

# THE LINNEMAN LETTER

This is an excerpt from the Spring 2015 issue of *The Linneman Letter*.

## Oil Economics

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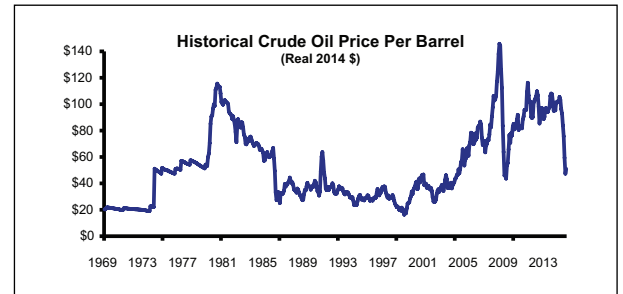
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The big questions on everyone's mind are, "What do low oil prices mean?" and "Will they remain low?" The volatility of crude prices has increased since 1994. From 1964-1993, the standard deviation of real crude prices was \$24 per barrel. In contrast, the standard deviation of prices for the most recent 20 years was \$31 per barrel. In the first quarter of 2008, immediately before the Great Recession, real oil prices increased 41%, from \$104 per barrel to \$146 per barrel, a 50-year high. Since 2008, real oil prices have been volatile, with crude plummeting to \$43 per barrel in the first quarter of 2009 before rising to \$116 by the second quarter of 2011, and subsequently declining to current pricing.

The real price of West Texas Intermediate crude oil in February 2015 averaged about \$51 per barrel, which is 51% below its \$105 peak in June 2014, but 2% above the 50-year average of \$50 per barrel. At \$43 per barrel in mid-March 2015, real crude prices are 2.7 times their 50-year low of \$16 per barrel, reached in 1998. This compares to a real price of \$103 per barrel in 1981; real prices today are 58% below this mark.

Over the past 50 years, real oil prices have generally been \$20-50 (in 2014 dollars), while the ratio of oil to natural gas prices has a norm of 6.8x. As fracking over the last 7 years massively increased natural gas production, natural gas prices fell dramatically. At natural gas prices of \$3-5 per MMBtu (million British thermal units), the price of oil should be \$20-45 today. Yet just 6 months ago, to our utter confusion, oil prices were well in excess of \$100. Thus while we do not claim to understand the timing of the collapse of oil prices, nor its "emperor has no clothes" speed, we understand today's oil price far better than we did when it was above \$100.

Several years ago we conducted a very simple exercise to calculate oil prices based on economic growth and elasticities of supply and demand. Repeating this analysis indicates that since 2004, global real GDP has risen by about 31%. If the elasticity of demand with respect to real GDP is (a very high) 4, while the price elasticity of oil



### Table of Contents

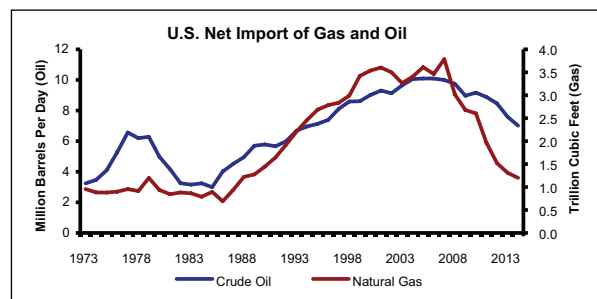
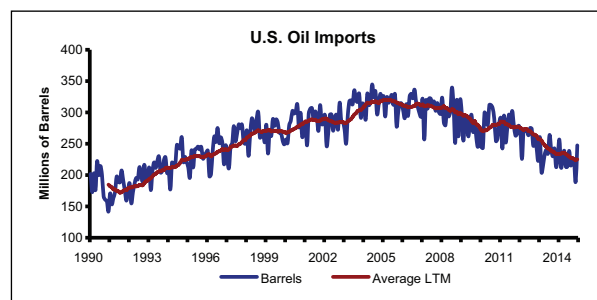
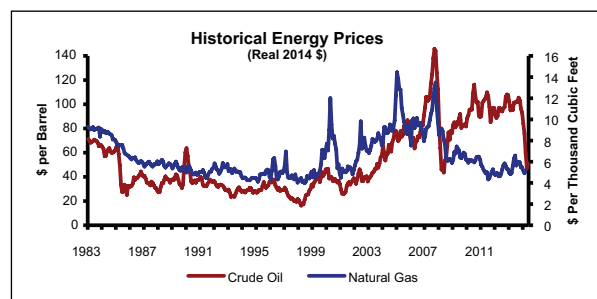
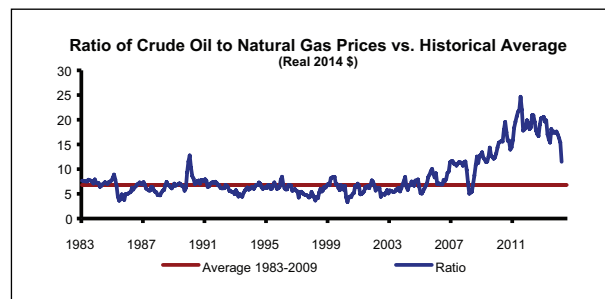
- The Sun Is Shining And Canaries Are Still Chirping
- Canary Watch Box
- Tax Inversion Is Not A Crime – In Fact, It Is Good
- Oil Economics
- The Linneman Letter Look-back: Oil Prices
- Central Bank Interventions Must End
- Comparing Renewable Energy Resources
- Linneman Perspectives
- The Impact Of Immigration On Citizen Welfare
- Ten Facts You Should Know About U.S. Immigration
- The Survey Of Household Economics And Decision Making
- Real Estate Capital Markets
- The Linneman Letter Look-back: China: From Net Importer to Exporter
- Housing Market Update
- Market Close-up: Minneapolis Office
- Market Close-up: Phoenix Industrial
- Market Close-up: Chicago Multifamily
- Market Close-up: Atlanta Hotel
- Office Market Outlook
- Industrial Market Outlook
- Multifamily Market Outlook
- Retail Market Outlook
- Hotel Market Outlook
- Seniors Housing And Care Market Outlook
- Vacancy/Occupancy And Absorption Projections

demand is zero and there is no increased supply due to higher oil prices, the price today should be 2.24 times the \$36 price in 2004, or about \$80. But if the elasticity with respect to real GDP is a more realistic 2, the price today should be about \$49. Add to this a 2% increase in global supply (all due to increased U.S. output), some degree of demand elasticity with respect to price, and the collapse of the OPEC cartel, making oil prices in the range of \$30-60 feel “about right”. Perhaps we will finally be proven right about oil! Better late than never.

The U.S. has net imports of 5.2 million barrels of oil daily. At a price decline of \$60 per barrel, this amounts to a net gain of \$114 billion for U.S. consumer wallets, or about 0.7% of GDP. This is an enormous gain to the U.S. economy, even though oil producers and related services have both suffered severe capital losses. But these capital losses are more than offset by the gains to U.S. consumers of oil products. This will prove particularly beneficial to those in the lowest 20th percentile of the income distribution, who spend roughly 3% of their income on gasoline. These consumers have de facto received an enormous subsidy thanks to U.S. fracking, which has disrupted the pricing dynamics of OPEC.

It is important to appreciate the scale of U.S. oil production expansion and the scale of output reduction required by Saudi Arabia in order to maintain oil prices. In 2010, the U.S. produced roughly 2 billion barrels of oil annually, representing 7.4% of global output. And at that time, many said we had reached “peak oil”, both in the U.S. and globally. We have always written that “peak oil” is a tragically flawed concept, as it ignores the power to innovate in terms of both supply and demand. In 2014, thanks to fracking and deep sea production, the U.S. produced 3 billion barrels, achieving a 10.8% market share. This 50% increase in output in just 4 years is due to innovation. In fact, U.S. production is up by 1 billion barrels while the output of the rest of the world (which refuses to embrace fracking) is down by 500 million barrels.

Fracking and deep sea production have not only pushed down prices by increasing oil supplies, but it has also made it far more difficult for OPEC to maintain an effective cartel. While Saudi Arabia could reduce its production to a point that would offset U.S. fracking and deep sea production, this would impose a staggering cost on its domestic economy. The largest beneficiaries of any Saudi production curtailment would be Iran and Russia, but the Saudis are unwilling to subsidize their Iranian enemy (or their Russian ally), with whom they are waging proxy wars in Syria, Iraq and Libya. One does not subsidi-



dize countries with whom you are at war! Thus, the breaking of the OPEC cartel was inevitable, as large marginal supplies in the U.S. make Saudi curtailment too painful both economically and politically.

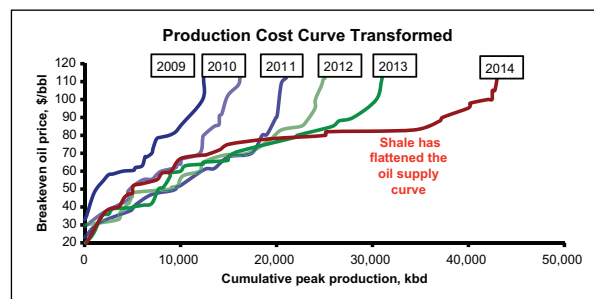
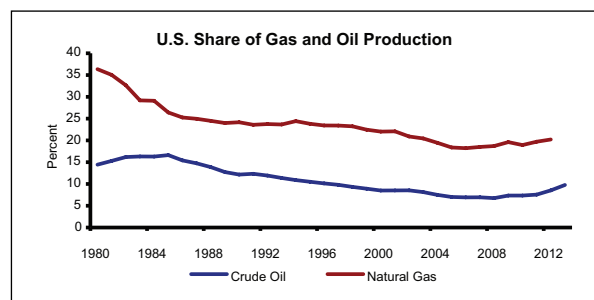
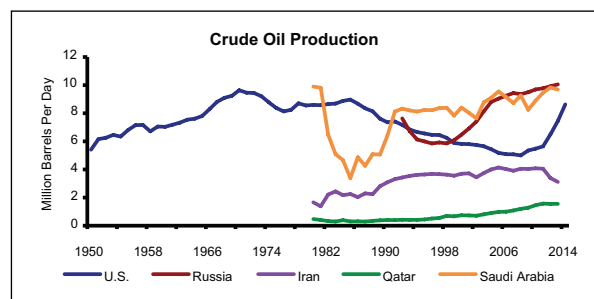
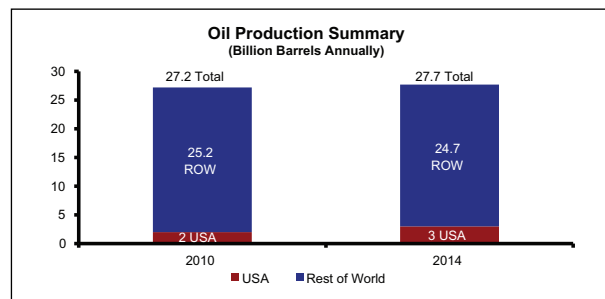
In order to offset increased U.S. production, Saudi Arabia would need to reduce their oil production by about 40%, or a billion barrels a year, costing them \$50-60 billion, or nearly 10% of Saudi Arabia's GDP. Thus, absent U.S. innovation (which continues), global production would have fallen, meaning oil prices would be rising rather than falling. And in spite of producing massively more oil than in 2010, U.S. proven oil reserves far exceed their 2010 levels. Yet again, so much for claims of "peak oil". Believe in "markets", not "peaks". This output increase has not only enriched the U.S., but it has also provided the marginal capacity that broke OPEC.

In a classic example of Adam Smith's Invisible Hand theory, U.S. oil consumers have gained from the efforts of fracking innovators and entrepreneurs who were simply seeking profits. It did not result from the endless "energy" and "self sufficiency" policies created by the U.S. Energy Department (under 40 years of different administrations). The answer to economic progress is self-interest driven innovation, not edicts by mandarins. This is equally true for job growth. In short, fewer political photo opportunities and more private enterprises are the surest routes to economic progress for the poor, the rich and everyone in between.

Of course, not everyone wins, as oil producing areas will notably suffer. For example, at oil prices below about \$65 per barrel, the Bakken region is generally not a viable extraction area. Houston and Dallas will also see notable slowing in their oil focused economies. Large capital losses have also been suffered by the owners of oil extraction and servicing companies, while their lenders will likely incur loan losses.

In the near term, the biggest problem for U.S. oil producers is the lack of growth capital. Much as real estate owners lever up in times of peak property values, oil producers have taken on staggering amounts of debt over the past two years. At today's oil prices, not only will additional debt flows be shut down, but many producers will struggle to service their debt burdens.

Over the next year or two, many U.S. oil producers will struggle under the weight of huge debt burdens incurred during the heady days of \$100 oil. This debt burden will challenge the growth capacity of many oil and natural gas producers, even if on a project basis, IRRs support further drilling. Given their debt burdens, these



producers will lack the free cash flow and borrowing capacity to undertake profitable new drilling. This means that drilling will fall farther, even for natural gas, and faster than the economics of drilling profitability suggest. This is especially true of fracking for natural gas, for which drilling economics remain largely unchanged. As happens with real estate development, periods of high prices fuel inordinate production, which sows the seeds for future excess supply. During that time, little new exploration occurs, which in turn drives the next cyclical price increase. Eventually the debt of over-levered companies will be restructured, or defaulting or at-risk borrowers will be absorbed into firms with strong balance sheets. As that occurs, drilling will cautiously resume in the face of attractive project level IRRs. These dynamics, which will play out in the oil and gas sector over the next few years, are all too familiar to real estate developers.

