

# FRBSF ECONOMIC LETTER

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## Why Hasn't the Jump in Oil Prices Led to a Recession?

Oil prices have increased substantially over the last several years. When oil price increases of this magnitude occurred during the 1970s, they were associated with severe recessions. Why hasn't that happened this time around? This *Letter* explores some answers to that question.

### Why should oil affect the economy?

When the price of oil rises, U.S. households and businesses who purchase fuel oil, gasoline, and other petroleum-based products have less disposable income to spend on other goods and services. However, for domestically produced oil, oil producers receive the extra income from the products they sell, so total U.S. income is not directly affected. Therefore, for domestic oil, a price increase represents a transfer from one group of U.S. residents (oil users) to another group of U.S. residents (oil producers).

The story is different for imported oil. An intuitive way to think about the initial effects of an increase in the price of imported oil on the economy is to consider it as a tax on domestic users. In 2004, the U.S. imported almost 5 billion barrels of energy-related petroleum products, amounting to about two-thirds of domestic petroleum use. Of these imports, 3.8 billion barrels were crude petroleum, or an average of 10.4 million barrels per day. For each \$10/barrel increase in oil prices, the United States pays an effective "tax" of about \$50 billion (5 billion barrels times \$10), or 0.4% of GDP.

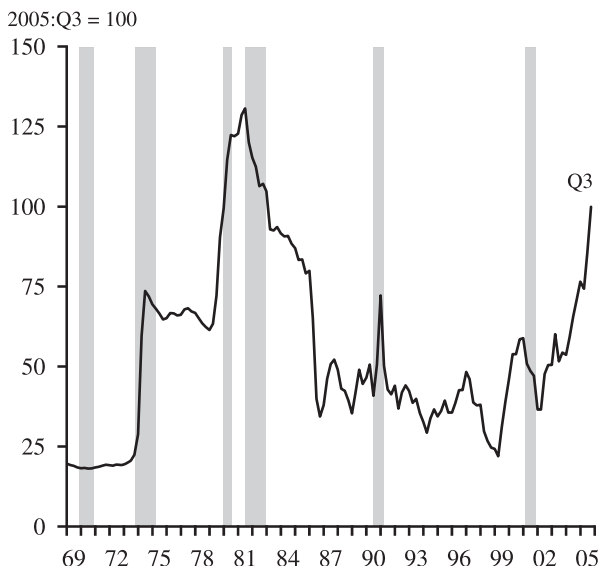
This is not the same thing as saying that GDP will fall by 0.4%. For instance, this estimate does not take into account what the foreign oil producers do with the additional income. It is likely that they would use at least part of this income to purchase goods from other countries. To the extent that these purchases consist of goods made in the U.S., they will help support U.S. GDP. Indeed, it is possible—in theory—to conceive of a situation where foreign oil producers purchase enough from the U.S. that U.S. GDP does not decline much, even though consumers are paying

a higher price for oil and therefore can afford fewer goods and services themselves.

### How big is the effect in practice?

As mentioned earlier, the experience of the 1970s suggests that oil shocks have a substantial effect on output. Indeed, Figure 1, which plots the real, inflation-adjusted price of imported petroleum, shows that high oil prices have frequently coincided with recessions. In a series of papers, Hamilton (1983, 1996, 2003) has argued forcefully that the oil shocks were responsible for these recessions. However, he argues that not all changes in the price of oil have the same effect on the economy. For instance, a fall in oil prices is unlikely to boost the economy in the same way that an increase can drag it down. In addition, he argues that oil price increases that simply reverse previous price decreases are unlikely to have a significant effect. One approach he recommends to isolate the kinds of price changes that can affect the economy is to record an oil shock only if the prevailing price of oil is higher than it has been over the past three years.

**Figure 1**  
**Real price of oil**



Note: Price of petroleum imports divided by the price index for personal consumption expenditures. Gray bars denote recessions.

Figure 2 plots oil price shocks according to this recommendation. The spikes line up closely with recessions. From the figure, it is easy to find a clear statistical relationship between this oil-shock variable and output. Indeed, the magnitude of the predicted effect is much larger than the simple tax analogy suggests. This could reflect some sort of multiplier, as the loss in income in the first round would lead to a reduction in spending, which would imply a further loss in income, and so on. However, a simple statistical analysis does not provide insight into why the magnitude is so much larger than the direct income loss.

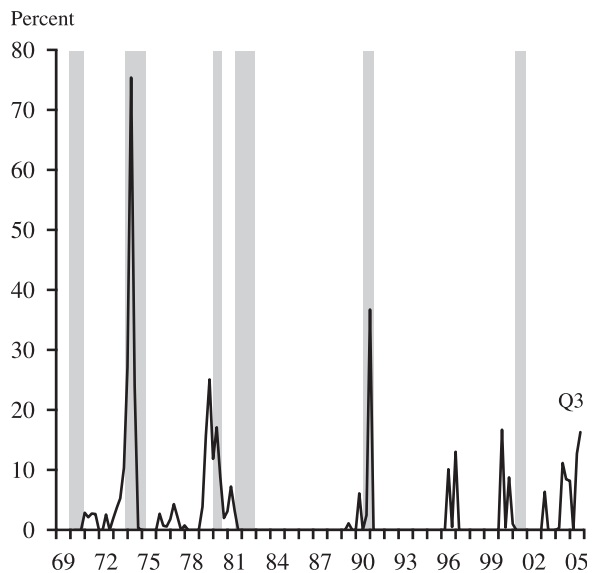
Moreover, the statistical evidence is not necessarily as strong as Figure 2 might suggest. Because an oil price shock is recorded if and only if oil reaches a three-year high, a temporary increase in the price of oil is treated as having the same impact as a permanent increase. But if the spike is temporary, then the effects on income are fleeting, and one would expect that many consumers will reduce their saving in order to avoid a big hit to consumption.

To see the point, compare the 1990 experience in Figures 1 and 2. Figure 1 shows that the price of oil spiked only briefly. But in Figure 2, which uses the Hamilton price-increase transformation, the 1990 spike was one of the largest. In Figure 2, this spike is followed by a long series of zeros. In Figure 1, however, more than 95% of the oil price increase is reversed next quarter and oil prices over the next year or two appear no different from the period preceding the spike. Indeed, more formal statistical analysis shows that over the post-1982 period the Hamilton oil shock variable has a significant negative impact on output only because of the spike in 1990. If the 1990 spike is set to zero, there is no evidence of a statistically important relationship.

Note also that the timing is suspect in several cases. The 1973–1975 recession began in November 1973; but oil prices surged in January 1974. The 1990–1991 recession began in July 1990; but oil prices surged in August.

Another way to get a sense of how large the effect of oil shocks may be is to consider the implications of more fully specified models, which incorporate the direct expenditure effects but then allow for additional, second round effects. These tend to suggest that the ultimate effects are roughly in line with the direct expenditure shares. In a recent paper, Guerrieri (2005) finds that a 50% increase in the price of oil starting in the first quarter of

**Figure 2**  
Oil price shocks using Hamilton's price-increase transformation



2004 causes output to fall about 0.4% below what it would otherwise be in the long run (assuming that the Fed conducts policy using the well-known Taylor rule). The effects are likely to have been larger in the 1970s, when the economy was more energy-intensive; however, even if we assume that the economy's energy-intensity is unchanged since the 1970s, the effect is not likely to be huge.

### Other explanations for the 1970s

Considerations like these have led a number of economists to suggest that the recessions of the 1970s reflected other kinds of shocks. For instance, Barsky and Killian (2001) argue that the great stagflation of the 1970s was the result of monetary policy alternating between periods of stimulation and restraint and not oil price shocks. Similarly, Burbidge and Harrison (1984) examine developments in five major industrial economies including the U.S. and conclude that even though the oil shocks in the early 1970s did have a significant effect, recessions were already on the way even before the jump in oil prices. They also find that the 1979–1980 oil shocks had a minimal effect on all these countries except Japan.

Others have argued that the recessions may have been caused by the Fed's reaction to the oil shocks. Bernanke, Gertler, and Watson (1997) show that postwar recessions have been preceded not only by rising oil prices but also by a tightening of monetary policy, which makes it difficult to distinguish between the effects of the two. According to them, the confusion between oil shocks and the response

of monetary policy explains why oil shocks appear to have an effect that far exceeds what is expected based on a comparison of energy costs to total production costs. Their own analysis leads them to conclude that oil shocks have not played a major role in recessions and that endogenous monetary policy can account for a major portion (and sometimes all) of the effects attributed to oil shocks.

### Is the current episode different?

It has also been suggested that the latest jump in oil prices has not had the usual effect on the economy because the price of oil has jumped for different reasons. For example, in the 1970s, the OPEC oil embargo and the fall of the Shah of Iran led to substantial reductions in the world supply of oil; similarly, the world supply fell in 1990 after Iraq's invasion of Kuwait. These seem like exogenous shocks to the world supply.

But much of the run-up in oil prices in the past few years seems to reflect the endogenous response of prices to the strength of global demand. The source of this higher demand turns out to be important. If the higher prices were the result of higher U.S. demand, then there would be little reason to fear a recession. It is hard to believe that the "tax" imposed by the oil price increase would exceed the increase in income that was the cause of the higher oil demand. But if the increase in demand originates abroad, things get more complicated. For instance, high oil prices which reflected rapid growth in China would have the same direct impact on the U.S. as a price increase engineered by OPEC, basically because higher oil consumption in China coupled with a relatively inelastic supply means that less oil is available to the U.S. There is a potential offset to this effect, as more rapid growth in China is likely to be accompanied by higher imports. Thus, countries that export significant amounts to China relative to their size will benefit from the rapid Chinese growth. The U.S. is not one of these countries, however, so that for the U.S. an increase in the price of oil due to higher demand from China is probably similar to an increase due to a reduction in supply.

### Conclusion

Our discussion suggests that the answer to the question posed in the title has two parts. First, looking

only at the correlation between some measure of the price of oil and output tends to exaggerate the role that oil price shocks played in the recessions of the 1970s, at least partly because one ends up ignoring the other things that were going on at that time. Second, an increase in the price of oil that reflects higher demand will not have the same effect as a decrease in supply. Here, though, it is useful to keep in mind that price increases that reflect higher growth in other countries will have the same effect on the U.S. as price increases that reflect a reduction in the worldwide supply of oil—unless U.S. exports to these fast growing countries account for a significant share of U.S. output.

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Index to Recent Issues of *FRBSF Economic Letter*

DATE	NUMBER	TITLE	AUTHOR
6/3	05-11	Are State R&D Tax Credits Constitutional? An Economic Perspective	Wilson
6/10	05-12	Fiscal and Monetary Policy: Conference Summary	Dennis/Williams
6/17	05-13	IT Investment: Will the Glory Days Ever Return?	Doms
6/24	05-14	Stress Tests: Useful Complements to Financial Risk Models	Lopez
7/15	05-15	Age and Education Effects on the Unemployment Rate	Valletta/Hodges
7/22	05-16	Understanding the Twin Deficits: New Approaches, New Results	Cavallo
7/29	05-17	What If Foreign Governments Diversified Their Reserves?	Valderrama
8/5	05-18	Monetary Policy and Asset Price Bubbles	Rudebusch
8/12	05-19	Does Europe's Path to Monetary Union Provide Lessons for East Asia?	Glick
8/19	05-20	Credit Union Failures and Insurance Fund Losses: 1971-2004	Wilcox
8/26	05-21	Housing Markets and Demographics	Krainer
9/2	05-22	Policymaking on the FOMC: Transparency and Continuity	Yellen
9/9	05-23	A Look at China's New Exchange Rate Regime	Spiegel
9/16	05-24	Why Has Output Become Less Volatile?	Trehan
10/3	05-25	Inflation Expectations: How the Market Speaks	Kwan
10/14	05-26	The Rise and Spread of State R&D Tax Credits	Wilson
10/21	05-27	Estimating the "Neutral" Real Interest Rate in Real Time	Wu
10/28	05-28	Oil Price Shocks and Inflation	Trehan
11/4	05-29	Economies of Scale and Continuing Consolidation of Credit Unions	Wilcox
11/10	05-30	Spendthrift Nation	Lansing

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