

CRS Report for Congress

Received through the CRS Web

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 1999-2000). 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 party candidates for president in the 2000 election expressed similar views. 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. The effect of these shocks on economic activity has been and can continue to be reduced and reduced substantially if the United States continues to achieve greater energy efficiency. Such efficiencies have been achieved over the past 25 years and, as a result, the 1999-2000 oil price shock has had a much smaller effect than those of the past. This suggests that greater efficiency in the use of energy should be a major consideration in formulating energy policy. *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 1999-2000). While the shocks have varied in magnitude, as shown in Figure 1, each has been a catalyst for national debate over the essentials of a proper energy policy. The most recent price rise has been no exception. As the presidential campaign occurred during the price rise, the two major party candidates for that office expressed similar views on this issue. Both candidates emphasized a need for greater American energy independence and less dependence on foreign oil as an important part of a national program. Vice President Gore argued for giving new incentives for the development of domestic resources like deep gas in the Western Gulf of Mexico, stripper wells for oil, and renewable sources of energy. Governor Bush emphasized an active exploration program for oil in America and

the development of our own natural gas and coal resources. 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.

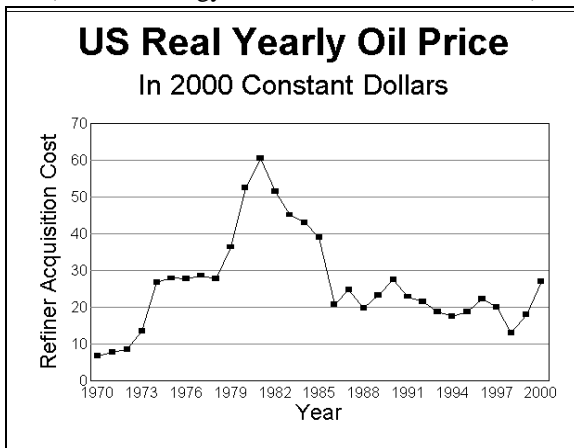
The analysis in this report suggests that the United States, short of completely isolating itself from the world market, cannot avoid the consequences of price shocks

through a policy of energy independence even if that policy could lead to the U.S. again being a net exporter of oil. While a policy that encouraged alternative energy sources might moderate the effects of the shock, it may also be useful to encourage greater efficiency in the use of energy. Greater energy efficiency, by lessening the energy input to produce a unit of output, could 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 shock, as shown in Figure 2. And this is one

reasons why the run-up in oil prices during 1999-2000 has not affected the economy as greatly as the three previous shocks.

Figure 1

(Source: Energy Information Administration)



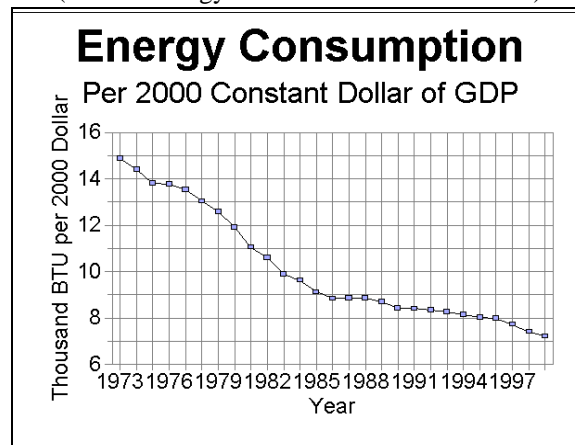
American Energy Policy

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 because it results in economically efficient decision-making.

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

Figure 2

(Source: Energy Information Administration)



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. (The effects thus far from the run up of oil prices during 1999-2000 seem confined to a small boost in the rate of 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.

But if we live in a world of sticky prices,¹ 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 resources² that makes some individuals, such as oil producers, better off and some, such as consumers,

¹ 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.

² 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.

worse off.³ But until overall prices have fully adjusted, the economy will suffer from a lower rate of growth in output. 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, even if such a policy implies a reduction in economic welfare. 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 imported no oil from any foreign country. 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, whose origin may have been the behavior of OPEC, would be a higher domestic price of oil just as it would 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*.⁴

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

³ 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 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.

⁴ Recent history has provided another interesting example in which national behavior, motivated by a common phenomenon, 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. It is worth noting that the United Kingdom is not only self-sufficient in oil, but is an oil exporting nation.

diversion from domestic to foreign markets) and to prohibit domestic oil companies from raising prices.⁵ But we do not live in the counterfactual world. Since net oil imports have 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, energy independence in the long run would likely imply a price that was less volatile, but even higher than prices at their recent peak.

Even if the United States could implement such a drastic policy, a part of the oil price shock could still affect the U.S. economy.⁶ Indeed, even if the U.S. were able to use only alternative energy sources, the shock could have some effect on the economy. This would occur as foreign nations adversely affected by the shock shifted to substitute energy sources. The demand for these sources of energy would rise, raising their prices, and, to the extent possible, U.S. suppliers would divert their output to the world market, possibly 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. Its magnitude would depend on the extent to which alternative energy sources were substitutes for oil and are exportable from the United States.

The 1999-2000 Oil Price Shock

The recent run-up of oil prices has so far not produced serious consequences for the U.S. economy, for several reasons. First, the run-up measured in constant year-2000 prices is small. And it is even smaller if viewed from the perspective of 1998. Following the serious economic contraction of several Asian countries during 1997-1998, world oil prices plummeted. They declined from an average constant dollar barrel price of \$25 in January 1997 to an average of about \$10 in December 1998. In September 2000, the average price was \$34. Thus, compared to January 1997, this is an increase of about 36%. Contrast this with the 1973-74 shock in which per-barrel prices rose from about \$8 in November 1973 to about \$27 in February 1975, the 1979-80 shock in which prices rose from an average of about \$29 in March 1979 to \$65 in March 1981, and the 1990-91 shock in which prices rose from an average of about \$19 in June 1990 to \$40 that September (all prices measured in constant year 2000 dollars).

Second, this oil price shock has not been with the economy for long (yet). At first American companies were probably able to use stop-gap measures to avoid the oil price shock, but this becomes more difficult as time goes by. Not only was the 1973-74 shock large, but high real oil prices, as shown on figure 1, persisted until 1979. The 1979-80 shock was large, and although prices fell continuously from 1980, they did not reach their

⁵ The only other theoretical alternative to banning exports would be for U.S. producers to meet not 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.

⁶ This presumes that the rise in oil prices is permanent or long-run in nature. If it were only temporary or short run in nature, the type of substitutions described in the following sentence would probably not occur.

1978 level until 1985. In the third shock, by contrast, prices began to fall as soon as the Gulf War was concluded, and had returned to their pre-shock level in a year and a half. The coinciding recession lasted only eight months. It is too early to assess the staying power of the current increase.

Third, the U.S. economy is far more energy efficient than it was in 1973-74. 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, a 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 freeing the economy from the effects of these price shocks. 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.

Energy Independence

The analysis above has suggested that energy independence in itself would be unlikely to free the United States from the effects of oil shocks. If domestic production of oil could not help, is there any other way that public policy can lessen the U.S. reliance on foreign oil? It would appear that if alternative non-petroleum energy sources could be developed on a large scale so they could supply a very large portion of U.S. energy demand, then the economy would be less sensitive to oil price shocks. Such a development does not appear to be very likely, at least in the near term. Thus, a case remains for increasing the energy efficiency of the economy as one of the best ways to contain the effect of oil price shocks.

⁷ For a more comprehensive discussion of the effects of a petroleum price increase on the U.S. economy, see Library of Congress, CRS, *Rising Oil Prices: What Dangers Do They Pose for the Economy?* by Marc Labonte, CRS Report RL30634, August 15, 2000.