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PICKENS' PEAK: FUNDAMENTALS, SPECULATION, OR MARKET STRUCTURE

Why did the chicken cross the road?

- Curiously, this is often offered as an example of an imponderable question
- As everyone knows, chickens cross roads for many reasons:
  - Random walk: All chickens cross all roads if enough time has lapsed
  - Nutrition: The grass is always greener on the other side of the road
  - Competition: There are fewer chickens over there
  - Reproduction: The chickens across the road are potential domestic partners

In 2008, WTI crude prices rose 45% and then fell by 80%

Spot Oil Prices During 2008
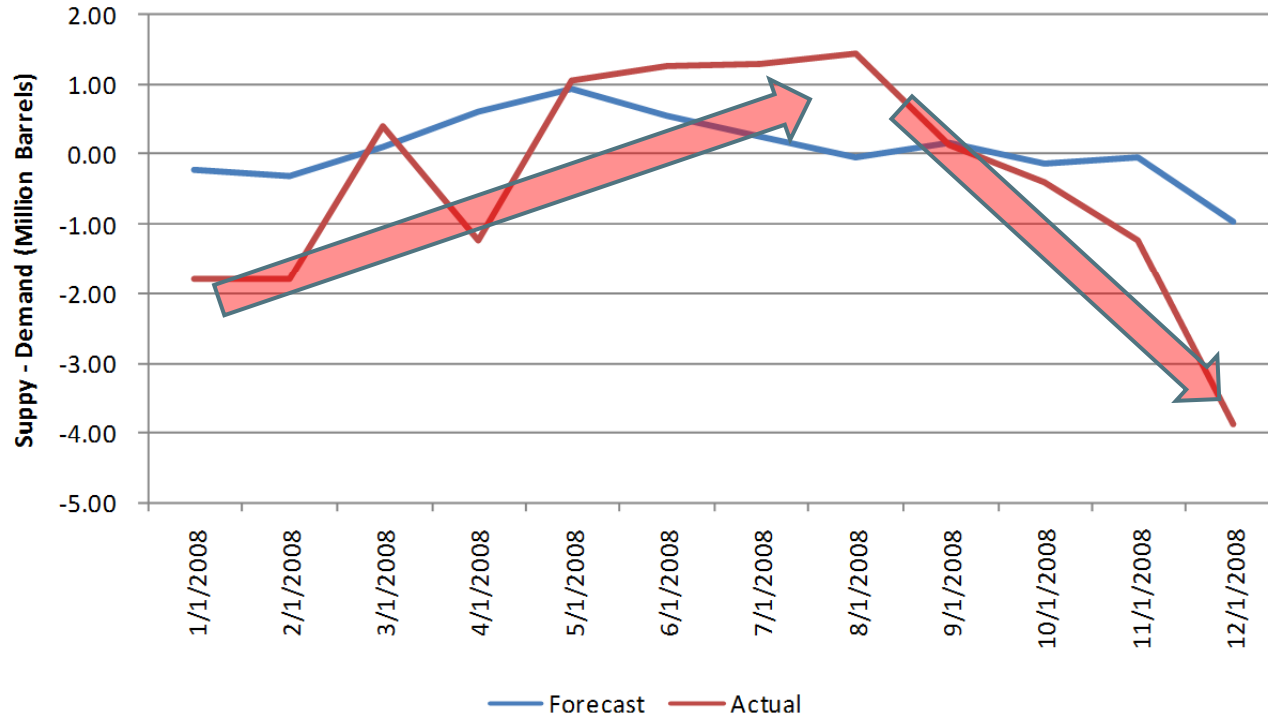Source: Energy Information Administration
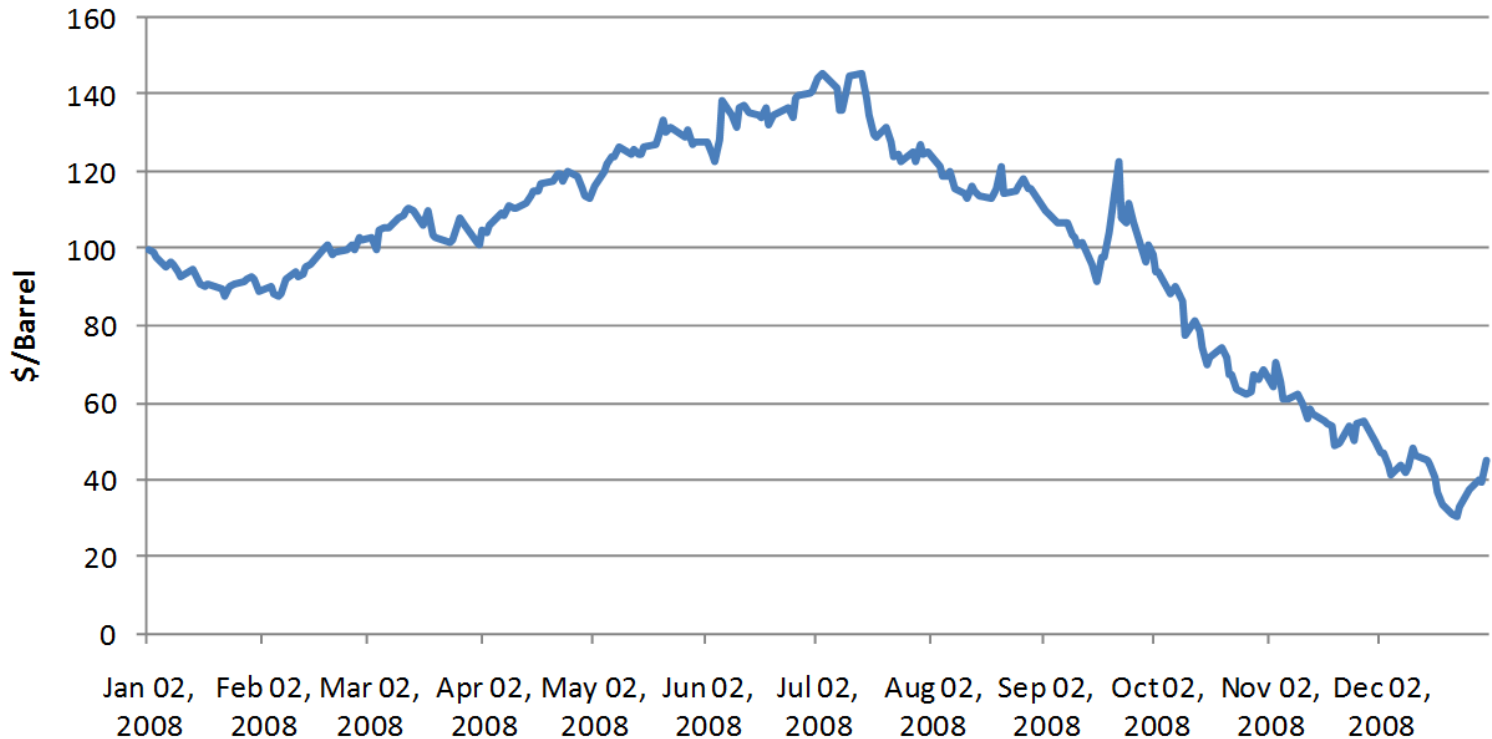
Media pundits had many answers:

- India and China
- Hubbert's Peak
- Exchange rates
- Excessive speculation
- Market manipulation

Fundamentals explain very little

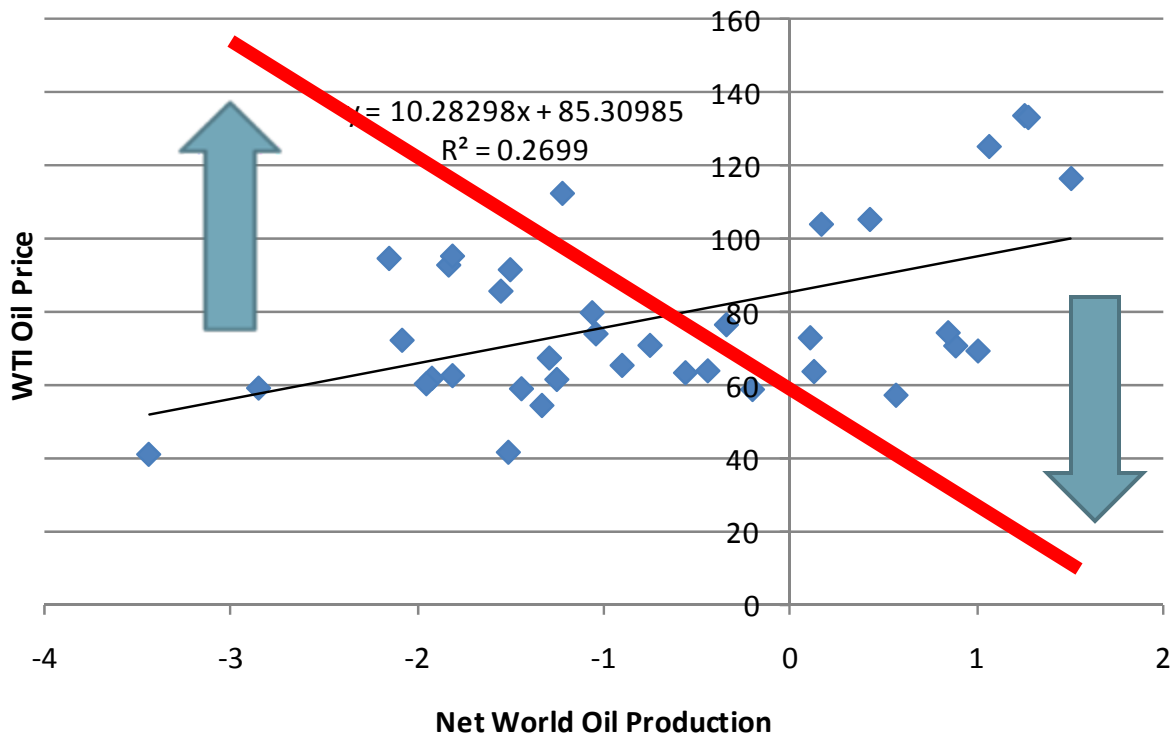January 2008 EIA Forecast Net Supply Versus Actuals

Source: EIA January 2008 STEO and January 2009 STEO

Actually, fundamentals go the wrong way

Net World Oil Production Versus WTI
Source: EIA March 10, 2009 STEO

Speculation or Market Structure?

- Speculation in the non-pejorative sense – buying land you don't plan to live on or stock in a company you don't plan to run
- Market structure:
  - Perfect competition with no control over prices
  - Oligopoly where price and inventory decisions are subject to substantial discretion

Intro Finance 101

- Oil forwards should reflect the risk adjusted cost of capital since it is easily stored (not even pumped)

- The risk adjusted cost of capital should reflect the risk premium of risk takers willing to make forward commitments

- The spot forward premium (positive or negative) should increase over time

NYMEX Spot and Forwards
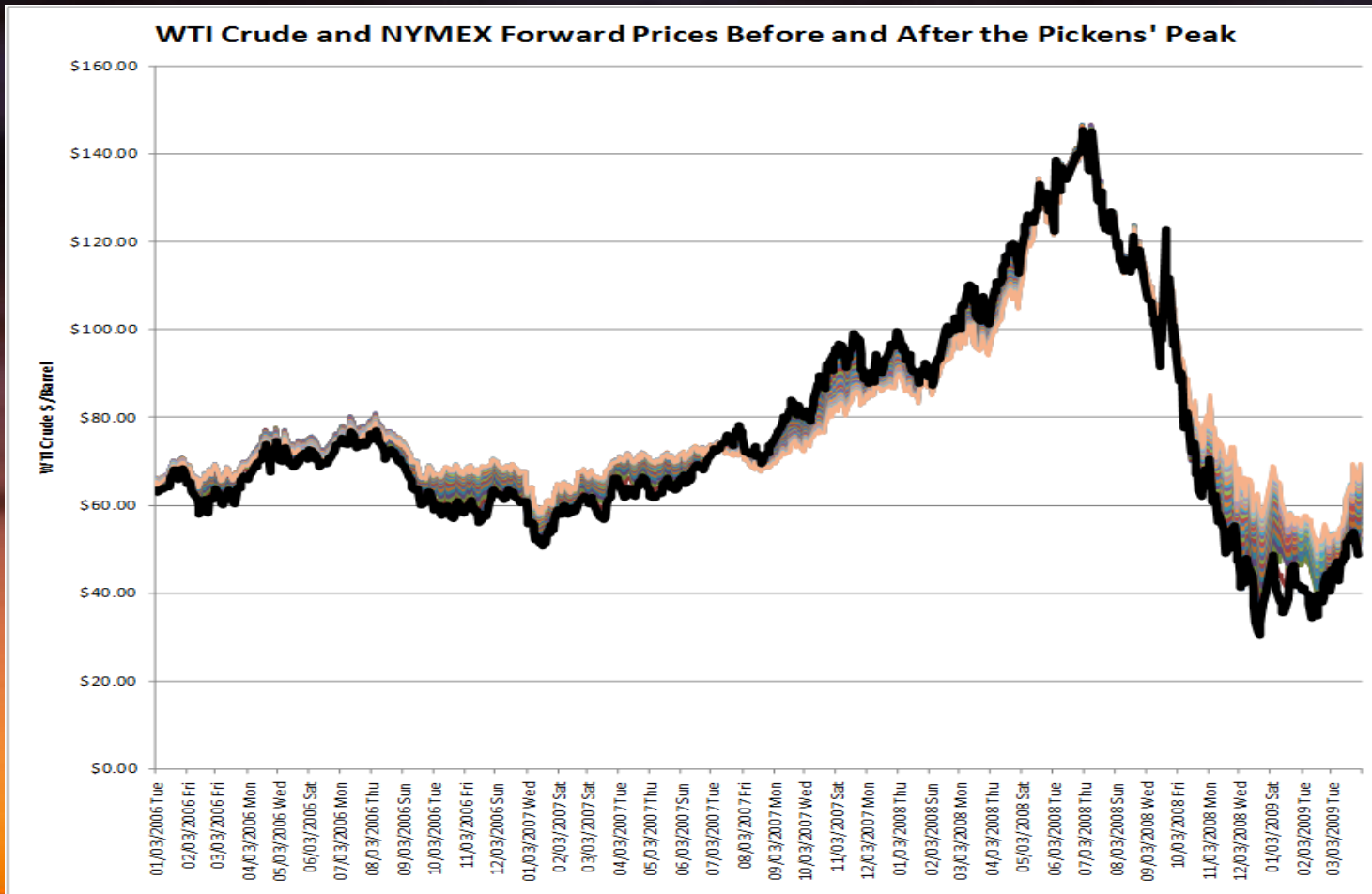
Pickens' Peak showed little term structure

- From March through September, forwards and spot were effectively identical

- This phenomena, often called "curve shift", reflects traders marking their forward curves up or down to reflect changes in spot prices

- This would seem to be inconsistent with speculators "bidding up" the risk premium for forward oil

Testing the data

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ARCH family regression

Sample: 1 - 801                                    Number of obs  =        801
Distribution: Gaussian                             Wald chi2(1)   =     573.51
Log likelihood = -1958.154                         Prob > chi2    =     0.0000

                             OPG
               Coef.     Std. Err.       z      P>|z|     [99.9% Conf. Interval]

delta
netlongnon~s  -.0000273   1.14e-06    -23.95    0.000      -.000031    -.0000235
      _cons    5.893198   .0802791     73.41    0.000      5.629037    6.157359

ARCH
      arch
       L1.     .6591728   .0842491      7.82    0.000      .3819488    .9363969
     garch
       L1.     .4007306   .0462841      8.66    0.000      .2484315    .5530297
      _cons    .1120789   .0270969      4.14    0.000      .0229158    .2012421
```
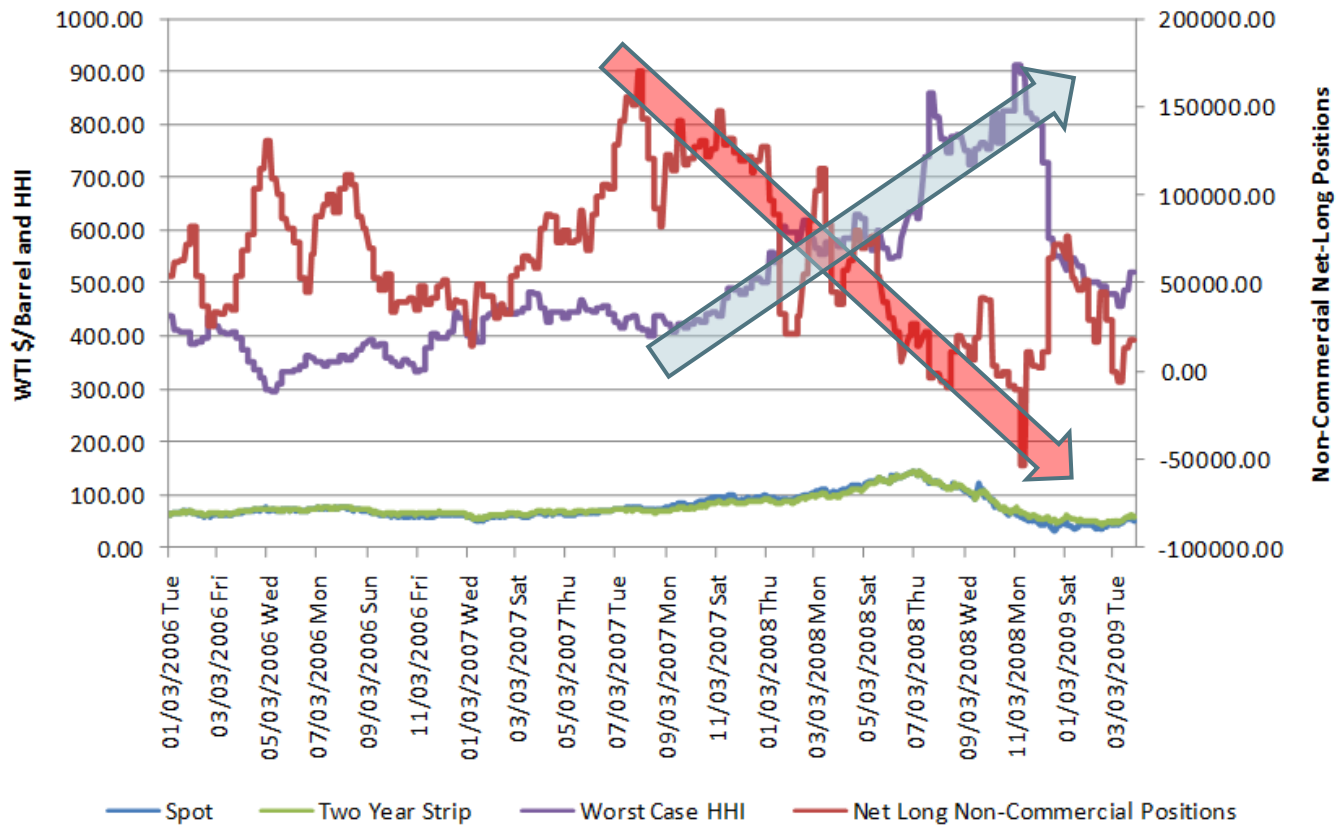
Speculators?

- If the causal linkage was forward back to spot, speculators "bid up" the risk premium without any apparent risk premium

- Moreover, the statistical impact has the wrong sign

Market Structure

Spot, Forwards, HHI, and Net-Long Positions

The case for market structure

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ARCH family regression

Sample: 1 - 801                                    Number of obs   =        801
Distribution: Gaussian                             Wald chi2(3)    =    6362.52
Log likelihood = -2602.388                         Prob > chi2     =     0.0000

                                  OPG
                  Coef.    Std. Err.       z     P>|z|    [99.9% Conf. Interval]

twoyearstrip
netlongnon~s   .0000892    2.47e-06     36.10    0.000      .000081      .0000973
worstcasehhi   .0881983    .0012621     69.88    0.000     .0840454      .0923512
networldpr~n   4.210875    .0677801     62.13    0.000     3.987842      4.433907
      _cons    32.08848    .5608717     57.21    0.000     30.24292      33.93405

ARCH
        arch
         L1.    1.009329    .1441439     7.00    0.000      .5350196     1.483638
       garch
         L1.    .0514633    .0596498     0.86    0.388     -.1448161      .2477427
      _cons    1.088519    .2207647     4.93    0.000      .3620873     1.814952
```

Why market structure?

- Concentration increased during the price increase

- "Non-commercial" net-long positions increased during the spring and summer

- World inventories increased during the spring and summer

- All three fell sharply during the fall

Conclusions and Recommendations

- Market structure fits the data very well: a rational oligopolist would leave traces in the data identical to those we saw in 2008

- We need to accumulate transaction data on the spot oil market since market power leads to very different policy recommendations than the alternatives

Paper and data

- "A Forensic Analysis of Pickens' Peak: Speculators, Fundamentals, or Market Structure" is available here at the conference and at mresearch.com

- We are happy to share our data set with other researchers

McCullough Research

http://www.mresearch.com