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Energy Information Administration
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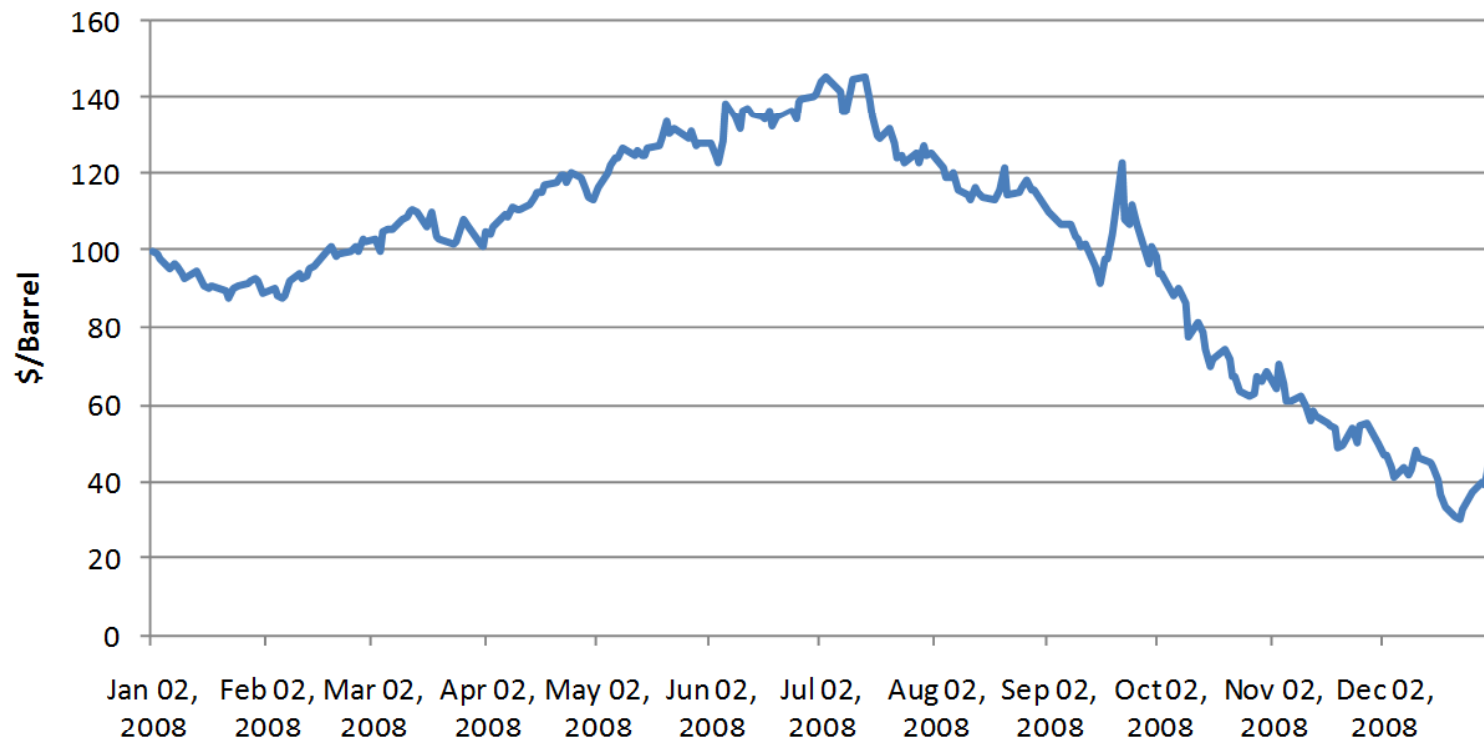
**PICKENS' PEAK:
FUNDAMENTALS, SPECULATION,
OR MARKET STRUCTURE**

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



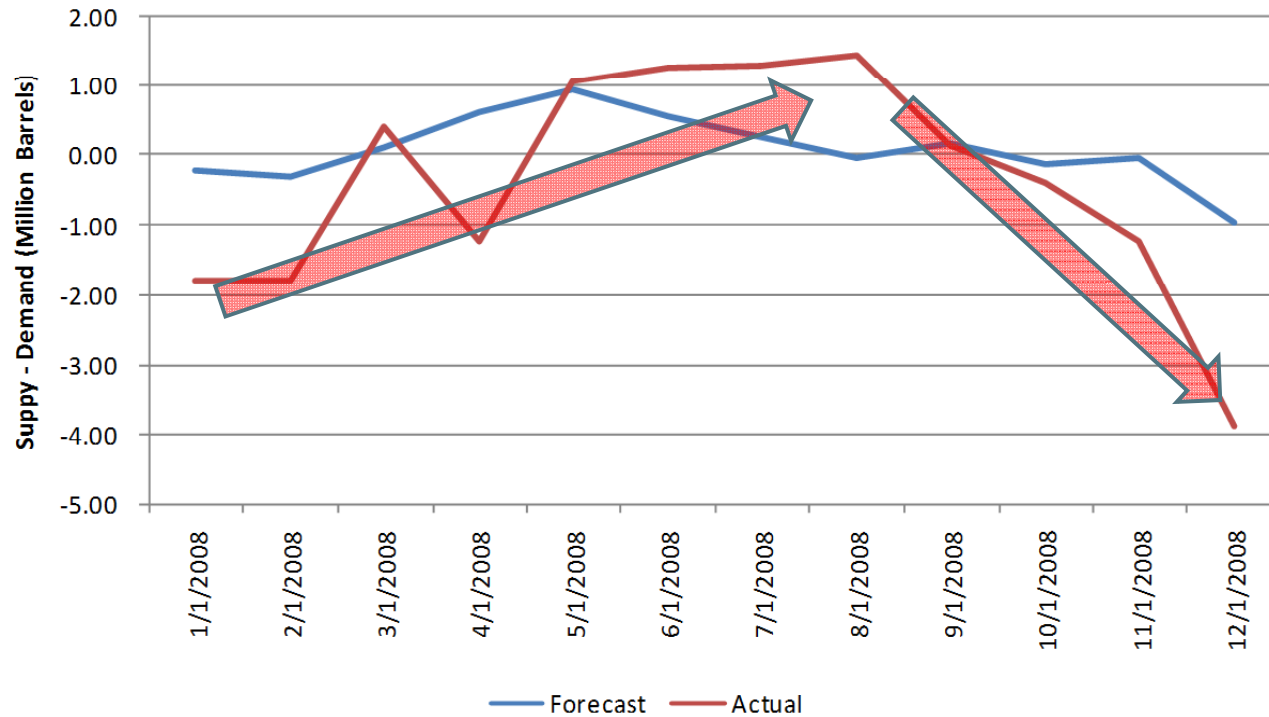
Media pundits had many answers:

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

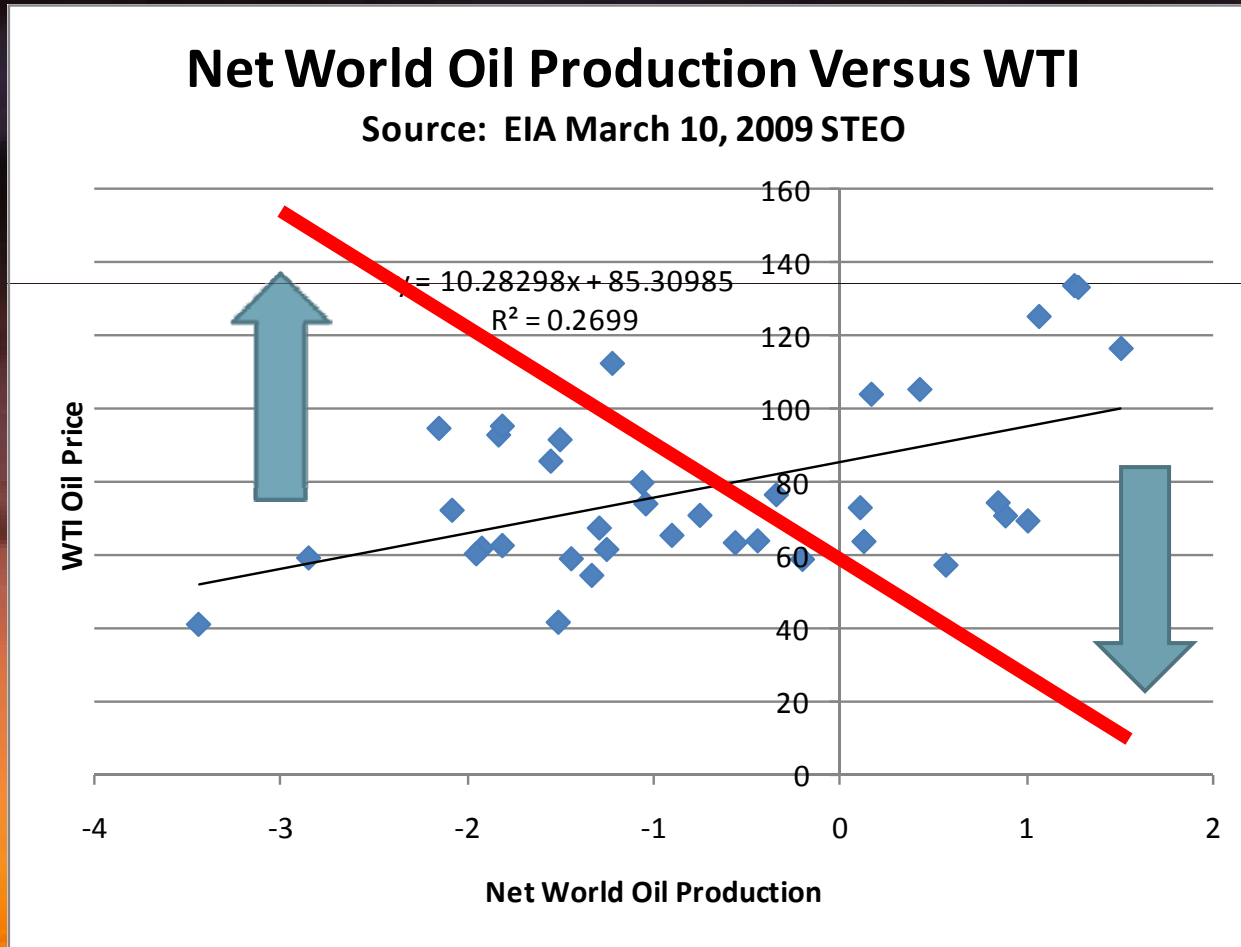
Fundamentals explain very little

January 2008 EIA Forecast Net Supply Versus Actuals

Source: EIA January 2008 STEO and January 2009 STEO



Actually, fundamentals go the wrong way



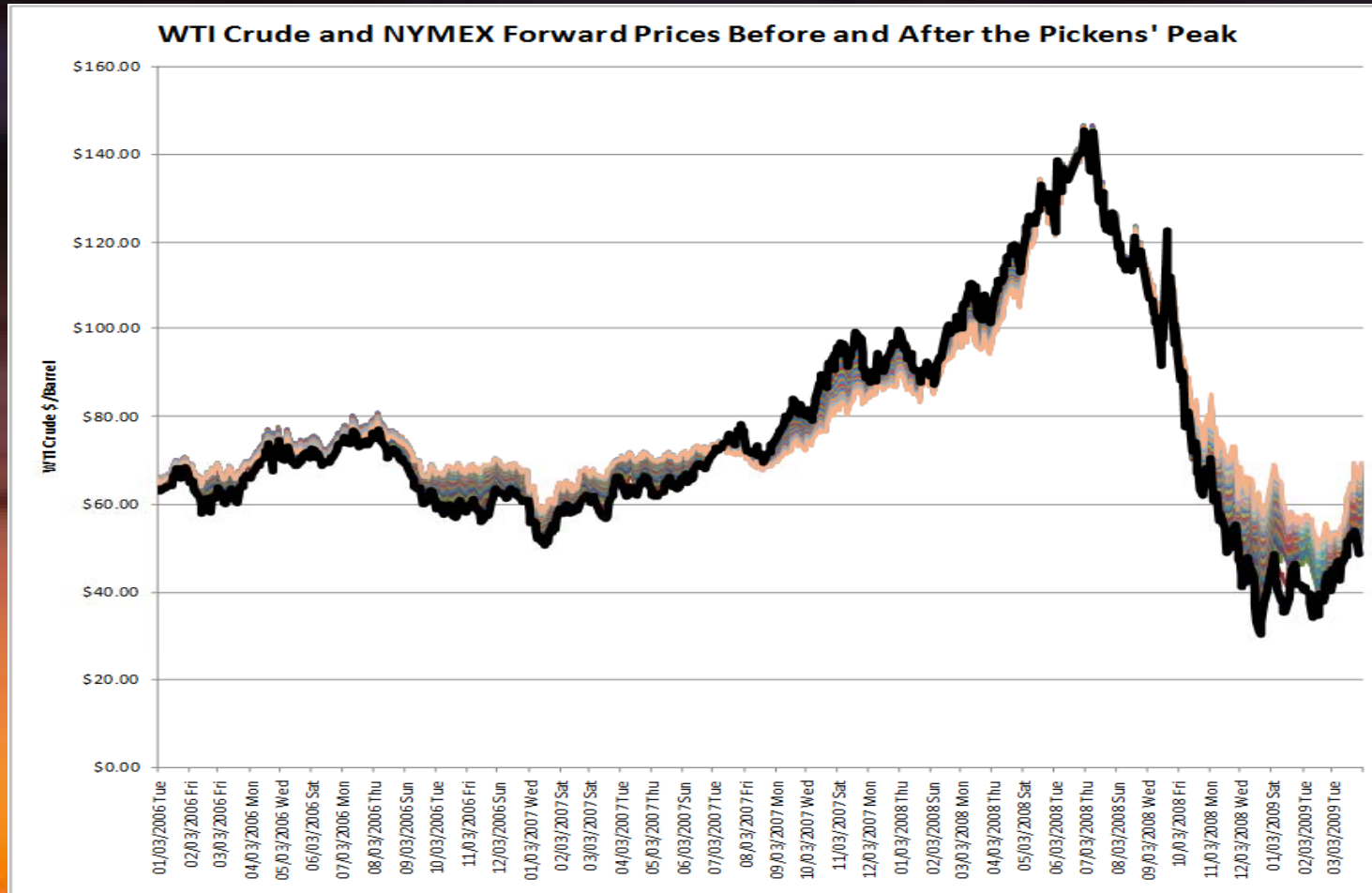
Speculation or Market Structure?

- ⦿ 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

ARCH family regression

Sample: 1 - 801

Distribution: Gaussian

Log likelihood = -1958.154

Number of obs = 801

wald chi2(1) = 573.51

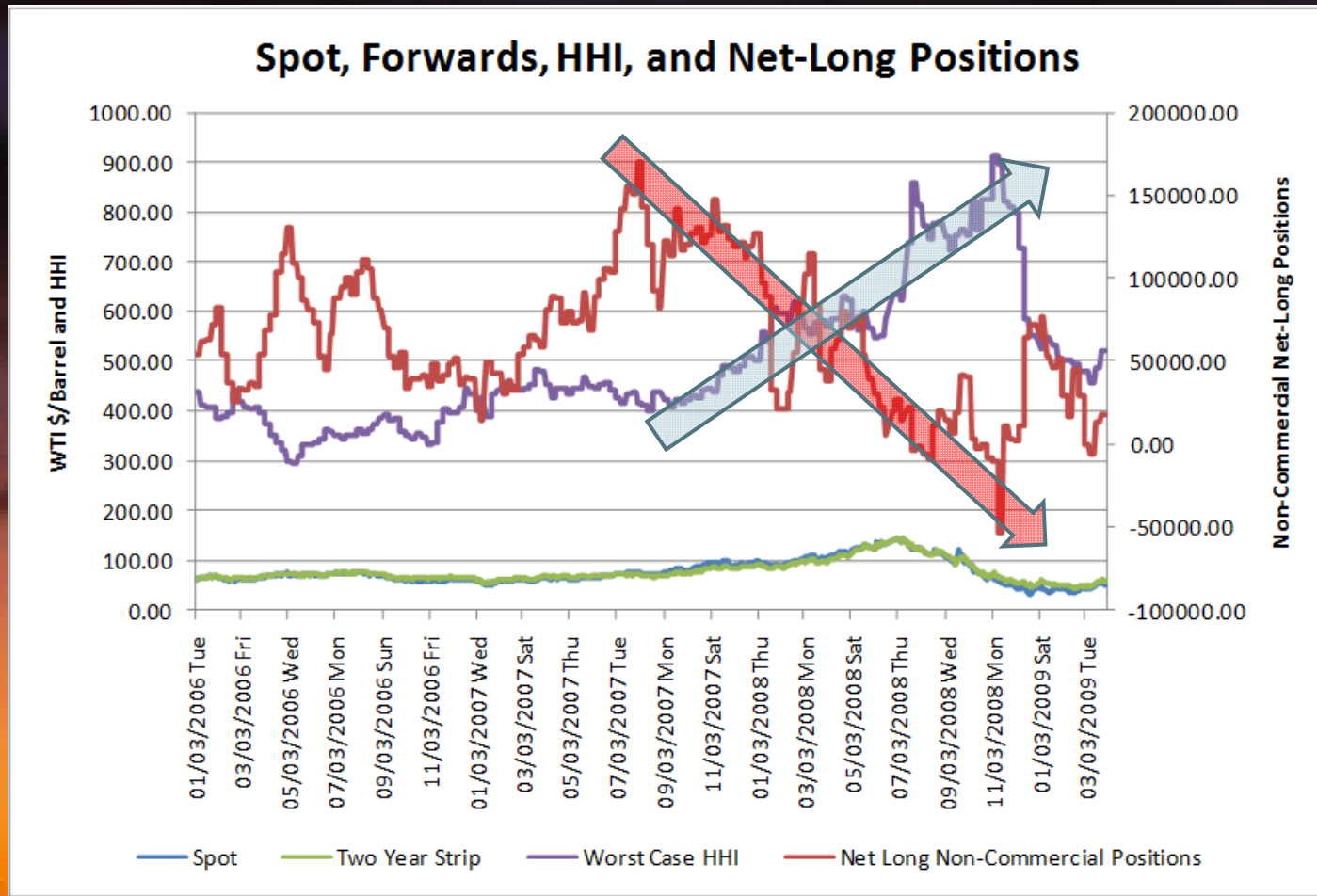
Prob > chi2 = 0.0000

	Coef.	OPG 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



The case for market structure

ARCH family regression

sample: 1 - 801

Distribution: Gaussian

Log likelihood = -2602.388

Number of obs = 801

wald chi2(3) = 6362.52

Prob > chi2 = 0.0000

	Coef.	OPG Std. Err.	z	P> z	[99.9% Conf. Interval]	
twoyearstrip						
netlongnon~s	.0000892	2.47e-06	36.10	0.000	.000081	.0000973
worstcasehi	.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

- ① “A Forensic Analysis of Pickens’ Peak: Speculators, Fundamentals, or Market Structure” is available here at the conference and at mresearch.com
- ① We are happy to share our data set with other researchers



McCullough Research

<http://www.mresearch.com>