Natural Gas: Secular Shift or Cyclical Swing?

Fact and Fiction in Unconventional Gas

Ben Dell—Co-Head, Energy Investments



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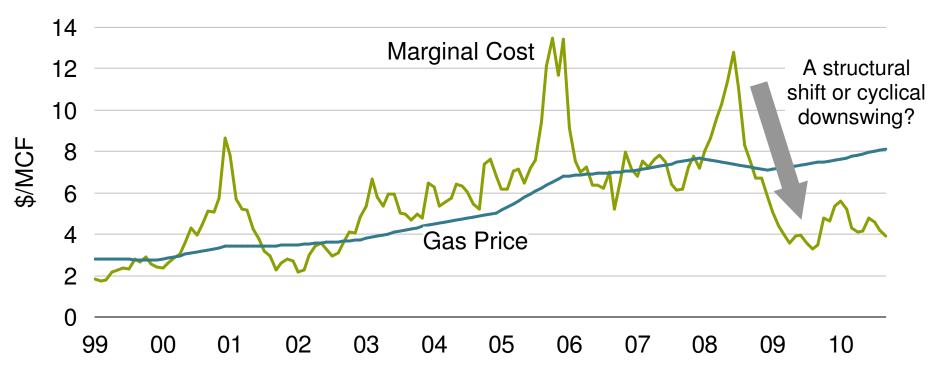
Framing the Debate: A Cyclical Trough or a Secular Shift?

Is today's unconventional gas volume growth due to high returns and a secular shift in the cost base or is excess liquidity in the capital markets driving irrational operator behavior?

Issue	Consensus View	AB View
Cost Structure	Low cost and declining Economic at \$4–\$5/mcf. IRR's of 30%–40%	Full range of Costs Marginal cost of \$6–\$7/mfc. Real returns of 0%–10%
Variation between wells	Little. Manufacturing play	High between core and outer tiers Same issues as conventional plays
LNG	Oversupplied in 2010 & 2011	Unlikely to reach the US Tightening market from 2011+
Demand	Recovering	Recovering
Conclusion	Supply is growing due to strong returns and the lower cost of production of unconventional gas. Long term prices will be lower (in the \$4–\$5/mcf range).	Supply is growing due to operators focusing on growth over returns. A Rebound to the marginal cost (\$7/mcf) is likely when liquidity declines

What Drives Prices?: Gas and the Marginal Cost

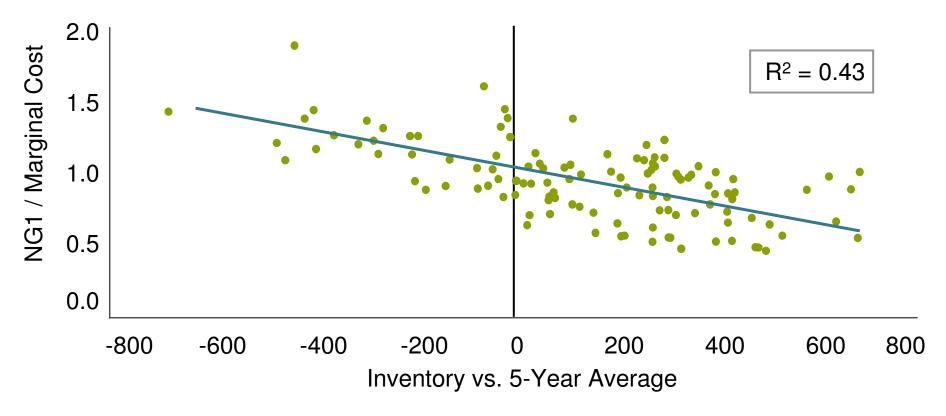
 Since the beginning of the unregulated gas market, prices have cycled around the marginal cost, rising to the price of demand destruction (15%— 20% return for operators) and falling to the cash cost (0% return for operators)



Source: Bloomberg, corporate reports and AllianceBernstein Estimates

What Drives Prices?: Relationship of Inventory to Prices Adjusted for the Marginal Cost

 Cycles around the marginal cost have been driven by near term supply/demand dynamics, most easily measured by inventories



Source: Bloomberg, EIA and AllianceBernstein Estimates

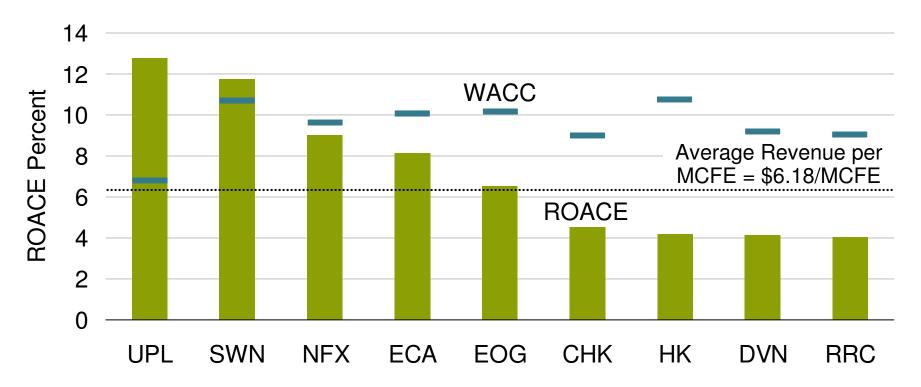
The Cost Structure of Shale Gas: Public Perception

- The Haynesville shale, which extends from Texas into Louisiana, is seeing costs as low as \$3 per million British thermal units, down from \$5 or more in the Barnett shale in the 1990s. And more cost-cutting developments are likely on the way as major oil companies get into the game. If they need to do shale for \$2, I am willing to bet they can."—Amy Myers Jaffe, Wall Street Journal, May 10, 2010
- "Gas prices, while low, remain economic for large tracts of shale gas: half of the 1,800 trillion cubic feet of discovered resource can be developed at present prices" —IHS Cera's chief energy strategist, David Hobbs
- "The recent shale gas boom has been called a 'game changer' in the North American energy picture. It promises to deliver abundant, cheap natural gas for decades to come."—Natural Gas for America
- Abundant, Affordable, Clean, Reliable— EnCana 2010



The Cost Structure of Shale Gas: Reported Data

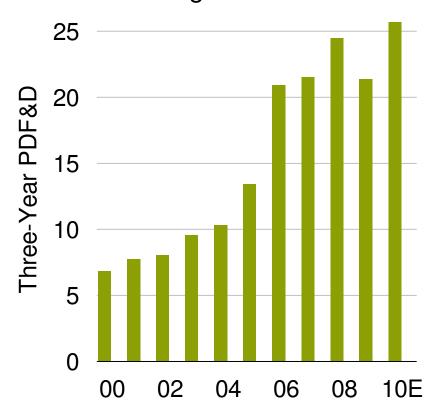
Despite the claims of low costs, in 2009 the majority of public E&Ps had returns that failed to meet their cost of capital (even excluding write downs) at a \$6.18/mcfe realized price

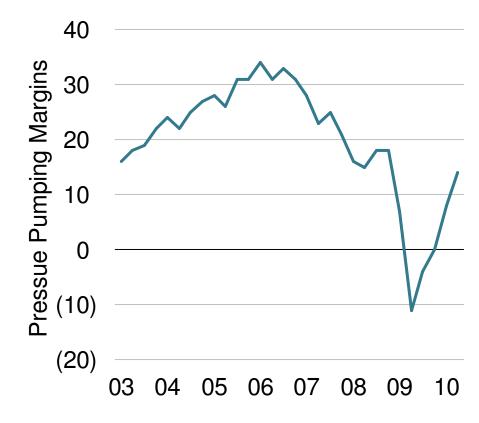


Source: Bloomberg and corporate reports

The Cost Structure of Shale Gas: Trends in PD F&D

Despite the emergence of shale gas corporate PD F&D has not materially fallen. While it dropped in 2009 due to cyclical service cost inflation this is now reversing



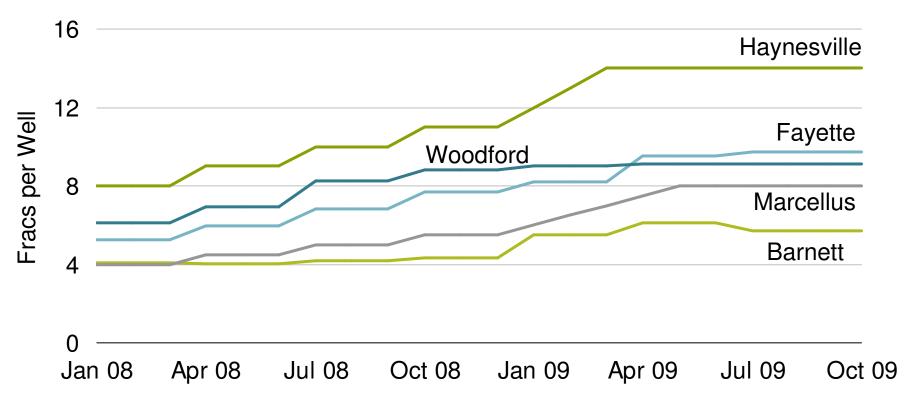


Source: Bloomberg and corporate reports

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Perception vs. Reality: Why Rising IPs Look Good, but are Coming at a Cost

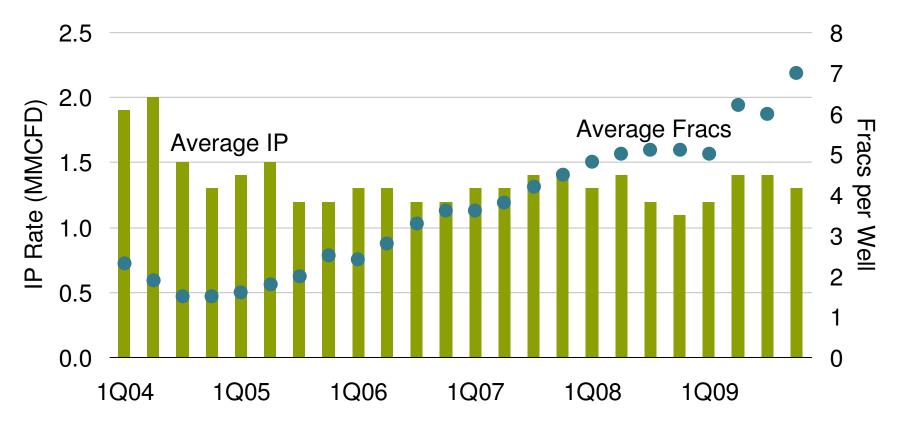
Much of the "hype" around shale gas has come from ever increasing IP rates. However these are largely the result of bigger, more expensive wells. As a result PD F&D hasn't fallen



Source: State Filings and corporate reports

The Trend Is Particularly Apparent in Mature Shales Like the Barnett

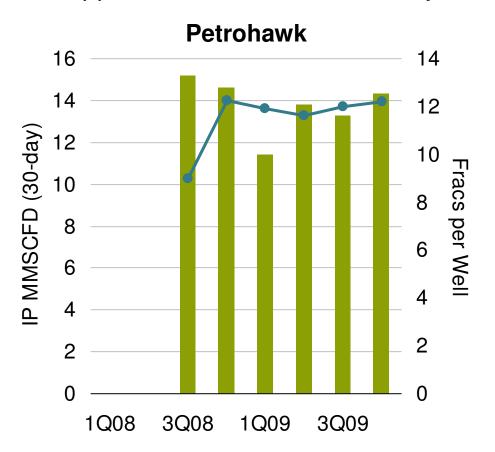
In almost all plays the number of fracs per well has risen. However in many mature plays this has not been associated with an increase in IPs or EUR

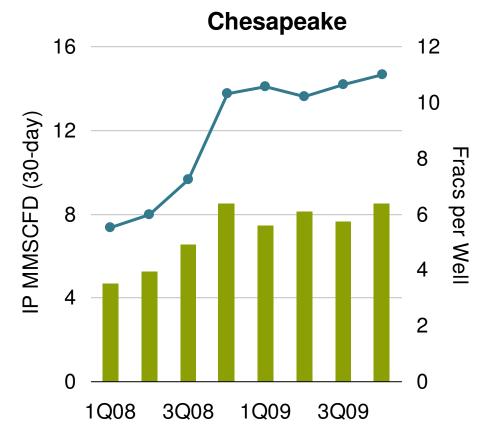


Source: State Filings and HPDI. Data is for DVN only.

But Is Evident in Even the Youngest Shale Plays

Early on in the Haynesville IPs rose with fracs. Now they appear to have topped out even on a choke-adjusted basis

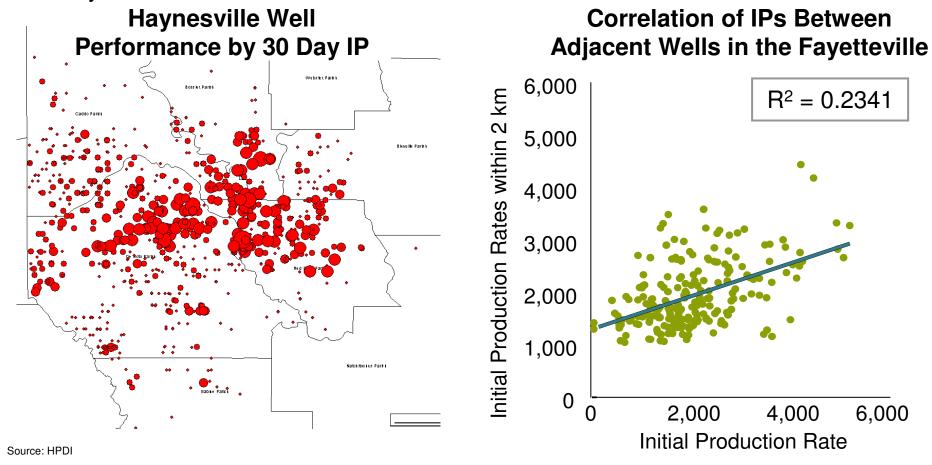




Source: State Filings and HPDI

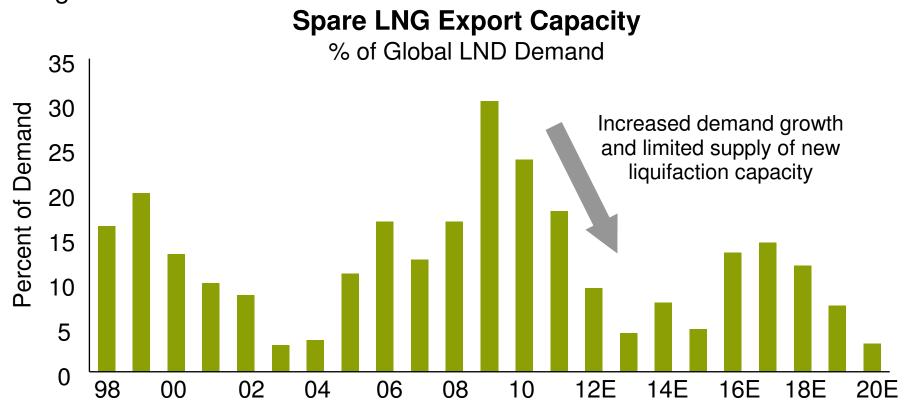
Shale Plays: Far from Homogeneous

Despite operator claims, very few shale plays are homogenous. Instead they tend to have a small highly economic core, and large amounts of more marginal tier 1 and tier 2 acreage. In addition the correlation of performance between adjacent wells is low, and many wells fail



LNG: Spare Capacity Is in Decline with Cargoes Going to the Highest Price Market (not the US)

 Despite concerns over a flood of LNG, strong demand from the Non-OECD and continued project delays have meant spare capacity is now contracting again



Source: AllianceBernstein Estimates

The Liquidity Problem in a Nutshell: A Publicly Listed US E&P

- First half of 2010 production growth was +15%
- First half of 2010 cashflow was \$21 million
- YTD CAPEX was \$112 million and the company is planning to spend \$175 million this year and \$150 million next year
- The company's debt is equal to 182% of its market value (10/11/2010)
- The average realized price in the first half of 2010 was \$6.10/mcfe, due to hedging
- The company says its hedging ensures IRR of 25-30%
- YTD annualized return on PP&E was 6% and return on equity was 2%

Source: corporate reports and Yahoo Finance

The Liquidity Problem in a Nutshell II: A Larger Public US E&P

- 2010 production growth was +15% yoy (target to double production over five years)
- YTD 2010 operating cashflow was \$1.5 billion
- YTD capex was \$3.7 billion
- Debt/(Debt + Equity): 30%
- YTD realized price of \$5.63/mcfe, due to hedging
- Forecast IRR on development program is >20%
- YTD annualized return on PP&E was 4.6%

Source: corporate reports and Yahoo Finance

Conclusions

- Unconventional gas is not changing the cost structure of US gas production. Much of the production is high cost outside of the core of new plays and the cost base is continuing to rise
- Operators are prolonging the downcycle by their focus on volume growth, not returns
- Ultimately this is a losing strategy and will continue to prolong the suffering of gas producers. For the market to correct, operators will have to show discipline or the marginal player will have to go Chapter 11
- If the cost of debt rises from its current low levels, many E&Ps will find themselves in a difficult situation
- Eventually, providers of capital (banks or equity investors) may impose discipline on the gas producers but in the meantime, the steady parade of foreign buyers continues

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