INSIDE THE VAULT

An Economic Education Newsletter from the Federal Reserve Bank of St. Louis

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Why Do Gasoline Prices React to Things That Have Not Happened?

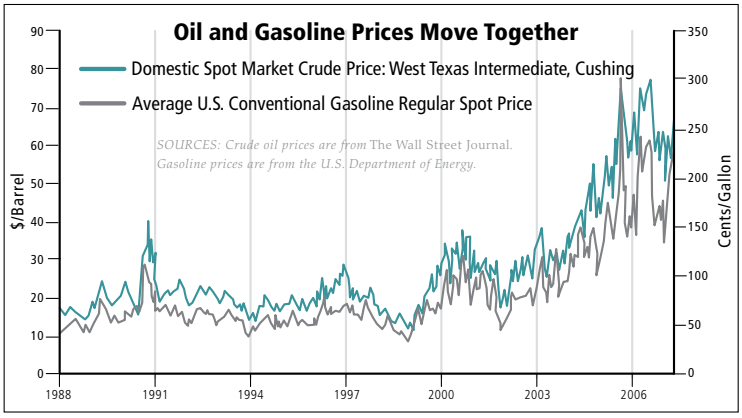
Have you ever wondered why gasoline stations raise their prices in response to fears about future supplies of oil? You may have thought to yourself, "I know the gasoline in the station's underground storage tank was purchased before the world price increased. How can they raise the gas price now? The gasoline market must be rigged."

In fact, gasoline stations should raise their prices to reflect increased future costs of replacing their inventories. Prices act like engine or voltage regulators—they automatically speed up or slow down the flow of the commodity in order to maximize performance, or what economists call allocative efficiency. (Consumers get the goods for which they are willing and able to pay.)

Oil and Gas, Here and There, Then and Now

To understand why U.S. gas prices respond now to things that might happen in the future, halfway around the world, one must understand how spot and futures prices for storable commodities, such as oil or gasoline, are related to each other.

The cost of oil comprises about half the cost of gasoline, but oil is the most volatile component; other factors, such as taxes and profit margins, do not change often.



The figure above shows that while gasoline prices can diverge from oil prices for short periods because of seasonal demand, tax changes or other reasons, the two prices are closely linked over longer periods.

Because oil can be transported anywhere, trading on global spot and futures markets determines the global price of a given grade of oil, aside from local taxes and transportation costs. Oil can either be sold for immediate delivery or stored for sale in the future; so, firms adjust their inventories in response to news about the future supply and/or demand for oil.

Because oil is such an important component of gasoline, wholesale gasoline prices react instantly to changes in oil prices, including those caused by expectations of future events. The price at your local gas station will change nearly as quickly as the wholesale price.

Let's see how two hypothetical competing gasoline stations in a small town might react to a sudden increase in the price of oil. On one quiet morning, both the Conch Gas station and the Pegasus Gas station were charging $1.999 per gallon of regular gasoline. They each had bought their inventories a few days before at a cost of $1.48 per gallon. With federal, state and local taxes combining for 50 cents per gallon, each station calculated that it would make about 2 cents per gallon at a retail price of $1.999.

During the late morning, news of an unsuccessful terrorist attack on Saudi Arabian oil fields spurred widespread fears of cuts in future oil supplies. As frenzied trading on exchanges in New York, London and elsewhere bid up the world price of oil, the station owners learned that wholesale gasoline prices for delivery next week had increased by $1 per gallon. Both owners raised their prices to $2.99 per gallon.

Despite much grumbling at the price increases, sales at the Conch Gas and the Pegasus Gas stations proceeded much as before—both stations sold out their existing inventories right on schedule and then took delivery on a new load of gasoline at the new, higher wholesale prices. The station owners made a tidy, unexpected profit that week—$1.02 per gallon.

Are the Gas Stations Gouging Us?

Did the stations' simultaneous price changes the week before wholesale prices actually went up prove that Conch Gas and Pegasus Gas were colluding to gouge consumers? No. These competing station owners did not have much choice if they wanted to remain as profitable as their competitors and stay in business over the long haul.

Suppose first that only Conch Gas had held its price at $1.999, while Pegasus Gas had raised its price to $2.999. Conch Gas obviously would have captured all of the traffic that day, but its storage tank would have run dry much sooner than expected. By the first or second day after the overseas disruption in the

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Q&A

Q. What is a commodity?

A. A commodity is a food, metal or other fixed physical substance that investors buy or sell, usually through futures contracts. Agricultural products, metals, petroleum, foreign currencies, and financial instruments such as Treasury bills and bonds are commodities. Petroleum (crude oil) is the world's most actively traded commodity.

Q. What are spot and futures markets?

A. A spot market is one in which commodities are traded for near-term delivery—within a month for oil markets. A futures market is one in which a commodity is traded for delivery on a specified future date, which could be months or years away. Major fuel users, such as airlines and trucking companies, often buy oil in futures markets to guarantee the cost of the fuel they will use.

Q. What are the benchmark crude oils?

A. Grades of crude oil are determined by their specific gravity and sulphur content. There are so many different varieties and grades of crude oil that buyers and sellers refer to a limited number, which are called reference or benchmark crude oils. Other varieties are then priced at a discount or premium relative to the benchmark. Brent blend crude oil pumped from the North Sea is generally accepted to be the world benchmark. According to the International Petroleum Exchange, Brent is used to price two-thirds of the world's internationally traded crude oil supplies. In the Persian Gulf, Dubai crude is used as a benchmark to price sales of other regional crude oils to Asia. In the United States, the benchmark is West Texas Intermediate (WTI). This means that crude oil imports into the United States are usually priced in relation to WTI. The Organization of Petroleum Exporting Countries (OPEC), a cartel of some of the world's leading producers, has its own reference, known as the OPEC basket, which is an average of seven crude oils. Six of the crude oils included in the OPEC basket are pumped by member countries, and the seventh is from Mexico. In practice, however, price differences are not large.

The Q&A segment was largely adapted from: the FAQ on Chicago Board of Trade web site, www.cbot.com/cbot/pub/page/0,3181,1065,00.html, and BBC News online, Oil Markets Explained, http://news.bbc.co.uk/2/hi/business/904748.stm.

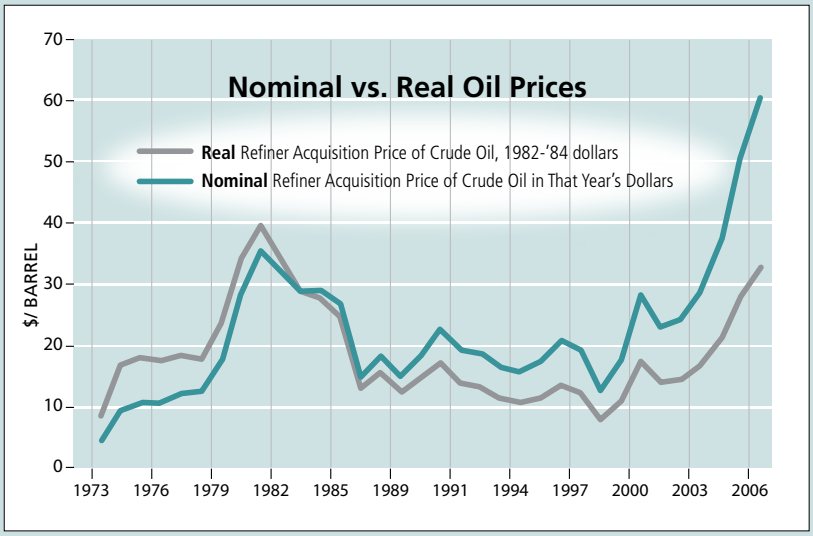
Economic Snapshot

Second Quarter 2007

(Percent change at an annual rate from the preceding period.)

	Q3-'06	Q4-'06	Q1-'07	Q2-'07
Growth rate — Real Gross Domestic Product	1.1%	2.1%	0.6%	4.0%*
Inflation rate — Consumer Price Index	3.1%	–2.1%	3.8%	6.0%
Civilian Unemployment Rate	4.7%	4.5%	4.5%	4.5%

**Preliminary estimate*



What is the difference between nominal and real prices?

Nominal prices, sometimes called current dollar prices, measure the dollar value of a product at the time it was produced. Real prices are adjusted for general price level changes over time, i.e., inflation or deflation. These adjustments give us a picture of prices for various years as if the value of the dollar were constant.

Were nominal prices for oil higher in 2006 than in any other time during the period 1973-2006?

Yes. The blue line on the graph indicates that the price per barrel in current dollars, i.e., the nominal price, was approximately $60 per barrel in 2006.

Were real prices for oil higher in 2006 than in any other time during the period 1973-2006?

No. The grey line on the graph indicates that the real price, i.e., the price adjusted for inflation, was highest in 1981, at more than $39 dollars per barrel.

SOURCE: The Federal Reserve Bank of St. Louis

New! Great Depression Curriculum

The Federal Reserve Bank of St. Louis has developed a new curriculum for teaching about the Great Depression. The curriculum includes six stand-alone lessons that allow teachers to pick and choose those lessons most appropriate for their students. The lessons include simulations, group work, role play and other active strategies to engage students.

If you teach history, economics or government, this curriculum is perfect for you. We are offering workshops throughout the District.

Oct. 25, 2007
Regional Professional Development Center
Rolla, Mo.
9 a.m. – 2:30 p.m.
Register at: http://campus.umr.edu/rpdc/

Nov. 9, 2007
Little Rock Branch
Little Rock, Ark.
9 a.m. – 4 p.m.
Register at:
www.stlouisfed.org/education/conferences.html

Nov. 27, 2007
Regional Professional Development Center
Cape Girardeau, Mo.
9 a.m. – 2:30 p.m.
Register at: www4.semo.edu/rpdc/

Jan. 17, 2008
Memphis Branch
Memphis, Tenn.
9 a.m. – 3 p.m.
Register at:
www.stlouisfed.org/education/conferences.html

Feb. 6, 2008
Hilton Garden Hotel
Chesterfield, Mo.
8:30 a.m. – 2:30 p.m.
Register at:
www.stlouisfed.org/education/conferences.html

Federal Reserve Resources

resourceguide plus

Tips and Tools

Do you have a great idea for using a Federal Reserve publication in your classroom, or do you need a great idea for using a Federal Reserve publication in your classroom? If so, visit **www.stlouisfed.org/education/resourcetools**. At this site, you can add a tip or tool that you want to share, and you can access tips and tools other educators have shared.

Real-World Economics

Are you looking for ways to bring real-world economics into your classroom? Consider these opportunities for fun and prizes by entering your high school students in one or both of these two programs:

- You can enter a team of five students in the **Fed Challenge**, a monetary policy competition in which students take part in a mock Federal Open Market Committee forum. A workshop for teachers, teams and coaches will be held from 9:30 a.m. to 1:30 p.m. at each of these Eighth District cities.
  - **Oct. 16, 2007 – Little Rock, Ark.**
  - **Oct. 17, 2007 – Fayetteville, Ark.**
  - **Nov. 14, 2007 – St. Louis**
  - **Dec. 5, 2007 – Memphis, Tenn.**

  (Louisville workshops will be arranged at high school sites upon request.)
- Invite your students to enter the Hot Topics in the News **essay contest** and earn prizes and recognition. Essays are due:
  - **Dec. 14, 2007 – St. Louis**
  - **Jan. 11, 2008 – Little Rock, Ark.**
  - **Feb. 15, 2008 – Memphis, Tenn.**
  - **April 4, 2008 – Louisville, Ky.**

For more information about either of these programs, go to www.stlouisfed.org/education.

Economic Summit
for Secondary Teachers

Nov. 12, 2007

University of Arkansas at Fayetteville

8:30 a.m. – 5 p.m.

This is a program for middle- and high-school educators who want to learn about current economic issues and ways to integrate these issues into classroom instruction.

For more information, contact Julie Kerr at Julie.A.Kerr@stls.frb.org.

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oil market, the owner-manager of Conch Gas might as well have gone on vacation—unpaid, it should be noted. Meanwhile, the manager of Pegasus Gas—who took his vacation in the first two days of the crisis—returned to sell out his remaining inventory at $2.999 per gallon. In the end, the Pegasus Gas station made a much larger profit.

Now suppose that both Conch Gas and Pegasus Gas decided to show hometown solidarity by keeping their prices at $1.999, at least until the new, higher-cost gasoline inventories arrived in a few days. Local residents certainly would have been appreciative, but so would all of the eager drivers from neighboring towns who would have driven in to enjoy "cheap" gas. Both the Conch and Pegasus stations would have run dry before their replacement inventories arrived. Anyone in this town who was unfortunate enough to need gas on the third day of the crisis would have been out of luck.

What if all the gasoline stations in the state had agreed to keep their prices at $1.999 until higher-cost supplies started arriving? Even if the flow of out-of-state bargain hunters might turn out to be small, a state-wide shortage of gasoline would almost certainly result. Recognizing that gas prices were only temporarily low and were bound to rise soon, all rational owners of cars, trucks, tractors, off-road vehicles, lawn mowers or leaf blowers would fill up their tanks as quickly as possible. That is, any attempt to constrain the retail price of gasoline in the face of higher future prices simply induces a scramble among buyers to beat the price increase. Many people would make wasteful extra trips to top off half-full tanks, and others would be genuinely inconvenienced as shortages developed.

Thus, the simultaneous price increases by Conch and Pegasus Gas are not harmful price gouging at all. Although no one likes to pay more for gas, market-determined gasoline prices operate to prevent shortages and maximize economic efficiency.

This article was adapted from Why Do Gasoline Prices React to Things That Have Not Happened?, *which was written by William Emmons, a senior economist at the Federal Reserve Bank of St. Louis, and Christopher J. Neely, an assistant vice president at the Federal Reserve Bank of St. Louis, and was published in the July issue of* The Regional Economist, *a St. Louis Fed publication.*

Classroom Discussion

1. How do prices in a market economy serve as a signal to producers and consumers?
2. If prices in a market economy were not allowed to rise when a commodity was becoming relatively more scarce, how would producers and consumers discover that the commodity was in short supply?
3. If prices are not allowed to rise as a commodity becomes in short supply, what are some methods that society could use to ration the scarce commodity, and how efficient would these methods be?

For a **lesson plan** to accompany this article, go to www.stlouisfed.org/education/itv_lesson_plan.html.

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