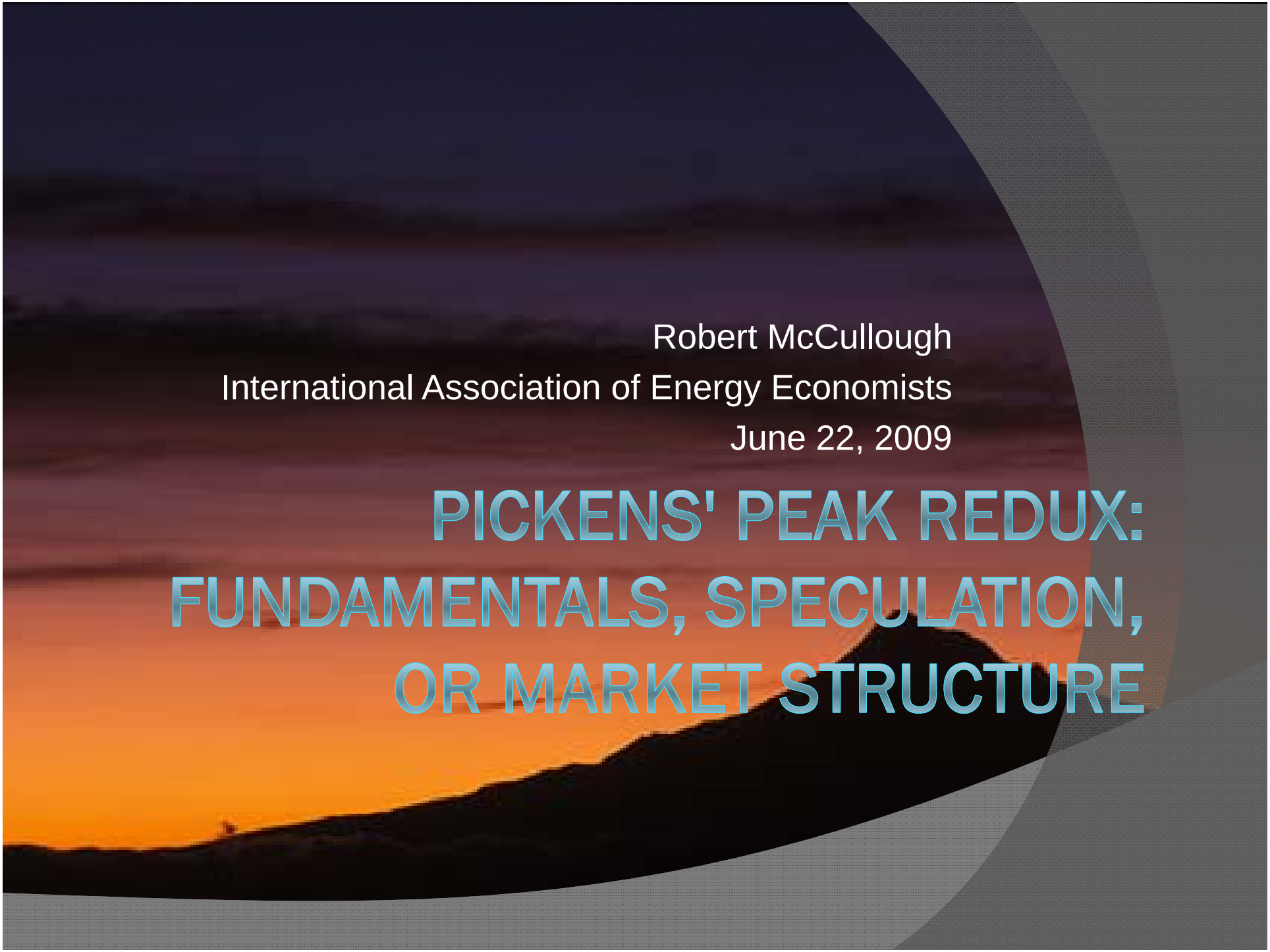
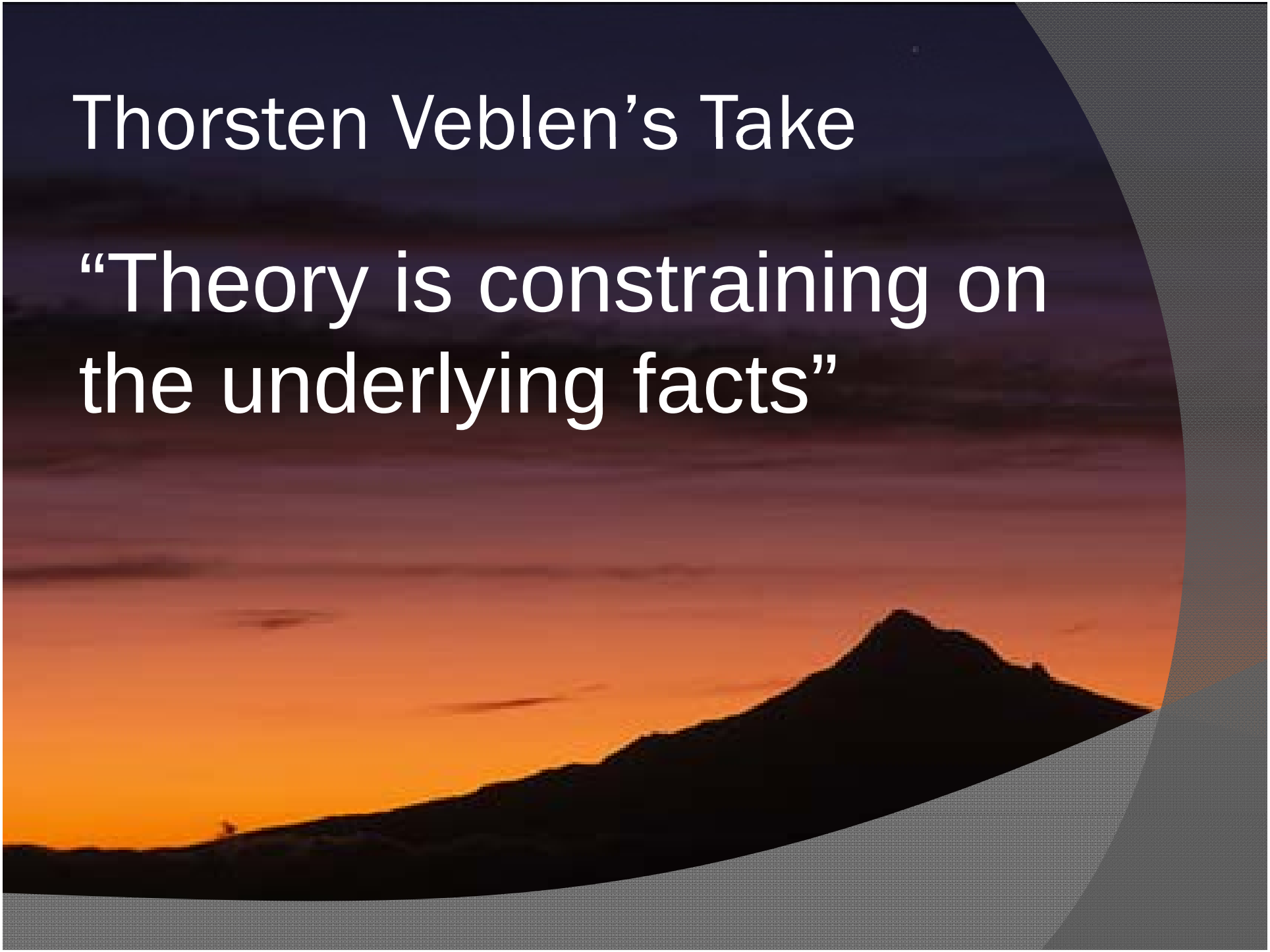


Robert McCullough
International Association of Energy Economists
June 22, 2009

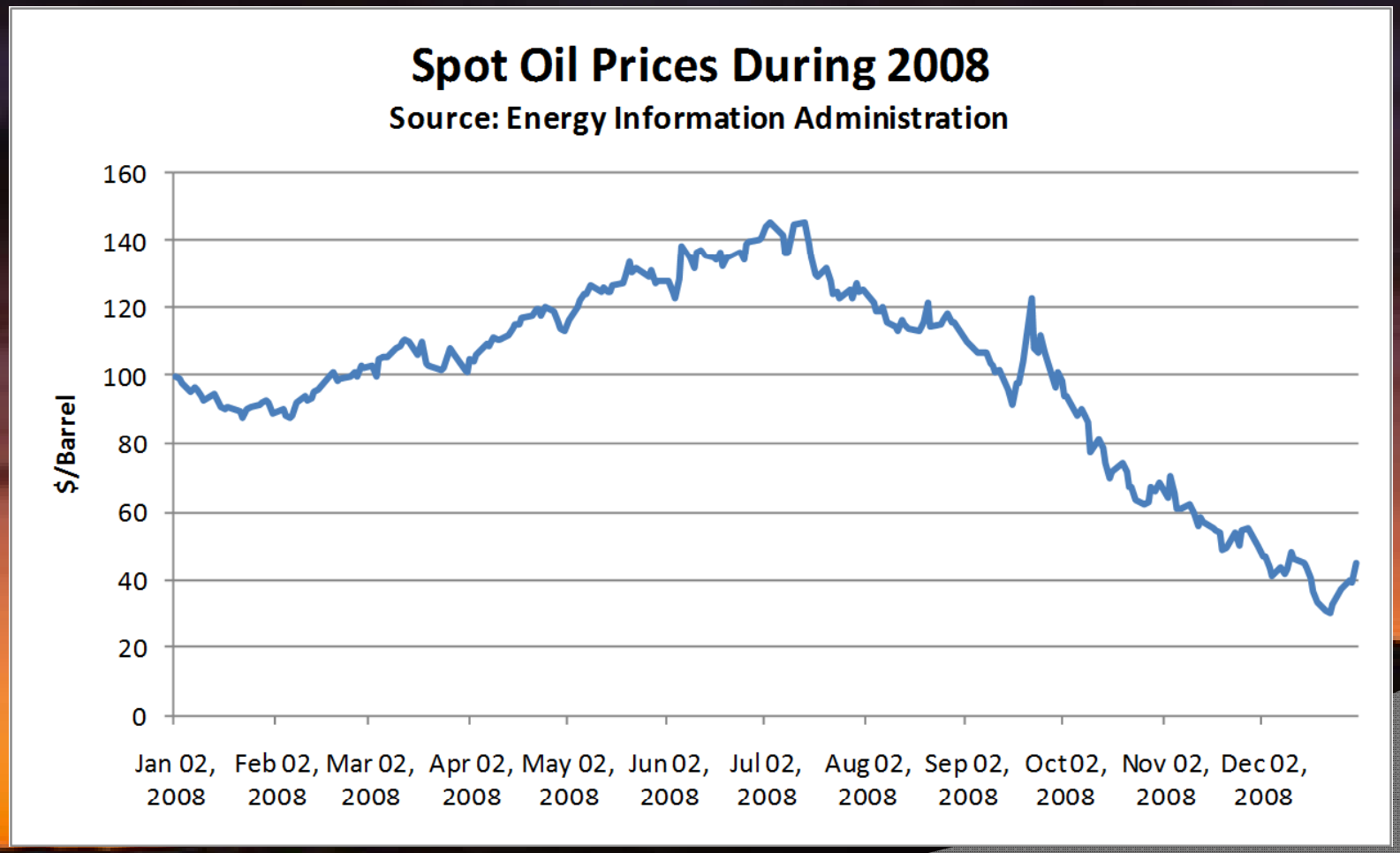
PICKENS' PEAK REDUX: FUNDAMENTALS, SPECULATION, OR MARKET STRUCTURE

Thorsten Veblen's Take

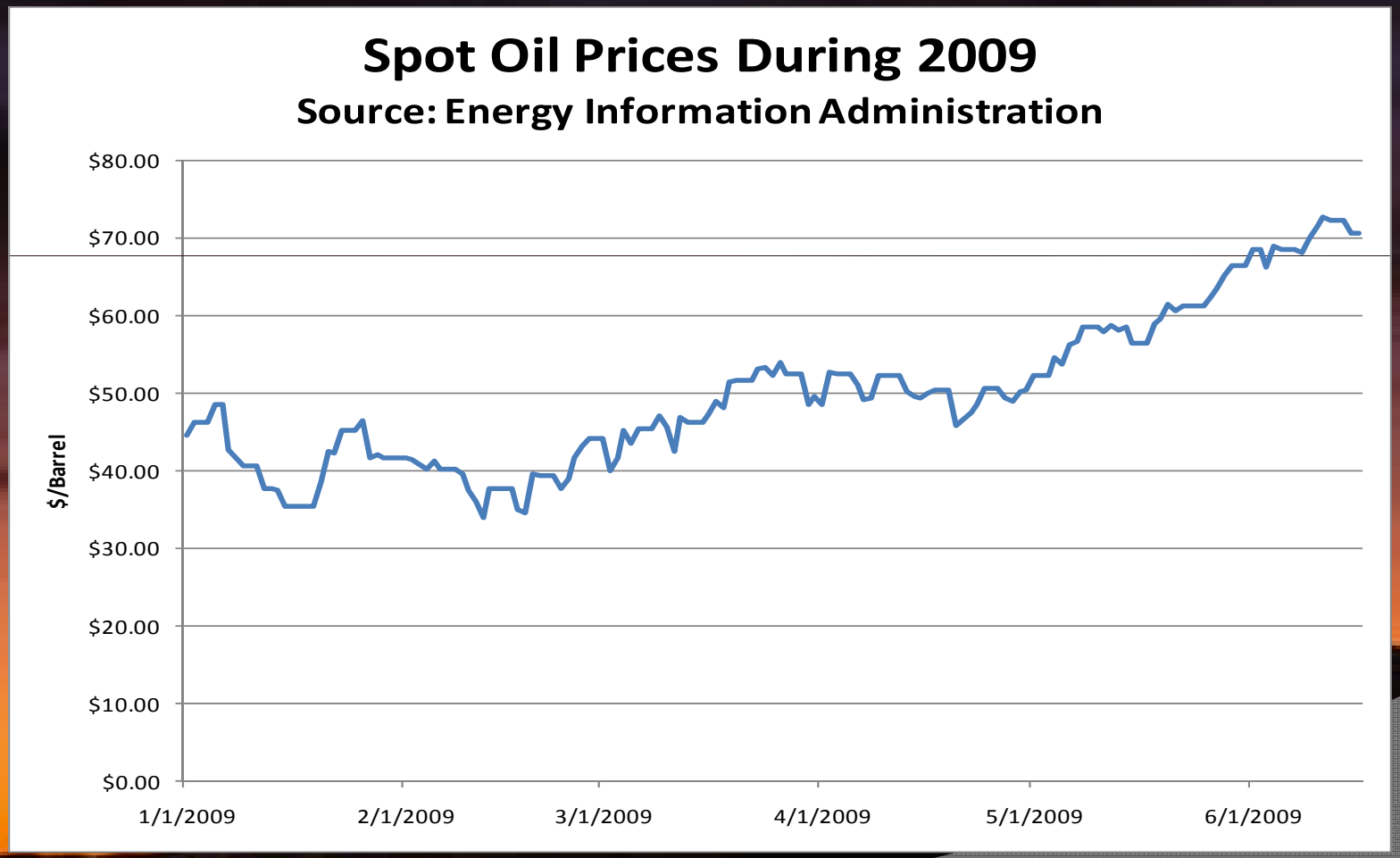
"Theory is constraining on the underlying facts"



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

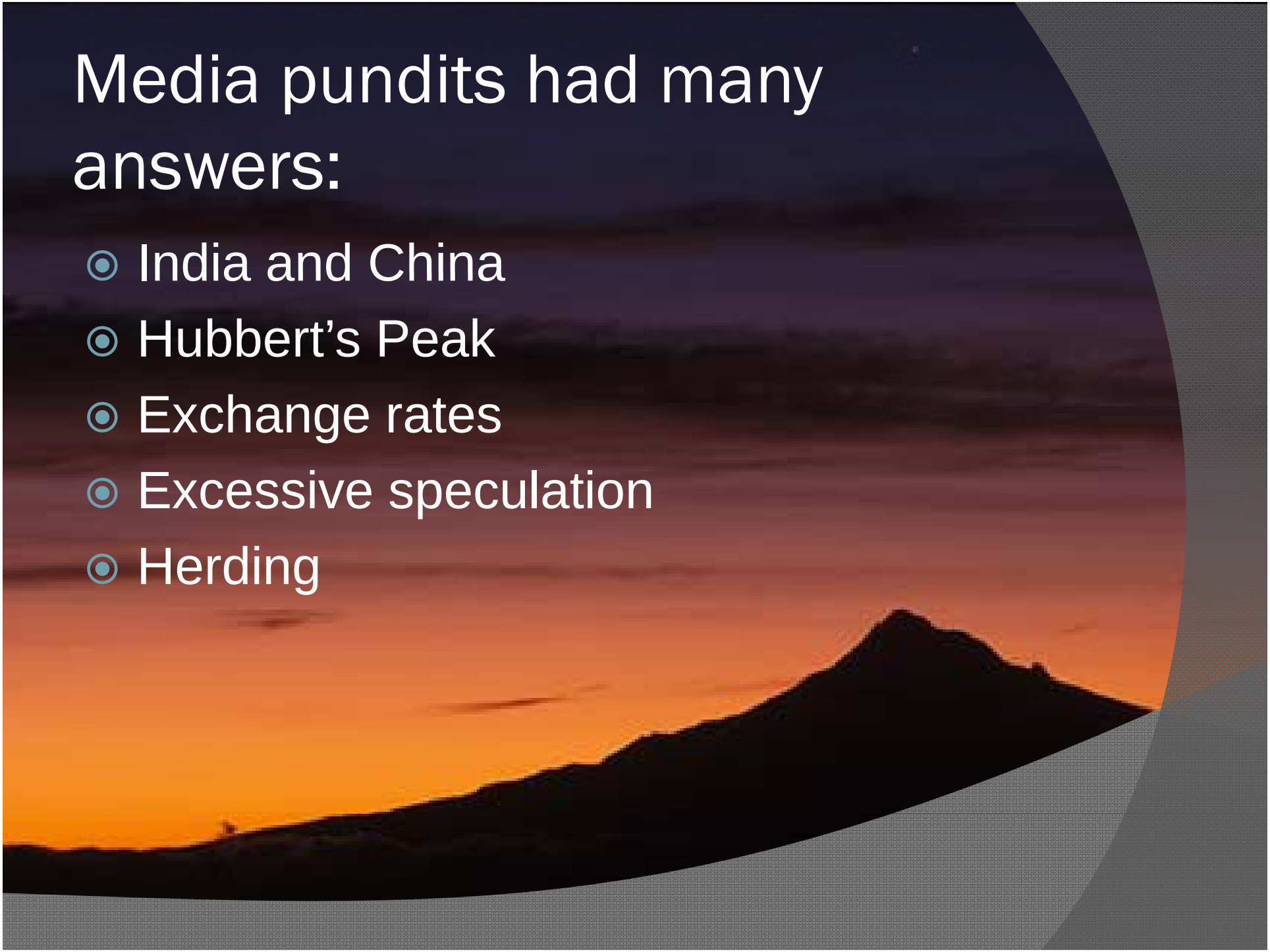


In 2009, WTI crude prices have risen 60%



Media pundits had many answers:

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



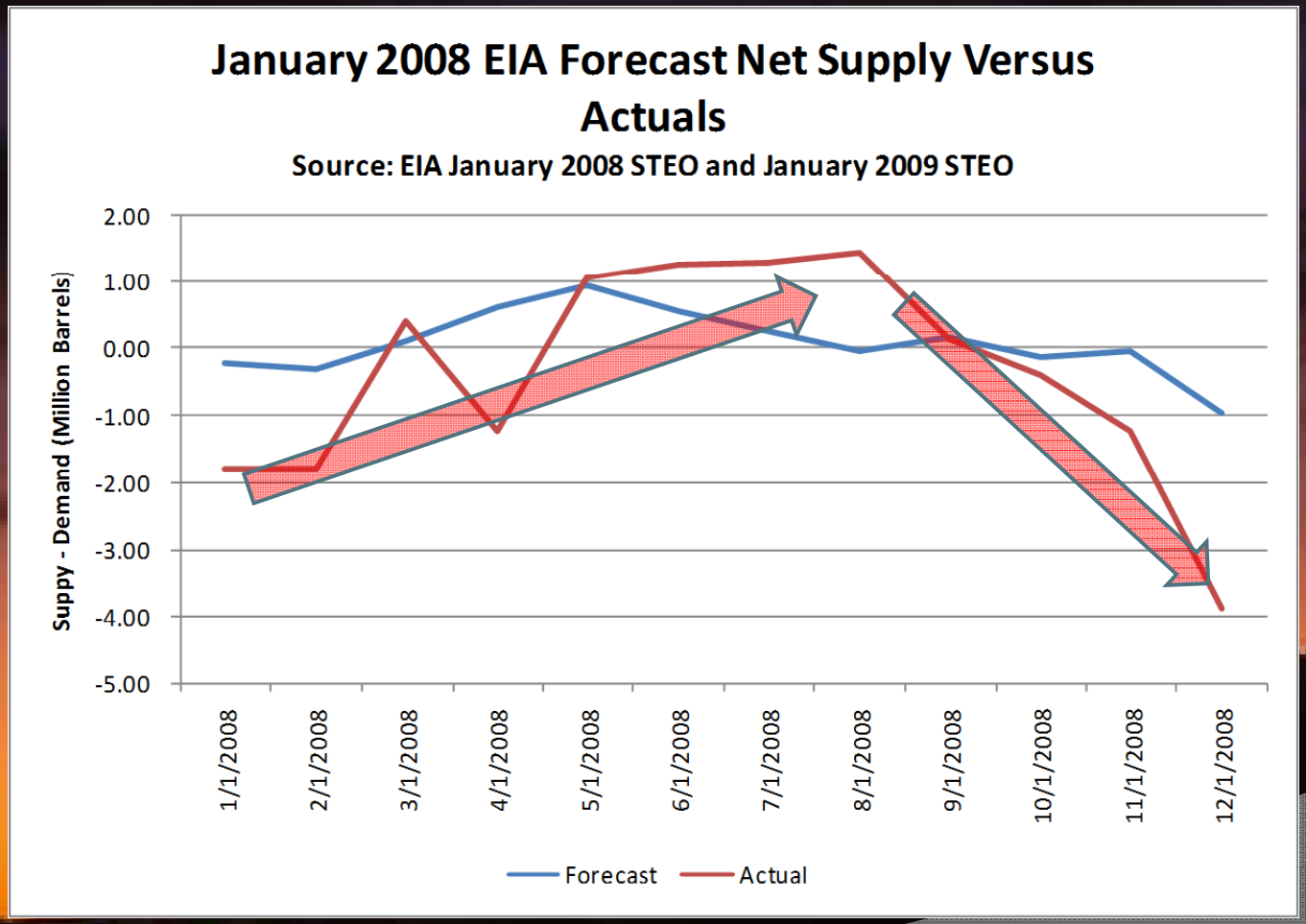
Actually Looking at Data

Linear regression

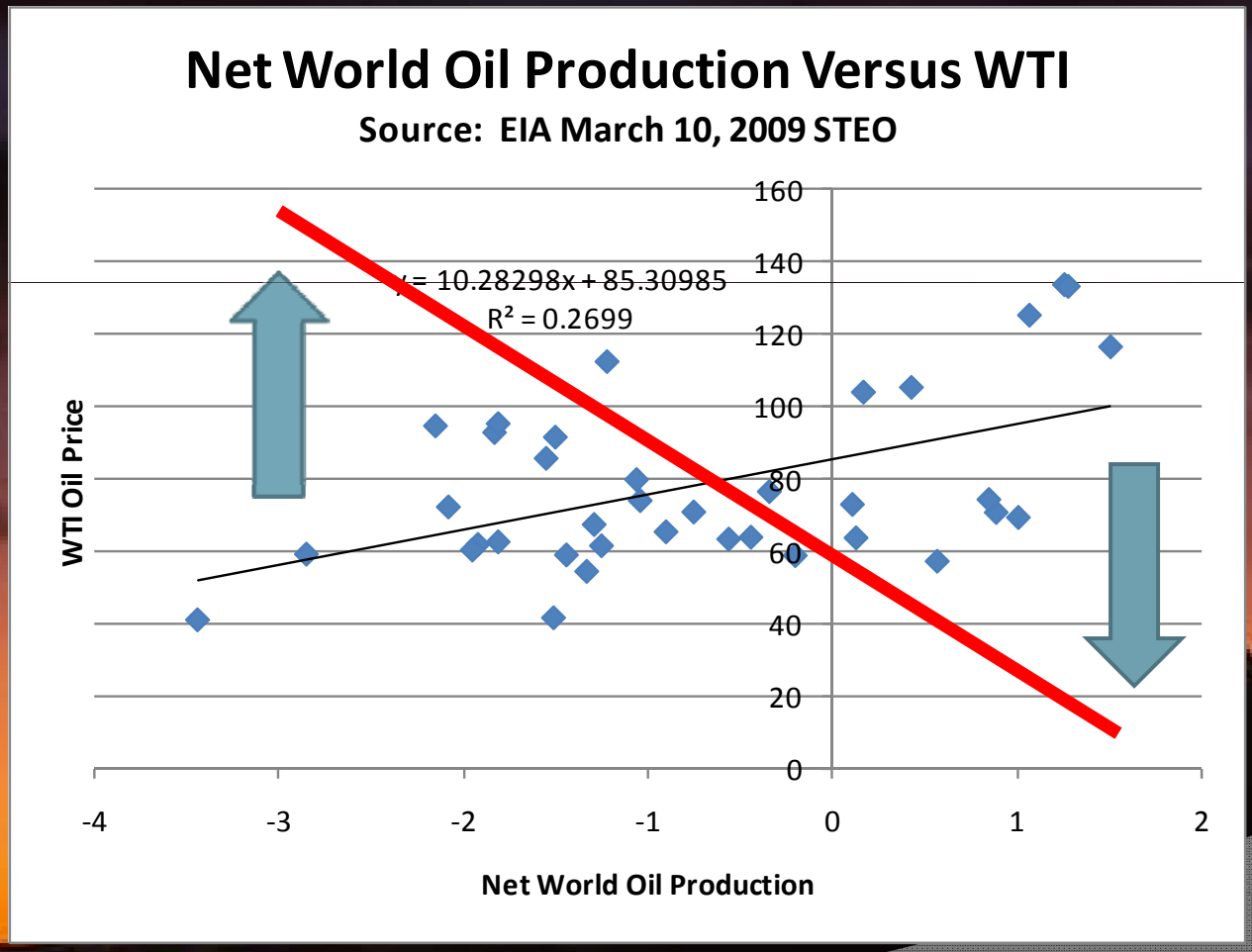
Number of obs	= 1628
F(6, 1621)	= 901.42
Prob > F	= 0.0000
R-squared	= 0.7082
Root MSE	= 12.498

wti	Coef.	Robust Std. Err.	t	P>|t|	[99% Conf.	Interval]
djii	.0047598	.0002884	16.50	0.000	.0040161	.0055036
euro	162.9345	3.750585	43.44	0.000	153.2623	172.6068
oecdinvent~y	-.0277737	.0065523	-4.24	0.000	-.0446711	-.0108762
hhi	-.0368438	.0054567	-6.75	0.000	-.050916	-.0227716
noncommerc~g	-.0001347	.0000109	-12.33	0.000	-.0001629	-.0001065
pricedelta	.0888047	.0440969	2.01	0.044	-.0249154	.2025247
_cons	-103.7526	19.83232	-5.23	0.000	-154.8974	-52.60767

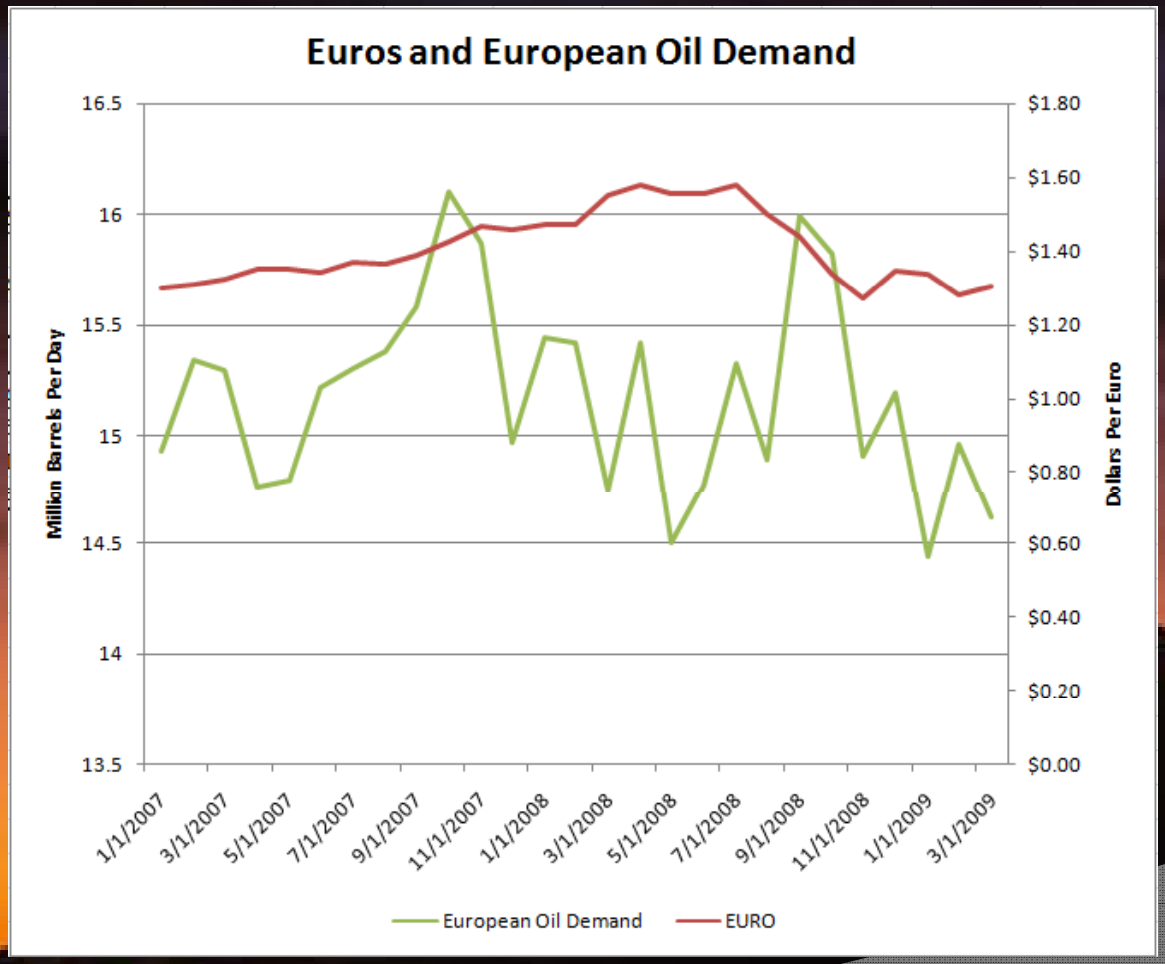
Fundamentals explain very little



Actually, fundamentals go the wrong way



Exchange Rates



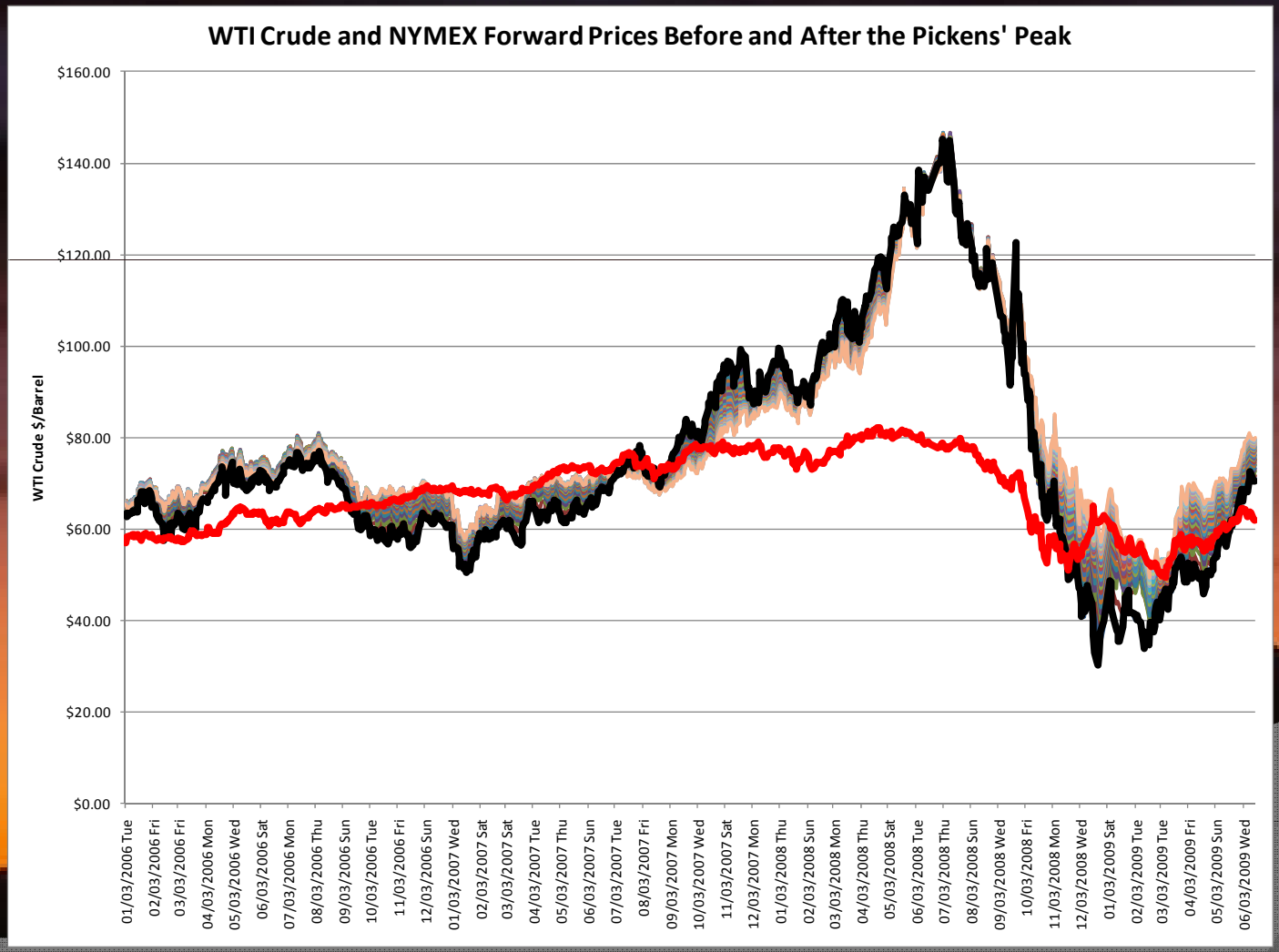
Speculation or Market Structure?

- 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

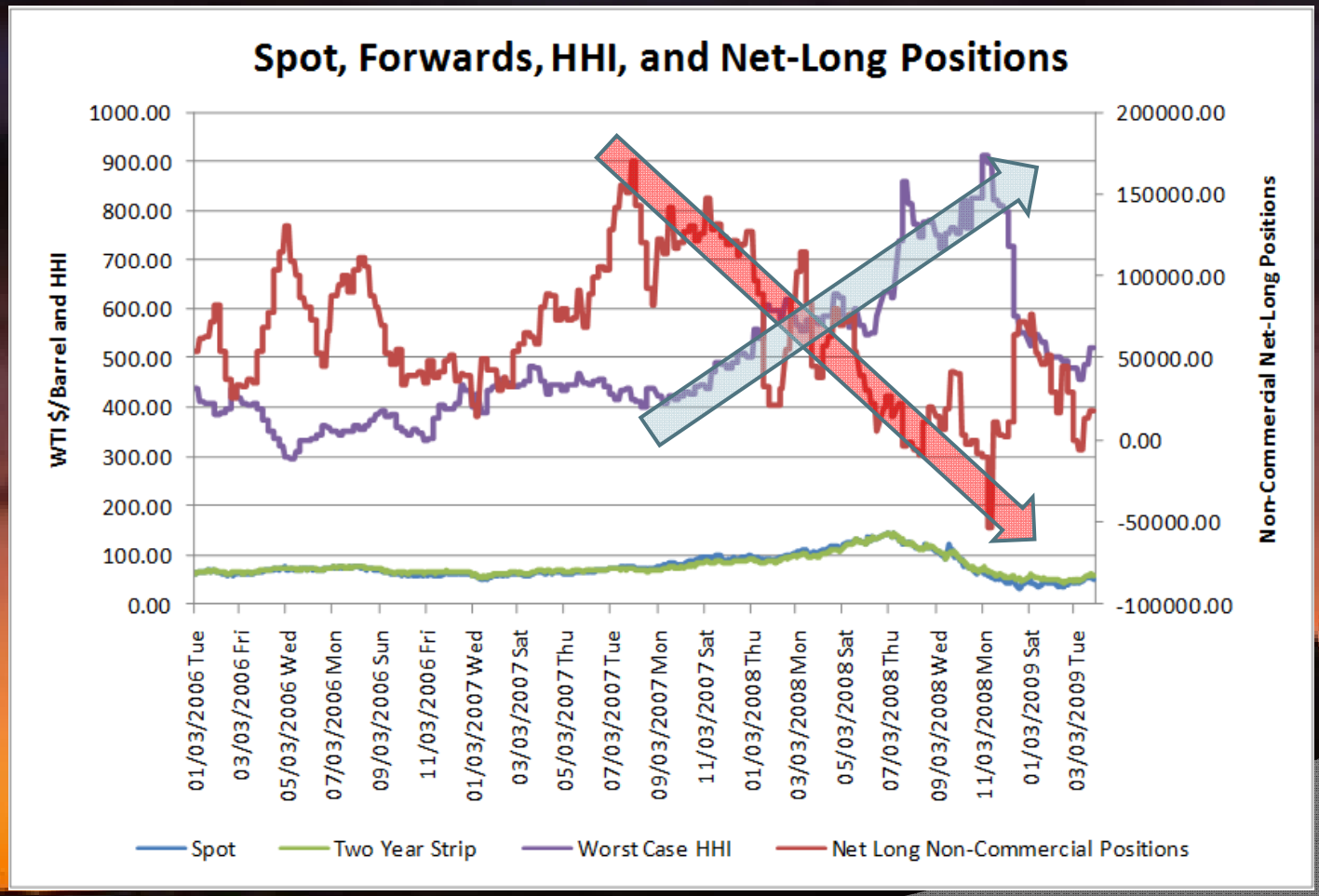
Number of obs	= 801
Wald chi2(1)	= 573.51
Prob > chi2	= 0.0000

	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
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

There seems to have been a very significant regime change in 2008

	2008-2009	2005-2007	Delta	P-value
Intercept	34.2310	-130.8795	165.1104	8.7380
DJII	0.0093	0.0043	0.0050	18.4663
Euro	149.6811	-63.4645	213.1456	64.2435
OECD Inve	-0.0783	0.0823	-0.1607	-25.3003
Non-Comı	-0.0003	0.0001	-0.0004	-37.5290
HHI	-0.0915	0.0110	-0.1026	-17.0103
Price Delt	0.0955	0.3816	-0.2861	-6.4898

Conclusions and Recommendations

- 2009 does not look like 2008 at all
- Market structure fits the data relatively 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 at mresearch.com
- We are happy to share our data set with other researchers


McCullough Research
http://www.mresearch.com