The Determinants of the Price of Crude Oil: The Relative Importance of Fracking, China, and Geopolitics

Summarized by Hilary Till
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The December 2015 JPMCC Research Council meeting featured a presentation by Professor James Hamilton of the University of California at San Diego. Professor Hamilton is an international expert on the oil markets and the macroeconomy as well as being a Research Council member of the JPMCC. His presentation was entitled, "Fracking, China, and the Geopolitics of Oil." Dr. Bluford Putnam of the CME Group and Professor Yosef Bonaparte of the University of Colorado Denver discussed Professor Hamilton's research from both practitioner and academic perspectives, respectively.

Professor James Hamilton, University of California, San Diego, presenting at the December 4, 2015 Research Council meeting on the key factors that have determined the price of crude oil.

Like the other summaries in the *Global Commodities Applied Research Digest (GCARD),* this overview of Professor Hamilton's presentation is highly condensed. For a more in-depth understanding of Professor Hamilton's presentation, one can download his slides at the U.S. Energy Information Administration's (EIA's) website: https://www.eia.gov/finance/markets/reports_presentations/2015JamesHamilton.pdf. (Professor Hamilton had also presented on "Fracking, China, and the Geopolitics of Oil" at the EIA's "Workshop on Financial and Physical Oil Market Linkages" on September 29, 2015 along with other international oil experts, as described in that workshop's agenda:
https://www.eia.gov/finance/markets/reports_presentations/2015WorkshopAgenda.pdf.)

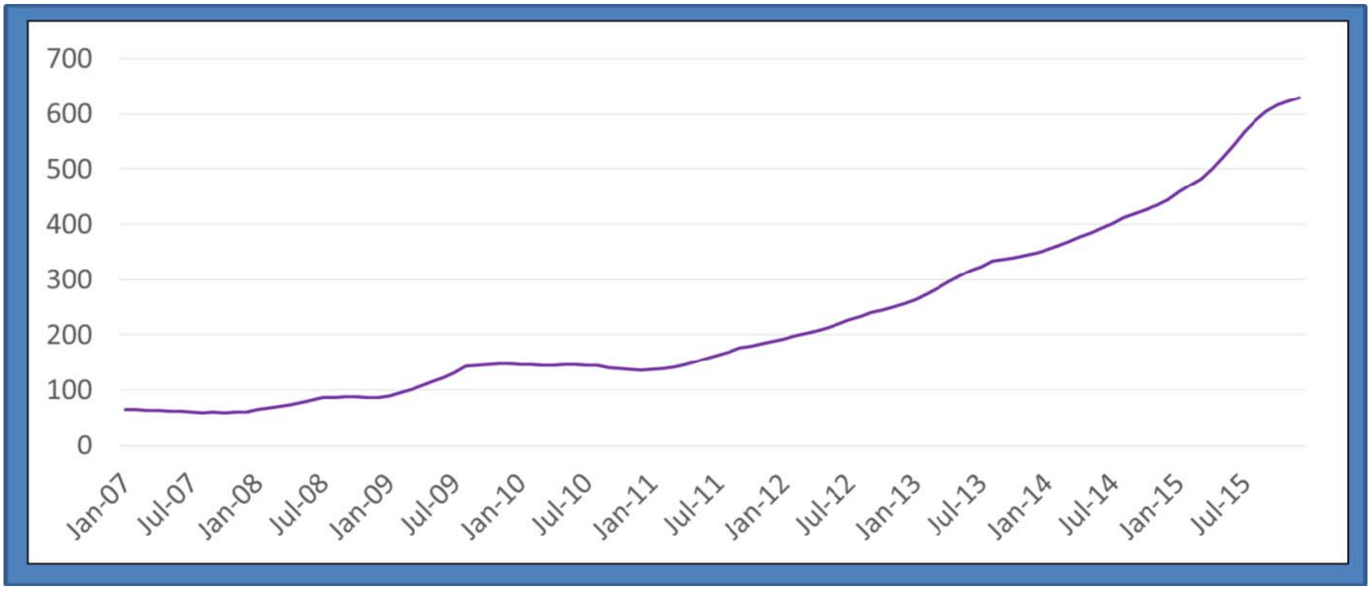
Presentation by Professor James Hamilton, Ph.D.

At the outset of Professor Hamilton's JPMCC Research Council lecture, he discussed why it turned out that oil priced at $100 did not hold, starting in 2014. In July 2014, he had believed otherwise. In his presentation to the Research Council, he stated that "it might be worthwhile to take a look at how I got that so spectacularly wrong. And my answer is [in] the title [of the presentation]: 'Fracking, China, and the Geopolitics of Oil.' What I propose … is to take a look at each of those three categories, explain what my assumptions were, and recognize how the world turned out differently than … [my expectations.]"

<u>Fracking</u>

"[My] … first assumption … was that production of tight oil (different from conventional oil) would fall off very quickly if we stopped additional drilling, … [and] we found that a year or two since then, it's even more true today than it ever was," stated Professor Hamilton. "My second assumption [had been] … if the price fell … below $80, …. [one would] start to see dramatic cutbacks [in oil rigs in operation.] … [T]o some degree, that's what happened …", recounted Hamilton. His third assumption was that a "big drop in legacy [oil] production and [the] number of active drilling rigs would mean [a] big drop in US production," according to his presentation. Why did this assumption turn out to be incorrect? The answer is productivity, which is illustrated in Figure 1 on the next page.

Figure 1
Drilling Productivity (Gross Added Barrels per Month per Rig) in Counties Associated with Tight Oil

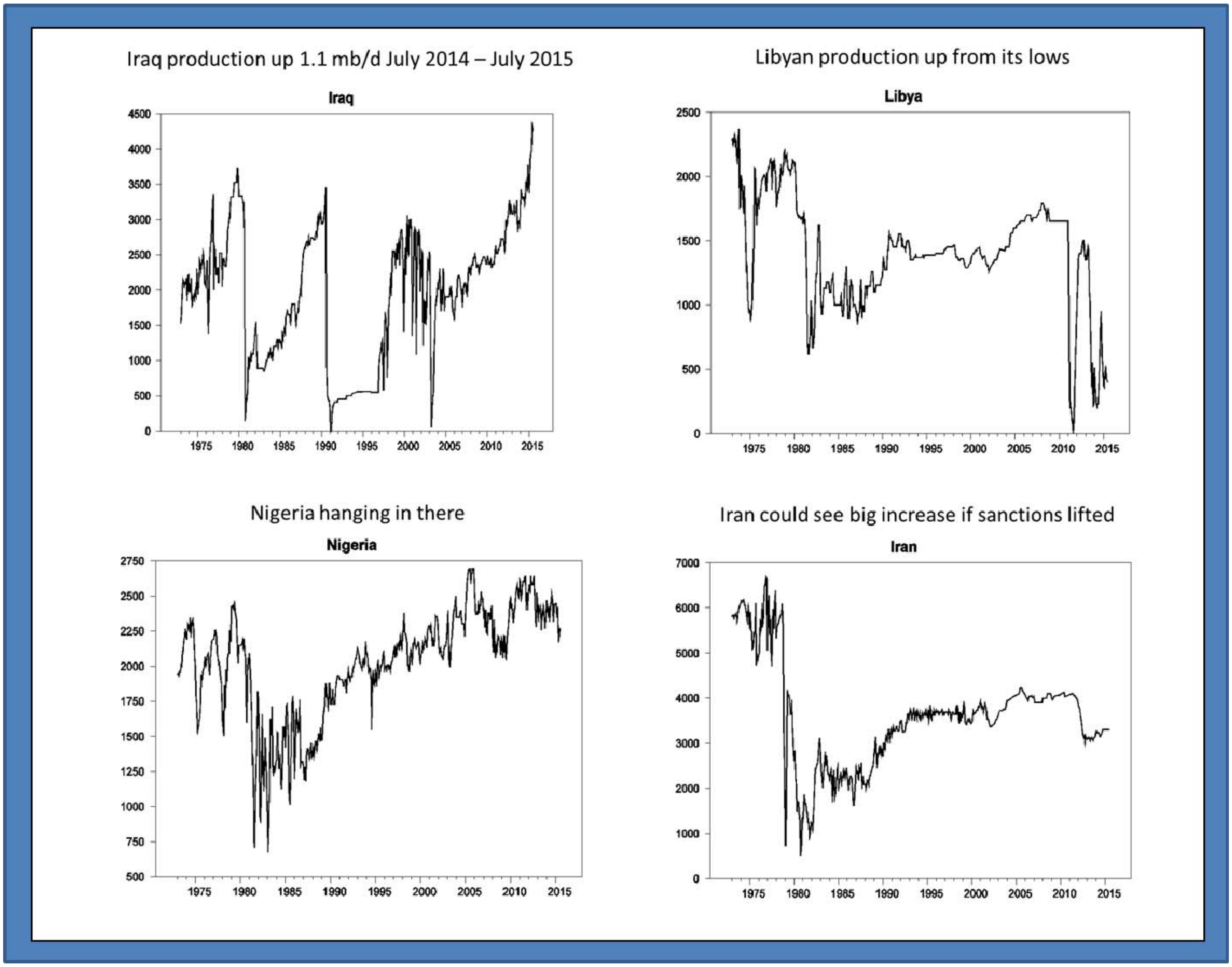


Source: Slide 10 of Professor James Hamilton's December 4, 2015 presentation to the JPMCC Research Council.

Geopolitics

Hamilton's fourth assumption had been that "turmoil in the Middle East and North Africa would continue," presumably leading to constrained production. While enormous upheavals have indeed taken place, the region has been "pumping more oil anyway," summarized Hamilton's presentation and which is illustrated in Figure 2 on the next page.

Figure 2
Crude Oil Production in Select Middle Eastern and African Countries (July 2014 to July 2015)



Source: Slides 20 to 23 of Professor James Hamilton's December 4, 2015 presentation to the JPMCC Research Council.

Hamilton's fifth assumption had been that "Saudi Arabia would never increase production above 10 mb/d [while in fact, the Kingdom] increased [production] from 9.8 mb/d [in July 2014] to 10.3 md/d [in] July 2015," noted his presentation. Given the relatively modest changes, though, in Saudi production, Hamilton stated that he thought analysts were "making a mistake when they put Saudi Arabia in the center of the story" on oil price changes since mid-2014.

China

The presenter's sixth assumption had been that "China's energy demand would continue its phenomenal growth [and while] China's oil imports remain strong … [the] future [is] unclear," according to his lecture.

Conclusion

What forecasts can one be confident about, asked the presenter? It would be very difficult to predict the presence or absence of stability in the Middle East and in North Africa. Further, whether China experiences a "big economic downturn" or not is very unclear. But Hamilton stated that one could be "confident about … US tight oil production … [becoming] the marginal [oil] producer. That's because it's the high-cost producer. … And that puts … a floor under the long-term price of oil. … [One] cannot continue to sell a product … below its true marginal cost." Therefore, Hamilton predicted that the long-term price of oil had to be "well above $50 [per] barrel."

Discussion: Professor Brian Wright, Ph.D.

Professor Brian Wright of the University of California, Berkeley, participated in the JPMCC Research Council meeting via Skype from Chile. Professor Wright asked the presenter: "Would you like to comment on the idea that Saudi Arabia thinks that it can … cut down shale production by dropping [the] price and then [will] raise the price later to dominate the market? It seems that everything you said … [indicates] that shale can shut down, but shale can open up again."

Professor Hamilton answered: "I think that … [shale] would be slower to open back up, [and] … I think that [indeed] is one of the incentives for the Saudis … [That said,] the actual changes in Saudi production are … pretty modest. … There is, [also] I think, a … strategic element to this, but as I said, I think it is a mistake to put them at the center of [the oil-price-decrease explanation.] I think they are responding [to market forces] … [and are being] opportunistic."

Discussion: Dr. Bluford Putnam, Ph.D.

Dr. Bluford Putnam, the Chief Economist at the CME Group, was the industry discussant for Professor Hamilton's panel session. Dr. Putnam is also a member of the JPMCC Research Council. The following is an edited excerpt from Dr. Putnam's remarks.

"We are in the middle of big transitions, and I don't see any new normal coming. So let me begin with a couple of points on the paper. I found myself in the exact opposite position of James [Hamilton's position-taking.] In July of 2014, I was explaining to my clients how I had been wrong for the last two years because I was looking at this incredible increase in supply. I was forecasting a dramatic decline in Chinese and emerging market growth. And the oil price was just staying at one hundred [dollars]. …

I think when we look at China, we forget about looking at all of their trading partners. One of the main reasons China is slowing down in the short-run is that all of its trading partners aren't growing. … On the supply side, we know the story from the US and the fracking, but we should also take a look at what has changed in the geopolitics in the Middle East. I think … [it was] mentioned today we had a roughly ten-dollar premium on oil prices for geopolitical reasons. I think a lot of that came from the Iraq/Kuwait War."

The afternoon panel at the December 4, 2015 Research Council meeting (left-to-right): Professor James Hamilton (presenter), University of California, San Diego; Professor Yosef Bonaparte (academic discussant), University of Colorado Denver; and Bluford Putnam (industry discussant), Managing Director, CME Group. The panel was chaired and moderated by Professor Emeritus Margaret Slade (far right), University of British Columbia and Co-Chair of the JPMCC's Research Council.

Dr. Putnam continued:

"We had that war in the early nineties, and Iraq shutdown production, and they burned Kuwait on the way out. It took a long time to build that back, and it comes from that frame of mind that if the Middle East were disrupted, it could be a huge impact on supply. In the last five years something very different is happening.

It's not about a war with the United States anymore. It's about all these civil wars going on. And every faction that I know about wants to control the oil revenue, and none of them want to destroy the facilities. And that's a sea change on how I look at oil. And I tell you that oil analysts just didn't get that in general. … I think we are in for a fairly long period of increasing supply, not decreasing. And while there is certainly probability that there could be disruption, it is a very low probability. …

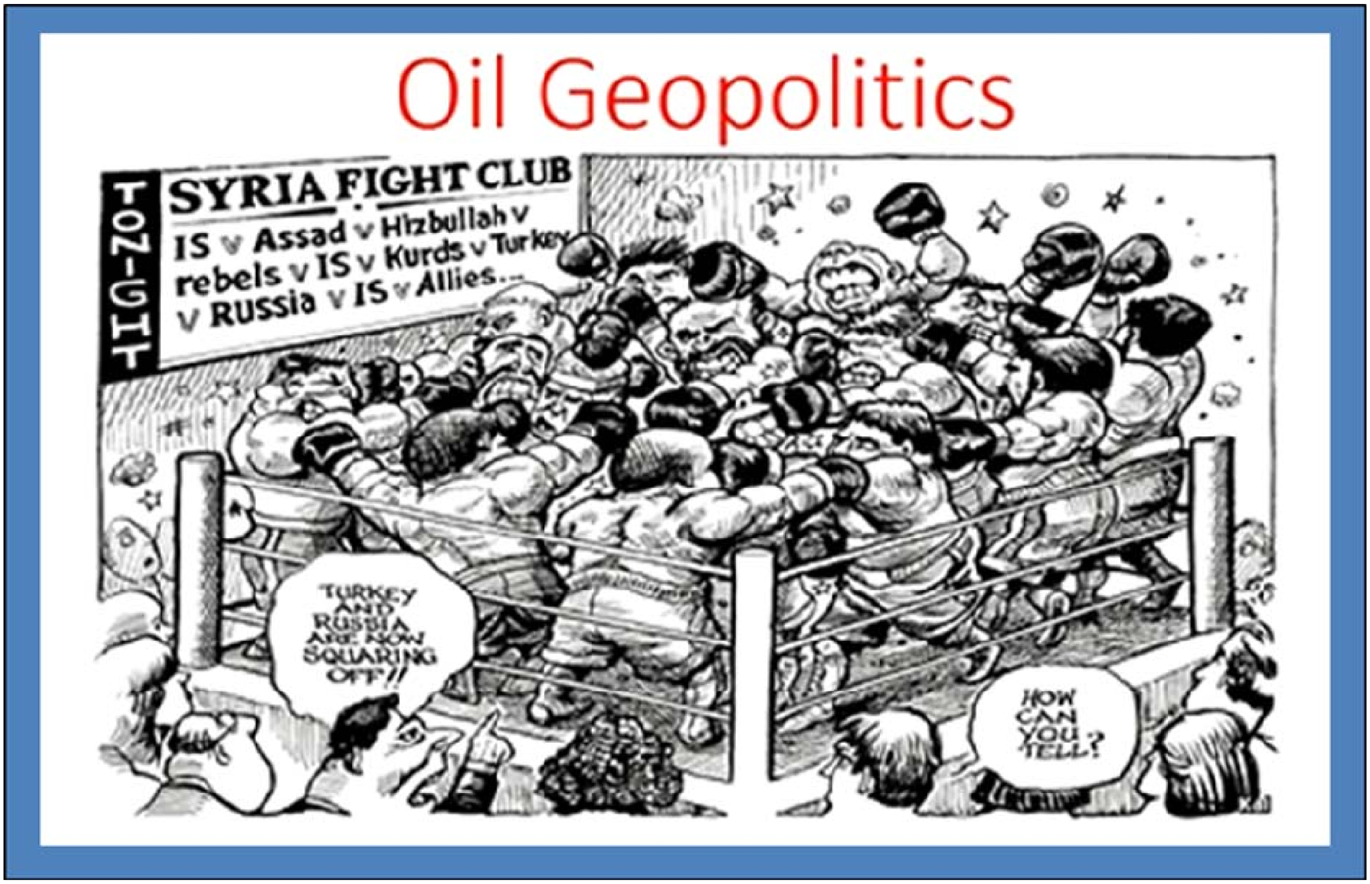
[I]t is hard … to talk about oil without talking about alternative supplies in energy and clearly natural gas. … Transportation is becoming increasingly more fuel efficient. So as we go down the path, we're going to see less growth in oil demand for a given growth in GDP."

Dr. Putnam concluded: "I think the big event in 2015 has been the total lack of investment in this sector. When … [one] doesn't make new capital investments, it doesn't show up tomorrow. It shows up down the road, year-by-year. I think in 2016 we're going to see a much more dramatic falloff in US production that will be a surprise to the market. The market knows about Iran, the market knows about China, it knows about emerging markets, but I don't think it really appreciates that there is, at least in my mind, the non-linear aspect to how production gets cut back. So with the lack of investment in 2015, I see a surprise, if you will, for markets in 2016."

Discussion: Professor Yosef Bonaparte, Ph.D.

Professor Yosef Bonaparte of the University of Colorado Denver was the academic discussant for Professor Hamilton's panel session. He emphasized the stress on Saudi Arabia's budget due to the unexpected drop in the price of oil since mid-2014. Noted Bonaparte: "[T]he Saudis [could] … go bankrupt in 5 years," as they spend through their previously accumulated budget surpluses, given their reliance on the price of oil. Bonaparte also discussed the difficulty that a non-Middle Eastern analyst, unfamiliar with the region's cultures, traditions, and languages, would find in interpreting geopolitical shifts. This confusion is illustrated in Figure 3 on the next page.

Figure 3



Source: Slide 6 of Professor Yosef Bonaparte's December 4, 2015 presentation to the JPMCC Research Council.

Regarding the geopolitical arena, Dr. Putnam added that "if you look at Russia, you just have to remember that they … really want Navy ports; they believe in a strong Navy; and if you go back to the Ukraine, the Navy port was in Crimea: they wanted it back. They have a port in Syria. It's their only access to the Mediterranean. [Their interest in the Syrian conflict] … is not about Syria [*per se*]. It's about their long-term military strategy: they feel they need Navy access. When you are a country as far north as them, … you want some other ports [from a global projection-of-power perspective.]"

JAMES HAMILTON, Ph.D.
Professor of Economics, University of California, San Diego

Professor Hamilton has published on a wide range of topics. His research in areas including econometrics, business cycles, monetary policy, and energy markets has been cited by more than 40,000 other studies. His graduate textbook on time series analysis has sold over 50,000 copies and has been translated into Chinese, Japanese, and Italian. He also contributes to Econbrowser, a popular economics blog. Academic honors include election as a Fellow of the Econometric Society and Research Associate with the National Bureau of Economic Research, receipt of the Best Paper Award for 2010-2011 from the International Institute of Forecasters, and 2014 award for Outstanding Contributions to the Profession from the International Association for Energy Economics. He has been a visiting scholar at the Federal Reserve Board in Washington, DC, as well as the Federal Reserve Banks of Atlanta, Boston, New York, Richmond, and San Francisco. He has also been a consultant for the

National Academy of Sciences, Commodity Futures Trading Commission and the European Central Bank and has testified before the United States Congress. Hamilton received the UCSD Economics Department Graduate Teaching Award on five different occasions.

Professor Hamilton is also a member of the J.P. Morgan Center for Commodities' Research Council at the University of Colorado Denver Business School.