The Oil Drum: Europe
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

Oil Prices Below $40 per Barrel

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Oil prices under forty dollars per barrel? It can't be true.

Yes it is true, oil prices are back to where they were more than four years ago. Time for a few thoughts on these past years and what led to apparently dissonant energy prices.

This is a crosspost from the European Tribune.

Back in July, no one that I am aware of was forecasting a 100$ drop in oil prices during the following six months. Even Daniel Yergin, the Nemesis of modern day Peak Oil study, was at the time predicting higher prices. Back then a friend told me to go short on oil, because all price forecasts by CERA are wrong. If I were a trader, I would have probably followed that advice, but could never imagine what was to come.

One of my first dives into the Peak Oil world was with Kenneth Deffeyes' book *Beyond Oil*. In it, the Princeton Professor explains how resources' prices go through chaotic periods in face of scarce supply. Without knowing it, he derived an expression to explain movements like spot Natural Gas

prices in the US after 2002, that was equivalent to Queueing Theory. This made immediate sense to me, after studying this theory in my formative years at the University.

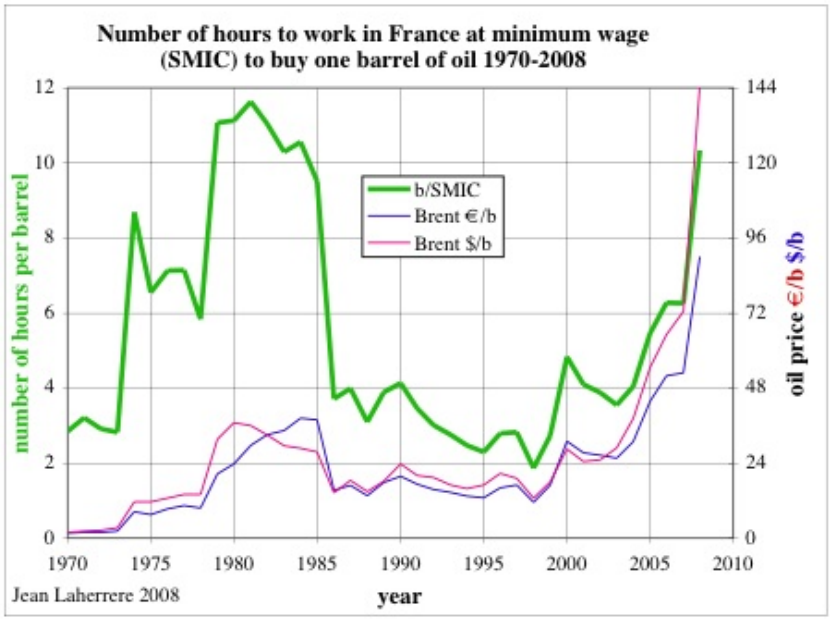
Let me try to explain briefly what this theory is. Imagine a supermarket with a certain number of points-of-sale (POS), to which a certain number of costumers arrive per hour. Queueing Theory allows one to derive information like the average queue length at each POS and the average waiting time each costumer spends in the queue. This information is not only useful for supermarket managers but also in other fields like transport and tele-communications.

Queueing Theory shows also provides another important result: if the load on the system goes above a certain threshold, it becomes impossible to predict queue lengths or waiting times, and the system goes into chaos. Going back to the supermarket, imagine that for some reason the flow of costumers increases several-fold over its normal rhythm (e.g. Black Friday in the US). At first, lengthy queues form at each POS, waiting periods then go beyond costumers' patience, and they simply start quitting the queue and leaving the supermarket without shopping. The dissatisfaction is such that costumers quit entering the supermarket altogether and the manager is eventually forced to close down some POS. But this is Black Friday, the avalanche of costumers eventually returns and it starts all over again. During this chaotic period a random sample of queue length at any given POS can result in any possible number and becomes effectively impossible to predict.

Substituting costumers by oil importers, POS by oil exporters and queue length by oil prices we have the international oil market.

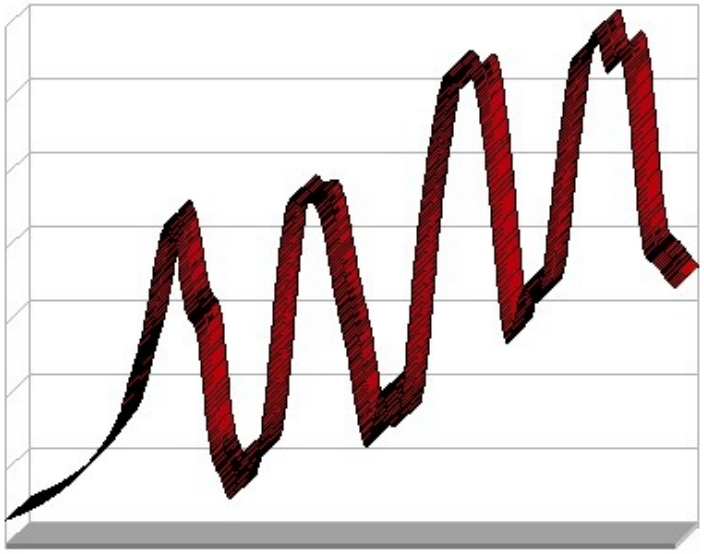
This chaotic outcome with respect to commodities prices in face of scarce supply was studied by Ugo Bardi, who found interesting examples of it in the past. I first got to know his work soon after I read Kenneth Deffeyes' book and was especially impressed with the pattern Ugo identified in whale oil prices after the peak in sperm whale catches in 1850. The Whaling Industry was possibly the largest of its time, on a global scale that in many ways can be compared with the modern day Oil Industry. To me a most fascinating aspect about Peak Whale Oil is that in the book *Moby Dick*, published right about that time, Herman Melville lays down quite clearly the reasons for a coming decline of the Industry: in his view Easy Sperm Whale was over.

With all this information I became convinced an increased volatility in oil prices would unfold, eventually leading to a series of "boom and bust" cycles, just like whale oil prices in the XIX century. Predictions of oil prices would become impossible, and I never attempted to forecast them.
Another important aspect to my understanding of this issue was presented by Carlos Cramez and Jean Laherrère in 2006 at the seminar that kicked off ASPO-Portugal. They showed a chart with oil prices in terms of the number of working hours required to buy the oil in the US and France, and concluded that to return to 1980's levels, the last oil crisis, prices would have to reach something like 125$ per barrel (in 2006 dollars). This number stuck to my mind, and I assumed this would be about the level at which the "boom" would turn around into "bust".



Oil prices as a function of working hours by the French minimum wage. For 2008 the oil price is taken as the July peak.

Jean updated this graph recently and was kind enough to mail it to me, showing that by July, prices were very close to the level that had caused pain previously. When oil prices fell after that, they did so in dollar terms, but not so much against the euro, thus the 2008 barrel price in working hours will be below the 1979 - 1985 period but will likely surpass the 1974 - 1978 period.



My mental model of oil prices evolving with scarce supply and expanding monetary mass.

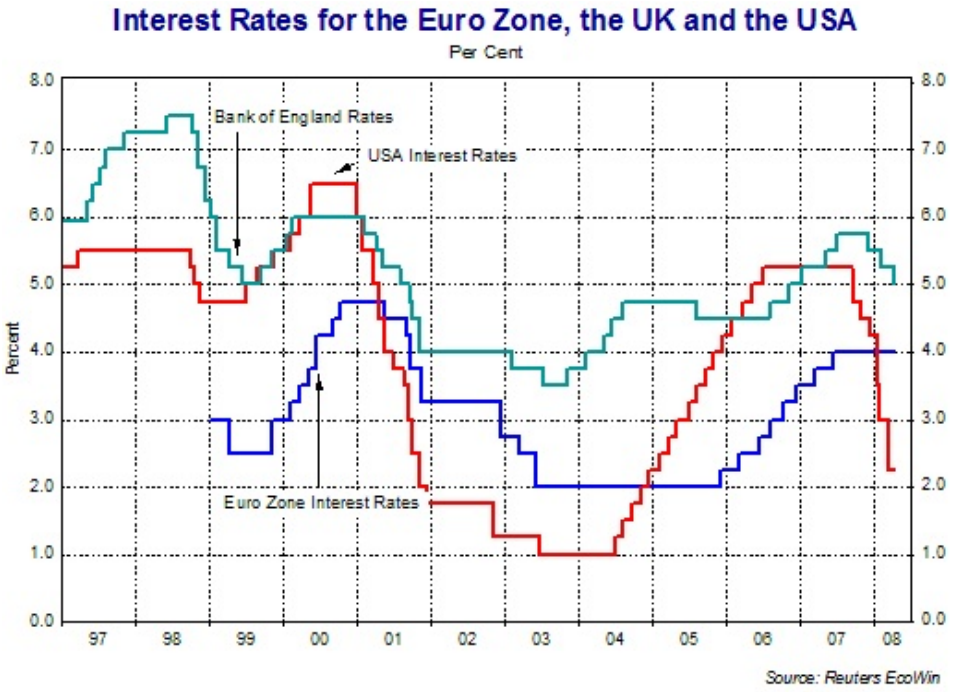
Finally there was another piece to add to this puzzle: paper currency supply has been growing by two digit percentages every year. So these fluctuations would possibly occur within a band of ever higher numbers but without never surpassing the 1980s record oil price in terms of working hours. The following is a graphic rendition of this mental model for the long term evolution of oil prices.

Back in July with prices nighing on 150$, I was getting concerned that either my mental model was rubbish or that the fist turn was now overdue. I had the opportunity to write at that time that oil prices had become unbearable to many people in developed countries, protesters were dying in picket lines and less scrupulous people started stealing diesel from their neighbours. Something had to break and something broke.

But I would expect something more in the line with the price turn that took place in the second half of 2006 and could never imagine so much in such a short time: more than 100$ in six months.

As anyone knows, oil prices are in fact being pulled down by the Credit Freeze. It is perhaps worth to take a look back to the events that lead to to this point, and oil's important role in these events:

- 1999: Glass-Steagall Act is fully repealed;
- 2001: September the 11th, NATO goes to war;
- 2002: Interest rates are now at historic lows, monetary mass starts expanding fast to finance the war (eventually reaching as low as 1% in the US);
- 2003: Half of NATO invades Iraq;
- 2004: OPEC's spare capacity dries up;
- 2005: Oil prices go above 60$, interest rates are inverted towards ascent;
- 2006: US interest rates reach 5.25%; households are confronted with increasing daily prices and increasing mortgages simultaneously;
- 2007: The US housing market bubble pops;
- 2008: Bear Stearns and the Lehman Brothers collapse, panic leads to a halt of the fractional reserve system, Central Banks are effectively unable to put their monetary policy at work;



Interest rates set by the European Central Bank, the US Federal Reserve and the Bank of England.

The most important thing to take home here is that the Fed started the rate hike in 2004/2005 because it misunderstood the oil price rise as a consequence of its poor monetary policy. But instead crude oil production had reached a plateau that remained up to the second half of 2008. In fact, the underlying physical economy stopped growing soon after the invasion of Iraq.

With this interest rate hike, millions of American families slowly became unable to honour their debt compromises, squeezed between mortgages and consumer prices, both rising. This lead to a sharp decline in home prices (demand collapsed, supply sky-rocketed) that were the physical collateral for much of the paper currency created during the low interest rates years. Losing this collateral, banks had to devalue or even write off asset after asset on their balance sheets. These problems started to affect an increasing number of banks and financial institutions to the point of breaking trust among them. The rest is history.

In Europe, events unfolded in similar ways, although the interest rate swings were of smaller magnitude. Here the rate set by the ECB never dipped below 2% and never went above 4.25%. The problem was that many European banks had acquired financial instruments backed by assets in the US housing market; within days of the spectacular collapse of Lehman Brothers, several institutions here started showing serious difficulties. In spite of the reversal in monetary policy by the ECB, the inter-banking lending rate,

Euribor, was perilously going up, menacing to squeeze households.

Governments are scrambling to invert the Credit Freeze and get their economies back on track. Luckily the ease seems to be coming first to Europe: the action by the ECB rapidly reducing interest rates and by state governments in providing credit and guarantees to ailing banks (or in some cases simply nationalizing them) has apparently restored confidence, as the collapsing Euribor rates show. Households in Europe are now facing declining consumer prices, with the fall in commodities' prices, and declining mortgages. This will bring some ease to European families and eventually pave the way for a turn around in Demand and avoid a serious expansion of unemployment. A major difficulty remaining is that an economic turn in Europe also depends on a turn in aggregate Demand of its main trading partners - especially the US.

In the US, things are not as simple. Not only were the interest rates swings much wider, but more importantly, the crisis is coinciding with the beginning of the transition between two governments (from two different parties). Interest rates have been brought down to the floor again and consumer prices are falling (also a consequence of a turn of the dollar exchange rates with other major paper currencies), but it came too late to avoid unemployment expanding. Restoring the confidence in the banking market seems a harder task, and similar to Europe, easing households from their obligations doesn't guarantee an immediate pick up in aggregate Demand.

All these actions by Governments and Central Banks, that translate into a rapid expansion of money supply, don't go without consequences. But that will be an issue for another time.

The Credit Freeze impacted the oil market in two different ways:

a) It decreased Demand, by crippling industrial activity--this is especially the case in the US where unemployment is already reaching significant numbers; in Europe several states entered Recession in the third quarter. At this moment there isn't enough data yet to evaluate how much Demand contracted; only in following months, as institutions like the IEA or the EIA produce their regular reports, it will be known.

b) Companies hedging their business in the futures market were forced to liquidate their positions in order to meet near term obligations, leading to a collapse of the number of transactions in the market.

Now that oil Demand has retracted, bringing prices down with it, the opposite phenomenon occurs: Supply destruction. Current prices are too low for the development of many oil reserves, especially those on the fringe of technology. The perfect example is the sub-salt layer reservoirs identified in the Santos Basin off Brasil. A recent study by Deloitte pointed 90 $/barrel as the break even for production from these fields. An optimistic figure possibly, given that as indicated by Brazilian scientists last year, the technology for doing is so is yet to be developed.

With time, new projects needed to offset aging fields won't be there, either because of lack of exploratory activity or lack of financing. Even healthy fields can become unprofitable and be mothballed or abandoned. Supply will go down to the point it can't fulfill Demand any more at low prices, the cycle will be closed and a new "boom" phase will unfold.

It would be interesting to know when this new cycle will start. That's all but easy, made even more difficult by unpredictable monetary policy shifts. Looking at the present futures market, presenting a heavy *contango* pattern, it doesn't seem like an oil price rise is imminent. Likely, only when the futures market moves toward *backwardation* will the environment be propitious for a new price rally.

The impossibility of predicting long/mid term oil prices is a serious problem for governments and businesses planing ahead. But this is all part of the game: the destructive process of dependence on scarce resources. If a steady increase in prices was the outcome (as some believed), business would be able to plan ahead, for instance hedging on the futures market. Instead, these unpredictable price swings are very disruptive. Taking the example of an airline company, if it plans for a high oil price and prices go down, it will likely loose competitiveness. On the other hand, if it plans for a low price and it happens to go higher, the company will lose profits and eventually have financial difficulties. If Queueing Theory applies fully to the oil market, prices are effectively impossible to predict in the long term, guaranteeing losses to all airline companies.

Probably these "boom-and-bust" cycles will henceforth perpetuate until at least one of two things happens:

a) A "bust" phase permanently erases an important part of Demand;

b) A "boom" phase eventually takes place supported mainly by alternative energies;

I'm hoping for b).