



Traversing the global oil summit (aka Hubbert's Peak)

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The monthly data for world oil production,¹ published online by the authoritative United States Energy Information Administration, show that since the middle of 2004 production of conventional crude oil has reached a plateau at an average rate of about 74 million barrels (bbl) per day (see figure). During the past 7 years, production has exceeded that level only in April–May 2005, December 2005, February–March 2008, May–July 2008, and, most recently, July 2010 to February 2011. The highest-ever monthly global production – 75.3 million bbl/day – was achieved in January 2011. This peak was followed by a stage of rapid decline, surely explained by the events following the ‘Arab Spring’ uprising, particularly the Libyan civil war.

When a second-order polynomial trendline is fitted to the historical production data, the long-forgotten Hubbert's Peak^{2,3,4,5} appears in smoothed form around mid-2008, coincident with the secondary July 2008 summit at 74.7 million bbl/day. When forward-projected over the next few years, this trendline forecasts a decline by June 2013 below 70 million bbl/day, a level which was first surpassed in October 2003. If so realised, the duration of the production peak will thus span a little less than one decade. In fact, the monthly roughness of Hubbert's Peak is considerable, and it is quite possible that there may be a sudden plunge below this level at a sooner time, especially if the current Eurozone economic crisis unravels badly to produce a period of severe recession and ‘demand destruction’, comparable to or greater than that which occurred between July 2008 and January 2009.

A remarkable feature of this recent history is the coincidence of Hubbert's Peak with a spike in the price of crude oil⁶ to nearly \$150/bbl in July 2008, followed by a crash in the price of oil to a low of about \$40/bbl in December 2008. The economist James Hamilton observed that the ‘...price run-up of 2007–08 was caused by strong demand confronting stagnating world production...’ and was therefore different from previous oil-price shocks that ‘...were primarily caused by physical disruptions of supply’. Despite this difference, the consequences for the US economy appear very similar to those observed in earlier episodes, namely, a significant reduction in overall consumption spending, particularly purchases of domestic automobiles, in the absence of which it is unlikely that the period from quarter 4 of 2007 to quarter 3 of 2008 would have been characterised as one of economic recession.⁷

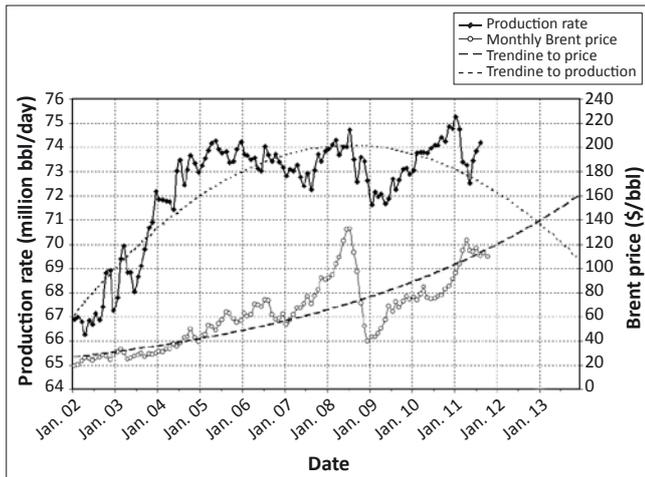
Hamilton has recently noted the curious fact that, observed against the real price of crude petroleum since 1860, oil ‘...has never been as costly as it was at the birth of the industry’⁸, and that the long-run behaviour of crude-oil prices appears to be at odds with ‘one of the most elegant theories in economics’, namely the characterisation of the price of an exhaustible resource.⁹ One possible reason for the discordance is that:

...although oil is in principle an exhaustible resource, in practice the supply has always been perceived to be so vast, and the date at which it will finally be exhausted has been thought to be so far into the future, that finiteness of the resource had essentially no relevance for the current price.⁷

Noting that a key feature of the growth in crude-oil production has been exploitation of new geographic areas rather than application of better technology to existing sources, Hamilton now suggests that the end of that era could come soon. After an extensive historical analysis and exploration of the possible implications of previous experience for what the transition era could look like, he concludes⁸:

Coping with a final peak in world oil production could look pretty similar to what we observed as the economy adapted to the production plateau encountered over 2005–2009. That experience appeared to have much in common with previous historical episodes that resulted from temporary geopolitical conflict, being associated with significant declines in employment and output. If the future decades look like the last 5 years, we are in for a rough time.

While a broader group of economists has yet to be persuaded of the imminence of peak oil, a substantial proportion – probably a considerable majority – of informed opinion amongst earth scientists and petroleum engineers holds the view that Hubbert's Peak is a current reality. Willy-



Sources: production rate from US Energy Information Administration¹; monthly Brent crude price from US Energy Information Administration⁶.

Note: The production scale is not zeroed, but it is in the range of 64 million–76 million bbl/day.

Temporal covariation of the monthly rate of crude-oil production (million barrels per day; million bbl/day), updated to August 2011 and the monthly Brent crude price to October 2011 with the second-order polynomial trendline to production and the exponential trendline to price.

nilly, the world is engaged in perhaps the most revolutionary transition in the entire history of human civilisation. Most of the industrial world's institutions – its social organisation, legal system and financial structures – have evolved during the late 19th and 20th centuries, all in an atmosphere of continued exponential growth fuelled mainly by fossil carbon and hydrocarbon resources, amongst which crude oil has a pre-eminent place.

The world's inability to increase the global supply of conventional crude oil much beyond current levels poses a problem for continued economic growth. An obvious consequence of the depletion of supplies of conventional, and hence cheap, crude oil, is that an increase in future supply requires exploitation of lower quality, expensive resources, which are economical only at high prices. A system of feedbacks is thus created, leading to what has been described as an 'economic growth paradox: increasing the oil supply to support economic growth will require high oil prices that will undermine that economic growth'¹⁰.

In the graphical tracking of the monthly covariation of conventional crude-oil production¹ and price⁶ through the remaining part of 2011 and into 2012, the reality of this economic growth paradox is likely to be manifested in the near future. The trendline to the price data is an exponential curve that passed through the \$100/bbl level in early 2011. By the end of 2012, it seems set to reach the same level that triggered the 2008 crash. In view of this disconcerting

prospect, and failing some remarkable change in how the global economy is managed, it remains to be seen whether the growth era of the past 40 years, to which the world has become accustomed, can continue in the long term.

It is notable that Hamilton⁸ has couched his argument for the relationship between oil prices, resource finitude and economic growth without any reference to the line of thinkers about peak oil stretching back over the last 50 years, including Hubbert^{2,3,4}, Campbell and Laherrere¹¹, and Hirsch¹², amongst others. This omission may be necessary in order to make a persuasive case to the academic community of macroeconomists to which he belongs. The failure to give due credit is regrettable, but understandable given the 'enormous walls of incredibility that prevent diffusion of thought between academic disciplines'¹³.

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