

Long-term sources of return in commodity futures markets from the grain markets

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Before 2006 the exponential rise in financial derivatives since the late 1970s had crowded out academic and practitioner interest in the commodity futures markets. There were surprisingly few long-term studies on commodity futures returns analysing these markets in an original way.

Notable exceptions were Greer¹ and Bodie and Rosansky.² These authors discussed the equity-like returns and inflation-hedging properties of investments in baskets of commodity futures contracts.

In 2006 fresh academic perspectives were offered regarding the nature of historical commodity futures returns. The *Financial Analysts Journal* in 2006 included a spirited debate on the inherent sources of return in commodity futures investing.

On one side were Gorton and Rouwenhorst,³ who argued primarily for a structural risk premium that is available across commodity futures contracts. On the other side were Erb and Harvey,⁴ who argued mainly for a strategy return that is due to how one weights and rebalances the components of a commodity index. In 2008 this debate has still not been resolved.

Research work by Professor Joëlle Miffre at EDHEC Risk and Asset Management Research Centre on the long-term-return properties of both commodity futures indices and individual commodity futures contracts should help resolve this debate. Using an expanded historical dataset, his work will examine the relationship between commodity futures returns and changes in the net positions of hedgers, unexpected changes

in inflation, shocks to industrial production and other logical risk factors.

Meanwhile, this article provides some preliminary contributions to the debate based on work drawn from the 2007 Risk book, *Intelligent Commodity Investing*. Essentially, Till⁵ and Feldman and Till⁶ found that in examining a 55-year period in three grain futures markets, the term-structure of an individual contract is the dominant source of return, but only over long (five-year) time frames.

During periods of price stability, grain commodity futures prices have been naturally mean-reverting. This means that sources of return obviously could be from trends in the spot price. Instead they had to be from secondary (not obvious) factors like the shape of a commodity market's futures curve.

If a grain futures contract was historically and systematically priced at a discount to its spot price, a state known as "backwardation", then this slight benefit only added up meaningfully over long time horizons. Otherwise, the volatility of the contract's spot price dominated as the futures contract's source of return.

Figure 1 illustrates this research work, showing the relationship of the returns from passively investing in three grain futures contracts to each contract's curve shape over the period 1950–2004. In this figure "excess returns" refer to the returns from exclusively investing in commodity futures contracts and exclude the return from investing one's collateral in interest-bearing instruments. "Roll yield" refers to the structural discount or premium of the futures contract to the prevailing spot price of the commodity.

The roll yield is calculated by dividing this structural discount or premium by the futures contract's spot price. When a commodity futures contract is structurally higher than its spot price, this state is known as "contango". When the futures market is structurally higher than the spot price, a futures investor will experience a "negative roll yield", as the contract continuously converges to a lower spot price.

These concepts will be familiar to bond investors who know to take into consideration the shape

of a yield curve in calculating expected returns. The "total return" of a commodity futures investment is from spot returns, roll yield plus collateral returns.

The "excess return" is solely from spot returns plus roll yield. Figure 1 shows how solely focusing on roll yield explains excess returns over five-year time horizons.

During periods of price stability, one would not expect trends in the spot prices of commodities to have a meaningful impact positively or negatively on the returns from investing in commodity futures. By virtue of the way we are defining this state-of-the-world, one is expecting whatever path a commodity price takes, it will revert to its starting point.

Therefore, it would be logical to expect that a strategy that explicitly takes into consideration mean-reversion in commodity prices should benefit during a time of price stability. In essence this is what Erb and Harvey² found over the period 1982–2004.

By actively rebalancing a portfolio of lowly correlated, high-variance commodity futures contracts, they found meaningful returns from the rebalancing effect at the portfolio-level, quite separate from the returns at the individual contract level.

Unstable prices

But what about when one is not in a period of price stability? Examining the grain futures markets – since these markets provide a long-term historical futures data – should give some insight.

Figures 2, 3 and 4 show the historical evolution of the front-month futures prices for soya beans, corn and wheat from January 1949 to June 2006. In viewing the crop futures price charts, the emergence of substantial instability in prices during autumn 1971, which is coincident with the collapse of the post-World II Bretton Woods framework of fixed-currency regimes, can be seen. The regime collapsed with negative consequences for the value of the US dollar.

In viewing the post-1971 crop price patterns, it may be hard to argue that weather became any

FIGURE 1. FIVE-YEAR ANNUALISED EXCESS RETURN AS A FUNCTION OF FIVE-YEAR ANNUALISED ROLL YIELD (1950–2004)

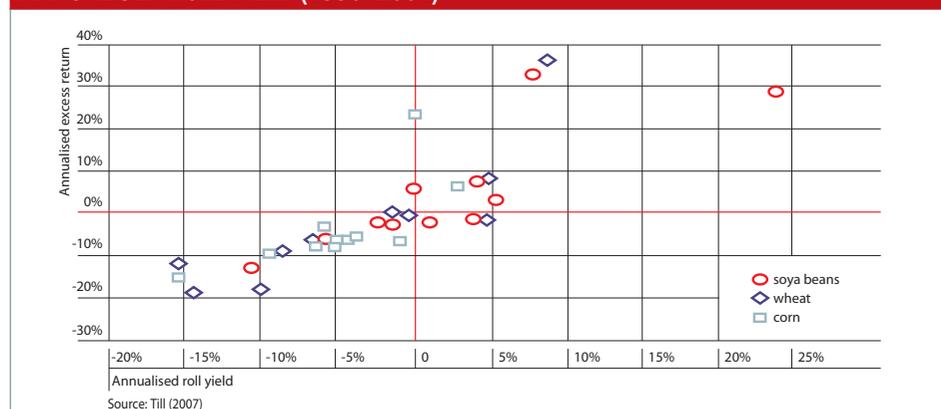


FIGURE 2. ROLLING SOYA BEAN FRONT-MONTH FUTURES PRICES DAILY DATA (MARCH 1, 1949 – JUNE 30, 2006)

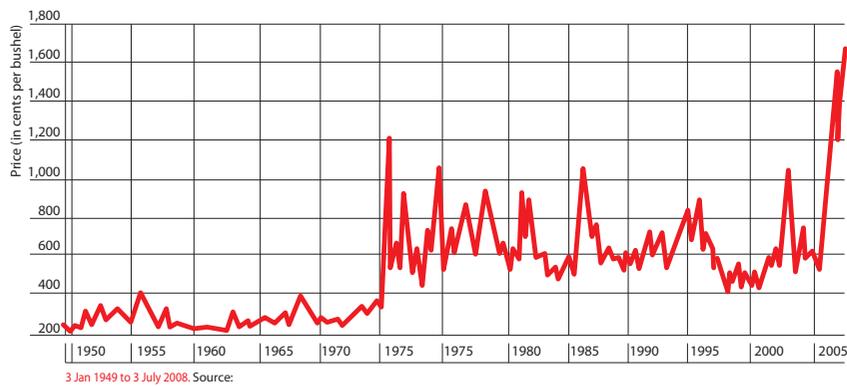


FIGURE 3. ROLLING CORN FRONT-MONTH FUTURES PRICES DAILY DATA (MARCH 1, 1949 – JUNE 30, 2006)

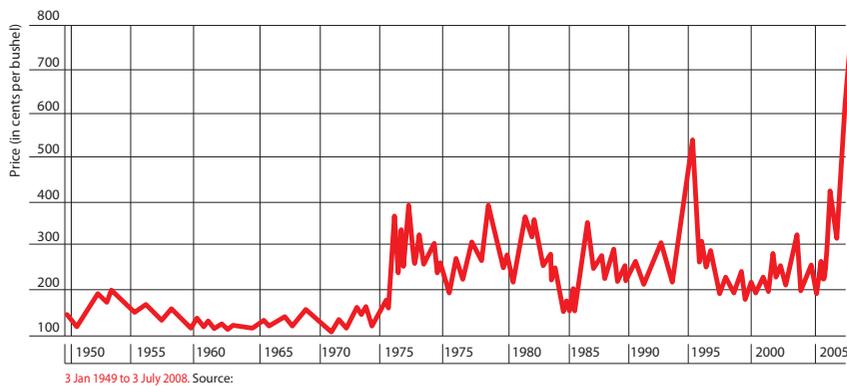
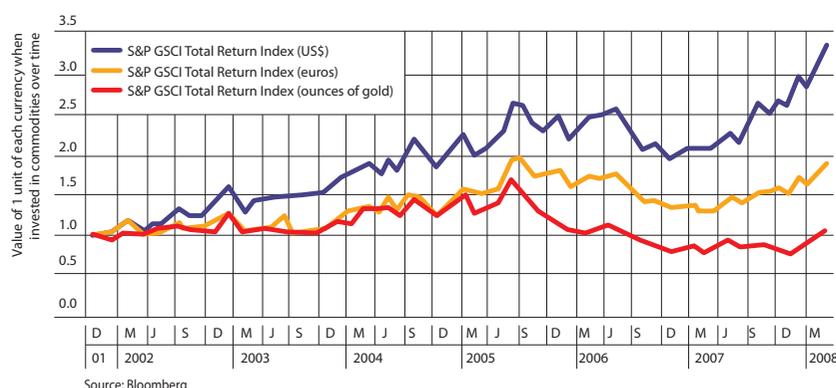


FIGURE 4. ROLLING WHEAT FRONT-MONTH FUTURES PRICES DAILY DATA (MARCH 1, 1949 – JUNE 30, 2006)



FIGURE 5. COMMODITY RETURNS DEPEND ON 'CURRENCY' (DECEMBER 31, 2001 – MAY 31, 2008)



more volatile in disrupting crops. So it would be logical to conclude that it was the instability in the value of the dollar that led to the increase in price volatility in crops.

We can also begin to understand why institutional investors have an interest in investing in stores-of-value, given the fallout from the autumn 1971 shock.

The significance of the early 1970s period in Figure 1 shows that the outlier observations of extreme commodity futures returns relative to roll yield were precisely from the 1970–74 period.

The reason for noting this exceptional period is that in our 55-year study, we did not adjust the futures prices for inflation because, for a dollar-based investor, futures returns due to general inflationary increases are just as valid as those due to roll yield.

Further, from the returns from commodity futures investing over the past six and a half years, we observe that they have relied on whichever currency they were denominated in (Figure 5).

Caution is needed in not drawing too many overarching conclusions from a historical study that confined itself to three grain futures markets. But our study and the current body of historical literature on commodity futures investing do not contradict the conclusion that the returns depend on whether the state-of-the-world is one of price stability or not.

During periods of price stability, it is secondary factors, such as the term structure of individual futures contracts, as well as index-level effects, such as rebalancing, that have given rise to positive returns in commodity futures investing.

A rare trend shift upward in spot prices can also be a meaningful source of returns, separate from the secondary effects of rebalancing and term-structure.

In future issues of *Hedge Funds Review*, we will draw further from *Intelligent Commodity Investing* in discussing commodity-index construction, portfolio diversification, risk management and due diligence in this burgeoning field. We will also discuss the impact of current regulatory initiatives in the US and UK and how they may impact the commodity investment field. ■

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