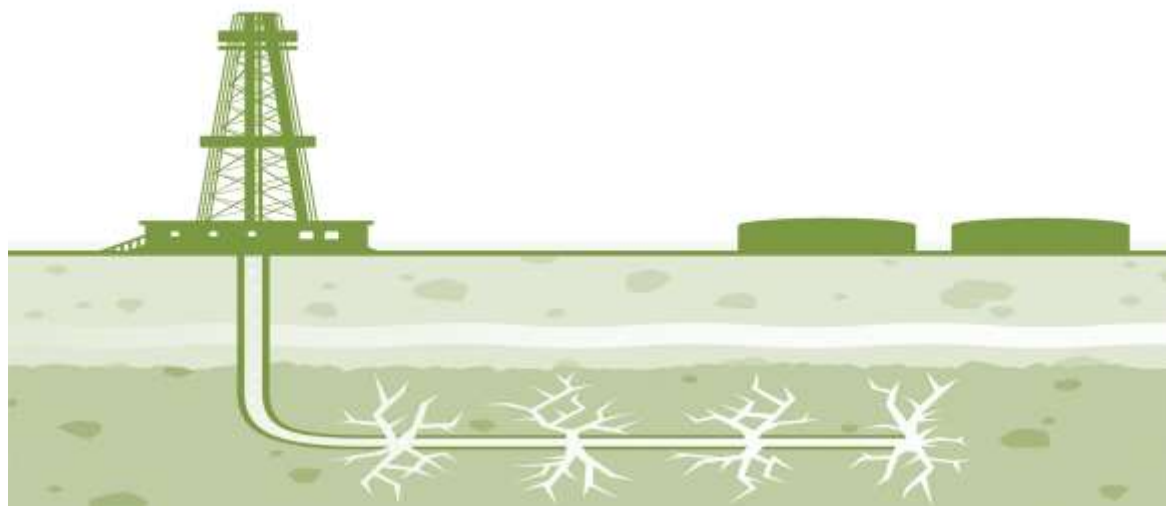


Oil Fatigue: Never Strong Again?

The US economy, in its permanent quest to achieve energy independence, has driven itself into yet another unsustainable state. Counterintuitively, allocating to commodity and oil exporting emerging market equities and debt might just prove to be the winning strategy going forward.



So much of the present investment policy status quo depends on the commodity prices that the implicit assumptions about the current doldrums in the commodity markets continuing for longer period affects long-term asset allocation. Among other things, this assumption has an impact on equity allocation to the emerging markets, high-yield credit allocation in the US, alternatives, infrastructure – you name it, it all depends on what one believes about the commodities, and particularly the oil price.

In our 2011 Global Systemic Risks review we wrote: “...despite higher production (non-OPEC countries) spare capacity in OPEC countries and falling consumption by non-OECD countries the oil price continues to go up. We explain this by the significant impact of the long positions in oil by financial institutions. A further slowdown in the global economy and oil demand will shift the long interest into short interest and cause large price swings. This will dampen the appetite of institutional investors and cause a period of very low oil prices (\$20-40 per barrel).”

At the time of course the \$ 20-40 range was career-threateningly far from the current price and the anchoring level. That range was eventually breached, partly due to the reasons we expected, and partly due to things that at the time were hard to predict. The drastic change in the oil price level shifted a number of dependencies in the global economy. ***In this issue of the Risk Wire we assess the supply chain impact of the current low oil prices on the US economy and propose reasons for unsustainability of the low-price regime.***

Estimating the total impact of low prices

Oil price is a critical conduit in the global economic network. Oil, of course, is a key commodity input for transport, petrochemicals, utilities, and as such has a direct impact on those industries as well as consumer spending. But the combined impact on the whole economy is far greater and more complex than that. Changes in oil prices cause disbalance in important economic equations and corresponding decisions. For instance, low oil prices make new, more fuel efficient aircraft less competitive. Families buying vehicles can now opt for larger, more powerful vehicles. The pay-back periods of solar projects are calculated on the back of the natural gas price, which in parts of the world is linked to oil.

In order to find a cohesive estimate, we split the combined impact into two fundamentally different mechanisms. First, cheaper oil causes wealth redistribution: a part of the annual income of oil producers and related industries was transferred to oil consumers. The wealth transfer creates an **income statement impact**. Second, the price change impacts fair values of various assets linked to oil (as in the example with new aircraft, which is less attractive as an asset in a low oil price environment). Changes in asset values cause a **balance-sheet impact**. The two mechanisms are common in supply chain research carried out by LINKS and are often at odds with each other.

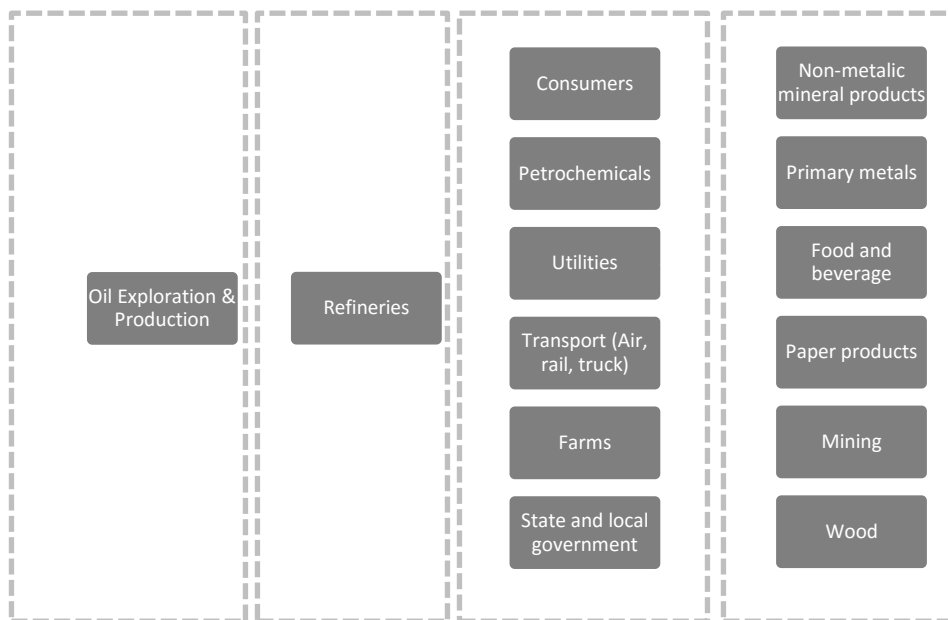
To illustrate the income statement and balance-sheet impacts, let us consider a simple example: a hypothetical petrochemical plant has oil-based production (strictly speaking it is a byproduct of oil – naphtha) and in 2012 makes a gross profit of 25%. Since natural gas price is much lower and has a competitive advantage, the plant management decides to invest in a natural gas-based production plant worth \$40 and expected to come on stream in 2016. In this period, as the oil price falls to \$41 from \$75, the utility company sees its gross margin increase to 59% - the income statement effect. However, the investment made in the gas-based plant is no longer viable and the company has to impair the full value of the plant (Table 1) – the balance-sheet effect. The combined effect of lower oil price on the company, although it is a consumer of oil, is negative.

Table 1: Income Statement and Balance-Sheet effects

Profit & Loss Statement	2012	2016	Gain/Loss
Revenues	100	100	
Cost of goods sold	75	41	P&L Effect
Gross profit	25	59	34
Balance-sheet			
Fixed asset investments including investments in the past 4 years	100 40	100 40	
Less impairment	0	40	BS Effect
Net fixed assets	100	60	-40

Since the whole economy experiences both the income statement and the balance-sheet effects, the size of the combined impact on the economy will depend on the cost structure of oil consumers as well as the size of the capital stock linked to the oil price. Estimating the income statement impact is relatively easy: we use LINKS Mira to assess the oil supply chain (Figure 1) and calculate the total impact of ~45% oil price decline across the first and second groups of oil consumers.

Figure 1: Oil and related products supply chain, source: LINKS Mira



The largest group of beneficiaries of lower oil prices is the US households, who spent \$268 billion on oil and oil-related products in 2014 (source: US Bureau of Economic Analysis, LINKS). If the present environment persists, savings from lower oil price for consumers would be ~ \$120 billion, or over 1% of personal consumption expenditures. Needless to say, this is a significant boost to the household budgets.

The impact on industries directly linked with oil is to the tune of \$ 90 billion (Table 2). This includes benefits accrued to the airlines, trucking companies, rail, water transport, farms and utilities. The Second group of industries is benefiting due to cheaper power and transport; their benefit is nearly \$ 44 billion. The income statement impact on the US economy is then estimated at \$ 255 billion per year, nearly half of which is accrued to the consumers.

Table 2: Impact of oil price decline on direct and indirect consumers

First group - direct impact	Petroleum and coal products (\$ million)	Total Output	Total benefit P&L (\$ million)
Air transportation	45,910	24%	20,538
Truck transportation	63,521	19%	28,416
Water transportation	11,129	18%	4,978
Rail transportation	11,867	13%	5,309
Transit and ground passenger transportation	5,274	9%	2,359
Other transportation and support activities	12,063	6%	5,396
Utilities	21,339	5%	9,546
State and local government enterprises	12,831	5%	5,740
Farms	20,118	5%	9,000
Second group – indirect impact			
Non-metallic mineral products	116,432	7%	3,668
Primary metals	281,905	6%	6,962
Food and beverage and tobacco products	970,305	4%	16,655
Paper products	193,924	4%	3,309
Wood products	97,834	4%	1,655
Data processing, internet publishing, and other information services	207,505	4%	3,309
Mining, except oil and gas	130,222	3%	1,939
Petrochemicals	810,147	2%	6,477

The balance-sheet impact is somewhat harder to assess, since income statement data is readily available in LINKS Mira, whereas the balance-sheet data needs to be aggregated over multiple years (capital expenditure over a number of years). We have identified 68 industries that have oil price-driven capital stock value. The combined capital stock of these industries on the balance-sheets is nearly \$ 2 trillion, more than half of which is accounted for by electric power generation, transmission and distribution. Assuming an average project value loss of 70% (typical assumption for a non-economically viable plant's residual value), the value loss due to the oil price is estimated at \$ 553 billion. As it turns out, the positive income statement impact is more than cancelled out by the large negative balance-sheet effect (Table 3). Little wonder then the weakening oil price coincided with the slowdown in the US economy, which was mostly blamed on the lackluster growth in China.

Table 3: Calculation of the total impact of oil price decline

Personal consumption	119,818
First group	91,281
Second group	43,973
Total: Income statement impact	255,073
Balance-sheet impact	-553,158
Net Impact	-298,085

Where from here?

One caveat in Table 3 is that the balance-sheet impact is an instant one-off number, whereas the income statement impact is annual. This means that the oil consumers continue to benefit from the lower oil prices so long as the current regime remains intact and in over 2.5 years the equation balances out. The big question is though: would the oil prices remain low long enough for the gains to outweigh losses?

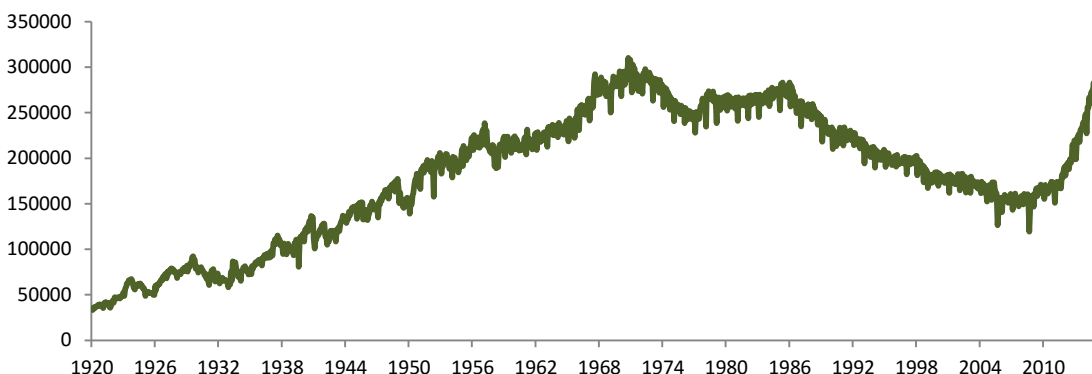
It is often much easier to forecast the commodity forecasters than the future commodity prices. A large price swing in one direction almost immediately creates a conviction that the strong move in the opposite direction is inevitable. If that move fails to materialize, commodity forecasters give up on the conviction within two to three months. The new level – what the behavioral finance readers would call an anchor, becomes the mantra and is followed and trusted as much as an old and wise uncle. Hundreds of pages of arguments are brought to justify why specifically this new level is here to stay with us at least for three to five years.

Oil price is a case in point: the new level of \$35-45 per barrel is touted as the only plausible outcome of the omnipresent and omnipotent supply-demand balancing equation. The same firms that two years ago claimed \$150 per barrel was likely to materialize soon, are now expecting the current level to remain with us for two to three years.

In reality of course these anchors are understandable. A typical forecaster – an analyst or a trader, plans to stay in the same job for no longer than three years (although ends up staying longer than that). This means that he/she can afford to be wrong only for two to three months at a time and any prediction should hold for two to three years. Remarkably, these anchors have nothing to do with fundamentals of the oil and related markets, the dynamics of the price collapse and its consequences.

Here we should take a cautious stance: in many ways it would appear that we claim to be able to forecast the oil price. In order to avoid this fallacy, this Risk Wire will merely present the facts and leave the reader to draw conclusions. So what happened in the oil market to cause such a sharp price decline? Although anything from slowdown in China to conspiracy theories about punishing Russia was widely circulated, we would draw the attention to Figure 2.

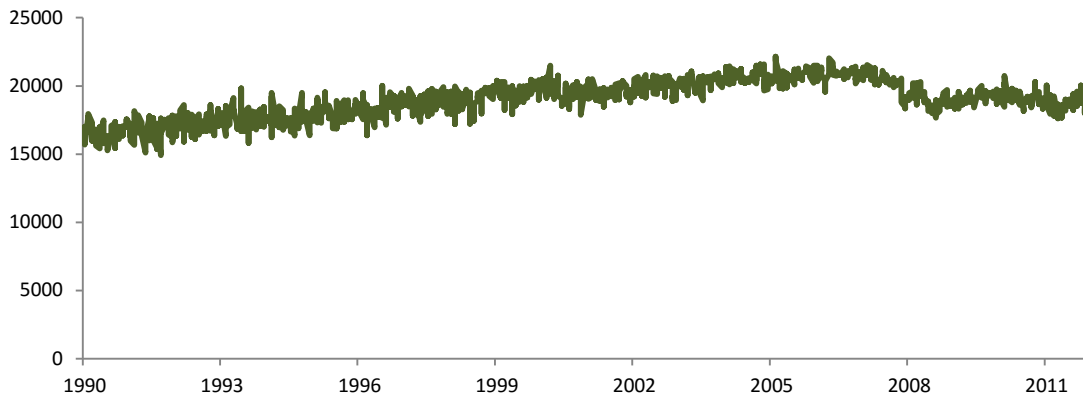
Figure 2: U.S. Field Production of Crude Oil (Thousand Barrels) , source: US EIA



Technological breakthroughs in horizontal drilling and fracking were achieved prompted by the historically high oil prices. Production of oil increased abruptly in parallel with the volume of oil pumped from a single rig.

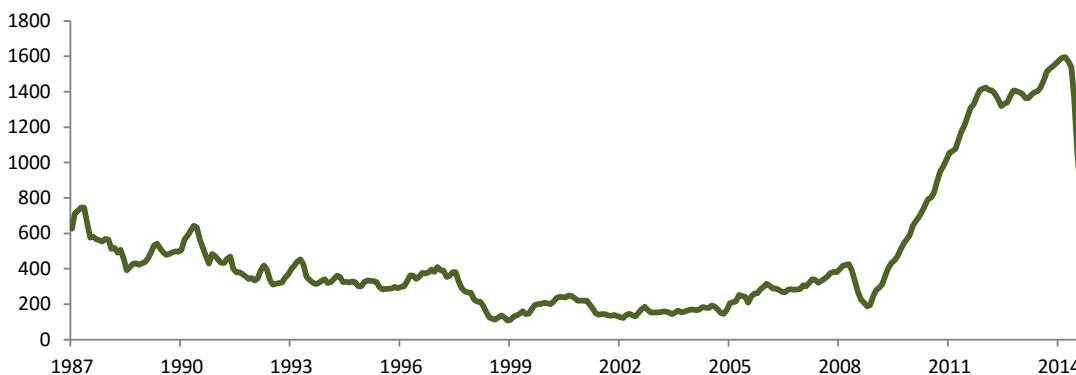
Clearly, such a large increase in production could not leave the markets unchanged. Should this level of production increases be sustained, the prices would be likely to remain low, particularly since the demand in the US is flat (Figure 3). For this to happen, shale oil producers should be able to make decent profits at the current price levels. This brings us to the heart of the puzzle: what is the cost of producing shale oil?

Figure 3: Weekly U.S. Product Supplied of Petroleum Products (Thousand Barrels per Day) , source: US EIA



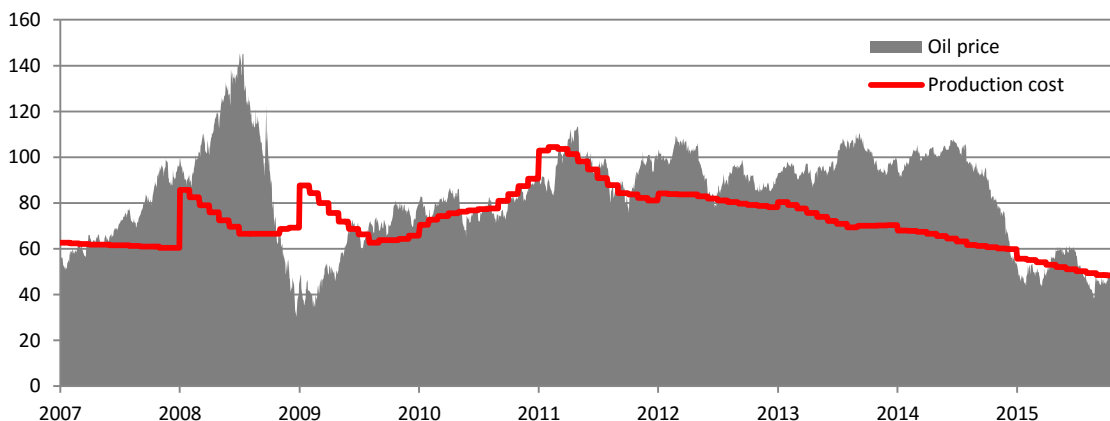
The answer to this question explains the overall confusion in the markets and inability of analysts to draw clear conclusions. If the production cost is close to \$80 per barrel as claimed by some, the current production will cease, however, if the cost is \$30, production will continue. Furthermore, many analysts claim that the volumes are bound to fall since the number of new rigs has fallen dramatically (Figure 4). On the other hand, due to the new technology a single rig produces multiple times more oil now compared to five years ago. So what is the real cost of producing and is the production falling?

Figure 4: U.S. Crude Oil Rotary Rigs in Operation Number of Elements, source: US EIA



The difficulty is in the very nature of shale oil technology. Due to the specific features of shale oil, the production process is very different from conventional oil: shale oil companies have to continuously drill in order to maintain and increase production since the application of the technology results in very quick depletion of existing rigs. Since large part of the lifetime cost of oil is drilling, ***shale oil companies are more directly linked in the supply chain with drilling and oil services companies. They have been able to push a part of their cost down to the supply chain and cut the cost of production (Figure 5).***

Figure 5: Oil price and cost per barrel calculation, source: US EIA, LINKS



Our estimate of cost includes assumptions about the pace of depletion of wells, US EIA data on costs of drilling and variable costs involved in shale oil. Evidently, the per-barrel cost has been falling largely due to the price cuts by the oil field services companies.

The very thing that has enabled cost declines, however, has also made the current price of oil unsustainable: the pain of low price has now been shared by oil services companies who are far more vulnerable and have higher fixed costs to operate. So far 29 of 62 shale oil exploration & production firms are nearing distressed levels. Distress in oil field services companies has doubled in 2015, 52 out of 79 oil services companies in our database have posted losses. This means that although our estimates of cost are down to \$ 50 pb, most of this cost decline was due to pushing costs to the oil services companies who cannot sustain the current pricing levels.

Conclusion

Lower oil prices have caused a major shift in the investment policy and perceptions of principal investors. Oil-exporting emerging markets have clearly been suffering however, the impact on the US economy is not positive either due to the significantly negative balance-sheet impact on companies. The supply equation is likely to change, since the current pricing regime is not sustainable for shale oil production and oil field services firms. Although many shale oil and oil-field services players may not survive until the adjustment takes place, traditional oil producers particularly in the Emerging Markets are better placed to survive and reap the benefits of higher pricing in the future.

This line of thought suggests that pension funds should consider realigning equity portfolios away from the US and developed markets into what is currently perceived as “toxic” oil- and commodity exporting emerging markets and global oil majors. Furthermore, the deflationary impact of low oil prices is also temporary, which means a recovery is likely to lift other commodity prices too, with the possible exception of agricultural commodities that have a dynamic of their own.

About LINKS:

LINKS Analytics B.V. has a focused offering of industry leading systemic risk management solutions for institutional investors. Our unique and proven methodology of estimating the degree of systemic risk is based on the assessment of asset valuation dislocations globally (Graham Risk) and the degree of interconnectedness and concentration (Network Risk).

Contact:

LINKS Analytics B.V.
Kluizenaarsbocht 6, 2614 GT Delft
The Netherlands
Tel: + 31 (0) 70 891 9282

E-mail: info@linksanalytics.com
www.linksanalytics.com

©2015 LINKS Analytics B.V.

Limitations:

This document is provided for information purposes only. The information contained in this document is subject to change without notice and does not constitute any form of warranty, representation or undertaking. Nothing herein should in any way be deemed to alter the legal rights and obligations contained in agreements between LINKS Analytics and its clients relating to any of the products or services described herein.

LINKS Analytics makes no warranties whatsoever, either express or implied, as to merchantability, fitness for a particular purpose, or any other matter. Without limiting the foregoing, LINKS Analytics makes no representation or warranty that any data or information supplied to or by it are complete, or free from errors, omissions or defects.

LINKSSM, LINKS AnalyticsSM, BIPSSSM, LINKS Risk PlatformSM, Graham RiskSM are service marks of LINKS Analytics B.V. Other products, services, or company names mentioned herein are the property of, and may be the service mark or trademark of, their respective owners.