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WSJ, Financial Times Raise Issue of Oil Prices Causing Recession

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The idea that high oil prices cause recessions shouldn't be any surprise to those who have been following my writings, those of Dave Murphy, or those of Jeff Rubin. Last month, though, the Wall Street Journal finally decided to mention the idea to its readers, in an article called "Rising Oil Prices Raise the Specter Of a Double Dip". The quote they highlight as a "call out" is

> When consumers spend more at the pump, they often cut back on discretionary purchases.

The WSJ shows this graph, linking oil price hikes to recessions:

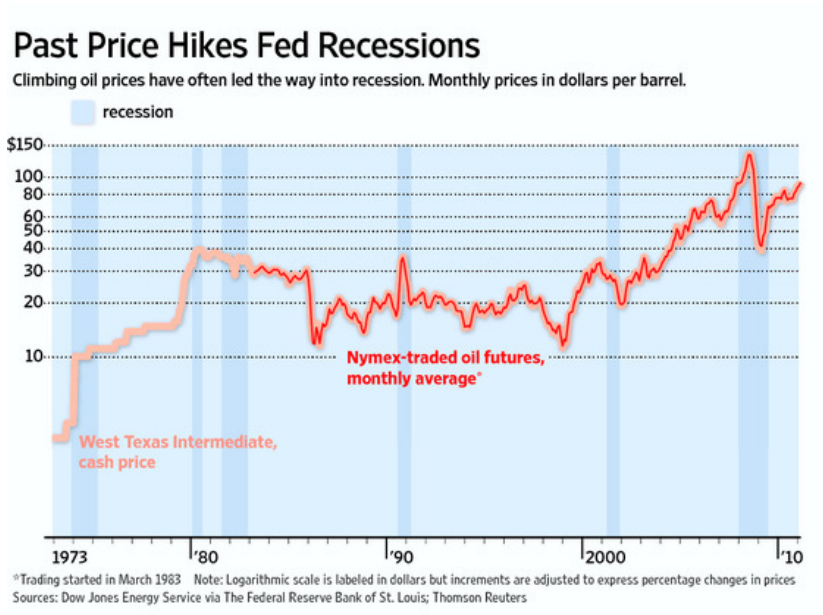

Figure 1. Wall Street Journal graphic showing connection between oil price rise and recession.

A Financial Times blog by Gavyn Davies says something very similar:

> Each of the last five major downturns in global economic activity has been immediately preceded by a major spike in oil prices. Sometimes (e.g. in the 1970s and in 1990), the surge in oil prices has been due to supply restrictions, triggered by OPEC or by war in the Middle East. Other times (e.g. in 2008), it has been due to rapid growth in the demand for oil.

> But in both cases the contractionary effects of higher energy prices have eventually proven too much for the world economy to shrug off.

In this post, I explain what the WSJ and Financial Times articles are missing regarding the connection between oil and the economy. I also explain how the inability of oil prices to rise very far suggests that the downslope may be considerably steeper than most models based only on the Hubbert curve would predict.

Impacts of High Oil Prices on the Economy

The graph shown in the WSJ is very familiar. On November 5, 2008, I wrote a post called Jeff Rubin: Oil Prices Caused the Current Recession that included this graphic from this publication of CIBC World Markets.

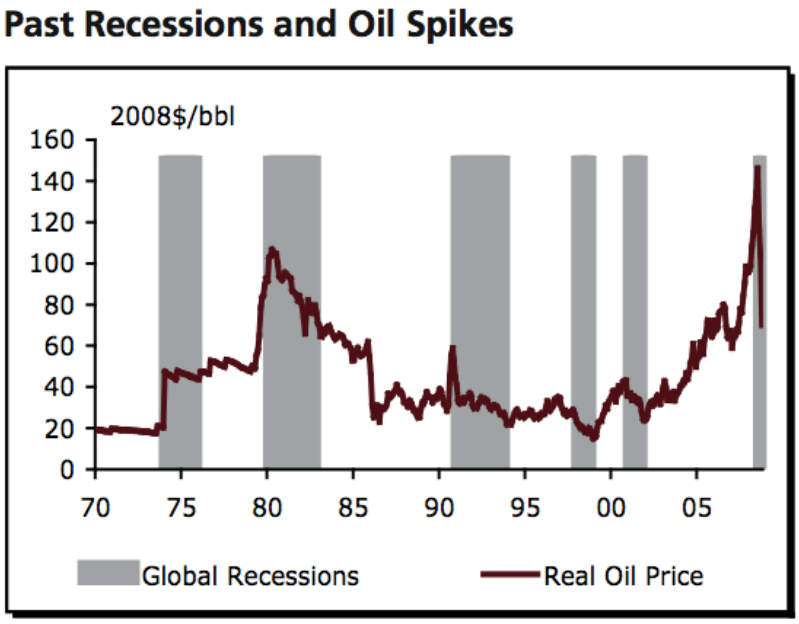

Figure 2. Jeff Rubin's graphic showing connection of oil prices and recessions.

A more recent analysis by James Hamilton called "Historical Oil Shocks" published (here or here) as a *National Bureau of Economic Research Working Paper* shows that almost an "if and only if" relationship exists between oil price shocks and U. S. recessions. According to page 26 of his paper,

> All but one of the 11 postwar recessions were associated with an increase in the price of oil, the single exception being the recession of 1960. Likewise, all but one of the 12 oil price episodes listed in Table 1 were accompanied by U.S. recessions, the single exception being the 2003 oil price increase associated with the Venezuelan unrest and second Persian Gulf War.

Table 1. Summary of significant postwar events.

Gasoline shortages	Price increase	Price controls	Key factors	Business cycle peak
Nov 47- Dec 47	Nov 47-Jan 48 (37%)	no (threatened)	strong demand, supply constraints	Nov 48
May 52	Jun 53 (10%)	yes	strike, controls lifted	Jul 53
Nov 56-Dec 56 (Europe)	Jan 57-Feb 57 (9%)	yes (Europe)	Suez Crisis	Aug 57
none	none	no	---	Apr 60
none	Feb 69 (7%) Nov 70 (8%)	no	strike, strong demand, supply constraints	Dec 69
Jun 73 Dec 73- Mar 74	Apr 73-Sep 73 (16%) Nov 73-Feb 74 (51%)	yes	strong demand, supply constraints, OAPEC embargo	Nov 73
May 79-Jul 79	May 79-Jan 80 (57%)	yes	Iranian revolution	Jan 80
none	Nov 80-Feb 81 (45%)	yes	Iran-Iraq War, controls lifted	Jul 81
none	Aug 90-Oct 90 (93%)	no	Gulf War I	Jul 90
none	Dec 99-Nov 00 (38%)	no	strong demand	Mar 01
none	Nov 02-Mar 03 (28%)	no	Venezuela unrest, Gulf War II	none
none	Feb 07-Jun 08 (145%)	no	strong demand, stagnant supply	Dec 07

Table 1. Significant post-World War II recessions and their connection to oil shocks (from Hamilton paper "Historical Oil Shocks")

My own research relates to reasons why changes in oil price can be expected to have a disproportionate effect on the economy. It has not entirely been published, but has been presented at conferences including the 2009 Biophysical Economics Conference and at the 2010 Advances in Energy Conference in Barcelona, Spain, and will shortly be written up in a book in Springer's *Brief's in Energy Analysis* series, under Professor Charles Hall. My analysis indicates some of the reasons for the connection between oil price spikes and recessions are as follows:

Cutbacks in Discretionary Spending. If a person (or state government, or other organization that cannot easily pass through its costs) faces an increase in oil costs, it has a tendency to cut back in discretionary spending, since many oil expenditures are for necessities, like commuting to work. This is an exaggerated graphic I put together in a post I wrote called There is plenty of oil but . . . showing that because most incomes do not rise when oil prices rise, there is a compression in discretionary spending.

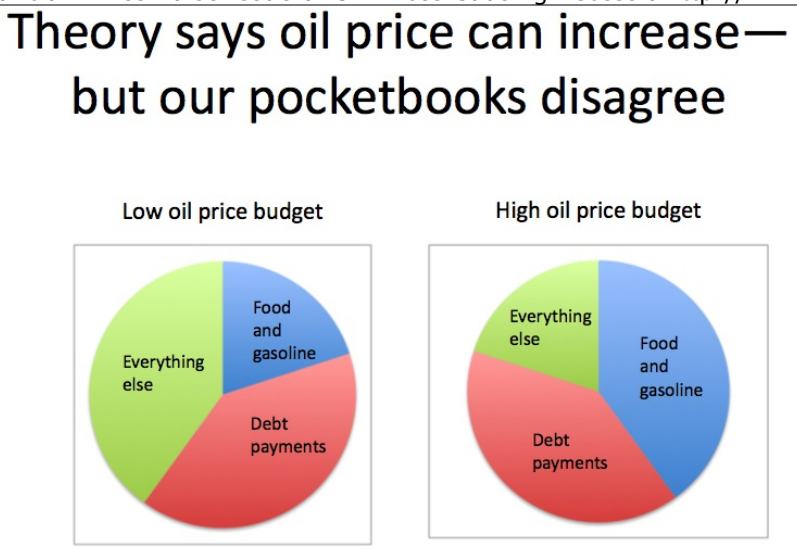

Figure 3. Exaggerated graphic pointing out connection between oil price rise and discretionary income.

In Figure 3, I combine food and oil prices, because food prices tend to rise at the same time as oil prices. This occurs because oil is used very extensively in raising crops (operating farm machinery, herbicides and pesticides, irrigation, fertilizer) and in food transportation and packaging. A comparison of FAO's Food Price Index and Brent oil prices (spot prices from the EIA) shows a high correlation:

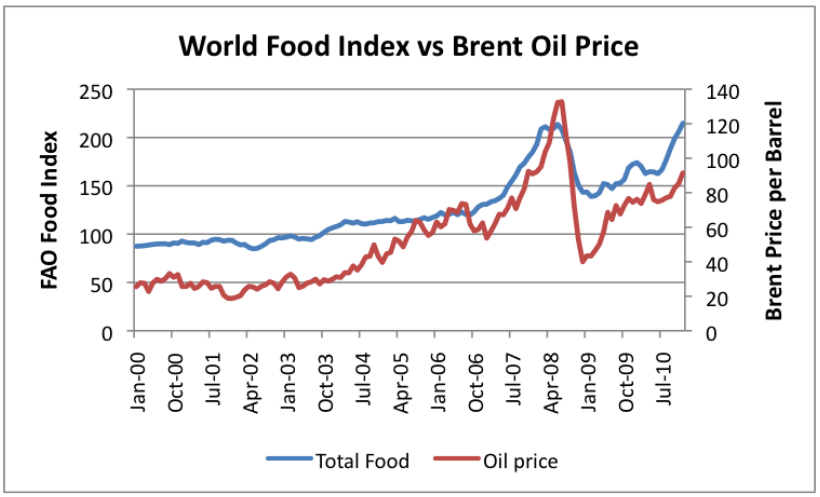

Figure 4. Comparison world food price index and Brent oil price shows very similar trend.

Interest Rates and Inflation Rates. Higher oil food prices directly affect the inflation rate. Furthermore, if prices of other types of goods rise because of higher transportation costs, this also tends to raise inflation rates.

In the 2004 -2006 period, when oil prices rose, the Federal Reserve raised target interest rates, from 1% to over 5%, specifically mentioning rising oil prices, and their expected impact on inflation rates as a problem. To the extent that these higher interest rates affected consumer loans, the higher interest costs also acted as a reduction to income, over and above higher food costs.

The WSJ doesn't seem to think that the Federal Reserve will again raise target interest rates this time. The WSJ reports:

> In part because it is driven by something other than increased demand, the rising price of oil is unlikely to prompt the Federal Reserve to move more quickly toward raising short-term interest rates, now near zero, or otherwise moving to tighten credit. That could change if higher energy and goods costs begin to seriously feed into prices of other goods and services. But with unemployment high, a large share of U.S. manufacturing capacity still idle, and little sign that public or market expectations for inflation are moving up, Fed policymakers see the chances of inflation rising by more than their informal target of about 2% this year as remote.

Of course, it isn't necessary for the Federal Reserve to raise target interest rates in order for interest rates on debt to rise. If investors can see that inflation is heating up, they will demand higher interest rates to compensate for the higher expected inflation rates. CNN Money shows the chart shown in Figure 5 in a February 7 article titled Bond shoppers: 10-year yields pushing near 4%.

Figure 5. CNN Money graphic showing rising interest rates affecting 10-year treasuries.

These higher interest rates on 10-year treasuries tend to translate to higher rates for other types of loans, such as mortgages, as well. So interest rates seem already to be headed higher, perhaps in part reflecting the inflationary impact of higher oil prices over the past year.

Decline in Home Prices. Another type of discretionary purchase is the purchase of a home. A person needs to have considerable discretionary income to purchase a more expensive home. So cutbacks in discretionary income tend to reduce demand for homes, and because of this, home prices tend to drop. Figure 4 shows that oil prices started rising in 2004. The timing of the 2006 - 2007 home price drop matches very well with what a person might expect, based on the 2004-2006 oil price rise and the interest rate rises that followed the run-up in oil prices.

Debt Defaults. If oil and food prices are higher, some of the more marginal buyers are likely to find it difficult to keep up their payments, and miss payments. In the 2006-2007 period, many of the more marginal home buyers were holders of subprime loans, but there are many others as well. Businesses facing cutbacks in buying because of reduced demand for discretionary goods are also likely to be affected by reduced demand, and find it difficult to pay their mortgages.

Eventually, banks figure out that loan applicants are likely to have a hard time repaying their loans, and cut back on offering credit because it doesn't make sense to offer loans to people (and businesses) who are likely not to be able to repay them.

Balance of Payments. If oil prices rise, balance of payments are likely to get more out of balance than otherwise, with oil sellers benefitting from the higher oil prices.

What oil price level is needed for recession?

The WSJ article linked above says:

> Most economists reckon that the price of oil would have to rise to at least $120 a barrel, and stay there, to threaten the recovery.

It is not clear how good an estimate we can expect from economists regarding when oil can be expected to affect the economy. The question of oil prices has only recently begun appearing on the radar screen of most economists.

One factor that may make recent estimates too low is the recent disparity between West Texas Intermediate oil prices and Brent prices. Most US analysts follow West Texas Intermediate (WTI) oil prices. These are the oil prices shown in Figure 1. WTI prices are now depressed relative to most other oil prices, as I discuss in this recent post, because of processing/shipping issues in the US Midwest. Another oil index, Brent, which many think is more representative, is $114 barrel now. So while WTI prices are "only" at around $100 barrel, other more representative oil indices are already higher.

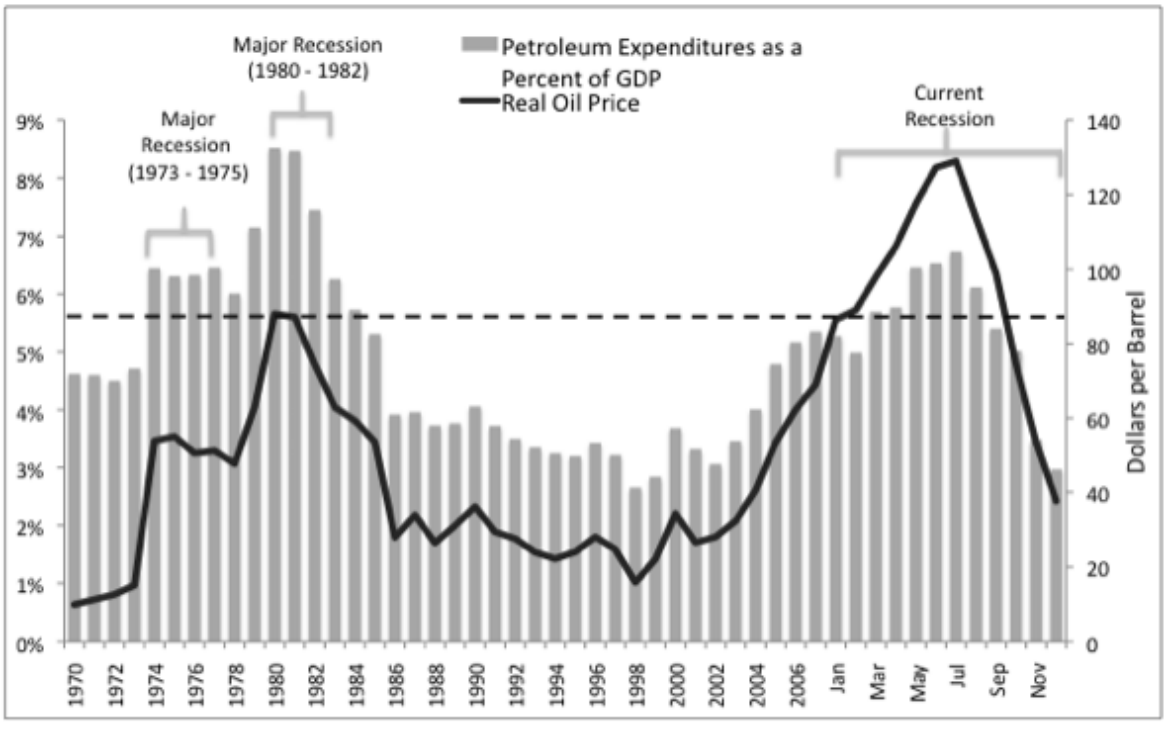

Figure 6. Figure by Hall, Balogh, and Murphy showing relationship between oil price and recession.

Furthermore, other analyses show lower oil prices can lead to recessions. Charles Hall, Steven

Balogh, and David Murphy did an analysis of the connection between the price of oil and when recession can be expected (Figure 6). In their view, recession is likely when oil amounts to more than 5.5% of GDP. When their analysis was done in 2008, this corresponded to a price of about $85 barrel.

If rising oil prices leads to recession, what are the implications for future oil supply?

If there were no problem with oil prices leading to recession, prices could keep on rising as much as they need to, to encourage additional production and to encourage alternatives. It is the fact that high oil prices cause recession, and the fact that recession tends to causes oil prices to drop, that prevents oil prices from continuing to rise, in a fashion that would allow oil companies, and makers of alternatives to be able to rely on the higher prices. This hampers the continued growth of oil supply.

If we think about it, extracting oil requires *investment* at many steps along the way: whenever exploration is done; whenever a new well is drilled, or "fracking" is done; when a decision is made to replace a broken oil and water separator; even when decisions are made to hire and train new staff members. As long as oil prices are rising enough that there is an adequate gap between the cost of production and what the oil can be sold for, there is the possibility that there will be enough funds left to reinvest.

In terms of Charlie Hall's "cheese slicer model," if the Energy Return on Energy Invested (EROI) is high enough, there will be enough energy coming out of the red arrows of Figure 7 for both (1) New Investment in Oil Extraction and (2) Demand for New Products that Use Oil. (See Nate Hagen's post, At $100 oil, what can the scientist say to the investor?)

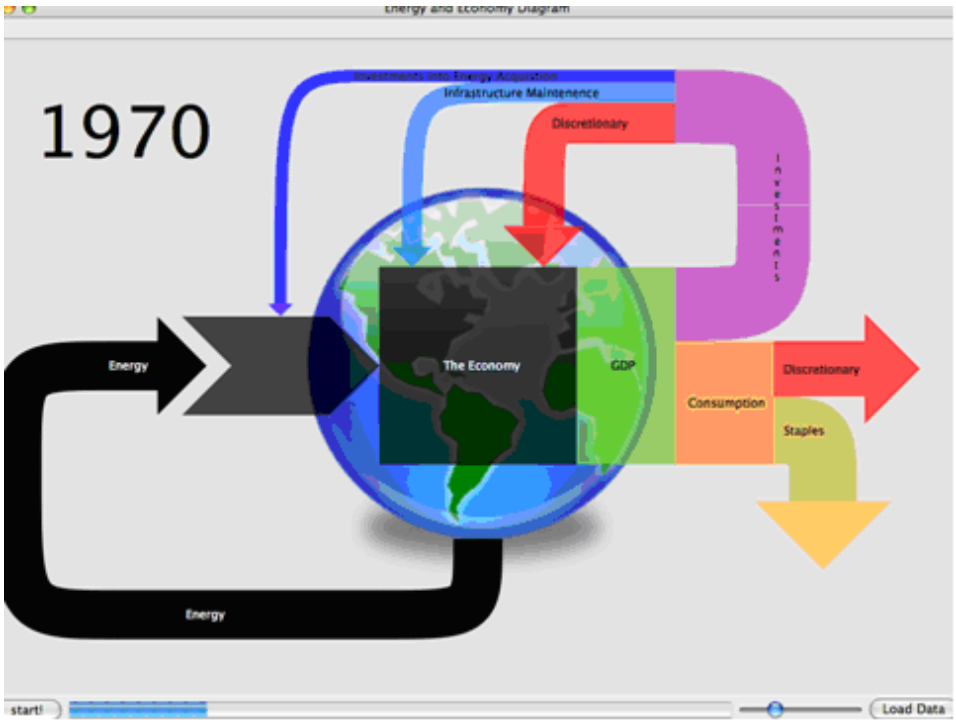

Figure 7. Charlie Hall's Cheese Slicer Model, showing arrows for various components of the reinvestment process. This version is theoretically for 1970.

On Figure 7, there are two red arrows. The one pointing to the right is the one relating to discretionary spending, and the one pointing down is the one for reinvestment. What happens is that over time, the easy-to-extract, high EROI oil, is depleted, and it takes more and more

energy the extract the remaining oil. As the EROI declines, the size of the investment for new oil extraction keeps going up (the black arrow across the bottom gets larger).

Barclay's recently illustrated their view as to how much the cost of oil production is increasing (Figure 26 in a publication called The Return to Scarcity).

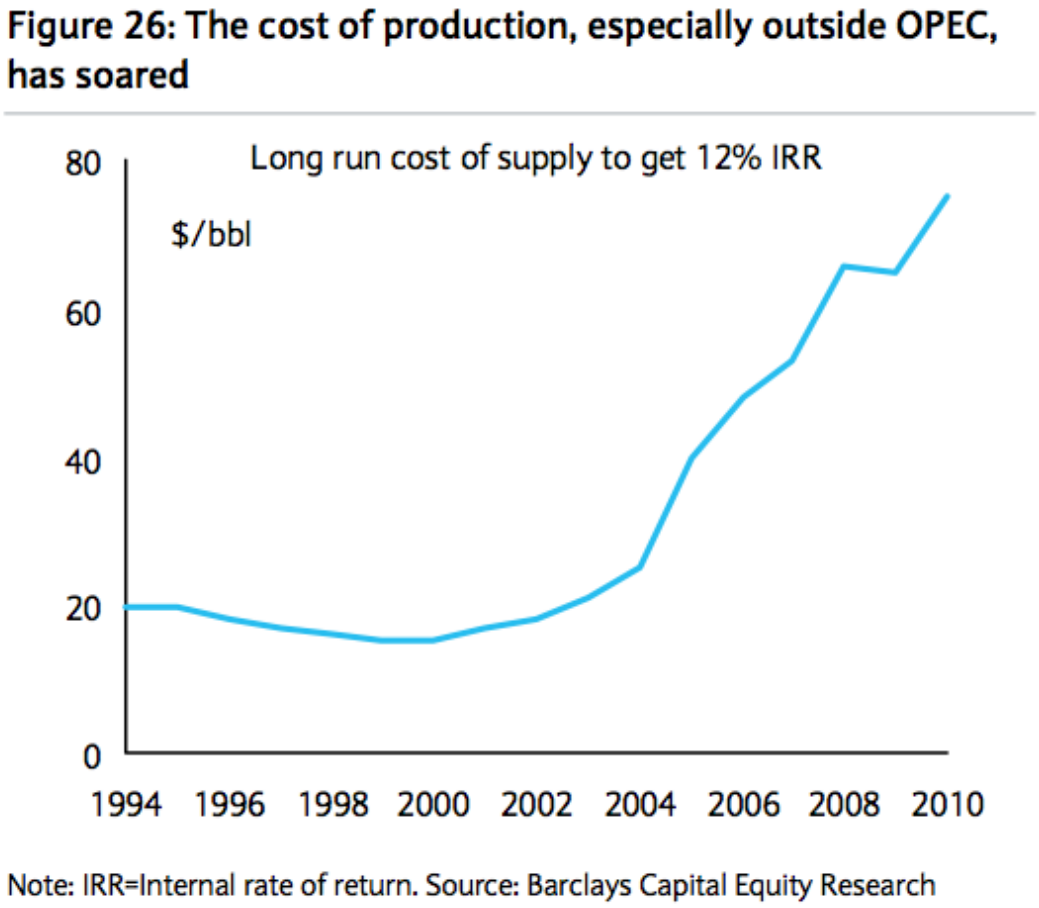

Figure 8. Barclay's estimate of the cost per barrel of oil production.

A rise in oil cost of production generally corresponds with lower EROI. I don't know whether Barclay's analysis is precisely correct, but it is clear that the cost of oil production has been rising, both in dollar terms, and in energy required to produce the energy we are using. What happens when increasing energy is required to produce oil is that the amount of energy coming out of the red "discretionary use" arrows becomes less and less, so the arrows become smaller.

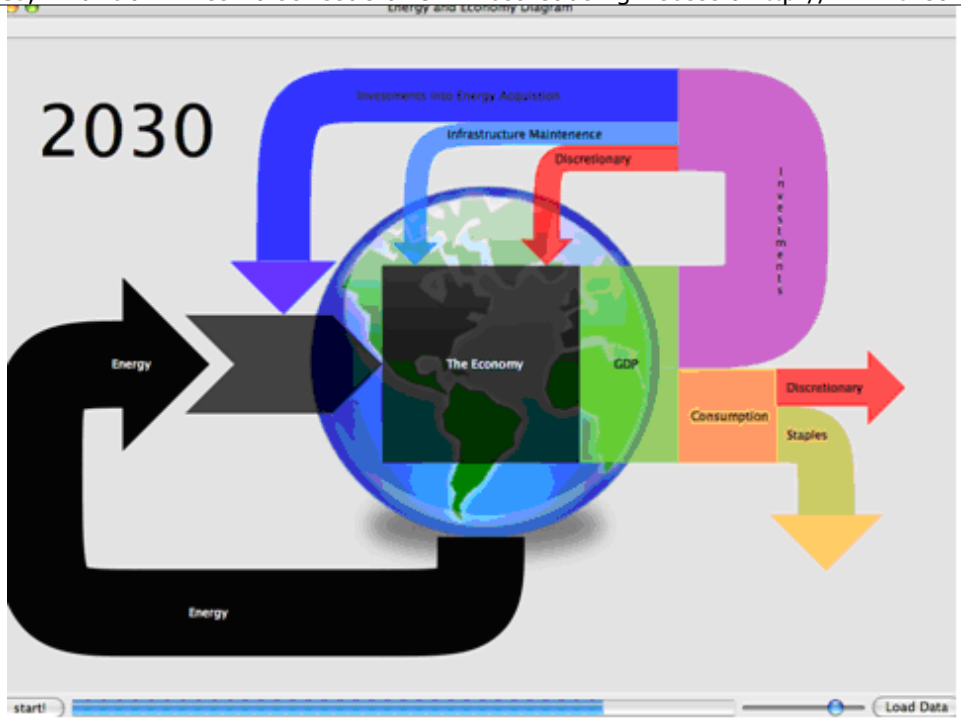

Figure 9. Charlie Hall's Cheese Slicer Model, as of 2030.

As the red arrows denoting discretionary output become smaller (compare Figure 9 to Figure 7), the need for investment (big black arrow at the bottom) becomes larger, causing a serious conflict between what is needed for investment, and what is available for investment.

It seems as though we may already be reaching this point of conflict, especially if oil prices do not keep rising. We have been able to disguise this conflict in the need for investment funds partly through borrowing, but if credit restrictions associated with recession occur, it will become increasingly difficult to find adequate funds for investment.

The small arrow to the right for discretionary purchases (for Figure 9, compared to Figure 7) indicates that there is a constriction in demand for goods of all kinds (including those using oil), because the system of extracting oil uses so much energy itself. If the red arrow to the right were bigger, it would denote higher demand for goods and services, even goods and services made with expensive oil. But with weak demand, we get recession, rather than demand for goods produced from high-priced oil. At times, this lack of demand may manifest itself as a glut of high-priced oil on the market, because people can't afford it. The net effect of all of this is that the lack of energy "push" from the red arrows is what brings the system to a halt. This may look like a lack of "oil demand" to economists.

The way I visualize the situation is to think of oil resources as a triangle, with the easiest to extract at the top, and the most difficult to extract at the bottom. These resources would include both conventional and unconventional oil. These resources would also include oil that can be gotten through very advanced (and expensive) extraction techniques, as well as oil that can be extracted very simply (and cheaply).

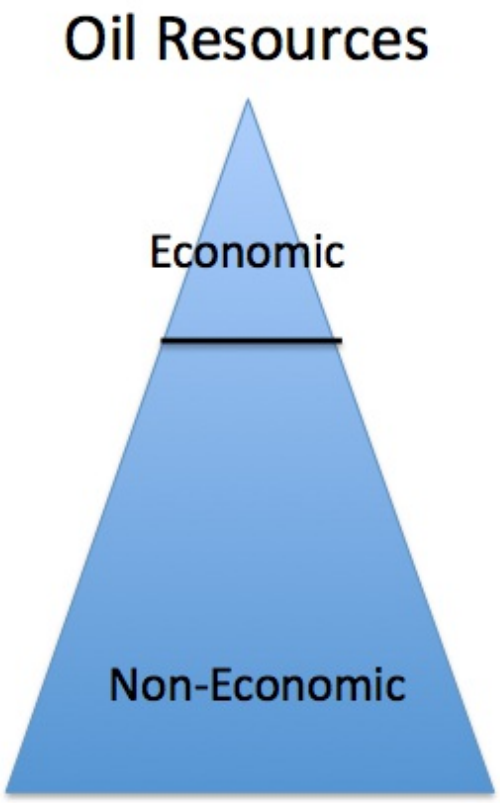

Figure 10. Schematic diagram of economic and non-economic resources

Right now, many people assume that all of the oil resources that we can "see" will eventually be economic. But if prices cannot rise high enough, then there is a limit on which of this oil can be extracted. It is not obvious from just looking at the available resources where this might be, but the limit is there. For example, if the limit where the economy goes into recession is $120, and if a particular "high-tech" extraction method needs a price of $140 to be economic, then that approach is not going to be economic, and what looks like usable oil resources using that method is likely to prove to be a mirage. Technology improvements may cause some oil extraction to move above the line, that would otherwise be below the line, and lack of investment funds may cause some oil to move below the line.

Many people see Hubbert's Curve as predicting a peak and slow decline, based on M. King Hubbert's analysis of how individual reservoirs depleted. It seems to me that Hubbert's analysis more or less says what will happen to conventional liquid oil, extracted using low tech methods. But it really doesn't tell us much about how much oil from lower quality sources or extracted using more and more advanced techniques will prove to be economic. The cutoff really takes place when prices are not high enough relative to production costs, so that there are not enough funds for investment and to support continued demand for energy-using products by consumers.

Once we start reaching economic limits (marked by serious recession and inadequate funds for reinvestment), we are likely to be well past the point where 50% of the oil that is economic to extract has been removed. Lack of funds for reinvestment can act to cut of future development fairly quickly, it would seem to me. If prices are not very high, say $60, much of the more expensive oil production will cease.

It should be noted that this model is not really complete. There may be other types of limits in addition to the cutoff relating to what is economic. We are hearing about the possibility of the

breakup of Libya and damage to oil fields. To the extent that political turmoil makes it impossible to extract oil, then even what appears to be economic in Figure 10 may prove to be impossible to extract.

See also: Developed countries share of oil