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Evaluating U.S. oil security and import reliance

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HIGHLIGHTS

- A variety of perspectives on the consequences of U.S. reliance on imported oil.
- Quantify and evaluate the costs of U.S. reliance on oil imports.
- Narrower approaches are more consistent with the economic definition of externalities.
- Narrower approaches yield recommendations for relatively modest policy.
- Expansive approaches favored by some policy analysts support more aggressive policy.

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ABSTRACT

We examine the literature that considers the consequences of U.S. reliance on imported oil. We take an approach that covers many ideas about the costs arising from U.S. reliance on imported oil, and we identify which of those ideas have broad support in the economics literature and which ideas have only limited support. We also quantify the costs of U.S. reliance on imported oil using two approaches. One is fairly narrow, conforms to the economics view of externalities, and yields small cost estimates. The other is relatively expansive, is favored by some policy analysts, and yields much larger cost estimates. We estimate these costs as expected U.S. economic losses over a time horizon from 2010 through 2035, while taking into account world oil market conditions, market power, probable oil supply disruptions, and the oil-market response to those supply disruptions.

Contents

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1. Introduction

Since the comprehensive study of energy markets carried out by Landsberg et al. (1979), economists and other analysts have recognized that U.S. dependence on imported oil is likely to yield a variety of social costs in excess of the market price paid for the oil. In addition to the well-recognized environmental costs associated with the consumption of domestic or imported oil, other costs resulting from U.S. dependence on imported oil may include such elements as the macroeconomic risks associated with greater exposure to world oil supply disruptions, the foregone opportunities for the United States to exercise market power in the world oil market, the costs to the United States of maintaining a strong military presence in the Middle East, and various factors affecting foreign policy. Now that the United States is reducing its import exposure, it seems appropriate to evaluate this large literature selectively and provide new estimates on the extent of these costs in this new market environment.

Over the years, researchers have produced numerous and conflicting approaches to assessing the costs of U.S. dependence on foreign oil. These approaches include an oil import premium, an oil security premium, an assessment of the costs of achieving oil independence, an evaluation of the political costs of U.S. dependence on foreign oil, and a denial that any such costs can be regarded as externalities that require a policy response.

Landsberg et al. (1979) developed an oil import premium that relied on quantifying two elements: (1) the increased size of the expected losses (in the form of the macroeconomic disruptions and transfers resulting from world oil price shocks) associated with increased reliance on imported oil; and (2) the ability of the U.S. government to exercise market power by reducing U.S. oil imports to reduce world oil prices. Subsequent work in this vein includes Energy Modeling Forum (1982), Bohi and Montgomery (1982a, 1982b), Brown (1982), Broadman (1986), Bohi and Toman (1993), Toman (1993), Parry and Darmstadter (2003), and Leiby (2007). Some of this literature has estimated premiums at prevailing or projected world oil market conditions without changing these conditions. Other literature has estimated optimal oil import premiums that allow underlying market conditions to change as the policy is introduced.[1]

Brown and Huntington (2013), hereafter BH, narrow inquiry from the dominant approach by estimating an oil security premium. They identify the oil security premium as the expected transfers and macroeconomic losses associated with oil supply disruptions. Following mainstream economics literature, they argue that the failure of the United States to exercise its market power in the world oil market does not represent a true economic externality. Using energy market conditions projected by the U.S. Energy Information Administration (EIA), BH estimate oil security premiums associated with the consumption of domestic and imported oil. They find relatively small oil security premiums, with somewhat larger premiums for imported oil rather than domestic oil.

The National Research Council (2009) goes further than BH and argues that the non-environmental externalities associated with U.S. dependence on foreign oil are extremely small or nonexistent. The council carefully defines what is meant by externality and then proceeds to reject the arguments made in previous analyses for regarding any of the costs of dependence on foreign oil as externalities. The council's conclusions are at odds with other economics literature, as discussed in Section 2.2.3 below.

Greene et al. (2007) and Greene (2010, 2011) estimate the costs of achieving U.S. oil independence. To set a standard for independence, these exercises recognize that independence does not require reducing oil imports to zero. Rather, it requires reducing dependence to a manageable level. According to Greene (2010), the first step in determining a manageable level is to estimate the total costs of U.S. oil dependence, using elements that are similar to those described above. According to Greene (2011), sufficient independence is achieved by reducing imports so that these expected costs are reduced to 1 percent of GDP. This standard is set without any attempt to balance costs and benefits.

Diverging from much of the previous literature, Cohen et al. (2011) take a portfolio approach to evaluate a country's diversification of oil supplies with the idea that such diversification reduces exposure to disruptions. Their approach seemingly ignores the conventional view – recently expressed by Nordhaus (2009) and BH – that oil is fungible, world oil prices move together, and consumption of oil from any source yields exposure to world oil price shocks.

[1] The optimal oil import premium is calculated for the change in world oil market conditions that would occur were the premium implemented as a tax. The optimal premium is lower than the premium at prevailing market conditions (*footnote continued*) because implementation of the premium as a tax would reduce U.S. imports and the world oil price.