



Peak Oil: Prescient or Premature?

Persistently high oil prices have been a key feature of the global investment climate for several years thanks to strong global growth and geopolitical developments in nations ranging from Iraq to Nigeria to Venezuela. The world economy and financial markets

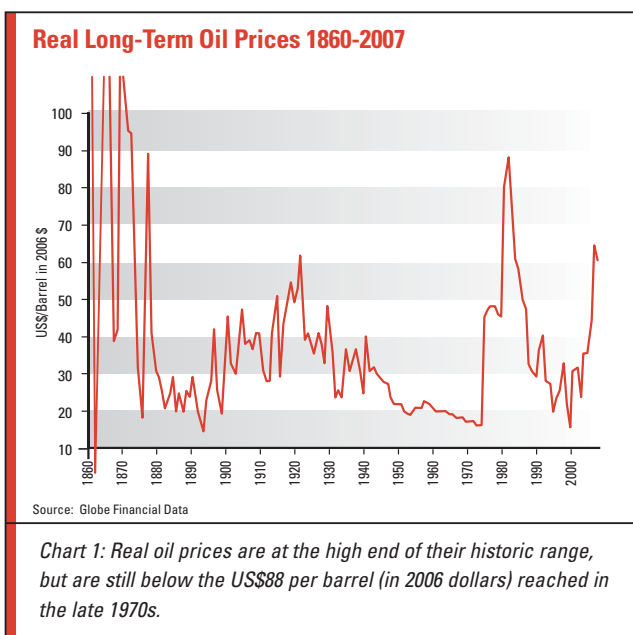
have adapted to high oil prices remarkably well. Fears of a return to “That 70s Show” – an oil-induced global recession or prolonged bout of stagflation – so far have turned out to be groundless, as interest rates, credit spreads and stock market trends have supported continued global expansion.

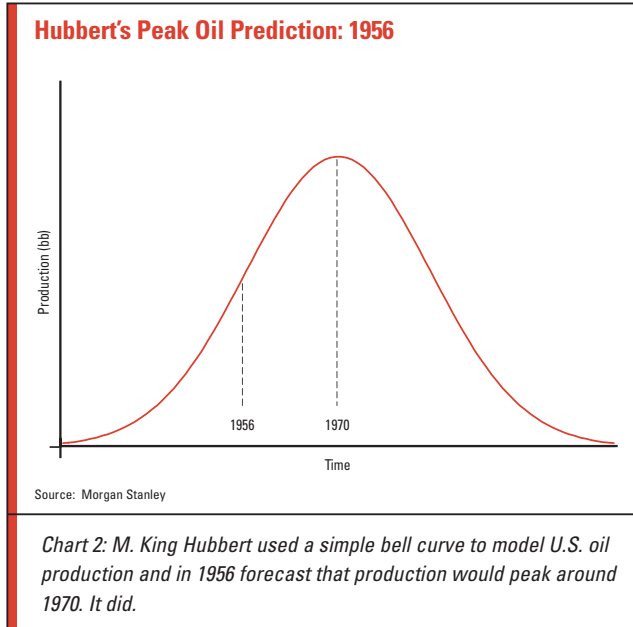
Oil prices have eased considerably since their peak last summer, but remain at the high end of their historical range in inflation-adjusted terms (see Chart 1). High oil prices have offered much support to adherents of the peak oil theory, who predict that future oil production will soon peak (if it hasn't already) and then rapidly decline.

They include bright people with impressive credentials, such as Ken Deffeyes, a former Princeton University geologist, and Matthew Simmons, a Houston investment banker and long-time oil industry insider. Peak oil theory is also known as the Hubbert's Peak Theory after geologist M. King Hubbert, who correctly predicted in 1956 that U.S. oil production would peak around 1970. Hubbert made his prediction by fitting known production data and estimated reserves data to a statistical bell curve model that basically said “what goes up must come down” (see Chart 2).

This line of reasoning has enormous popular appeal since most people appreciate that there is only so much oil out there and that a limited resource will ultimately be depleted. We would also note that the 18th century theories of Reverend Thomas Malthus, who said exponential population growth would soon bump into hard limits, were enormously popular in their time (and to some extent still are). The tricky questions related to such “limits to growth” arguments are always: “When exactly are physical constraints likely to kick in?” and “How much can improved technology put off the day of reckoning or even make it moot as other substitutes are developed?”

It is worth noting that both Malthusian and peak oil arguments attract devotees who espouse their views with religious or indeed eschatological fervor. There has been a virtual cottage industry of books in recent years on the topic of peak oil, with titles like *The End of Oil: On the Edge of a Perilous New World* and *The Party's Over: Oil, War and the Fate of Industrial Societies*. There is a plethora of Internet sites devoted to peak oil theories, and some debunking





them. One of the most useful is www.oilcrisis.com, which contains archives of many articles produced by prominent peak oil theorists. Others with news, commentary and passionate debates include www.dieoff.com, www.theoildrum.com and www.peakoil.com.

Is “We’re All Gonna Die” a Useful Prediction, Even if It’s True?

A visitor to those websites may quickly understand why I used words like “religious” and “eschatological” to describe the tone of many of the discussions of the peak oil theory. Eschatology concerns doctrines about death and its aftermath, in relation to judgment and heaven and hell. There is indeed a soul-cleansing “fire and brimstone” element to much of the preaching related to peak oil theory. Consider the words of prominent peak theorist Colin Campbell, who was asked in 2002: “What will be the likely effects of hitting the production downslope?” His response: “Big question. Simply stated: war, starvation, economic recession, possibly even the extinction of homo sapiens.”

The aforementioned Ken Deffeyes, who believes that world oil production peaked in December 2005, wrote last year: “By 2025, we’ll be back in the Stone Age.”

To be fair to Mr. Deffeyes, he later retracted that remark as “hyperbole.” But it is very clear that he believes a major economic, social and political crisis is around the corner because of a decline in the supply of oil.

Based on such anecdotes, it would be tempting to dismiss peak oil theorists as kooks, except for the fact that they are being joined by respected mainstream analysts. For example, the U.S. General Accountability Office (GAO), which monitors U.S. government programs, issued a report in February this year entitled: *Crude Oil: Uncertainty about Future Oil Supply Makes it Important to Develop a Strategy for Addressing a Peak and Decline in Oil Production*. The report essentially endorses the idea that world oil production is likely to peak in the not-so-distant future, although it does make clear that peak could come any time between now and 2040.

Other respected mainstream economists, such as Prof. James Hamilton of the University of California at San Diego, have endorsed many of the key concepts behind the peak oil theory and have highlighted information suggesting that some of the world’s largest oil fields, like Ghawar in Saudi Arabia or Cantarell in Mexico, have entered into phases of irreversible decline in output (see www.econbrowser.com).

That said, even if one believes that oil production is peaking, there is a world of difference if the peak comes in 2040 versus now, since there will be many years to adjust and develop alternative energy sources if the peak comes later. In contrast, there will be virtually no time to adjust if the peak is imminent or already behind us. Moreover, if world oil production continues to grow for 30 more years, there may be plenty of time for cyclical upswings and downswings to unfold in the meantime. The difference is as profound as a doctor telling you that you have only a few months to live compared to telling you that you will die after living to a ripe old age. Even if the alarming base case forecast is true, it is not very useful if it leaves a range of uncertainty of more than 30 years in terms of the timing.

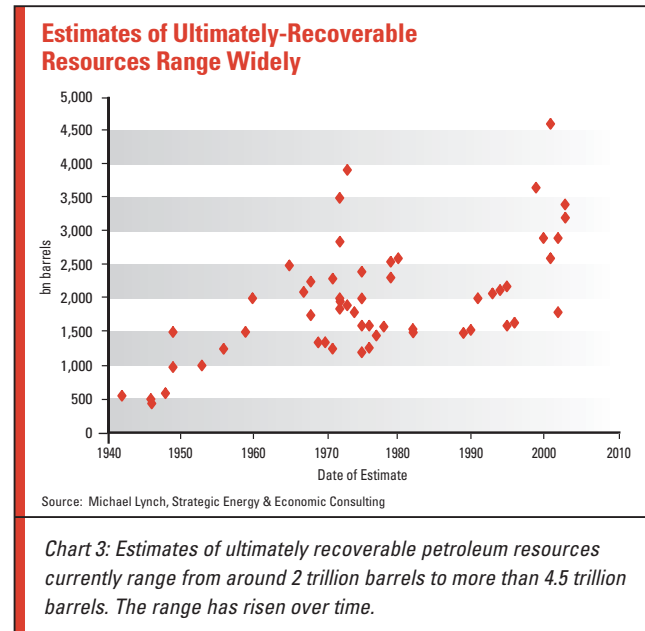
The Case for Skepticism

Accordingly, despite the compelling neo-Malthusian narrative provided by the peak oil theory, we remain very open to the idea that it could be the wrong story – or at least so premature that it is effectively the wrong story. So we think it is worth paying attention to what respectable skeptics have to say, aside from their calling attention to some of the hyperbole associated with prominent peak oil theorists.

An excellent summary of the case for skepticism was recently written by Michael Lynch, an experienced oil economist who now heads a firm called Strategic Energy and Economic Consulting. Writing for CLSA Securities, he published a study in March entitled *Crying Wolf – Peak Oil Alarmism: Fact or Fiction*, which draws on many years of watching various intellectual fashions come and go with respect to oil price forecasting.

Although Lynch's criticisms of peak oil theory are too numerous to summarize briefly, they focus on calling into question two of the key building blocks of the peak oil view. One is the idea that we can know with any precision how large existing oil reserves actually are (have you personally surveyed all the fields, or do you know anyone who has done so without the possibility of measurement error?) and the other is the assumption that the statistical bell curve that Hubbert used is a universally applicable construct (since there are many other plausible models that lead to different conclusions).

As shown in Chart 3, past and current estimates of how much oil is in the ground encompass a very wide range. The estimates have also tended to grow over time as technology has progressed. So while pessimists would argue that the "ultimately recoverable resource" is only two trillion barrels, optimists can point to recent estimates as high as 4.5 trillion barrels. Obviously, the greater one's estimate of how much oil is in the ground, the longer it is likely to last and the further away is the "day of reckoning." Lynch is critical of some prominent peak oil theorists for willfully ignoring credible estimates of a much larger



reserve base. The very natural tendency to screen out data which do not validate one's deeply cherished beliefs is known by behavioral finance experts as "confirmation bias" and is a well-documented way to make poor investment decisions.

Lynch also provides numerous examples of why the simple bell curve estimates of declining production provided by Deffeyes, Simmons and others are not necessarily representative of production dynamics in many areas around the world. Many other oil field production paths have not followed such a simple shape. Data from such fields may give a "head fake" by appearing to peak for some time before the results of new drilling or new extraction technologies give rise to much higher production for many years. Engaging in his own hyperbole, Lynch concludes that "the quantitative models used by peak oil theorists would earn a university student in elementary statistics a failing grade." We think this may be overly harsh, because some prominent supporters of the peak oil view, such as Prof. Hamilton of the University of California, are among the most respected applied statisticians in the world. That said, even extremely intelligent people are not immune to confirmation bias, including those who are fully aware of the possibility of such bias.



Avoid Overconfidence and “Texas Hedges”

We do not pretend to be able to settle the raging debate between highly qualified and experienced analysts on this important topic. We are reasonably sympathetic to the idea that an “effective” peaking process is in place now for global oil production, notwithstanding the very wide range of estimates for how much oil is out there. That is based on the U.S. GAO’s observation that nearly two-thirds of proven worldwide reserves are in countries with medium or high levels of political risk. The implication is that even if there is more oil out there, you would have to be out of your mind to invest a lot in trying to extract it unless peace and harmony miraculously break out in many troubled parts of the world.

That said, Lynch is right to remind us that intellectual fads and fashions come and go in oil forecasting, just as is the case in many fields. In the early 1980s, it was an absolute matter of faith that oil was a scarce resource and that prices would rise by about 3% per annum for the rest of our lives. This widely held belief did not prevent oil prices from crashing in the mid-1980s or again in the late 1990s. It also highlighted the danger of investor overconfidence in fore-

casts of ever-rising prices, resulting in such absurdities as “Texas hedges,” whereby wealthy Texas oil barons would “diversify” by investing some of their oil money in – you guessed it – leveraged bets on Houston real estate. We suppose nothing like that could be happening now in places like Dubai or Calgary.

Lynch is also right to remind us that prominent peak oil theorist have “cried wolf” prematurely numerous times in the past (see Chart 4). His key takeaways from his many years of watching fashions in oil price forecasting are:

- Consensus is no indicator of accuracy.
- Experts can misinterpret events and believe theories contradicted by the evidence all around them.
- Non-experts joining a debate often assume that the consensus view is correct and by joining, reinforce the consensus.
- Short-term transient events can be misinterpreted as changes in underlying trends.
- Political constraints on production can be misinterpreted as physical constraints.
- Casual study of a complicated subject can be dangerous!

We would end by noting that, despite the enormous uncertainty about the future suggested by the peak oil debate, the volatility of oil prices has recently fallen to the low end of its historic range (that includes both actual volatility and implied volatility as derived from options on crude oil futures). Therefore, while prices have moved up tremendously in recent years, market participants appear to be betting that they will stay within a relatively subdued range for some time to come. That seems like a reasonable view to us, but it would not appear to be consistent with Armageddon-like conclusions of peak oil theory.

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