

Buyer Beware: The Asymmetric Impact of the Strategic Petroleum Reserve on Crude Oil Prices

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The Strategic Petroleum Reserve (SPR) was created in response to the 1973-1974 oil embargo by the Organization of the Petroleum Exporting Countries, and was intended to reduce the impact of petroleum supply disruptions on the U.S. economy. The theory that motivated the creation of the Reserve is simple: the government could offset supply disruptions by increasing oil supply with the SPR rather than by restricting oil demand with unpopular quotas, tariffs, or taxes. Since research was beginning to connect oil price increases in the 1970s with the subsequent economic downturns, a policy mechanism that controlled oil prices had broad political appeal.

We use data on purchases and releases from the SPR since the early 1980s to determine whether U.S. oil market policy interventions through the SPR succeeded in lowering the price of crude oil. We show in a structural VAR model with recursive timing restrictions that an unanticipated SPR release has no measurable effect on oil prices, while an unanticipated SPR purchase increases the price of oil by 1 percent over 20 weeks following purchase.

We also explore alternate identification methods for SPR policy using information that is not contained in the VAR model. To identify the impact of SPR purchases on oil prices, we construct an instrument for SPR purchases from the purchase schedules set by the Department of Energy. These schedules are set months ahead of actual purchases, making them exogenous with respect to other oil market shocks at the time of purchase. This instrument identifies SPR purchase shocks in the VAR framework without other restrictions on the structural shocks. An unanticipated SPR crude oil purchase, identified with the purchase schedule, increases the price of crude by approximately 2 percent over 20 weeks following purchase.

We use a different model to identify the effect of SPR releases with high-frequency crude oil futures market data. The change in crude oil futures prices in the 30 minutes following release announcements is used to measure whether SPR releases are unanticipated by the market. Estimating policy shocks with this method avoids problems with endogeneity and omitted variables that have been raised concerning policy shocks estimated in traditional VAR models. This model shows that unanticipated SPR releases do not have a statistically significant effect on oil prices.

The main contribution of this paper is developing a framework to estimate the impact of U.S. oil market interventions on oil prices. We show that, under a variety of identifying assumptions, SPR releases have not lowered the price of oil, while SPR purchases have increased its price.

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