

## Oxford Energy Comment

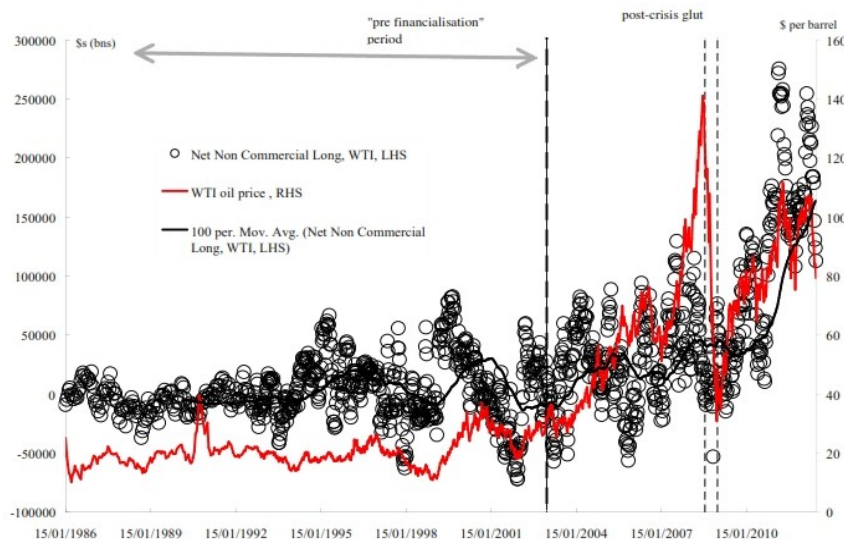
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# Financialization in Oil Markets: lessons for policy

By Bassam Fattouh and Lavan Mahadeva

In the last decade, purely financial players with no interest in the physical commodity such as hedge funds, pension funds, insurance companies, and retail investors have become more prominent in oil futures and derivatives markets. In parallel, there has been an explosion in the variety of instruments that permit speculation in oil, such as futures, options, index funds, and exchange traded funds (ETFs). This massive expansion of the financial layer of oil has been called the financialization of the oil markets. Has this affected the oil price? And does it matter?

**Chart 1. Net Non-Commercial Long Positions and the Oil Price**



Notes: Dark line indicates the ten-month moving average. Source: CFTC reports, St Louis Federal Reserve and own calculations.

Chart 1 plots one measure of financialization. The net long positions of non-commercial traders in oil futures as compiled by the Commodity and Futures Trading Commission have increased tremendously especially since 2003. Also, although the data is noisy, a brief slowdown in the second half of 2008 is discernible. The chart

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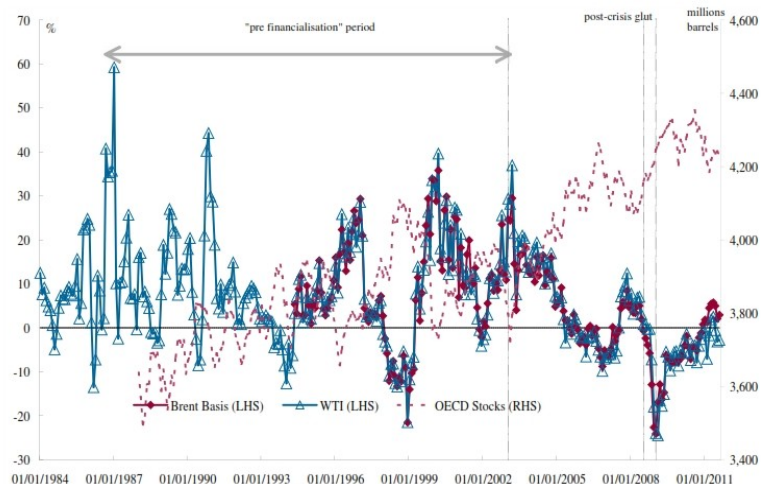


shows that the real WTI oil price has followed a similar pattern; it has also risen on average since 2003, and also experienced a temporary fall in late 2008.

Motivated by this correspondence, some have been led to conclude that greater financial participation has changed oil price behaviour. There have even been calls for policy intervention to limit financial participation in oil per se. However correlation is not causation. It has yet to be established that financialization is the cause of significant changes in oil price behaviour. Indeed, one of the conclusions we drew from our survey of the studies on financialization, co-written with Lutz Kilian,<sup>1</sup> is that the familiar culprits of supply and demand forces could instead have been responsible for the post 2003 data. It also must be shown that financialization changes are harmful to the final consumers of oil.

In a recent research paper,<sup>2</sup> we put this financialization hypothesis to the test. We examine whether underlying changes in the incentives and constraints of purely financial players could have interfered with the workings of the oil market.

**Chart 2. Real Basis (1 mnth versus 12 mnths, arithmetic)**



Source: Bloomberg and own calculations.

Chart 2 plots the real 12-month basis against OECD inventories. As we have defined it, the basis is the difference between the spot price and the future price contracted now for 12 months ahead. Thus, the basis is the inverse of the simple return that someone who bought physical quantities of oil and sold it now in the futures market for delivery in 12 months—a physical speculator. This is not the return to a stereotypical financial speculator, who does not have the capacity to store oil and typically buys (not sells) oil forward.

<sup>1</sup> [Fattouh, B, L Kilian, and L Mahadeva \(2012\), “The Role of Speculation in Oil Markets: What Have We Learned So Far?” OIES Working Paper No 45.](#)

<sup>2</sup> [Fattouh, B and L Mahadeva \(2012\), “Assessing the Financialization Hypothesis” OIES Working Paper No 49.](#)

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The basis is commonly interpreted as a proxy of the net convenience yield, the extra gain to holding physical quantities of a product that can turn out to be useful if there is a suddenly supply disturbance for example. To see why this is, consider that the complete net excess return to a physical speculator would be equal to the future price minus the spot price (the inverse basis) plus the convenience yield minus futures participation and storage costs and the risk-free rate (the latter as the opportunity cost). Of the list of latter components, it is assumed that the convenience yield is the most variable. In order for there to be no arbitrage, therefore, the basis and the convenience yield must move together, so that the net excess return to hedged storage is constant.

If one accepts this argument, what Chart 2 describes is that the net convenience yield rose up to a peak in 2003 and from then on has declined, interrupted only by a temporary reversal during 2006-2008. Crucially OECD inventories follow an opposite pattern. At the end of 2002, oil stocks were low following a strike in Venezuela, the Gulf war and disruptions in Nigeria. Stocks recovered strongly from 2002 and 2006, presumably in anticipation of even stronger demand going forward. As we would expect, this drive was accompanied by a fall in the convenience yield (a falling basis). In 2006, demand proved to be so strong that stocks were run down slightly and the convenience yield rose briefly. But in mid 2008, when the financial crisis struck home, the demand for oil fell and stocks accumulated again. As the market suddenly absorbed the implications of the crisis, the oil price fell sharply in the following six months. As steep as it was, the fall in the price level was remarkably short-lived — the level rose back in January 2009 (Chart 1). But the basis returned once more to its prolonged slide: there is little need for convenience during a prolonged recession as long as there are high levels of stocks.

Hence Chart 2 also contains its own clear messages. First that inventories and the returns to physical speculation have been closely related over this period. The counterpart to the physical speculator is the financial speculator who agrees to buy the oil forward and expects to sell it on spot markets before having to take delivery. Thus the shifts in incentives for physical speculation, shown in Chart 2, may have driven financial market participation and not the other way around. It could also be that the rising trends that have occurred in both are largely independent, with financialization having little implication for oil markets.

The point is that spot demand and supply prospects for oil are unavoidably uncertain, and so physical speculation is a natural reaction. Anyone who decides between buying a small car or a petrol guzzler is effectively speculating in oil, and it is surely not a concern that they they have a view on the future price of energy. Similarly, the accumulation of physical inventory in anticipation of future changes (providing the market is not being squeezed) is a market solution to uncertainty. The real question is not whether speculation is harmful but whether the greater appetites or resources of purely financial investors can be damaging for final consumers.

We formalise the financialization hypothesis as follows. As a result of a fall in the risk aversion of financial speculators or a rise in the financial resources they can muster, it is predicted that:

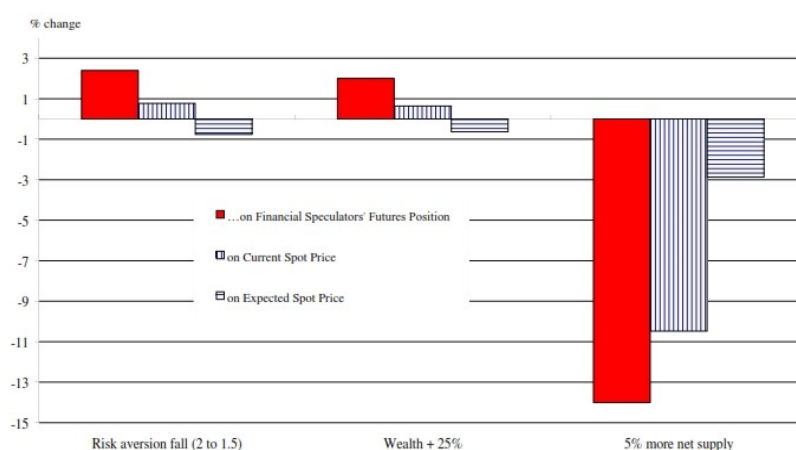


- a) there has been a greater participation by purely financial investors and a higher oil price level;
- b) that physical inventory carry over is lower and that current prices are less responsive to future shocks, so that futures markets are working less well;
- c) spot and futures prices become relatively more sensitive to shocks arising in the financial layer of oil markets, for example in predicted stock market returns;
- d) spot oil prices have become more unpredictable;
- e) final consumers have become worse off;
- f) and they have become more exposed to supply and demand disturbances such as the vagaries of Middle East politics.

We test these sub-hypotheses by building a small model of the oil market and calibrate it to match the pre-2003 data. We simulate separately for a rise in the risk appetite and resources of purely financial players and observing if predictions a) to f) are borne out. The sizes of these shifts are considerable: we lower the risk appetite of financial players halfway towards making them completely indifferent to risk and raise their wealth by a considerable 25%.

A good experiment should always have a control. So we also simulate shifts in the physical layer of the oil market: a sudden expectation of a 5% more expansive net supply as could have occurred in 2006-8.

**Chart 3. Simulated effect of Greater Financialization vs. Looser Net Supply**



Source: Own calculations.

Chart 3 describes our first result. Even large changes in financial players' incentives— shown in the first two sets of columns — are not predicted, by themselves, to have led to more than a small rise in financial player's futures positions. And they are predicted to imply only small rises in the current spot level.

On the other hand, as the righthandside of Chart 3 shows, an expected 5% loosening of net supply leads to a large fall in financial participation. This suggests that the fall



in participation in 2008 may have been the result of an anticipation of slack in spot oil. Conversely when there is an expected tightening of future supply, inventories will be accumulated and this will stimulate greater need for the hedging services of purely financial players. We should expect a rise in financialization during these episodes. The implication is that financial participation and oil prices could both be due to anticipations of supply and demand changes, and are not necessarily driven by the incentives of financial players.

Moreover, comparing the vertical and horizontal striped bars, financialization is predicted to have lowered expected future prices even if it raised current prices. This latter finding is, we argue, a quite general feature of financial layer changes. Incentives to financial players do not affect spot supply and demand directly; financial layer changes only alter how much inventory will be carried over from current to future spot markets. Thus if any change in the financial layer leads to more inventory accumulation, it will indeed raise current spot prices, but then also lower expected prices. If it leads to fewer inventories, then current prices will fall as expected prices rise. Either way, the consequence of financialization shifts for final consumers who buy spot oil now and in the future will be limited as the current and expected future spot prices will only move in opposite directions and of a very similar magnitude. Because it can have only a seesaw effect on the term structure of prices, it would take an implausibly huge change in financialization in order to lead to the large change in the level of spot prices we have observed.

To summarise our other results:

- a) We find that changes in the financial layer can only have small effects on the basis. But shifts in expectations of net supply can drive large changes in the basis.
- b) Shifts in the financial layer do not lower physical inventory carry over and don't make current prices less responsive to future shocks. If anything they improve the signalling and buffering function of the oil markets. When there is an expected supply loosening, inventory rises and the basis falls. Thus the relationship between the basis and inventory in Chart 2 could be explained by speculation about future supply and demand prospects but not shifts in the financial layer.
- c) We do predict that oil prices should be more sensitive to anticipations of predicted stock market returns as a result of financialization but the effect is tiny when judged against the size of typical movements in the oil price or the shift in share returns required to generate such effects.
- d) The financial layer changes do not make spot oil prices more unpredictable. If anything they make them easier to predict.
- e) By increasing risk-bearing capacity, financial layer changes make consumers slightly better off and slightly better protected. Supply and demand factors matter much more for welfare.

In conclusion, our findings offer no support for the view that greater financialization has had an important effect on oil market variables and harmed final consumers. There are powerful natural limits on the ability of financialization shifts to raise the



expected spot prices. In contrast, anticipations of net supply shifts can have important impacts on prices, spreads, welfare, and even on financial market participation.

It is true that we have not allowed for all the frictions displayed in real world financial markets. For example, financial speculators in our paper are not leveraged and there is no moral hazard in their risk taking. Their expectations are rational. It is quite possible that financial layer changes might have large effects under other circumstances. But then these fundamental market failures would elicit their own specific policy solutions. For example, if it were found that the entrance of highly leveraged financial speculators disrupts oil markets, the implication is that prudential regulation should be employed on leveraged investors. Therefore, before oil financial market policies are contemplated, it is crucial in the first instance to identify the channels through which financialization can result in market failure.