and demand declines. Conversely, the trend toward higher prices is directly related to the rising demand for and constrained supply of physical commodities. If supply continues to be tight, with falling exports and dwindling inventories, and demand from emerging markets continues to rise, restrictions on the structure of institutional investment in commodity markets will not be effective in meeting the goal of reducing commodity prices.

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