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## Economic Trends

# Do Oil Prices Directly Affect the Stock Market?

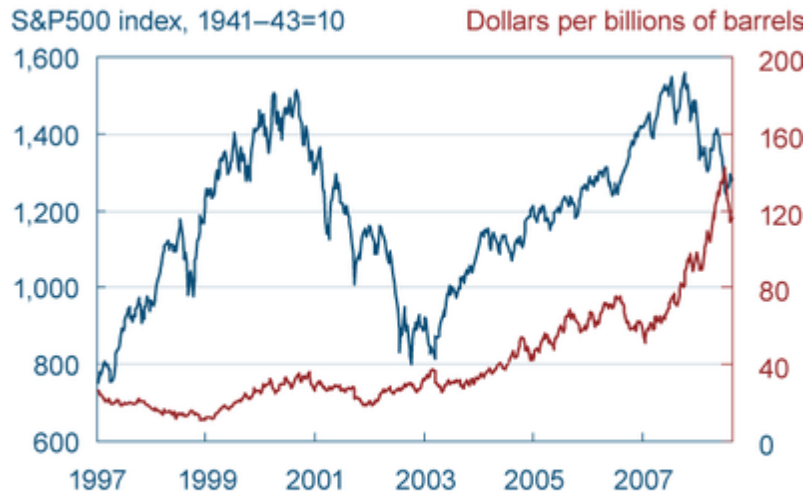
Andrea Pescatori and Beth Mowry

Market commentators and journalists like to draw direct lines between the behavior of crude oil prices and market behavior on a given day, with such headlines as “Oil Spike Pummels Stock Market” (*Wall Street Journal*) or “U.S. Stocks Rally as Oil Prices Fall” (*Financial Times*). But does a change in oil prices affect the overall stock market in any predictable, meaningful way? Might a hike in crude foretell a weak day on the Street?

It seems logical to assume that oil prices and stock market performance might be negatively correlated. More expensive fuel translates into higher transportation, production, and heating costs, which can put a drag on corporate earnings. Rising fuel prices can also stir up concerns about inflation and curtail consumers’ discretionary spending. But it is also possible to associate expensive crude with a booming economy. Higher prices could reflect stronger business performance and increased demand for fuel.

Which is it? A look at oil prices and the S&P 500 index suggests neither. Both oil prices and the S&P 500 index have mostly climbed over the past 10 years, but they have frequently moved in opposite directions. Sometimes they rise and fall together, but the relationship between oil and stocks does not appear to be very strong.

## Oil Prices and the S&P 500 Index

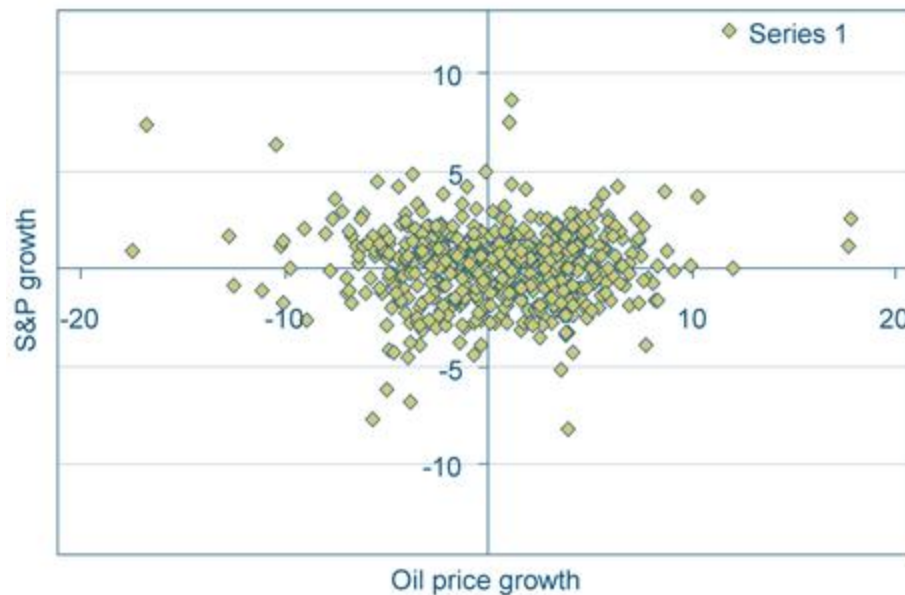


Notes: The oil price is the weekly average domestic spot price of light sweet crude oil (WTI). The S&P 500 index values are taken from the average weekly close.

Sources: *The Wall Street Journal*; S&P.

The following scatterplot relates the weekly behavior of crude prices with S&P 500 performance since the beginning of 1998. If a clear negative relationship between oil prices and the S&P 500 index existed, we would expect to see the points aligned along somewhat of a downward-sloping line, indicating poorer stock performance when oil prices pick up. No such relationship is evident, at least not in the time period sampled. Furthermore, the correlation between weekly averages of the spot oil price and the S&P 500 index is a weak and statistically insignificant  $-0.021$  for the past 10 years (with a confidence level of 95 percent).

## Oil Price and S&P Growth



Note: The sample period is January 1998–August 2008, and the data are weekly.  
Source: Financial Times.

It is possible that a stronger correlation might exist for data at different frequencies (daily, weekly, monthly) or with different stock indexes. The S&P 500 index is widely used as a broad market indicator because it contains the stocks of 500 leading U.S. companies that trade on the two largest U.S. stock markets, the New York Stock Exchange and the Nasdaq. We can expand the industries covered by including other indexes: S&P Financial, S&P Industrial, Dow Jones Industrial, Dow Jones Transportation, the Nasdaq Composite, and the NYSE Composite, and we can look at data at all three frequencies to see if either of these factors affect the correlation.

It is also possible that the relationship between oil and the stock market changes over time, say when oil prices are at a trough versus when they are at a peak. To investigate this possibility, we designate the 18-month period surrounding December 1998 as an oil price trough (from March 1998 to September 1999) and the most recent 18-month period beginning February 2007 as a price peak, and compare the correlations.

As it turns out, correlations between oil prices and all of these stock indexes at the daily, weekly, and monthly levels for the two time periods also reveal very few relationships of statistical significance. Calculations using daily data yielded the most statistically significant results, but as you can see from the table below, these were very small.

## Correlation Between Oil Price and Stock Index Growth (daily)

	S&P 500	S&P Industrial Index	S&P Financial Index	NYSE Composite	Dow Jones 30 Industrial Average	NASDAQ	Dow Jones Transportation
1998-1999	0.028	0.048	-0.029	0.043	0.032	0.057	<b>-0.110</b>
2007-2008	<b>-0.095</b>	-0.020	<b>-0.244</b>	-0.003	<b>-0.140</b>	<b>-0.132</b>	<b>-0.210</b>

a. Only the highlighted correlations are statistically significant at the 95% confidence level.  
Source: The Wall Street Journal, S&P, Financial Times.

The majority of correlations we computed for the different indexes and frequencies of data are relatively small and, in the first sample, not significant, with the exception of the Dow Jones Transportation index. (A statistically insignificant correlation indicates that a relationship is likely nonexistent.)

During the oil peak between February 2007 and August 2008, five correlations are significant at the 95 percent confidence level. Furthermore, *all* correlations for this period (whether statistically significant or not) are negative. Not surprisingly, the Dow Jones Transportation index is the only index with significant correlations in both samples. In this case, it seems fair to say that changes in oil prices have a direct effect on the share prices of transportation companies. On the other hand, the Financials index has the highest negative correlation in the 2007-2008 sample. In principle, the financial industry is not directly affected by energy costs, so this correlation may support the inverted causality argument claimed by some financial analysts: When financials are battered by bad news, liquidity flies to “the easier bet” markets like commodity markets. (This does not necessarily last.)

More generally, the fact that correlations for the first period in the table above change from being mainly insignificant to being generally significant (and negative) in the latter period suggests that the *level* of oil prices might matter. This is another reflection of the possibility that correlations are generally not stable over time. For example, the short-run share of the economy going toward oil is price elastic, which means that the share increases when the price of oil does. When oil takes up a higher share of the economy, like today with respect the 1990s, it implies that a change in the price of oil could be more harmful than when oil’s share was smaller. So, for example, a 1 percent change in the price of oil today could do more damage than a 1 percent increase in 1999.