CHAPTER 12

Paper Barrels—Oil and Gas Markets

'Please Lord, give us one more boom.
We promise we won't screw it up this time'.

Trading of paper barrels, such as oil futures and oil derivatives, characterise today's oil and gas markets and add further volatility to oil prices. The trillions of dollars that are found in hedge funds operated by commodity traders and speculators often follow a herd mentality. This magnifies the effects of geopolitical unrest or natural disasters by creating panic buying or selling situations. Hedge funds and speculators need prices to oscillate to make profit—buy low, sell high and buy low[1].

Nature's Best

You don't have to trade commodities to know the simple rule: the best quality fetches the highest prices. Just go down to a coffee shop; the best beans command a premium. Oil is no exception to the quality rule, yet the prevailing stereotype is that a group of oil barons in Dallas or oil sheiks in Dubai control prices behind closed doors. Thankfully, the reality is somewhat more transparent with petroleum prices being determined by market forces, quality and trading.

Pricing Is Complex

The pricing of petroleum is highly complex. Making comparisons between producers regarding what is a fair price for oil and gas is a tough call. This is because it would involve selecting countries that match each other's profiles in terms of oil and

gas exports and imports. Almost all petroleum exporters import petroleum either for derivative needs or to maintain refining blends for national refineries. Even then, the comparison would be invalid due to differing circumstances such as:

- Fiscal arrangements
- Production agreements
- Royalties
- Tax breaks
- Seasonal adjustments and their affect on West Texas Intermediate (WTI) crude (which does not necessarily apply to Brent crude)
- Discounts and sunk costs for a certain type of refinery configuration for a certain basket of crudes
- Per barrel finding costs, and
- The sweetness and density of the crudes being imported and exported[2].

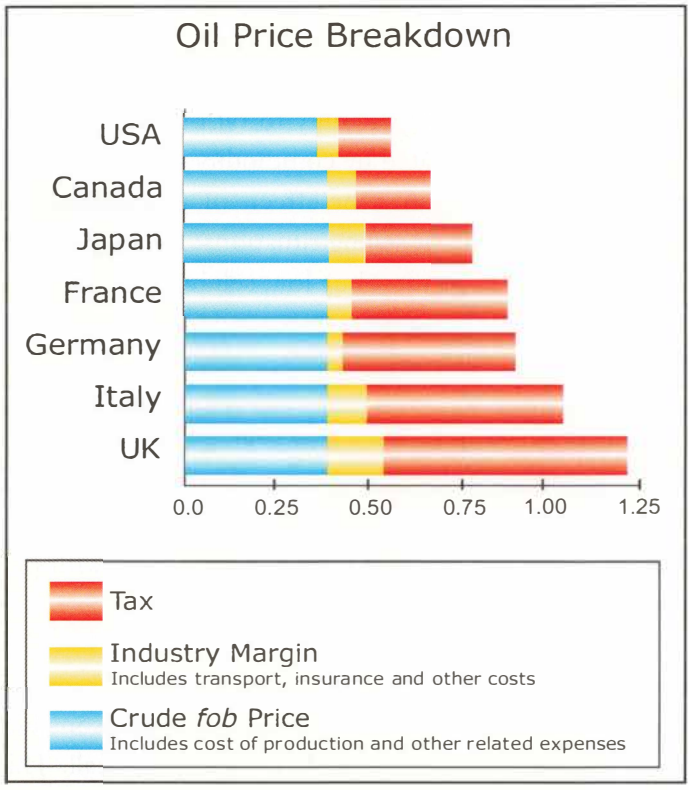

Figure 1 - Oil Price Breakdown (OPEC)

The following example is instructive. Consider that sweet WTI crude trades at US $X on a given day. WTI Sour would trade at a lower rate between US $3.75 to $5.00; therefore, WTI Sour would trade at approx. $X-$3.75 to $X-$5.00. A sliding scale operates that knocks down the price according to sourness. A 50° API sour would trade at approx US $68.25 per barrel although the marker WTI would trade parallel at US $90—a price differential of nearly US $12. Additionally, crude that is below 25° API, would fetch lower prices. Roughly speaking, 20 cents is deducted for each API degree below the benchmark. For crude below 20° API, 70 cents would be deducted for each API degree[3]. This gap is likely to increase in the future due to the shortage of sour and heavy refineries.

Petroleum pricing is further complicated due to variations in the type of oil company, its internal marketing channels, the age of refineries involved as well as their configuration, efficiency, ownership, economies of scale and sunk costs[4].

Oil and Gas

The split between oil and gas production is always important because oil and gas are priced according to their nature and utility. Gas pricing is different to crude oil pricing mainly due to the long-term contracts which can be as long as 20 years, a situation which is unthinkable in oil futures. Even the most progressive and forward thinking oil companies or oil traders will not likely contract beyond a few years. This leads us to the second fact: differences exist in oil contracts between oil companies and traders and oil contracts 'off-the-trading-floor'. The latter are not hushed up for secrecy purposes, but for more mundane reasons—getting the right blend for refining[5].

Trading

Everyday billions of dollars worth of petroleum contracts are traded at exchanges around the world. The most famous are those of the New York Mercantile Exchange (NYMEX), Chicago Mercantile Exchange (CME) and the Intercontinental Exchange (ICE) London. These exchanges act as trading venues by bringing buyers and sellers together. These exchanges do not control price, nor can they intervene to stimulate demand or supply. What they offer is the certainty and anonymity of a regulated trading place. Today's corporate governance and anti-trust laws make price fixing and monopolies a historic relic. Regulated contracts are generally either here-and-now (spot) contracts or set at a pre-determined date (futures). These contracts allow buyers and sellers to hedge against future risk, oil price increases or reductions. Hedging or speculative investments are unregulated financial instruments where

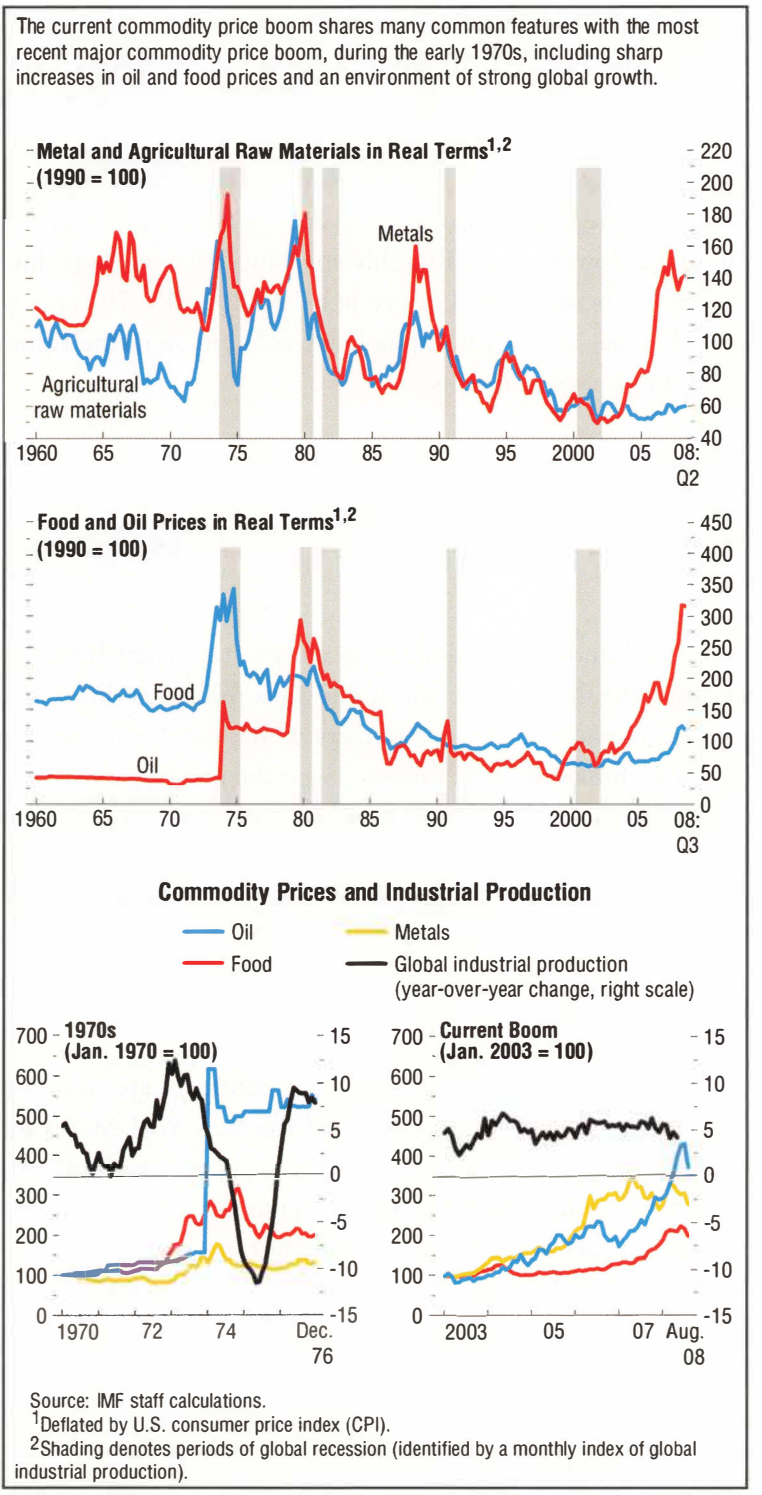

Figure 2 - IMF Commodity Prices (Source IMF). Note the commodity boom clearly burst in late 2008

traders look for a 'margin' between market value and real value. Their profits are made when the values differ[6,7,8].

Auto-Pilot

Bright blazers, frenzied finger signs, shouting and paper strips littering the floor—the unmistakable scene of open pit trading. In 2005, London's open-pit petroleum exchange became completely e-based. Buyers and sellers instruct brokers who set e-tag alarms at given bid-to-buy or offer-to-sell levels. This has removed much of the human element in petroleum trading making it almost automatic execution. Although this removes an element of panic, prices are still influenced by volume transactions or the 'herd' mentality. The NYMEX still maintains open pit trading, but it is only a matter of time before this too becomes automated.

Control or Influence?

No single body, organisation or even nation state is capable of controlling oil prices without inflicting major harm on itself. If a trend for oil prices has been established, and is achieved by all the world's producers and consumers, this trend can only be undone by the same combination. Of course, certain institutions may be able to influence the trend, but the underlying trend is far too diverse and powerful to be broken. Not even the world's financial muscle can control oil prices. Banks and billionaires can clearly influence prices by buying and hoarding physical oil stocks. They can suddenly offload oil at high prices, and buy it back at a lower price; however, the daily volumes involved just to make a difference would be huge (one million barrels a day [MMbbl/d] would cost many millions of dollars). Considering, the severity of the current banking crisis, it is hardly likely either banks or billionaires will want to hold substantial volumes of oil.

To see the trends clearly, consider that by the end of 2008 the Organisation of the Petroleum Exporting Countries (OPEC) had promised a production cut of two MMbbl/d—the largest cut in its history. Yet, this had minimal impact on the downward trend. To contrast, in early 2005 in certain European markets, some finance houses profited from rising oil prices by chartering oil tankers and storage facilities to hoard oil; however, they were profiting from an upward trend not creating one and were able to access capital easily.

Even the powerhouse of OPEC, which supplies roughly the equivalent of 40% of the world's crude oil, is unable to determine prices. Of course, OPEC and its con-

stituent state companies influence the market by increasing or decreasing production. They cannot, however, reverse or start a trend that is already underway[9,10,11].

But what if suppliers increased production in an upward-market? In theory, this should send prices spiralling downwards due to excess supply. In reality, however, the supply-demand equation is so tightly reckoned that insufficient spare capacity exists that could actually pump more oil or gas, let alone refine, market and distribute it. What if the suppliers reduced production in an upward-market? Of course, this would increase prices. In the normal course of business, however, this is not likely as producers want to make the most of high prices.

If oil prices become too high, this will induce inflation and restrict global growth, reducing consumption and bringing prices downwards. The oil producers seek stability; they are highly dependent on oil and gas revenues. If supply was shut off completely, that would send economic shockwaves worldwide as in the 1970s. While it may be possible, this is not likely to happen in the normal course of business[12].

On the demand side, as long as world economies continued to grow (even at very low rates, i.e. 0.25% per annum), oil demand does not falter and oil prices maintain their high levels. However, as soon it was clear that world economies were going to falter in late 2008, demand dropped so fast that by early 2009 the oil price was US $40 per barrel. This was a drop of more than US $ 100 within less than six months.

Consumers and Producers Dance Together

Consumers and producers are locked in a complex and inescapable equation that continually attempts to balance trillions of supply and demand transactions. To comprehend this, we need to look beyond politics and realise that producers and consumers are mutually dependent. Although certain countries hold the world's long term oil and gas reserves, those reserves are only ever of real value if they are marketed.

Giant consumers such as the US, Europe and China need to meet demand for heating, cooling, lighting and mobility. Other consumers such as Brazil and India are growing demand. As demand is so heavily dependent on economic health, any change in consumption will affect producer decisions regarding production output, exploration spending, etc. That much seems clear.

What is not clear is the time delay between a growth or fall in consumption and the reactions of producers. Not only is this delay so protracted that it goes unnoticed,

it is also deadly. Why are we consistently unable to spot the dangers of 'boom and bust' cycles? Since biblical times, and the seven years of feast followed by seven years of famine, why is it that we always get hit?

Just like the Titanic and the iceberg, it seems as if the cycle has suddenly come from nowhere. Bang. By the time we get hit, it is too late to change course. But is our fate the same as that of the Titanic[13]?

Large economic swings leading to excess production or consumption are not in the interests of producers and consumers. They can lead to recession and even depression; therefore, it is in the interests of both groups to maintain stability. Ultimately, however, the market balances the uncertainties of economic growth and oil price. But how does affect the oil and gas industry?

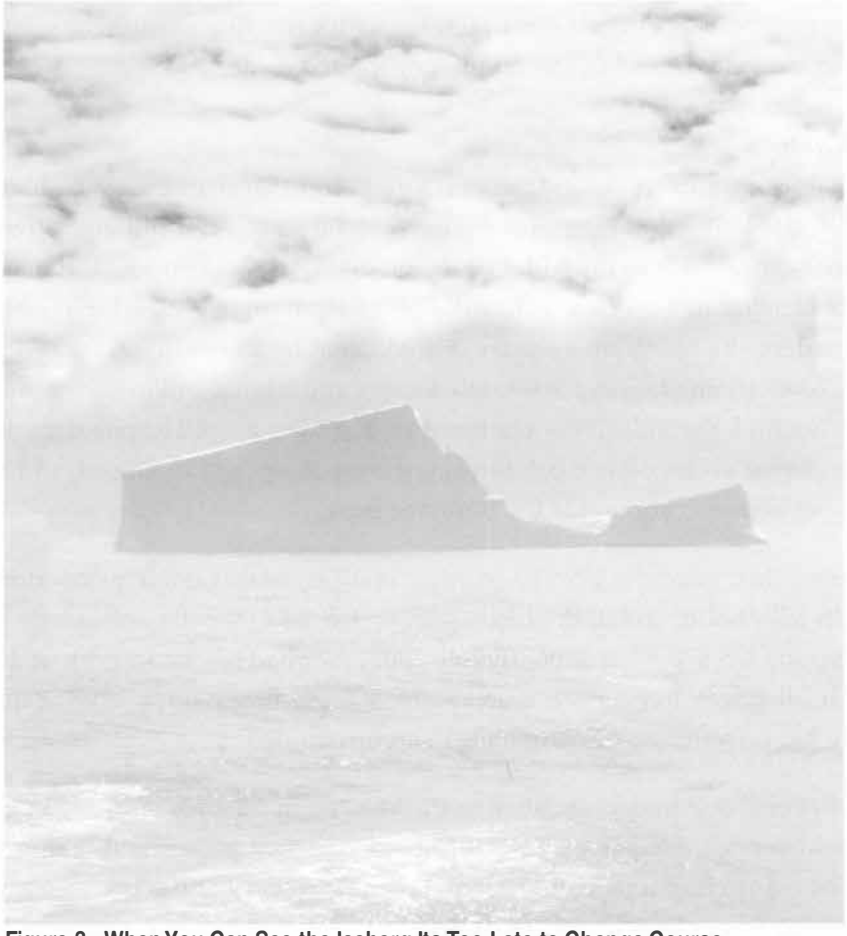

Figure 3 - When You Can See the Iceberg Its Too Late to Change Course

Cycles

Clearly, the major determinant of oil company profits and share prices is the oil price. As such, it is a crucial factor in pacing industry activity. It dictates budgets and investment throughout the industry from E & P spending, rig activity, wells, facilities, refineries and pipelines. It is relatively easy to see where the industry is in a given cycle by looking at oil prices. If they are low, so are share prices, capital expenditures, rig levels, drilling and activity in general. When oil prices rise, the opposite applies[14].

From an investor's perspective, ExxonMobil, BP, Royal Dutch Shell and ChevronTexaco all enjoyed an increase in absolute values in line with high oil prices and record corporate profits. Independents and service-company stocks had a similar story. Anadarko, Burlington, Baker Hughes, Halliburton, Schlumberger, Smith and Weatherford experienced relatively large gains. Both majors and services, however, had tremendous fluctuations in unison with cycle movements thus wiping off billions in market share values as oil prices dropped in late 2008.

Down Cycle

But how does that affect the industry? It's no secret that markets are ruthless. Since the 1970s, the boom and bust cycles have seen oil prices and drilling activity crash three times—twice due to the wider recession in the world economy and once due to the Arab-Israeli war. Two clear patterns emerge from these cycles. First, just like the market traders, the upstream industry is dominated by a herd mentality too. Despite bust markets offering less expensive stocks, rigs and labour, drilling levels never rise; they fall. Second, the industry is regulated as if it were a tap. Despite experience reminding us that cycles do not last forever, the tap is opened or closed, and the flow that follows always compounds the boom or bust [15].

To illustrate this, since the US $10 oil price in 1998, basket crude prices doubled to above US $20/bbl by 2000, doubled again to US $40 by 2004 and nearly doubled again reaching US $78.40 in 2006. By July 2008, they had reached a peak of US $147. Although oil prices have more than doubled three times since 1998, exploration spending has only increased marginally in comparison.

Despite lower E & P budgets relative to the increase in oil price, most rig contractors and oilfield service companies have all recorded record profits and high utilisation levels. The reason is that demand for equipment and services has been very high and technological forces have also been at play.

We have seen that fewer wells are being drilled, but they are far more effective at drainage and production is increased. Better technology such as sub-salt imaging is helping to discover fields such as Tupi in Brazil, while directional drilling techniques can access and enable multiple reservoir completions. Yet, once again faced with uncertain economic conditions, the industry is faced with cost-cutting[16,17].

Big Crew Change

Arguably the industry's most valuable resource, upstream labour, suffers the most when the tap closes. The 'big crew change' refers to an ageing population that is creating a labour deficit across all skills and capacities, but is largest in technical areas. Many people who are laid off exit the industry and potential new entrants remain wary. Today, nearly half of all oil and gas industry workers are over the age of 50. Only 15 percent are in the age range of 20s to mid-30s. University enrolment in petroleum engineering is down from 11,000 students in 1993 to 1700 today. The number of universities with petroleum engineering degrees has fallen from 34 to 17. Companies searching for their future leaders are fast realising they are going to have to do things differently; there are lots of intellectual gaps. We're seeing more outsourcing, greater dependence on suppliers to solve problems and higher demand for consultants[18].

Oil—Profits or Profiteering?

Rocketing oil and gas prices and record corporate profits are almost always accompanied by the pockets of consumer's hurting. This leads to greater scrutiny of oil and gas companies, yet what are the issues surrounding petroleum prices and corporate profits[19]?

Nobody wants oil or gas. What people want is the progressive lifestyle that oil and gas provides. It's all about comfort, freedom and consumption. We want the 'climate-comfort' that comes from heating or cooling our homes, our workplaces and malls. We want the freedom that comes from driving our cars or from flying anywhere. We want derived goods such as aspirin, plastics and cosmetics. No other commodity touches us so completely or underpins modernity as petroleum. Undeniably, we are 'petroleum people'.

As the desire for modernity spreads, lifestyles that were once confined to wealthy classes in wealthy countries are now found up and down social classes and across the globe—not just China, India, Russia and Brazil but the wealthy states of the Middle

East. Together, this relentless social mobility has contributed to oil becoming in many ways the world's most desired commodity [20].

Petroleum Generation

Emotions run high because everyone wants a better lifestyle or at least a more comfortable one, and oil and gas can make this happen. It's that simple. If we strip away our needs from our wants, however, it becomes clear that we do not need everything we want. Linked to this, we can also use energy more efficiently.

Of course, no one is suggesting that air-conditioning in the tropics (gas power generation) is unnecessary or that heating (gas fired) in cold countries is a luxury. What is important here is that we don't need to drive everywhere, but we want to. It just seems easier to get to the shops, to work and to the gym. Our language is telling; often our first car is a little 'runabout' for local journeys[21].

As petroleum people, we drive everywhere—no matter how short the distance—and we fly. Where past generations would have seen flying as a once in a lifetime experience, we think nothing of flying to visit people, go shopping or even to get a 'winter-tan'.

Lifestyle Price

It's fine that lifestyles come with a price. The logical question is at what price and who should pay. The logical tendency is that those that pollute should pay. What this means is that those people that live in Northern climates must get used to paying higher prices, especially during peak demand periods such as winter. Those that inhabit temperate climates will pay more for their energy, especially in summer. Everyone can expect higher gasoline prices. As students of economics will be quick to point out, this is demand and supply theory at work. In this context, what is a fair price for the lifestyle? All commodities can fluctuate wildly according to seasonal production changes and non-scheduled events such as droughts or flooding. See the peaks and troughs of orange juice or coffee futures; where crops are plentiful, prices fall. The reverse is also true. Without exception, oil and gas are commodities which are subject to price fluctuation[22].

Cheap Oil

Getting it on the 'cheap' is a reality for only a handful of countries that 'enjoy' heavily subsidised oil such as Venezuela and several Arabian and central Asian states.

Of course, the artificially low prices that these countries enjoy mean that part of oil revenues are transferred directly to consumers' pockets. Some commentators have decried this as distorting demand by allowing artificially low prices which lead to greater demand. That may be true, but the decision to remove taxes from gasoline sales in given countries is a sovereign decision and right. In some ways, it is an easy method of spreading the profit.

It is clear that the oil price is determined globally by many buyers and sellers engaging in trillions of transactions: however, the time-delay before we can measure the difference is so long that it often catches us by surprise (who remembers the last bust cycle when it was a decade ago?) This is best characterised by the Texas car sticker—'Please Lord, give us one more boom. We promise we won't screw it up this time'.

In the long term, as long as economies and populations grow, demand will inevitably increase. On the supply side, three major world producers—Venezuela, Iraq and Nigeria—have had reduced production for four successive years. Add to this the spate of hurricanes and other non-scheduled events to use an analyst's term, it's hardly a surprise that oil and gas peaked recently.

But what is the trend for the future? Will renewables change the equation? What of global warming and climate change? The next chapter looks at these two points specifically. By understanding where renewables fit into the oil and gas equation, we will be better placed to understand which are the true exits from the Hydrocarbon Highway[23].