



RESEARCH HIGHLIGHTS

Hotelling Under Pressure

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Can U.S. oil firms quickly increase production in response to changes in global oil prices?

Context

While the United States has become an increasingly more important player in the global oil market, industry observers and academics have questioned the ability of U.S. firms to become swing producers. Unlike the state-controlled companies that operate in countries such as Russia and Saudi Arabia, the private oil companies that operate in the United States do not sit on idle production capacity that can be turned on within days or weeks.

Method

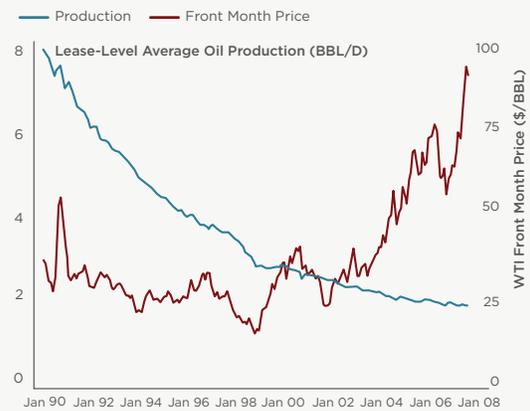
Using well data from Texas from 1990 to 2007, the researchers create a model that links directly to observations on oil production, drilling and drilling costs. They track these changes in relation to global oil prices.

Key Findings

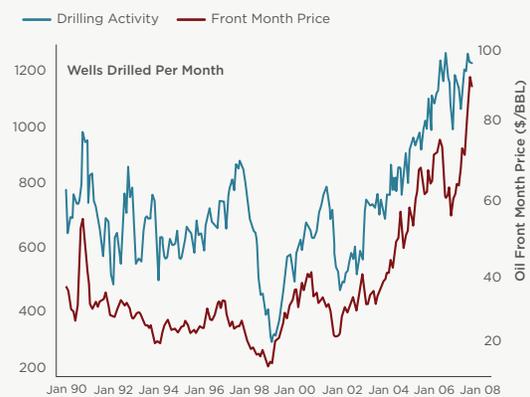
While existing wells cannot boost production to respond to steep price increases because of geological constraints, producers can respond by drilling new wells—though there is lag time in bringing that oil to stream.

- In existing wells, the capacity of the well and underground pressure that pushes oil through the rock, to the wellbore and up to the surface creates a maximum flow rate that smoothly declines over time as the pressure eases. As a result, existing wells do not increase or decrease production in response to prices.
- Oil extractors can drill new wells in response to prices, eventually leading to increased oil production. Drilling new wells takes both money and time, creating a lag of a few months before oil can come on stream.
- Large changes in oil demand have an immediate impact on oil prices and drilling activity, and eventually on production from new wells.

Oil Production from Existing Wells



Drilling Activity in Response to Price Changes



Note: "Front month" price is the futures market price for West Texas Intermediate crude oil, with delivery next month. Data from the EIA, the Texas Railroad Commission, and authors' calculations.

CLOSING TAKE-AWAY

While the U.S. oil industry's ability to drill and complete more wells after a price shock will eventually lead to increased oil production, the inability to jack up production from the wells already in the ground severely limits the amount of new oil that can quickly come on stream.