

Better Markets, Inc.⁺

Review of

Irwin and Sanders
2010 OECD Reports

Speculation and Financial Fund Activity

and

The Impact of Index and Swap Funds on Commodity Futures Markets

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Last week, OECD published a report co-authored by University of Illinois professor Scott Irwin and University of Southern Illinois professor Dwight Sanders.¹ The study purports to find statistical evidence that speculation played no role in generating the damaging volatility in food and energy prices during 2008. In fact, it even goes so far as to claim the opposite: speculation by long-only index investors with no understanding of underlying supply and demand conditions actually helped *reduce* volatility, by providing liquidity. The study and its findings can be disregarded for three reasons:

- 1) The statistical methods applied are completely inappropriate for the data used.
- 2) The study is contradicted by the findings of other studies that apply more appropriate statistical methods to the same data.
- 3) The overall analysis is superficial and easily refuted by looking at some basic facts.

In the report, Irwin and co. promise to give “a detailed and dispassionate synthesis of the arguments and latest research” concerning the role of excessive speculation in driving volatile commodities prices in 2008. Recall that in 2008, oil prices shot up to over \$140 per barrel, before crashing back down to around \$30 over the course of a few months. In addition to their synthesis, the authors also promise new and exciting empirical findings. However, the synthesis is unsatisfactory for a number of reasons, and the supposedly new findings are neither as new nor as significant as claimed. Ultimately, the OECD report is merely the latest in a series of attempts by Irwin and Sanders to use ill-suited regression analyses to try to prove that speculation has no impact on prices.²

First, some background that will be familiar to those readers who have followed the debate, but which bears repeating. The level of volatility witnessed in commodity prices through 2008 was unprecedented throughout history. For most of the twentieth century, commodities derivatives were traded on regulated exchanges, and subject to meaningful speculative position limits. Exchange-trading requirements and position limits were originally created in 1936 by the Commodity Exchange Act (CEA). Following this act, commodity markets

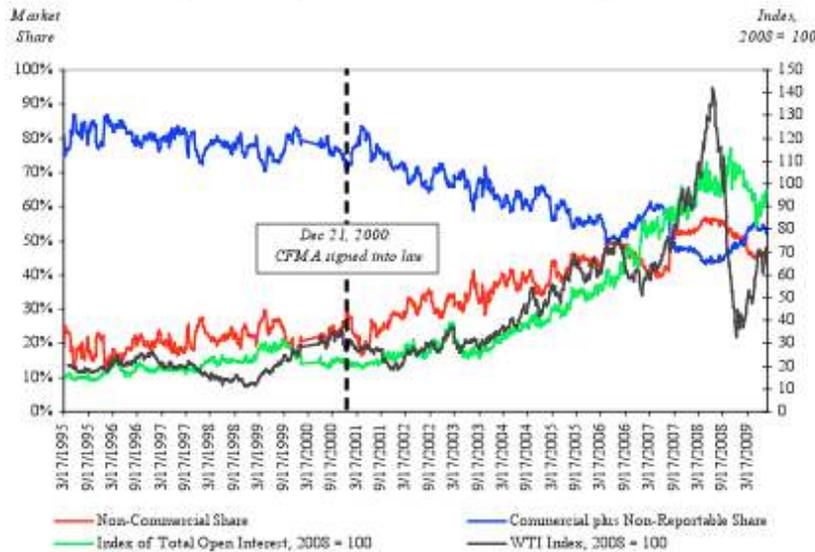
¹ As is customary with OECD, there are actually several reports, all of which are variations on the same paper. They include Irwin, S. H. and Sanders, D. R., *Speculation and Financial Fund Activity: Draft Report*, Irwin, S. H. and D. R. Sanders, *Annex 1 to Speculation and Financial Fund Activity: Draft Report*, and finally Irwin, S. H. and D. R. Sanders, *The Impact of Index and Swap Funds on Commodity Futures Markets: Preliminary Results*, OECD Food, Agriculture and Fisheries Working Papers, No. 27 DOI: 10.1787/18156797. All page references in this response are to the *Annex 1* form of the report.

² See also, Sanders, Dwight R., Irwin, Scott H. and Merrin, Robert P., *The Adequacy of Speculation in Agricultural Futures Markets: Too Much of a Good Thing?* (June 2008) available at SSRN: <http://ssrn.com/abstract=1147789>, and Irwin, S., *The Misadventures Of Mr. Masters: Act II* (September 2008) available at http://www.econbrowser.com/archives/2008/09/scott_irwin_tak.html

functioned fairly and effectively for over sixty years. In 2000, the Commodity Futures Modernization Act (CFMA) deregulated commodities markets, weakening speculative position limits and providing loopholes for speculation through completely unregulated shadow markets. From the moment the act passed, non-commercial participants began to increase their share of the commodities futures market, with severe effects (or “misleading coincidences,” as Irwin would argue).

Because of its central role in the economy, oil has taken center stage in most discussions of excessive speculation. The Irwin report focuses on agricultural commodities, but also analyses oil and other energy commodities. Sticking with oil for the moment, consider the following diagram, which illustrates the effects of deregulation on levels of speculation in commodities futures.

Figure 2: Market Composition, Open Interest, and the Price of Oil



Source: Energy Information Administration, CFTC Commitment of Traders Reports

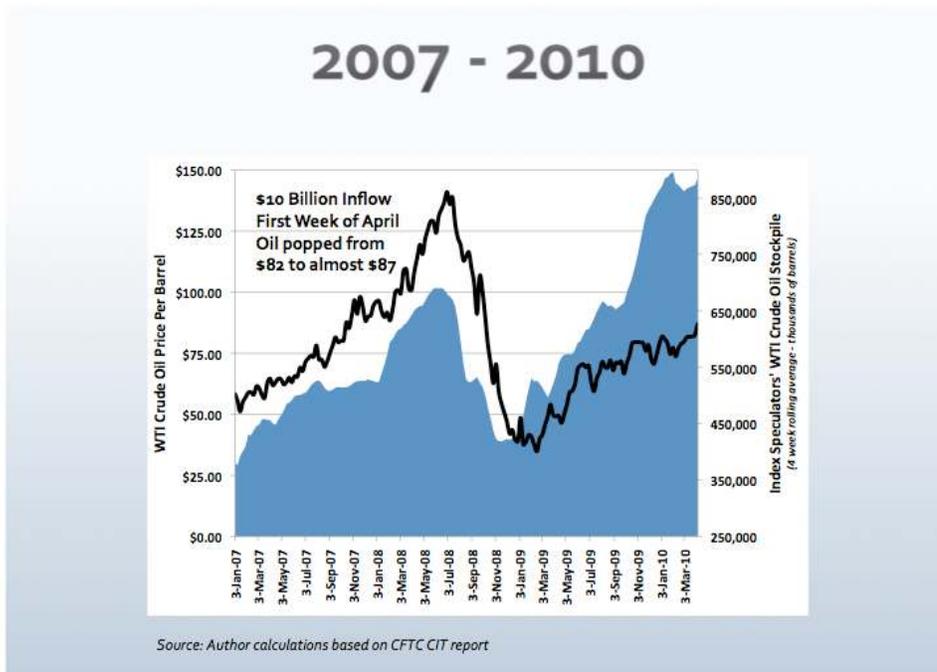
Reproduced with authors' permission from (Medlock & Jaffe 2009)³

The blue line at the top represents the proportion of oil futures market participants who have a genuine commercial interest in oil. The red line denotes the proportion who are merely non-commercial, financial speculators. The green line is the total open interest (i.e. the total size of the paper oil market). The black line is the price of oil. As the diagram shows, subsequent to the passage of CFMA, the proportion of participants with no legitimate commercial interest jumped from around 20% to over 50%. The overall size of the oil futures market also quadrupled in size due to the sheer volume of these non-commercial

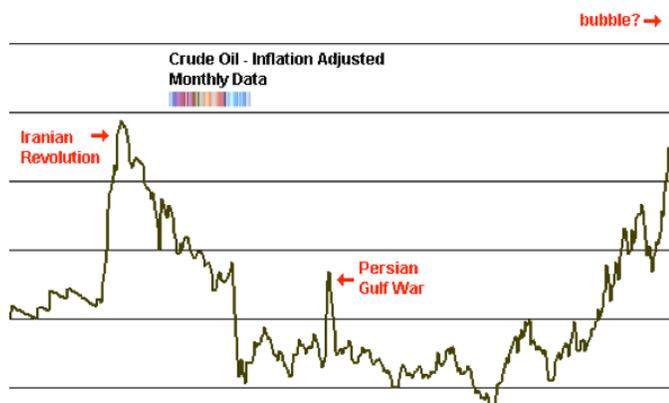
³ Medlock, K., and Jaffe, A., *Who is in the Oil Futures Market and How Has it Changed?*, James A. Baker III Institute For Public Policy (2009)

speculators.

At around the same time CFMA was passed, the price of oil embarked on a steadily accelerating upward climb, which culminated in the meteoric rise up to \$140+ by mid-2008. It then plummeted back down over the next six months at the fastest rate in recorded history. To reiterate, this sort of volatility was completely unheard of before the tidal wave of speculative money that followed the passage of CFMA. The diagram below shows how the flows of speculative money into oil futures correlated with the price of oil.

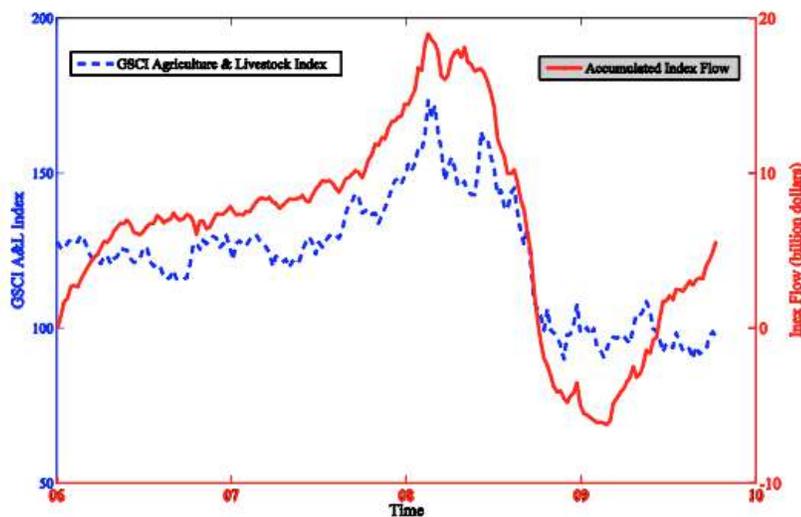


Not even the volatility caused by the 1973 oil embargo, the Iranian revolution, or the Persian Gulf War, each of which threatened to slash the world's supply of oil, was of comparable magnitude. Yet, those wedded to a strict market fundamentalist view continue to point to vague trends in "Chinese demand" to try to explain price fluctuations that radically outweigh those caused by even the most severe oil shocks since World War II.



Reproduced with permission from <http://www.tradersnarrative.com/price-of-oil-manipulation-bubble-supplydemand-1753.html>

As noted earlier, the OECD study focuses on agricultural commodities, though the analysis also covers energy commodities. However, the same arguments that apply to oil hold for other commodities. As Tang and Xiong (2009) have shown, since CFMA opened the loophole that enables index speculation, in 2000, agricultural commodities have begun to behave more and more like the energy commodities they are indexed with.⁴ The following diagram from the same paper clearly illustrates that the link between index flows and price that was demonstrated is not limited to oil; it also holds for agricultural commodities and livestock.



Reproduced with permission from Tang and Xiong (2009)⁵

Irwin and Sanders are certainly arguing against the common sense interpretation of these facts. For sixty-plus years, commodities markets were regulated, and speculation was subject to legal limits; the markets functioned well throughout this time, despite wars, revolutions and oil embargoes. Then, those markets were deregulated, and the limits on speculation were lifted; within a decade, commodities were displaying unprecedented volatility. To argue that this is merely correlation and not causation, as Irwin and co. attempt to do, one needs an extremely compelling alternative story. More compelling, at least, than a vague gesture towards “fundamental factors.”

The authors cite “a number of economists”⁶ (specifically, a blog entry by Paul Krugman,⁷ an opinion piece by Craig Pirrong, and one of their own papers) who

⁴ K. Tang and W. Xiong, *Index Investing and the Financialization of Commodities*, Technical Report, Princeton University, 2009.

⁵ Ibid.

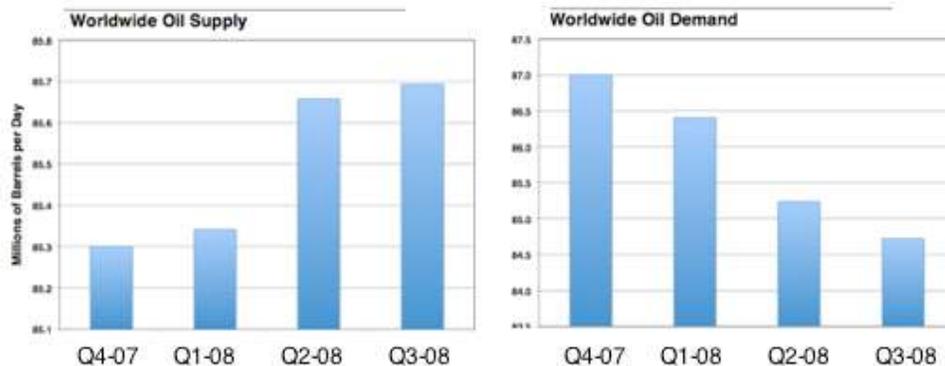
⁶ Op. Cit. p6

⁷ Krugman has actually changed his view since the blog entry cited in the report. See: <http://krugman.blogs.nytimes.com/2009/07/08/oil-speculation/>

argue that commodity markets “were driven by fundamental factors that pushed prices higher.”⁸ They add that “the main factors cited as driving the price of crude oil include strong demand from China, India, and other developing nations [and] a leveling out of crude oil production...”⁹ They provide no data to substantiate this explanation.

In fact, it’s not surprising Irwin and Sanders fail to back up their “supply and demand” story with data, because the actual data clearly proves them wrong. True enough, Chinese consumption of oil-based products did increase in 2008. It rose by around 12%, according to most estimates.¹⁰ But even the rise in Chinese demand wasn’t enough to offset the *global* decline in demand for oil. Remember, that in 2008 the USA, along with most of Europe, was in a recession. At the same time, global oil supply was rising. According to the National Bureau of Economic Research (NBER), the United States entered into an economic recession in December of 2007. So U.S. economic output was dropping during the first six months of 2008. During that time, the worldwide supply of oil was increasing, and the worldwide demand for oil was decreasing. If supply and demand were really driving the oil price, it should have fallen, not risen sharply. Instead, oil defied the economic recession and the laws of supply and demand, and rose over 50% in just six months.

It bears repeating: as oil prices rose steadily by over 50% in six months, supply was rising, and demand was falling. Here are the EIA figures to back it up¹¹:



Source: Energy Administration, U.S. Department of Energy, "World Oil Balance 2004-2008," January 13, 2009.

⁸ Op. Cit. p6

⁹ Ibid.

¹⁰ See e.g. http://www.chinadaily.com.cn/china/2009-01/27/content_7429805.htm

¹¹ EIA figures can be revised as much as two years after the fact, but any such revisions are not expected to make a material difference to the shape of the data as used here.

Empirical Studies

The analysis in the report clearly does not hold up to scrutiny. What about the “new data” it promises? In fact, there is actually nothing new about the data. It is the same CIT and DCOT data both sides of the excessive speculation debate have been using all along. The new part lies in their choice to apply a different type of test from those used in their previous studies. The specific test they use is a Granger Causality Test. The name sounds impressive, and – used in the right context – the test itself is, too. Granger was a brilliant econometrician who won a Nobel prize for his work on cointegration. His eponymous test sprung from a desire to develop a rigorous way of determining when correlations might have a causal link.¹²

The idea is very simple. If two time series are correlated, try offsetting them a little and see if one appears to “predict” the other. So, instead of looking at the correlation between X and Y on Monday, Tuesday, Wednesday, Thursday, etc., look at how X on Monday correlates with Y on Tuesday, how X on Tuesday correlates with Y on Wednesday, and so on. If you find that the value of X on one day lets you “predict” the value of Y the following day (i.e. correlates pretty well with it), you can say that X “Granger causes” Y.¹³ Ideally, you’re looking for a situation where X Granger causes Y, but the inverse doesn’t hold. That way, you have *some reason to suspect* that X *actually does* cause Y. Even then, you’d still have to make a qualitative analysis, and a subjective judgment call to say that X causes Y. It’s standard practice to consider Granger causality to have little intrinsic value unless you have an underlying theory that provides a solid independent basis for believing that there is a real causal link.

Beyond the fact that on its own a Granger test is relatively meaningless, there are several problems specific to the authors’ application of it. First, there is the fact that Granger tests can’t handle extremely volatile dependent variables. In fact, this is true of all the prior statistical tools used by Irwin and Sanders in their efforts to prove that speculators’ money is somehow worth less than everyone else’s. Pagan and Schwert (1990) showed that stock market prices do not possess the required formal properties for Granger-type tests to be reliable.¹⁴ Phillips and Loretan (1990) extended Pagan and Schwert’s analysis to include commodities, concluding that commodities data are far too volatile for Granger-

¹² Granger, C. W. J. 1969 Investigating causal relations by econometric models and cross-spectral methods. *Econometrica* 37, 424-4

¹³ More precisely, X “Granger causes” Y if one can better “predict” the value of Y on day two when one knows the value of X on day one than when one knows only the value of Y on day one.

¹⁴ Pagan, A., and Schwert, G., *Testing For Covariance Stationarity in Stock Market Data*, *Economics Letters*, Volume 33, Issue 2, June 1990, pp165-170

type tests to mean anything.¹⁵ They actually reached this conclusion studying a period during which commodities were far less volatile than they were during the interval studied by Irwin and Sanders.

These facts (or even just a quick glance at any of the charts presented so far) will attest that **commodities prices over the period studied were perfect examples of the kind of volatile variables that Granger tests can't handle.** Indeed, Irwin and his coauthor even admit as much – though they do so as inconspicuously as possible:

The time-series tests may lack statistical power to reject the null hypothesis because the dependent variable—the change in futures price—is extremely volatile.¹⁶

Indeed.

That alone is enough to discredit the findings of the OECD study. However, there are additional problems with the statistical methodology of the paper. A second major problem with the application of the Granger approach relates to the fact that it is notoriously difficult to choose the right lag for such tests.¹⁷ Singleton (2010) illustrates this point clearly when he says:

Many of the studies that have explored Granger causality between returns on futures positions and trader positions have focused on very short horizons (typically days)...It seems likely that, if the flows of index investors and other trader categories affected futures prices, then these effects would build up over longer histories than just a few days. Put differently, the lead/lag patterns that might be useful for identifying short-term manipulation in futures markets are likely to be very different than the longer-term patterns that would naturally be associated with the ebbs and flows of herding-like behavior.¹⁸

Irwin and Sanders use a lag of one week for almost every commodity they test.¹⁹ Little wonder their test comes out negative. As was already discussed, Granger tests are not even designed to apply to data of this sort. But even if they were, it would not be reasonable to use a lag of one week to test a theory that posits a latency of several weeks at the very least. Just by looking at the charts, it is evident there is *some* relationship between speculative flows and commodities prices. As many readers probably learnt in their very first statistics class, if one

¹⁵ Phillips, P., and Loretan, M., *Testing Covariance Stationarity Under Moment Condition Failure with an Application to Common Stock Returns*, Cowles Foundation at Yale University (1990)

¹⁶ Op Cit. p38

¹⁷ See, e.g. Freeman and Hannan (1975), Hoffman, Carter and Cullen (1994)

¹⁸ Singleton, K., *The 2008 Boom/Bust in Oil Prices*, (Forthcoming)

¹⁹ Op. Cit. p33 Specifically, this relates to the link between inflows and returns. The exceptions are live cattle and feeder cattle, for which they use a two-week lag, and natural gas, for which they use a three-week lag in one test. For the “volatility” tests, they generally use longer lags, of up to three weeks.

sees a clear relationship in a graph, and the statistical tests imply no relationship exists at all, one ought to regard those tests with some suspicion. One probably made an arithmetic error somewhere, picked bad parameters for the test, or just picked the wrong test outright.

The problem is worse for energy commodities. Irwin and Sanders, like Masters and White (2008) before them, are primarily attempting to measure the specific effect of index speculation.²⁰ This is the mechanism whereby large institutional investors place unidirectional bets that a “basket” (index) of commodities will rise in price. Masters and White use CFTC data in combination with published commodities index weightings to interpolate the flows of speculative money into energy commodities. This is necessary to get a reliable estimate for those flows, since no direct data exists, and there is no good proxy. Irwin and Sanders are well aware of this necessity, and in fact state the case well:

An important question, especially for the energy futures markets, is the degree to which the *DCOT* swap dealers category represents index fund positions. One can infer from comparisons found in the CFTC’s September 2008 report on swap dealer positions (CFTC, 2008b) that *DCOT* swap dealer positions in agricultural futures markets correspond reasonably closely to index trader positions. Since swap dealers operating in agricultural markets conduct a limited amount of non-index long or short swap transactions there is little error in attributing the net long position of swap dealers in these markets to index funds. However, swap dealers in energy futures markets conduct a substantial amount of non-index swap transactions on both the long and short side of the market, which creates uncertainty about how well the net long position of swap dealers in energy markets represent index fund positions. For example, the CFTC estimates that only 41 percent of long swap dealer positions in crude oil futures on three dates in 2007 and 2008 are linked to long-only index fund positions (CFTC, 2008b).²¹

In other words, we have data on swaps dealer activity in both agricultural and energy commodities. For agricultural commodities, that activity has pretty much a one-to-one relationship with index speculation; it is all dealers executing orders on behalf of index speculators. For energy commodities, however, only about 40% of swaps dealer activity represents index speculation. As a proxy for index speculation in energy markets, therefore, swaps dealer activity is completely useless. Recognizing this, Masters and White instead used the agricultural data to calculate the total amount of money flowing from index speculators into agricultural commodities. They then looked at the indexes that are most popularly speculated on. By comparing the relative weightings of agricultural vs. energy commodities in those indexes, they were able to infer a reliable estimate of how much money was flowing into energy commodities.

The authors’ comments illustrate that they understand both the problem with

²⁰ Masters, M.W., and White, A.K., *The Accidental Hunt Brothers: How Institutional Investors are Driving up Food and Energy Prices* (2008)

²¹ *Op.Cit.* p24

using swaps dealer activity as a proxy for index speculation in energy, as well as the appropriate solution. So it is somewhat surprising that they choose to ignore it in their own analysis, and instead revert to using swaps dealer positions as a direct proxy for index speculation in energy commodities, an approach which they themselves earlier dismiss as inadequate:

Lacking any other data to represent in index fund positions in the energy markets, we follow Buyuksahin and Harris (2009) and assume swap dealer positions are representative of index trader positions in the crude oil and natural gas futures markets.²²

By way of explanation for this baffling choice, they offer only:

The following analysis of the summary statistics and data trends helps provide some insight as to the reasonableness of this assumption.²³

Although hard to decipher, this statement appears to mean that the fact the test results come out negative (i.e. support the conclusion already argued for by the authors) justifies the use of clearly unsuitable data.

Irwin and Sanders' Working's T analysis fails for a similar reason.²⁴ They use proxies for hedging and speculation that they themselves have characterized as unsuitable for the task:

A frequent complaint about the traditional *COT* data is that the trader designations may be somewhat inaccurate (e.g. Peck, 1982; Ederington and Lee, 2002). For speculators, there may be an incentive to self-classify their activity as commercial hedging to circumvent speculative position limits. In contrast, there is little incentive for traders to desire the non-commercial designation...[Additionally, t]he available evidence about the composition of non-reporting traders is dated (Working, 1960; Larson, 1961; Rutledge, 1977-78; Peck, 1982), so little is known about this group other than their position size is less than reporting levels. The data set is further limited because it is purely a classification system and provides no insight as to the motives that drive actual trading decisions (see Williams, 2001).²⁵

And again:

In recent years industry participants began to suspect that these data were "contaminated" because the underlying risk for many reporting commercials were not positions in the actual physical commodity (CFTC, 2006a,b). Rather, the reporting commercials were banks and other swap dealers hedging risk associated with over-the-counter (OTC) derivative positions.²⁶

²² Op. Cit. p27

²³ Ibid.

²⁴ Op. Cit. p25

²⁵ Op. Cit. p20

²⁶ Op. Cit. pp20-21

Yet, rather than heeding their own advice, they proceed to use these categories as straightforward proxies for “hedging” and “speculating”.²⁷

The formal conclusion of the OECD study can therefore be paraphrased as follows:

Applying statistical techniques that aren't applicable to volatile data sets like the ones used in this study, and using proxies for energy commodities that the authors themselves argue are unsuitable, we found little historical correlation between how much money flowed into commodities futures one week, and how commodities prices behaved the following week, for a period of 186 weekly observations taken between June 2006 and December 2009. For Cotton and Corn, we actually did find a significant correlation.

In the paper itself, this is stated more succinctly as: “The results summarized above tilt the weight of the evidence even further in favor of the argument that index funds did *not* cause a bubble in commodity futures prices,”²⁸. The authors close by acknowledging that index speculators poured huge amounts of money into commodities, and by expressing their admiration for “the remarkable ability of the commodity futures markets to absorb this increased participation with apparently minimal price impact.”²⁹ This review will close with a simple diagram of the oil price over the last twenty or so years, and leave the reader to form his or her own opinion on just how capable of absorbing speculative inflows these markets proved to be.

Figure 1: Crude Oil Price (WTI, Daily – 01/02/90 through 08/19/09)



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Source: Energy Information Administration

²⁷ Op. Cit. p26

²⁸ Op. Cit p38

²⁹ Ibid.

³⁰ Op. Cit.