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Energy Independence: Would It Free the United States From Oil Price Shocks?

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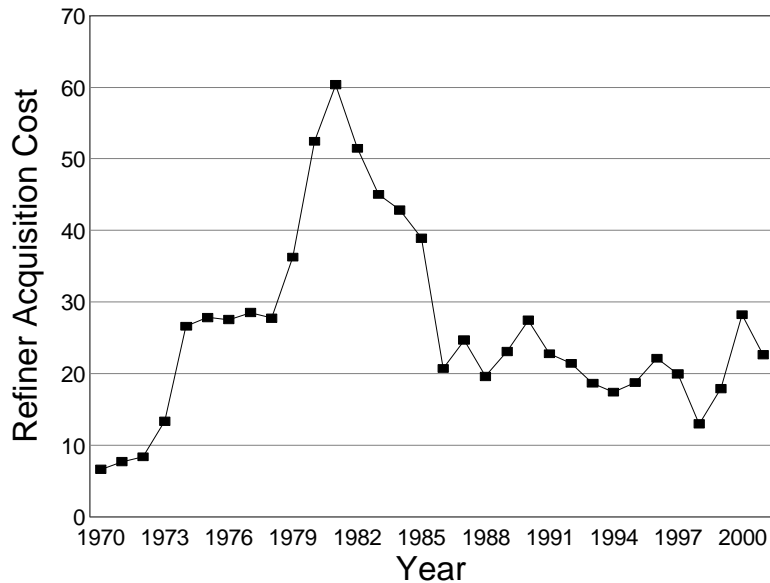
Summary

Over the past 25 years, the U.S. economy has experienced four large oil price shocks (1973-74, 1979-80, 1990-91, and 1999-2001). Each has been a catalyst for discussions about a proper national energy policy. Many analysts have suggested that energy independence should be an integral part of such a policy. Both major parties have sponsored legislation to that end. However, U.S. suppliers of energy participate in the world energy market. So long as prices are determined in that market, energy independence will not free the United States from oil price shocks. By contrast, if an energy independent U.S. no longer participated in the world market, prices would become less volatile but would likely be higher than at their current peak. Alternative energy sources cannot shield the U.S. economy from the oil price entirely. But increased energy efficiency has reduced, and can continue to reduce, the effect of these shocks on the overall economy. Such efficiencies have been achieved over the past 25 years and, as a result, the 1999-2001 oil price shock has likely had a smaller effect than those of the past. This paper will be updated as events warrant.

Over the past 25 years, the United States (and the rest of the world) has been subjected to four major oil price shocks (1973-74, 1979-80, 1990-91, and 1999-2001), as shown in Figure 1. On a monthly basis, oil prices rose from \$10/barrel in December 1998 to a high of \$34 in November 2000. Since then prices have fallen considerably. As can be seen in Figure 1, the latest price rise was not nearly as drastic as in the first two oil shocks. Nevertheless, while the shocks have varied in magnitude, each has been a catalyst for national debate over the essentials of a proper energy policy, and energy independence has loomed large in that debate. The most recent price rise has been no exception. Both parties have sponsored legislation whose stated goal is to reduce dependence on foreign oil by some large fraction, including H.R.4, which passed the House on August, 1 2001, and S.883. In fact, an argument for energy independence has been an integral part of

recommendations for a national energy policy at least since the time of the first oil price shock, 1973-74. Yet the petroleum market is not national. Rather, the market is international and the price is set internationally, even though what we do here in the United States can have an important effect on that price.

Figure 1: U.S. Real Yearly Oil Price



Source:

Energy Information Administration

Note: Average yearly refiner acquisition cost measured in constant 2000 dollars.

American Energy Policy

Since price and other controls imposed in the 1970s were removed, U.S. energy policy has primarily relied on the market. The relatively unhindered forces of supply and demand are allowed to determine the prices of different energy sources and the public has been allowed to access any energy source for consumption. The rationale for this policy is that market prices best reflect the relative scarcity to society of the energy source in question. Reliance on the market as an energy policy is justified on the grounds that it results in economically efficient decision-making. Furthermore, because the market ensures that petroleum will be supplied by the most efficient producers, it delivers the lowest price to U.S. consumers on average.

This overall reliance on the market has not prevented the federal government from playing an active role. The government has sought to increase the supply of alternative fuels by promoting such petroleum substitutes as gasohol. It has also sought to reduce the demand for energy by mandating fuel efficiency standards for motor vehicles and appliances, and by providing subsidies to individuals to better insulate homes, among other things.

Moreover, there are conceptual objections to a totally market-based national energy policy. They rest on the argument that while market prices may incorporate all the relevant costs to the individual, they may fail to incorporate those that are relevant to the nation. There may be environmental concerns that the market price does not capture. Market prices may also fail to incorporate a premium to help counteract any unacceptable foreign influence on U.S. foreign and domestic policies. For example, this reliance could affect national security in event of an armed conflict. Considerations such as these explain the existence, and have conditioned the recent use, of the Strategic Petroleum Reserve.

Finally, since oil supply shocks are seldom anticipated, market prices can rise dramatically when they occur. When prices do rise suddenly and sharply in the short run, they can be disruptive and, in the past, have had a measurable effect on GDP, employment, and inflation. Since oil is an important input in the production and transport of most goods, a rise in the price of oil raises the cost of production for producers. This effect will be felt by producers using alternate energy sources as well, if those prices also rise. What makes a supply shock so difficult for policymakers to respond to is the fact that it *reduces economic output and raises the price level in the short run*, holding all else equal. If prices were perfectly flexible, producers could lower their other input prices (such as wages) leaving aggregate output and the aggregate price level the same. There would be no reduction in output or increase in the price level in the short run.¹

But if we live in a world of sticky prices,² as common observation suggests we do, then producers cannot lower their other input prices quickly, and so must pass part of the price rise on to consumers. As a result, output falls as people are willing to buy fewer goods at the now higher prices. Since the price of labor is now too (relatively) high to be compatible with the higher oil price, some employers may need to lay off some of their workers. With fewer workers employed, less output can be produced. In effect, the rise in the price of oil and the inability of other prices to adjust temporarily reduce the rate of growth of output that the economy can produce. Since producers have to pass part of the oil price rise on to consumers by raising the price of their goods, the general price level temporarily rises as well. When prices adjust in the long run, as economists argue that they will, the decline in output will end: the supply shock causes no real long-run change in the economy's overall productive capabilities, merely a reallocation of resources³ that makes some individuals, such as oil producers, better off and some, such as consumers, worse off.⁴ But until overall prices have fully adjusted, the economy will suffer from a

¹ For a more comprehensive discussion of the effects of a petroleum price increase on the U.S. economy, see CRS Report RL30634, *Rising Oil Prices: What Dangers Do They Pose for the Economy?*, by Marc Labonte.

² Wage contracts, publication subscriptions, and items from catalogs are three examples of prices that are believed to be particularly sticky, or relatively difficult to adjust in the short run.

³ Some economists have theorized that the costliness of this reallocation of resources is the characteristic of an oil shock that has the greatest impact on the economy, rather than the price adjustment problem.

⁴ What is not captured in this simple model is the role that overreaction played in the first two oil shocks caused by shortages and political uncertainty prevalent in the first two shocks. First, since consumer confidence is an important determinant of aggregate demand, an overreaction may have
(continued...)

lower rate of growth in output and a higher price level. Since a majority of our oil is purchased abroad, the adjustment process is likely to take longer than usual.

Thus an argument exists, even in the context of a policy that places primary reliance on the market, for an energy strategy that may not be strictly market driven. The goal of such a policy would be to reduce the volatility of energy prices, not to reduce average energy prices. A tradeoff can be made between market efficiency, on one hand, and enhanced security and economic stability, on the other hand. The essential question remains: if the tradeoff is desirable, is energy independence a policy that could successfully render the United States either immune or less vulnerable to oil price shocks?

Would Energy Independence Isolate the U.S. Economy from Energy Price Shocks?

To answer this question, let us use counter-factual reasoning. We will suppose that during the three major oil shocks, oil prices rose exactly as they did. The only factual change will be to suppose that the United States was energy independent in the sense that it did not import any oil from abroad. Under these altered circumstances, would the U.S. economy have been immune from the rise in world oil prices?

The answer is quite simply no. To see why, consider what would happen when oil prices outside the U.S. rose. With world oil prices rising above the U.S. price, U.S. producers would have an incentive to sell their oil in foreign markets. As U.S. supplies were diverted from domestic to foreign markets, a situation would be created in the United States in which demand exceeded supply. This “excess demand” would then cause the U.S. price of oil to rise to restore balance or equilibrium between U.S. demand and supply. The end result of the oil supply shock, even if it was caused by the behavior of OPEC, would be a higher domestic price of oil just as if the U.S. had been an oil importer. The major difference would be that in the counterfactual case in which the United States was assumed to be self-sufficient in oil, it would now be an oil *exporter*.⁵

The only way to isolate the U.S. economy from supply disruptions abroad under the counterfactual situation posited above would be to forbid the exportation of oil (i.e., its diversion from domestic to foreign markets) and to prohibit domestic oil companies from raising prices.⁶ But we do not live in the counterfactual world. Since net oil imports have

⁴ (...continued)

reduced aggregate demand in the short run, thereby aggravating the decline in output caused by the supply shock. Second, overreaction may have led to individuals and businesses using resources in inefficient activities such as hoarding and queuing, which could reduce their productivity, and thus aggregate output.

⁵ Recent history has provided another interesting example in which national behavior is similar and unrelated to the status of energy independence. In July and August 2000, French citizens demonstrated in protest to the run up in gasoline prices. France is an oil importing country. Shortly thereafter, in September 2000, similar agitation swept the United Kingdom. The United Kingdom is not only self-sufficient in oil, but is an oil *exporting* nation.

⁶ The only other theoretical alternative to banning exports would be for U.S. producers to meet not
(continued...)

accounted for about 50% of U.S. consumption in recent years, such a policy, were it to be implemented, would lead to shortages unless domestic oil prices were allowed to rise much higher than at present. This is because oil extraction in the United States on a large enough scale to meet our energy needs is much too costly to compete with foreign producers. *For this reason, withdrawal from the world market would likely imply a price that was less volatile in the long run, but even higher than prices at their recent peak.*

Indeed, even if the U.S. were able to use only alternative energy sources, the shock could have some effect on the economy. Assuming the shock lasted for a significant period of time, foreign nations adversely affected by the shock would shift some of their consumption to alternative energy sources. The demand for these sources of energy would rise, raising their prices, and U.S. suppliers would divert their output to the world market, creating a situation in which domestic demand exceeded domestic supply. The resulting “excess demand” in the United States would then force up the domestic price of any substitutes for oil. Thus ultimately, to some degree, the original oil price shock would reach the United States, although its effect on the economy would be smaller. Its magnitude would depend on the extent to which alternative energy sources were substitutes for oil and are exportable from the United States.

Would Greater Energy Efficiency Free the U.S. from Oil Shocks?

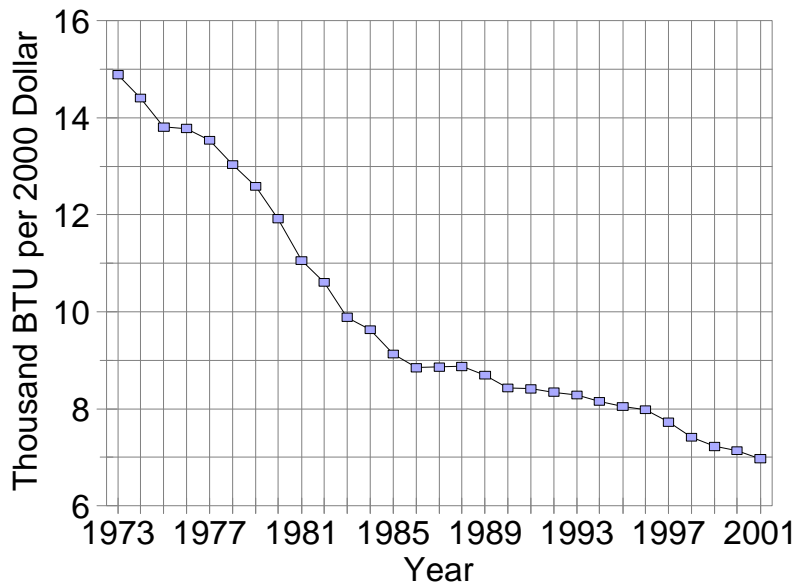
The U.S. economy is far more energy efficient than it was in 1973-74, as seen in Figure 2. The increase in the real price of oil in particular and energy in general led to moves that increased the energy efficiency of the economy. While many of these changes resulted from the way an economy would respond to an increase in real energy prices, others, such as mandated federal gasoline mileage standards for automobiles, resulted from legislation. Energy efficiency is often touted on environmental grounds, but there is a purely macroeconomic argument for greater efficiency: the more energy-efficient an economy, the smaller the likely effect from a given oil price or energy shock. Oil shocks reduce economic output and increase prices by raising the cost of one portion of a producer’s inputs. When a producer becomes more energy efficient, fewer of his inputs are affected by an oil shock. Therefore, less economic adjustment needs to take place.⁷

Thus, policies to make the economy more energy efficient are likely to pay dividends in terms of reducing the effects of oil price shocks on the economy. Indeed, greater energy efficiency is part of the reason that output is likely to contract less and inflation has risen less in the current recession than in the recessions of 1973-1975 and 1980-1982. And the benefits of energy efficiency do not rely on greater energy independence. Whether the United States imported none or all of its oil, greater energy efficiency still implies that a sudden increase in oil prices will cause a proportionately smaller disruption to output.

⁶ (...continued)

only domestic consumption needs, but enough of world consumption to break OPEC’s market power, which would imply domestic production on an even greater scale.

⁷ It is worth stressing again that the macroeconomic goal of greater energy efficiency is to promote less volatility in the overall economy, not to promote lower oil prices.

Figure 2: U.S. Energy Consumption per Dollar of Output

Source: Energy Information Administration

Note: Petroleum and Natural Gas Consumed per 2000 Constant Dollar of GDP

Energy Independence

The analysis in this report suggests that the United States cannot avoid the consequences of price shocks through a policy of energy independence even if that policy could lead to the U.S. again being a net exporter of oil. That is because the price of oil is set in an international market on the basis of world supply and demand. The laws of international supply and demand can only be avoided if U.S. consumers and producers were legally forbidden from accessing the international market, but the result would likely be oil prices that were higher (albeit less volatile) than at the peak of the latest price spike. While a policy that encouraged alternative energy sources would moderate the effects of an international oil price shock, it would not make the U.S. economy immune because foreigners would substitute alternative energy sources for oil. Greater energy efficiency, by lessening the energy input to produce a unit of output, could also moderate the effect of future shocks on the economy. American economic activity, as measured by gross domestic product (GDP) has become less dependent on energy since the first oil price. And this is one reasons why the run-up in oil prices during 1999-2001 has not affected the economy as greatly as the three previous shocks.