



North Dakota Oil & Gas Producing Counties

**10th Annual Meeting
September 9, 2015**

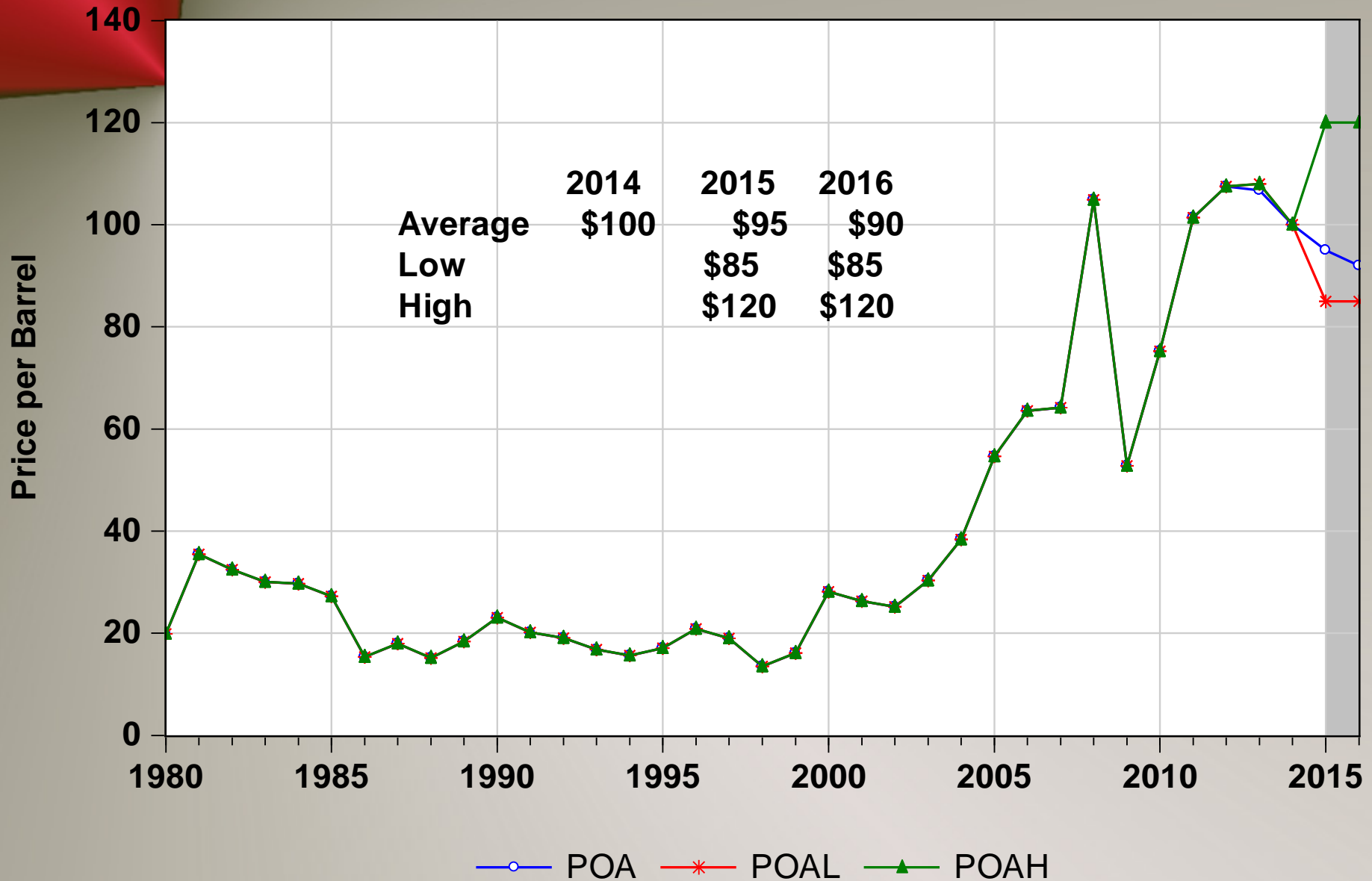
**Dr. Loren C. Scott
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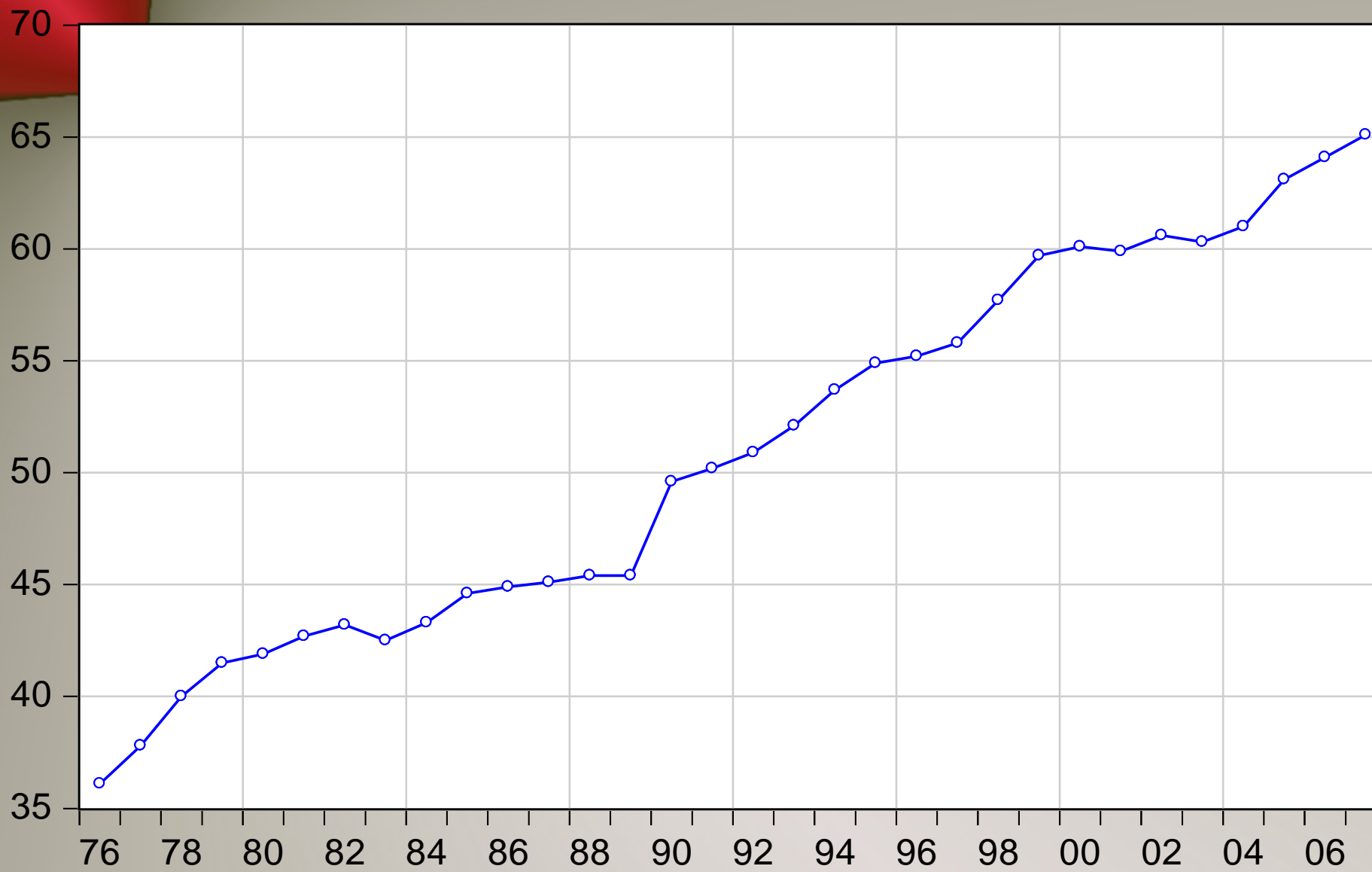
A red, folded-corner graphic element in the top-left corner of the slide, casting a soft white glow onto the background.

Energy Prices

Our Forecast in Early September

Fig. 6: Oil Prices







**Want clear evidence of global
warming?**

Positive proof of global warming.



**18th
Century**

1900

1950

1970

1980

1990

2006

A red ribbon is folded into a corner in the top-left corner of the slide.

HIS - Shale plays Responsible for:

**U.S. oil production up 85% since 2008---
highest growth of any country in world
over that period**

Impact on Imports of Crude Oil

- **2015e:**
 - **U.S. Production: 9.4 mmb/d**
 - **U.S. Imports: 7.2 mmb/d (43%)**
- **2008:**
 - **U.S. Production: 5.0 mmb/d**
 - **U.S. Imports: 9.8 mmb/d (66%)**
- **Guess who lost 2 mmb/d in sales to U.S.?**



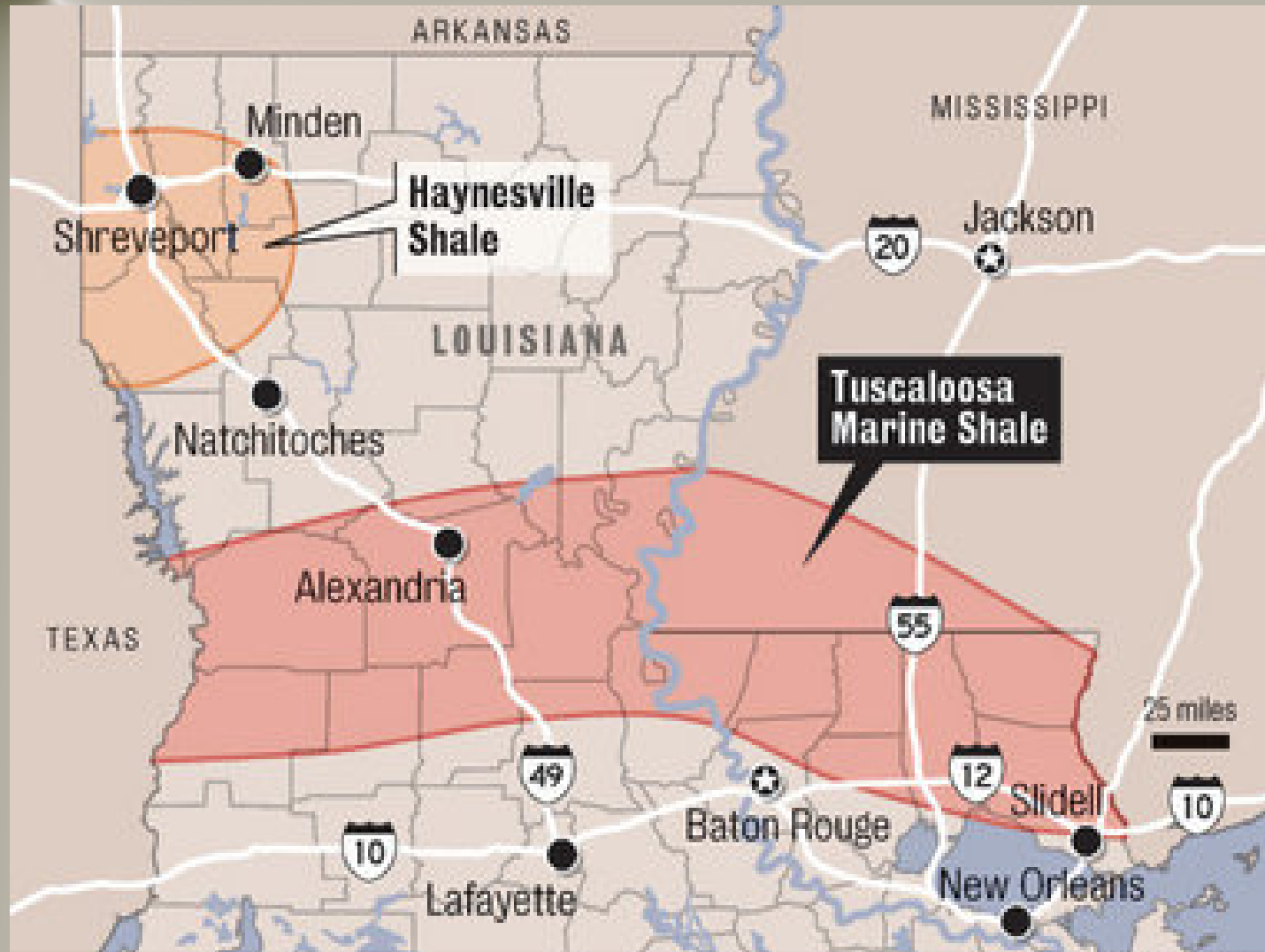
Each shale play is different

**Technology not as easily
transferable**

North Dakota's Bakken Field: A Hard Rock Shale

- **2003: 10,000 b/d produced**
- **2015: 1,200,000 b/d produced---120-fold increase**
- **ND surpassed Alaska as 3rd largest source of domestic oil in 3/12**

Tuscaloosa Marine Shale: A Clayey Shale



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Result: Different Plays

Different Breakeven Prices

Breakeven Oil Prices by Play

(Rodgers Oil & Gas Consulting)

- **Monterey (CA)** **\$36**
- **Eagle Ford (TX)** **\$49**
- **Bakken (ND)** **\$50**
- **Granite Wash (OK)** **\$57**
- **Niobrara (CO)** **\$66**
- **Tuscaloosa (MS)** **\$69**
- **Tuscaloosa (LA)** **\$92**

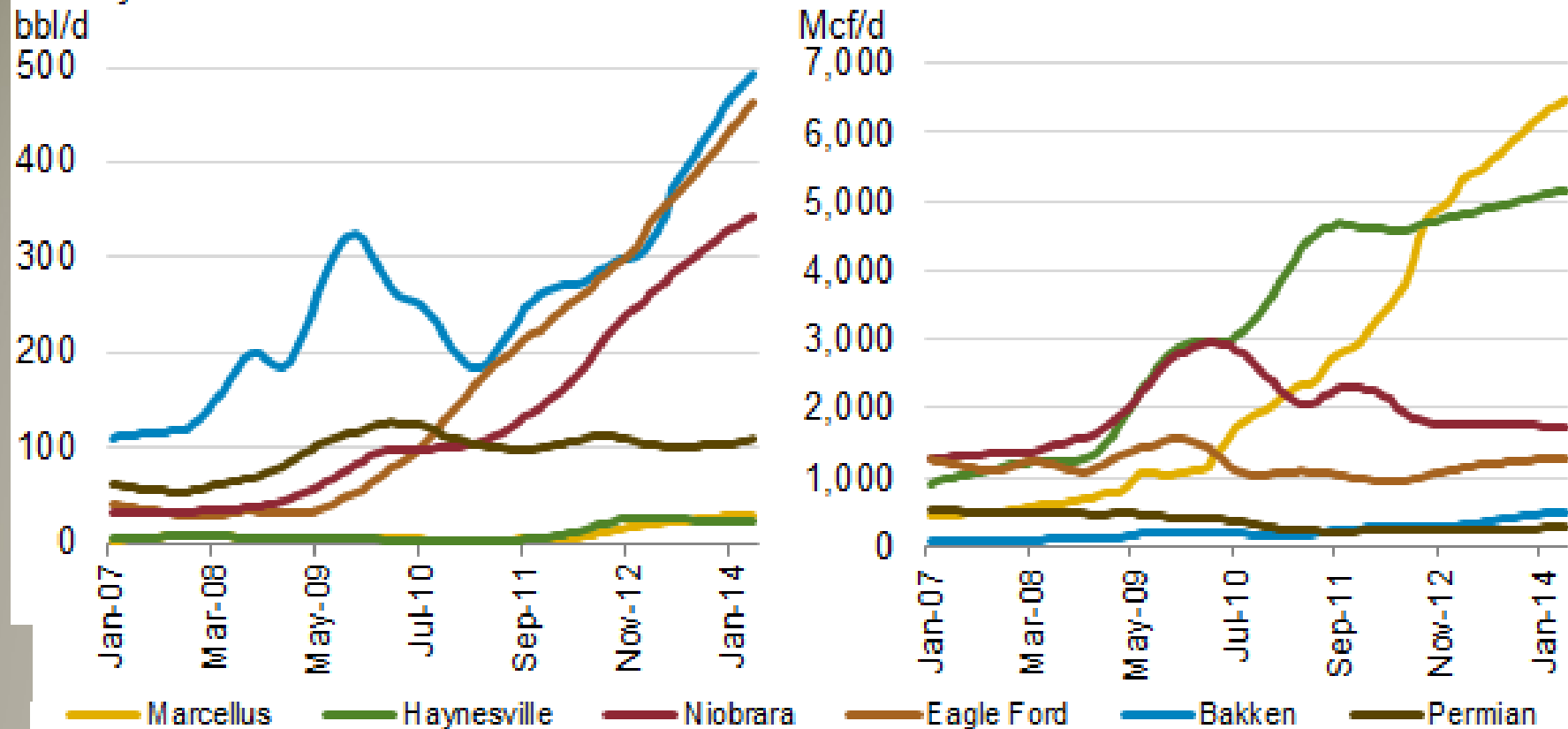
Declining Breakeven Prices

- Fracking costs down 32% over last year
 - The “Shoveling Down Effect”
- Drilling costs down 20%
- Time to drill well:
 - Anadarko EOG (Bakken)
 - 2009: 18 days 2012: 22.7 days
 - 2015: 7.5 days 2015: 7.1 days
- Completion:
 - EOG (Bakken)
 - 2012: \$10.5 mm
 - 2015: \$8.2 mm
- Plus more output per well

Daily Output Per Well

Oil and natural gas production per rig by shale play

January 2007 to March 2014



Breakeven Within Each Play:

These Are Averages

- **Monterey (CA)** **\$36**
- **Eagle Ford (TX)** **\$49**
- **Bakken (ND)** **\$50**
- **Granite Wash (OK)** **\$57**
- **Niobrara (CO)** **\$66**
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Breakeven Within Plays: Bakken

• <u>County</u>	<u>BE</u>
• Dunn	\$29
• McKenzie	\$30
• Williams	\$36
• Stark	\$37
• Mountrail	\$41
• Billings	\$44

• <u>County</u>	<u>BE</u>
• BOT-REN	\$52
• Burke	\$62
• Divide	\$73
• BOW-SLP	\$75
• McLean	\$77

- **Only 6 rigs outside green in 2/15**



**We're not exaggerating the
edges...**

**LAST NIGHT A MOVIE THEATER WAS
ROBBED OF A \$1000 DOLLARS**

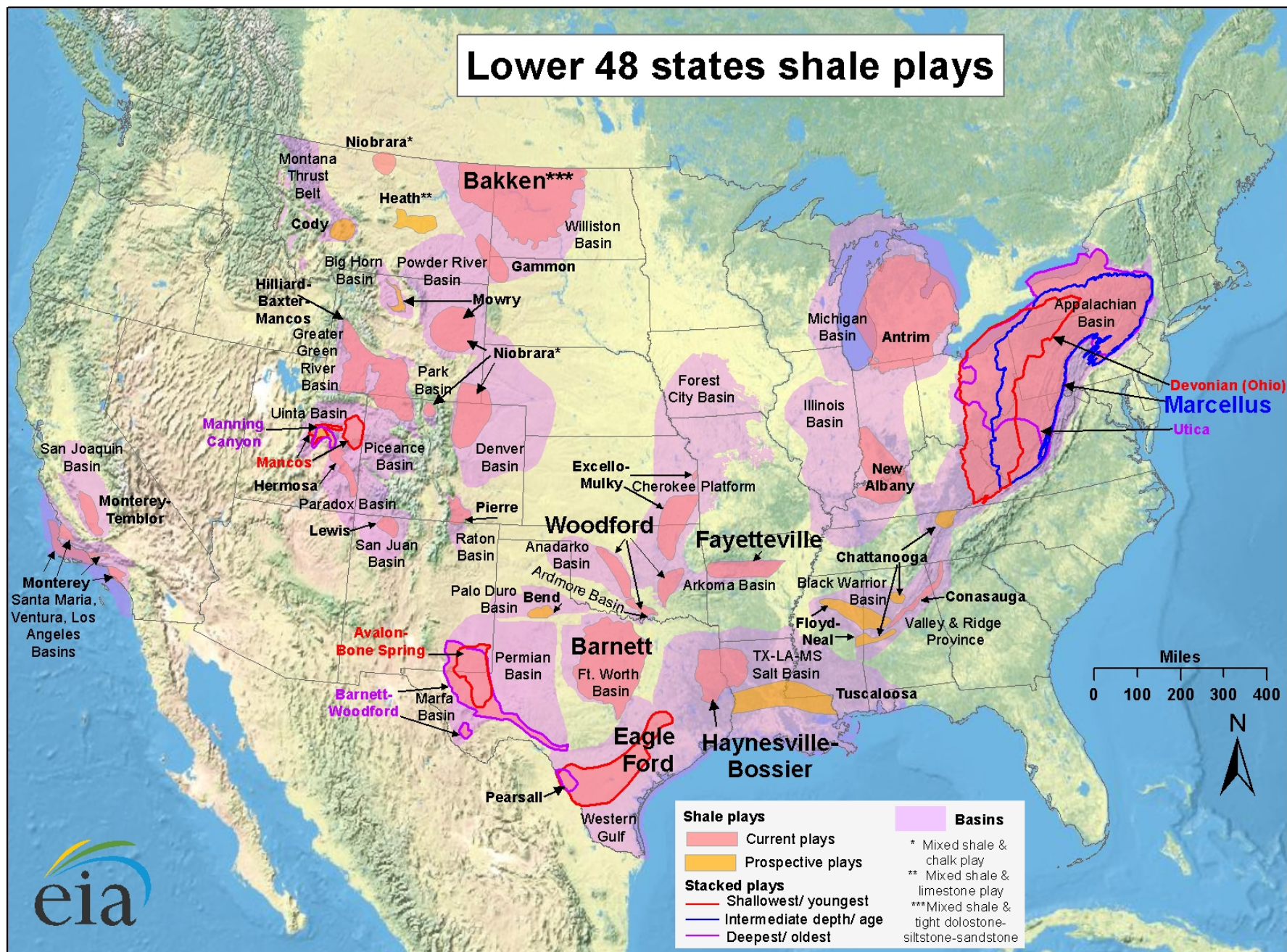
A photograph of actor Will Ferrell dressed as the character Fred Flarsbeyer from the movie 'Anchorman: The Last Man Standing'. He is wearing a dark suit, a white shirt, and a striped tie, and has a prominent mustache. He is holding a piece of paper and looking directly at the camera. The background is a blue screen with a repeating pattern of the 'Channel 4' logo and the words 'NEWS TEAM'.

**THE THIEVES TOOK ONE LARGE BAG OF POPCORN,
A COMBO MEAL AND A BOX OF MILK DUDS**

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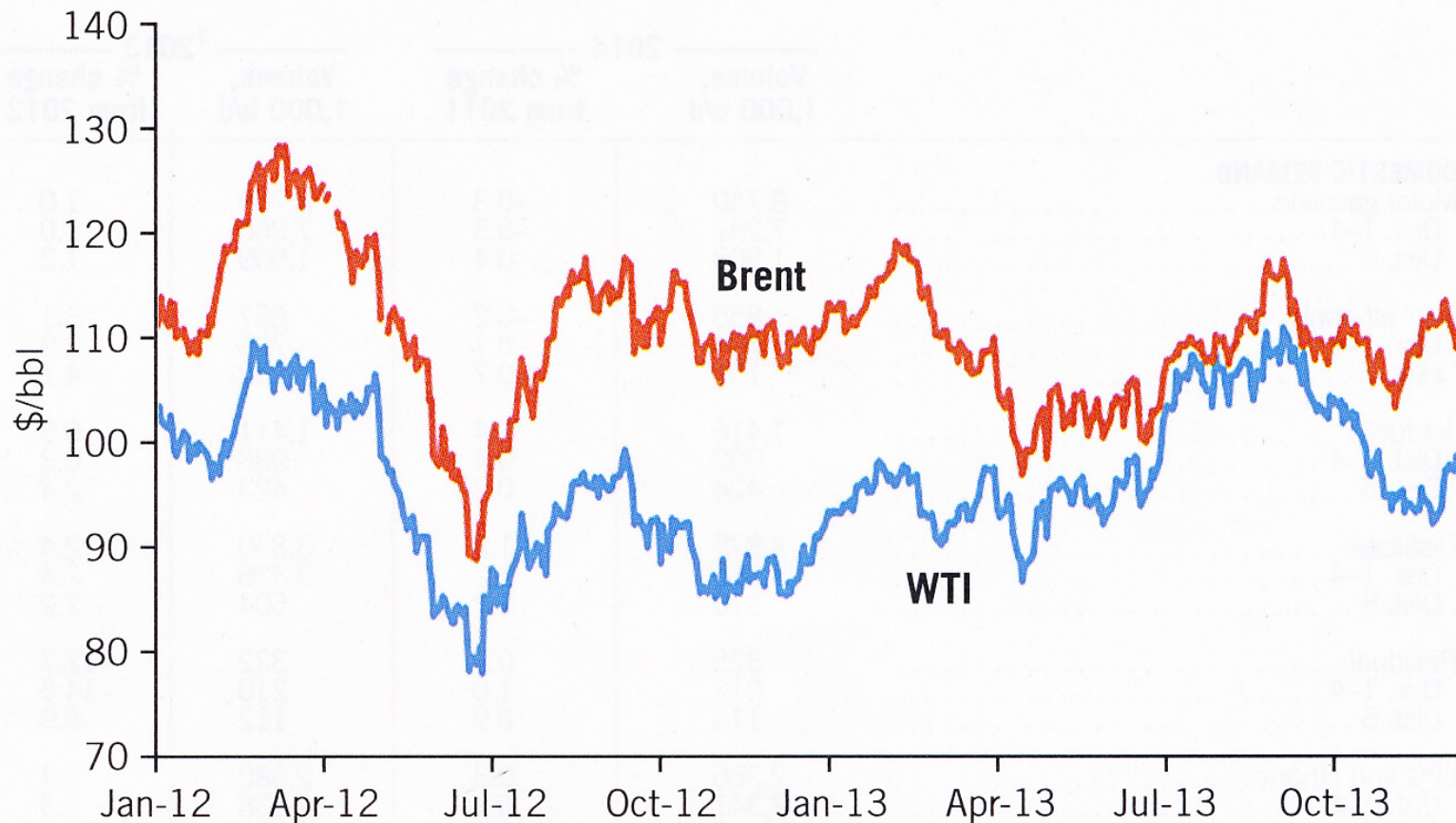
Weird Bakken Effect on Oil Prices

Lower 48 states shale plays



Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011

Oil Price Trends



Lower 48 states shale plays

Shale plays

- Current plays
- Prospective plays

Stacked plays

- Shallowest/ youngest
- Intermediate depth/ age
- Deepest/ oldest

Basins

- * Mixed shale & chalk play
- ** Mixed shale & limestone play
- *** Mixed shale & tight dolomite-siltstone-sandstone

Map Labels: Niobrara*, Heath**, Bakken***, Cody, Montana Thrust Belt, Williston Basin, Gammon, Powder River Basin, Big Horn Basin, Mowry, Niobrara*, Park Basin, Hilliard-Baxter, Mancos, Greater Green River Basin, Uinta Basin, Piceance Basin, Denver Basin, San Joaquin Basin, Monterey-Tembler, Monterey-Santa Maria, Ventura, Los Angeles Basins, Hermosa, Paradox Basin, Lewis, San Juan Basin, Raton Basin, Anadarko Basin, Ardmore Basin, Permian Basin, Ft. Worth Basin, Eagle Ford, Pearsall, Western Gulf, Woodford, Fayetteville, Arkoma Basin, Black Warrior Basin, Conasauga, Valley & Ridge Province, Floyd-Neal, TX-LA-MS Salt Basin, Tuscaloosa, Haynesville-Bossier, Excelsior-Mulky, Cherokee Platform, Forest City Basin, Illinois Basin, New Albany, Appalachian Basin, Devonian (Ohio), Marcellus, Utica, Antrim, Michigan Basin.

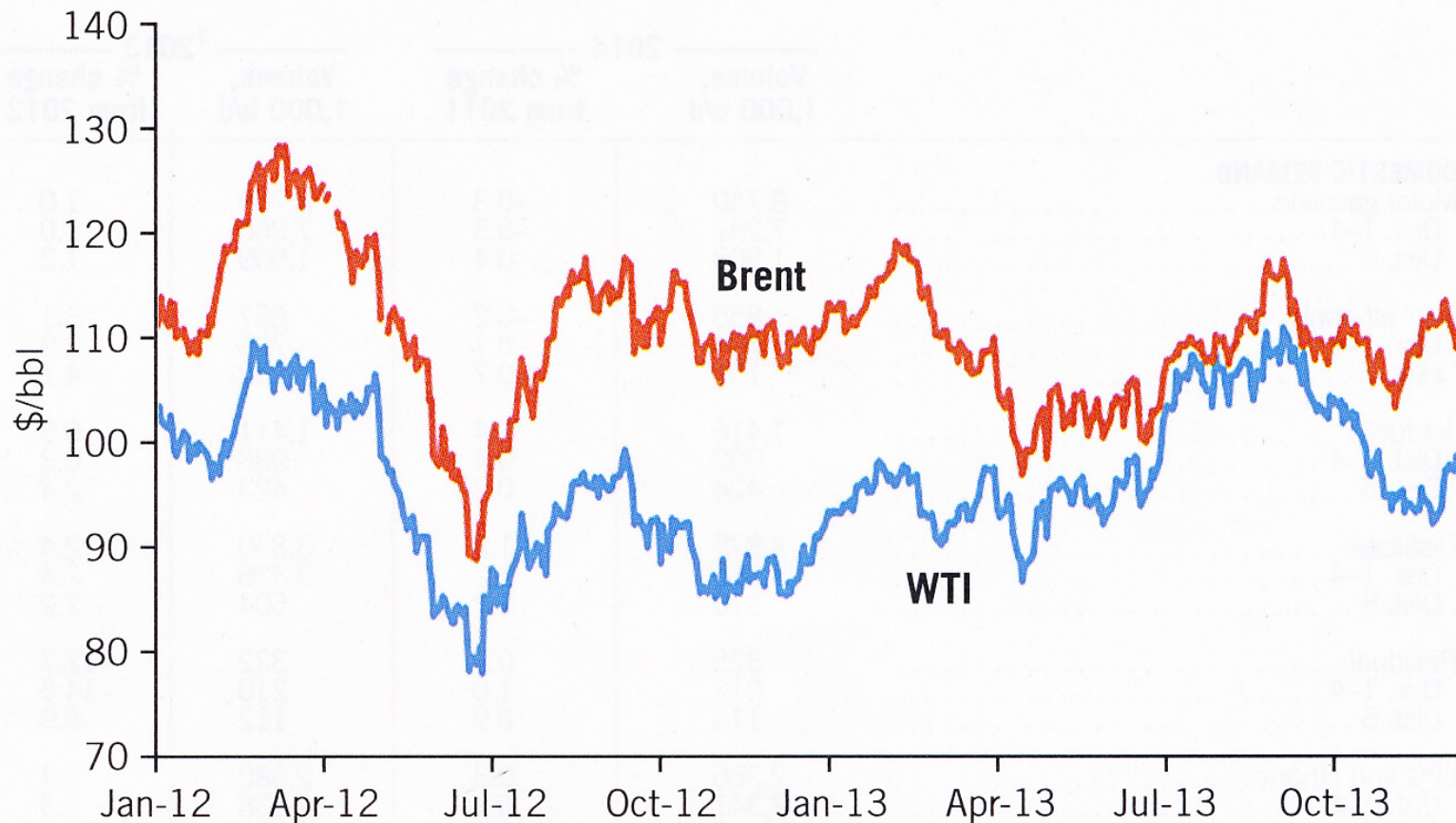
Scale: 0 100 200 300 400 Miles

North Arrow: N

eia

Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011

Oil Price Trends



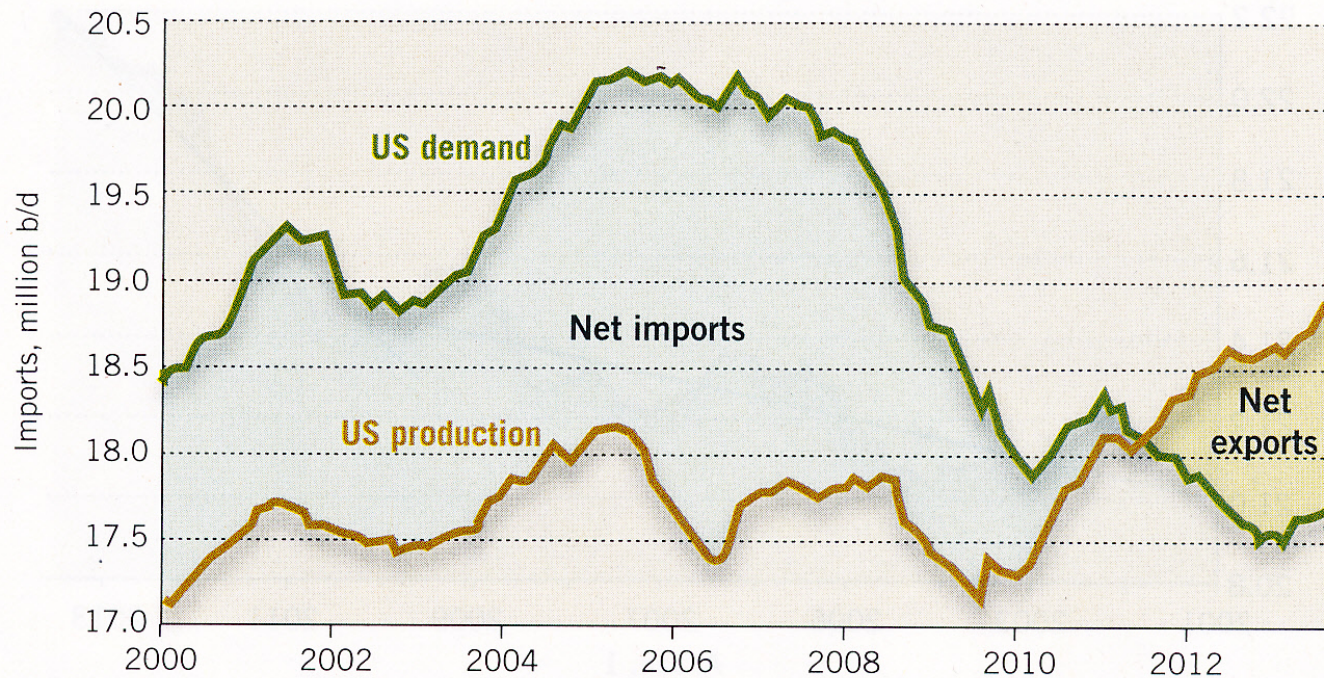
Desire to Export Oil

- **Key to recent price decline**
- **Export of petroleum illegal since 1970s (Swaps now allowed with MX)**
- **Export of petroleum products is legal**

Oil Product Demand/Production

US PRODUCT DEMAND, PRODUCTION*

FIG. 2



*Net; 12-month average
Source: EIA

At Jan. 1



What is a “product”?

**Is a field-level \$500K to \$5mm
facility to strip off volatile
propane and butane so
condensate can safely flow
through pipelines make it a
“product”?**



Why have oil prices declined?

Why did they drop so quickly?

Was it rising U.S. Production?

Quick drop: Look to Saudis



Saudis & OPEC

**Is it a desire to enforce discipline
within OPEC---a' la 1982?**

**Or a desire to maintain market
share?**



**Main restraint on consistently
lower oil prices:**

“Lets have a meeting!”

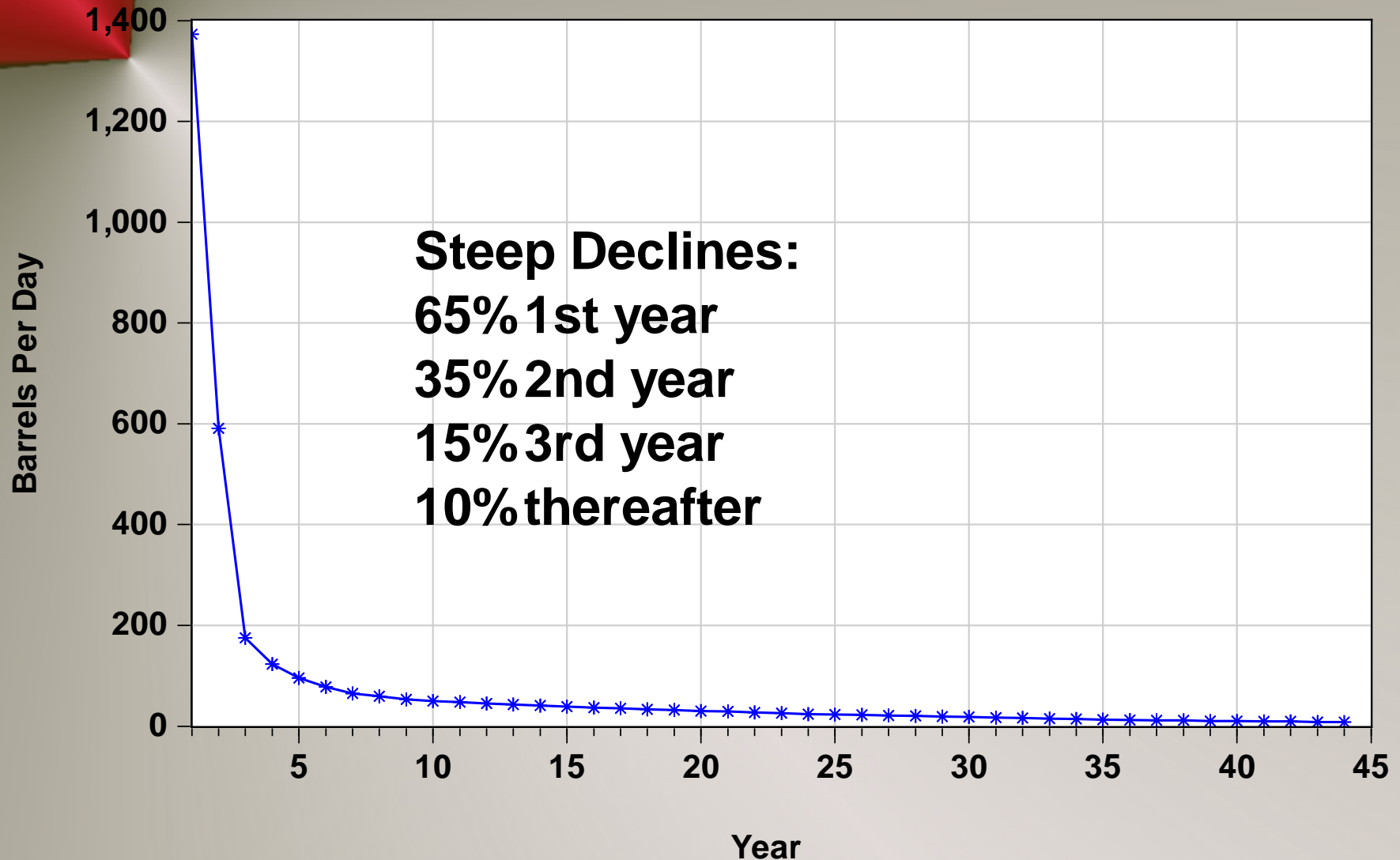
A red ribbon is folded into a corner in the top-left corner of the slide.

Kill the Edges:

**Impact on U.S. production will
be swift.**

**Bakken oil production already
peaking**

Typical Bakken Well Production



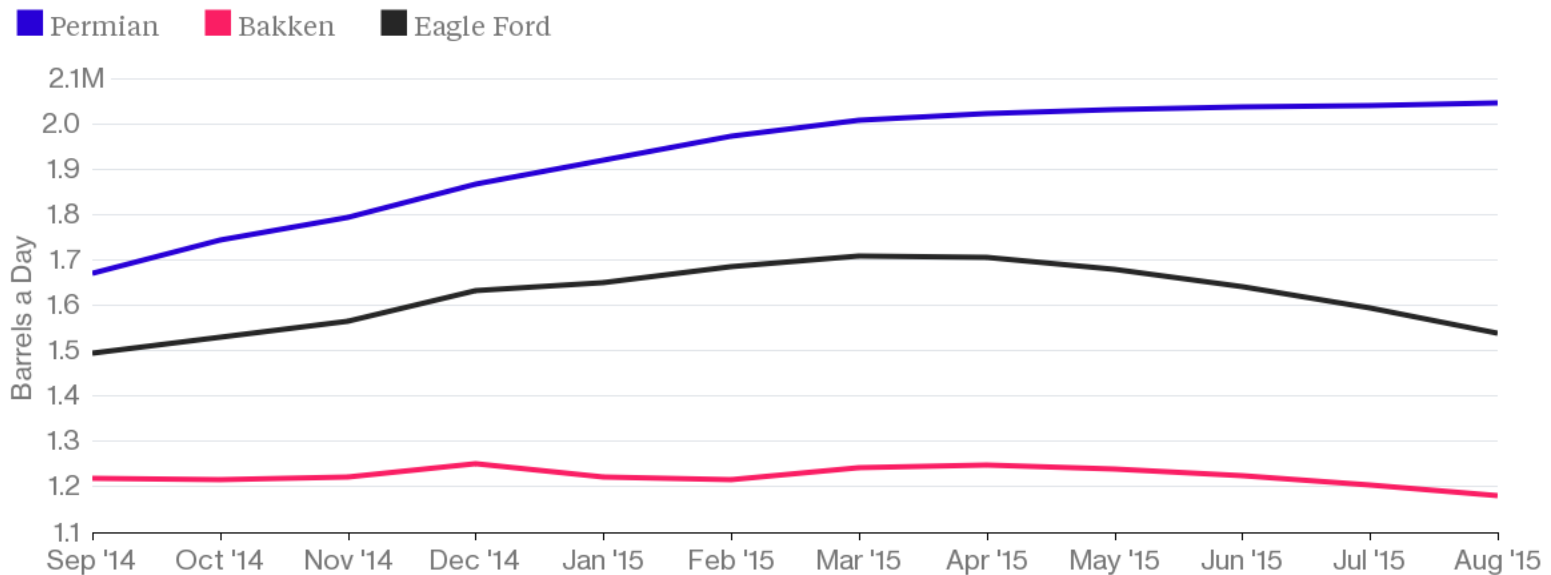
Steep Declines:
65% 1st year
35% 2nd year
15% 3rd year
10% thereafter

Source: ND Dept of Mineral Resources

Production Trends: Shales Plays

Permian Powerhouse

Oil output is still growing in the Permian Basin, unlike other U.S. shale fields



Source: Energy Information Administration

Oil production levels off

Million barrels per day

10.0

9.5

9.0

8.5

8.0

7.5

7.0

6.5

Jan-13

Apr-13

Jul-13

Oct-13

Jan-14

Apr-14

Jul-14

Oct-14

Jan-15

Apr-15

Jul-15

Rig Count

2000

1800

1600

1400

1200

1000

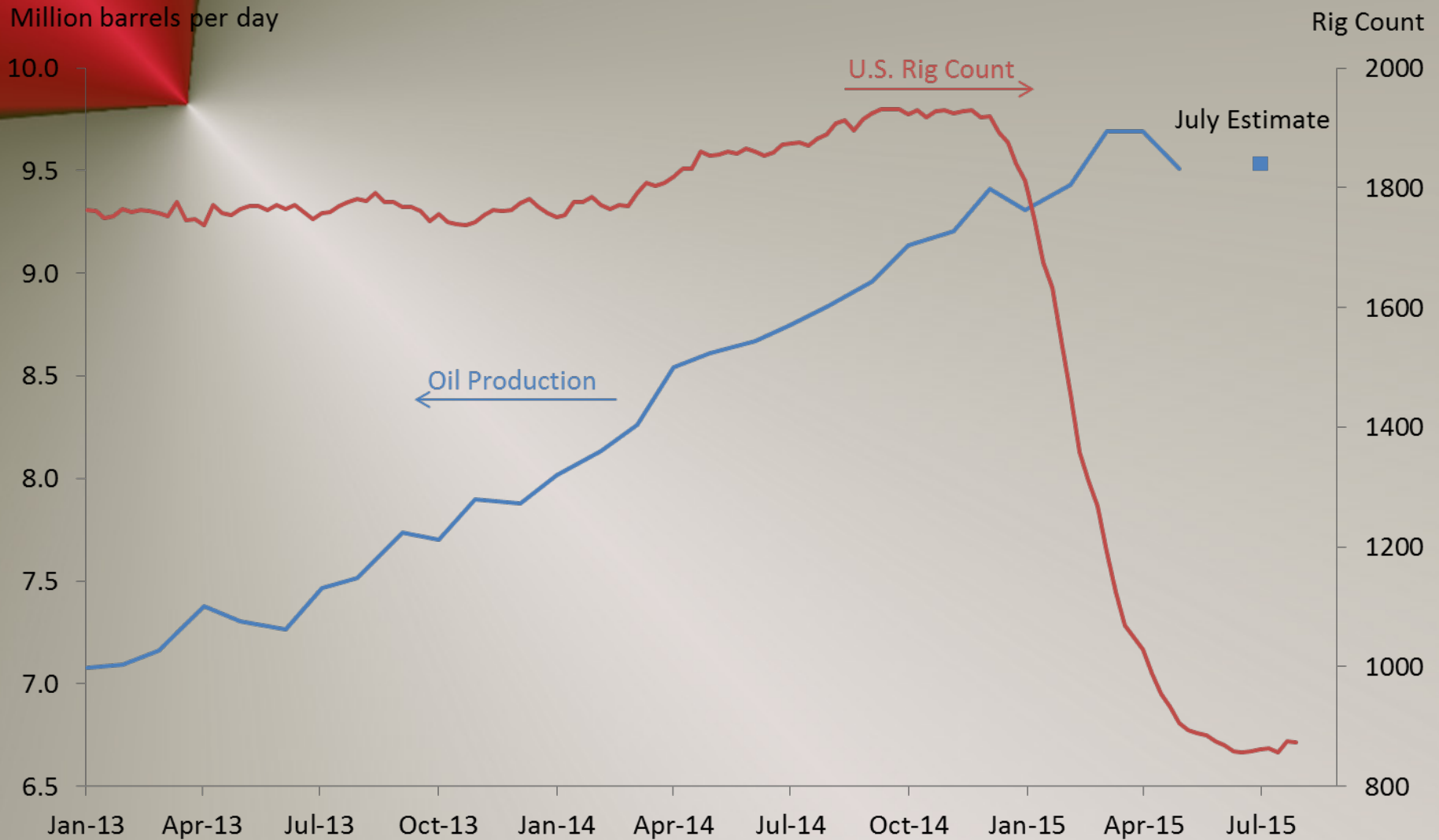
800

U.S. Rig Count

July Estimate

Oil Production

Source: Oil and Gas Journal; Baker Hughes.

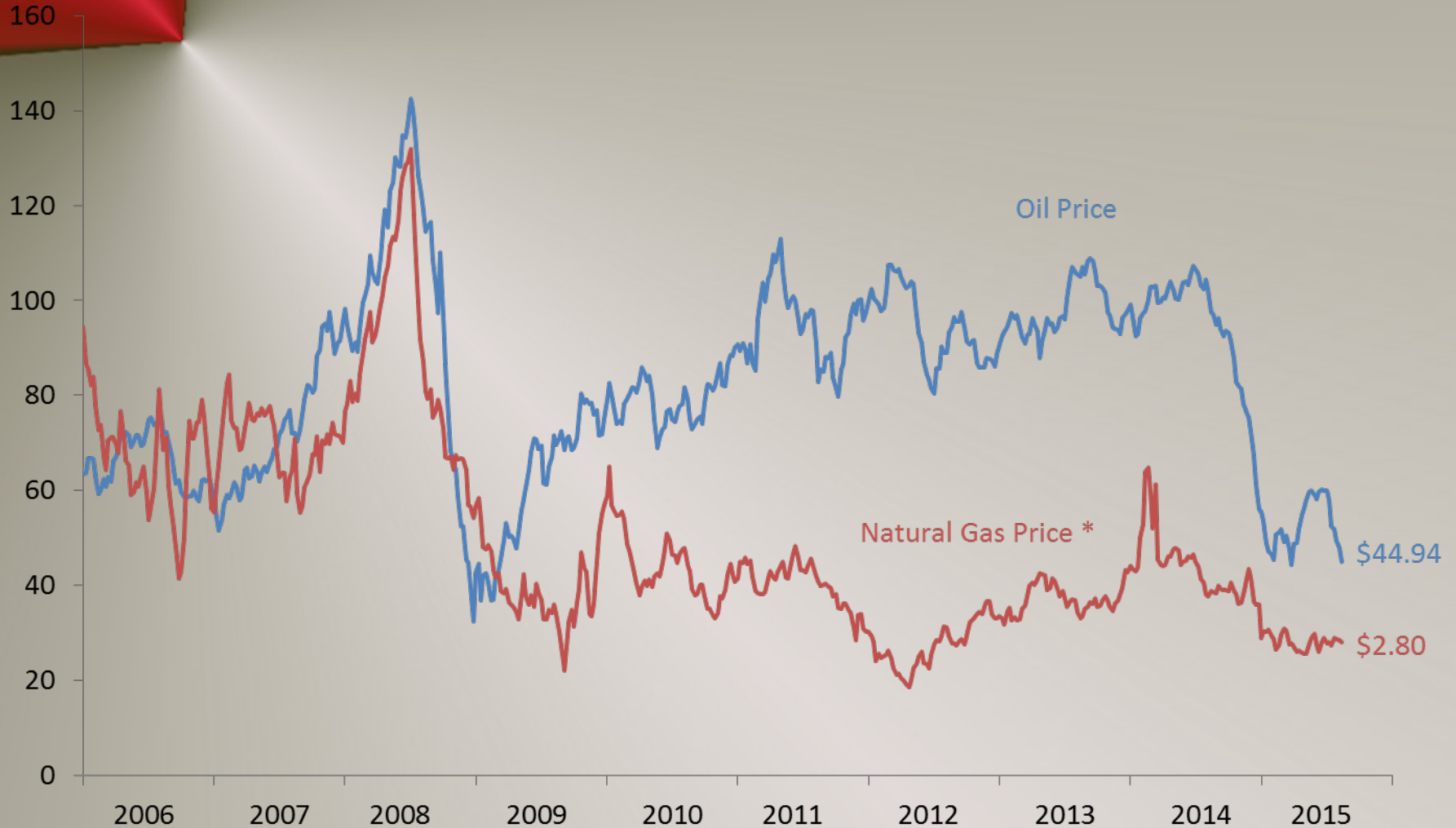



Oil Production

- **By August, oil production from shale areas will have fallen for 4th month in a row (EIA forecast)**

The “W” in Oil Prices Plunge

Nominal price, \$,
weekly



A red, folded-corner graphic element in the top-left corner of the slide.

Responses to Latest Price Decline

The rig count

Responses to Latest Price Decline

- **BP**: Reducing spending from \$26 billion to \$20 billion
- **Shell**: laying off 6,500 & reducing capital budget by \$7 billion
- **Chevron**: eliminating 1,500 jobs & cutting spending by \$1 billion
- **ConocoPhillips**: cutting spending from \$16.5 billion to \$11 billion

Responses to Latest Price Decline

- **Woods McKenzie**: Oil companies have canceled or delayed \$200 billion in projects since mid-2014
 - 50% in deepwater projects
 - 30% in Canadian oil sands
- **Oil Service Companies**
 - Less work to do with fewer rigs
 - Plus “shoving down”

Where Is Price Going?

- **Demand Side: Credit Suisse**

–	2015	2016	2017
– OECD	-1.0%	0.9%	0.5%
– Emerging	3.0%	2.5%	2.6%
– <u>Total</u>	1.0%	1.7%	1.6%

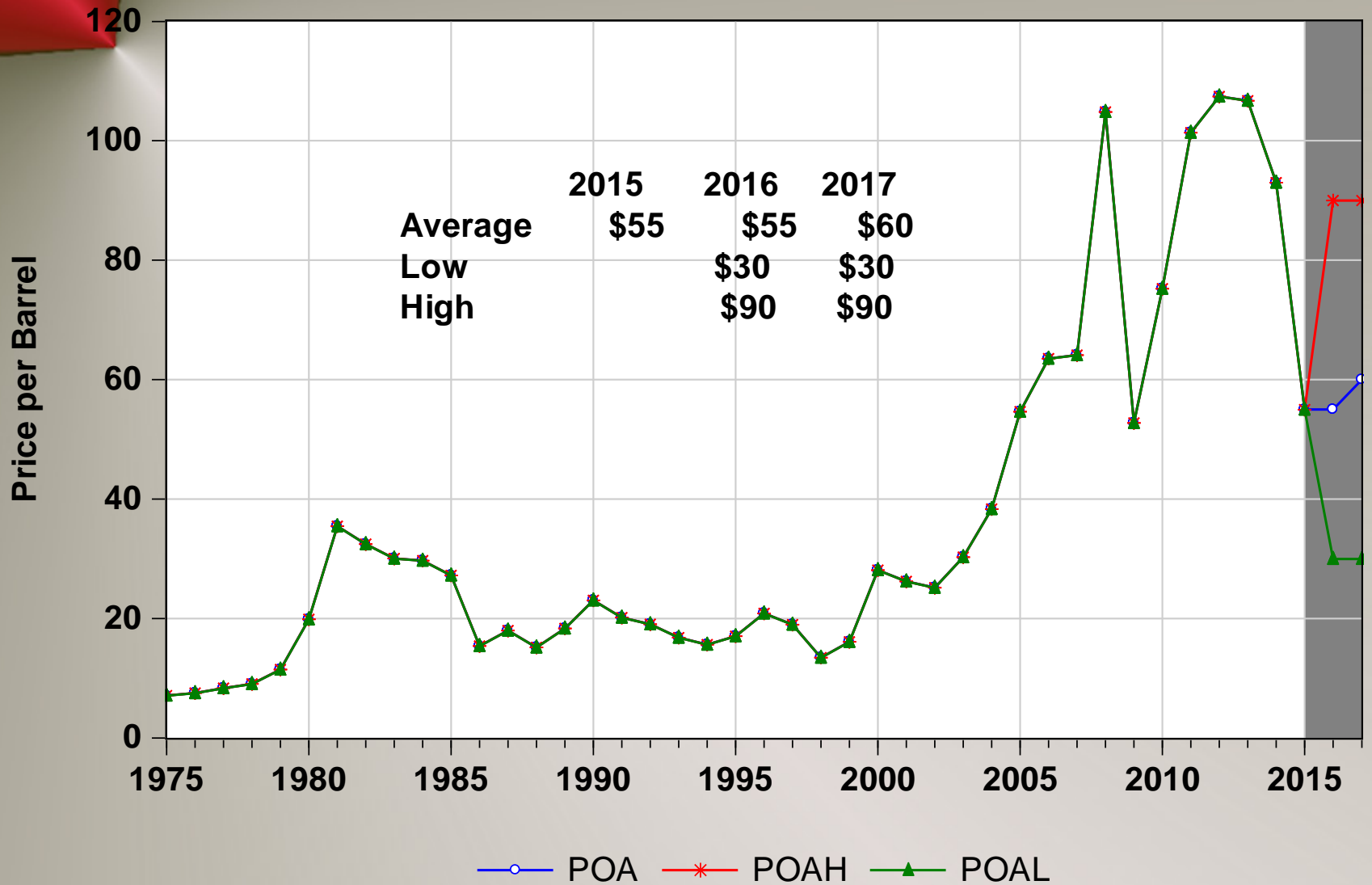
Where Is Price Going?

- **Supply Side: Countervailing Moves**
 - **US Down**
 - **OPEC pressures down?**
 - **Iran???**
 - **Treaty?**
 - **In December putting out to auction 45 properties to show international exploration companies**
 - **Bump production from 3.1 to 5.7 mmb/d**

What Is the “Market” Saying

- **Futures market is in “contango”**
 - **Spot August 28, 2015** = **\$45.22**
 - **Future June 2016** = **\$50.52**
 - **Future December 2016** = **\$52.79**

Oil Prices

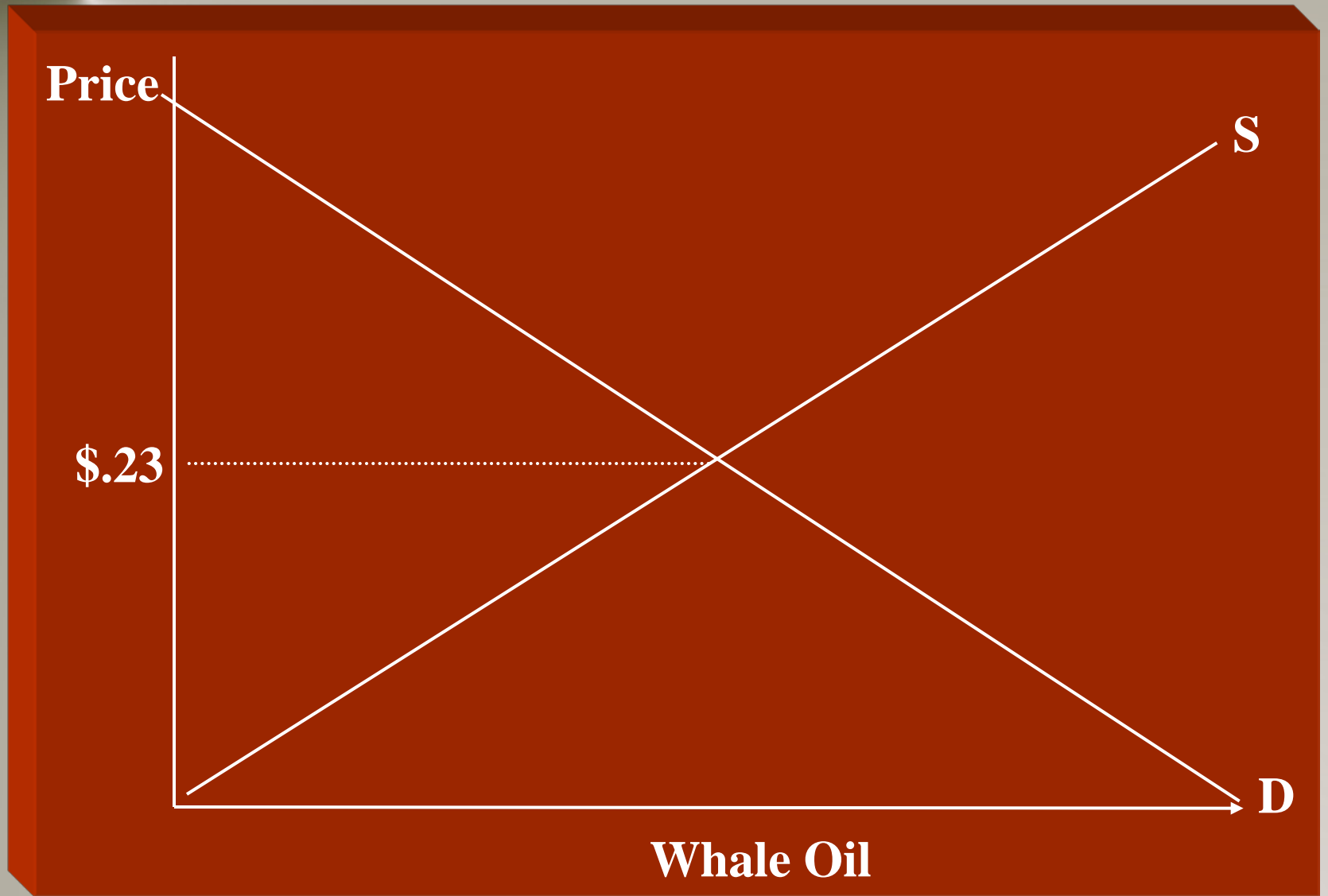


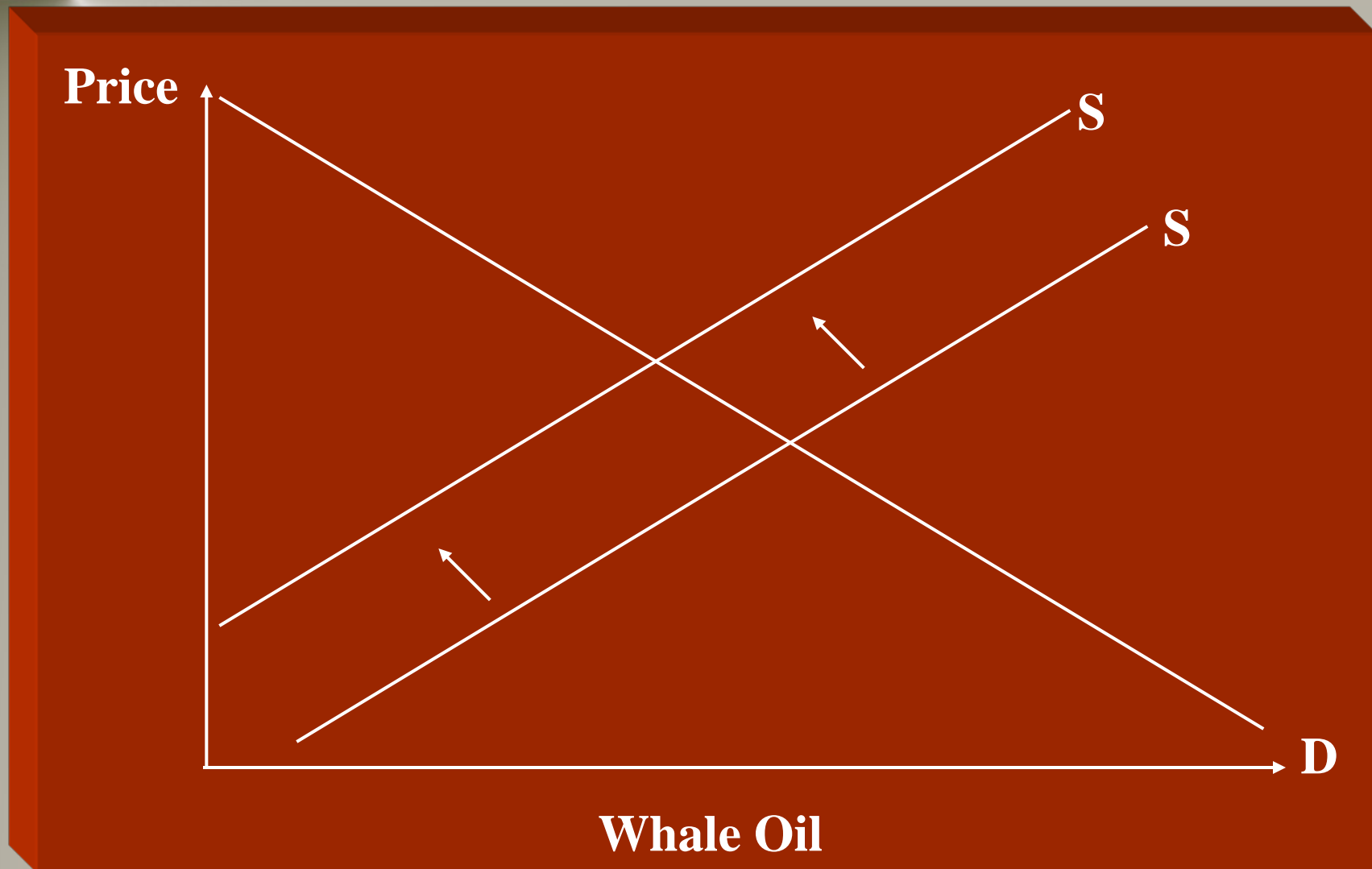


When you get discouraged...

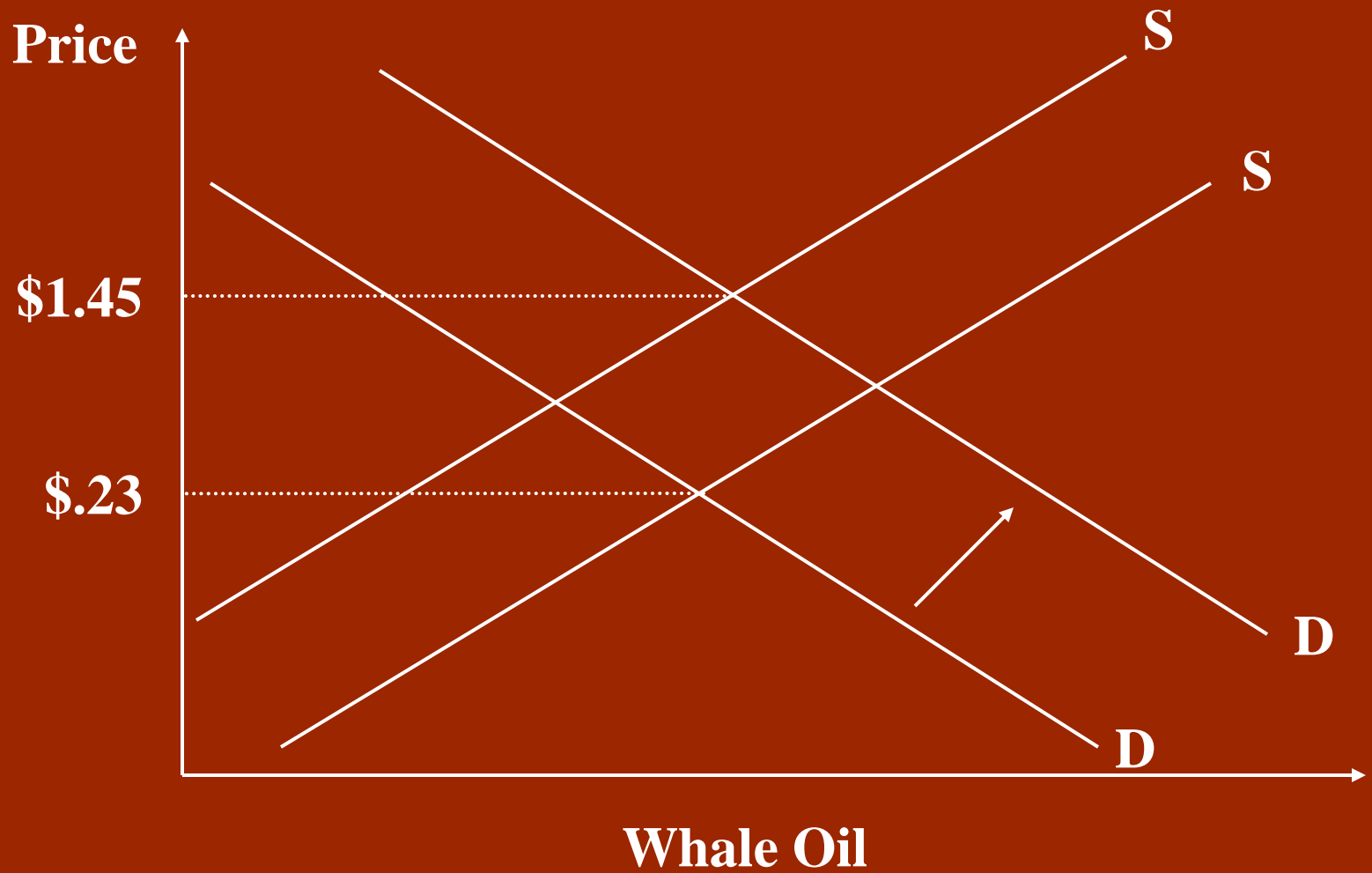
**Remember our responses to
crises**

1865

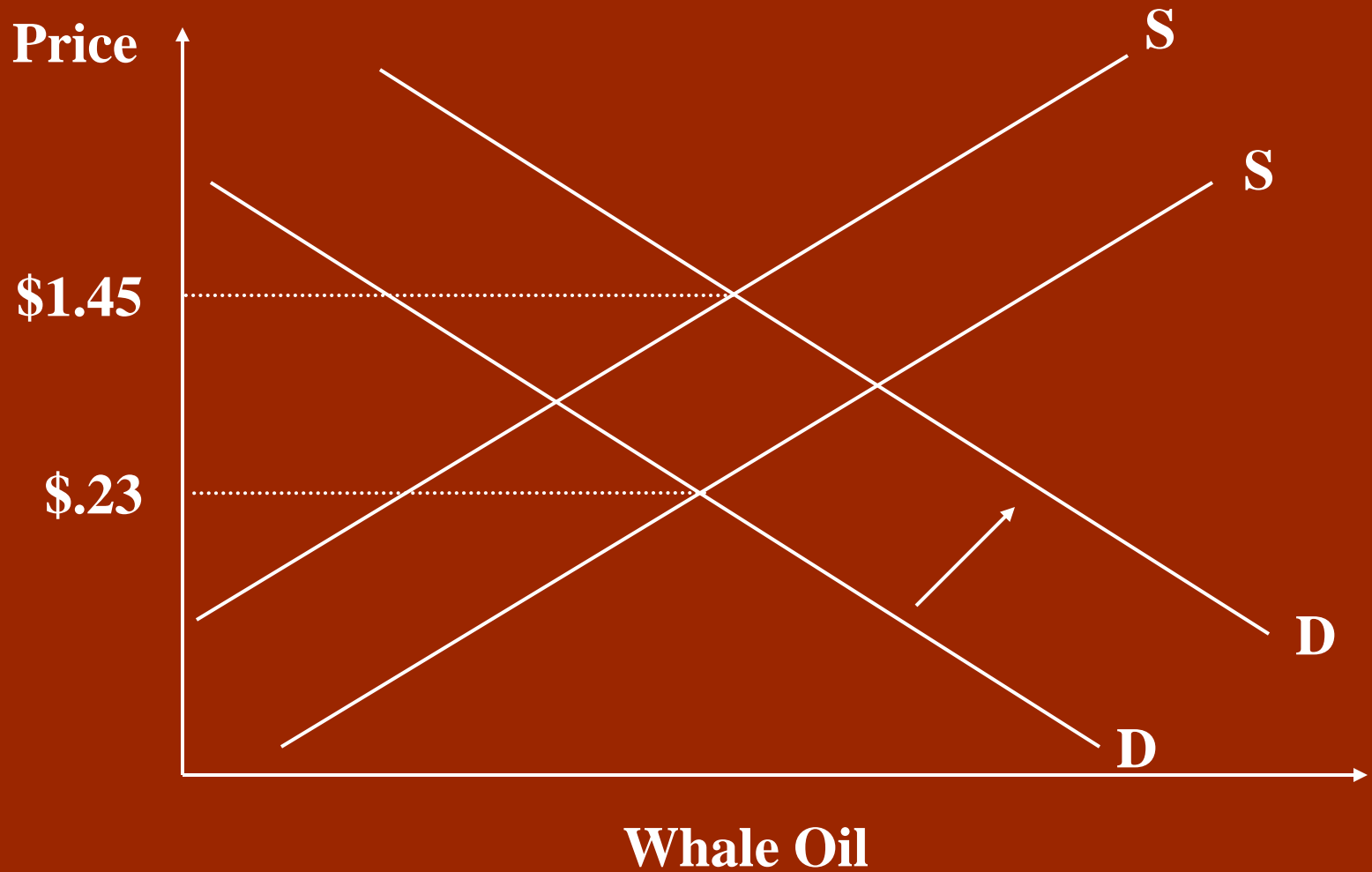




1867



1859: Oil Discovered





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