The Benefit Principle As Applied to Middle East Oil

Implications for US Energy Policy

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The benefit principle, well known in public finance theory, suggests that people who benefit most from a good or service should pay the taxes associated with the public provision of that good or service in proportion to the benefits they receive.[1] The United States has violated that principle of public finance since it began military expenditures to maintain access to Middle East oil in the 1930s.[2] Over time, this practice has amounted to hundreds of billions and possibly several trillions of US dollars (assuming inflated current dollars). That is, rather than paying for military costs at the gas pump as direct users, all US federal taxpayers share the cost of US military presence and involvement in the Middle East—not just those who use petroleum and petroleum products the most.

In a very real sense, the small consumer of petroleum and petroleum products carries a disproportional burden of the socialized costs of these large military expenditures.

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For this reason, we propose that the price of gasoline sold in the United States more accurately reflect the military costs of US presence and involvement in the Middle East.

We wish to increase fairness according to the benefit principle. Specifically, users should pay in proportion to the benefits they receive, and doing so would improve efficiency of resource use. If the United States continues to exclude the high military costs associated with providing imported Middle East oil, all US users of petroleum and its derivative products will continue to overconsume a good whose cost is actually more than the retail price indicates. Basically, that price—as applied to gasoline originating from the Middle East—is distorted.[3] Without an appropriate tax, the price signals to consumers that petroleum from the Middle East costs much less than it does.[4] Therefore, demand proves greater than it would if the price reflected this hidden cost.

This article seeks to move the market price (retail price) closer to a market-efficient equilibrium, thereby internalizing the external costs of higher taxes now imposed on the frugal consumer of petroleum products rather than the large users. Doing so would also impart information to the consumer to utilize the petroleum resource more sparingly.

An Opportune Time for the Tax

Four major mileposts make this an opportune time to implement a tax. First, the United States has experienced a boom in shale oil and gas development.[5] This boom significantly lessened US dependence on imported oil from the Organization of the Petroleum Exporting Countries (OPEC) from over 5 million barrels per day in 2004 to about 3.5 million by October 2013.[6] Second, Canadian tar-sand development has allowed the United States to substitute Canadian crude oil for that from the Middle East: "Crude oil imports [from Canada] by the United States averaged a record 2.6 million bls/d [barrels per day] in 2013, up about 15% from their 2011 level."[7] Third, China has overtaken the United States as the biggest consumer of OPEC oil imports.[8] China's purchases of OPEC oil have risen from about 1 million barrels per day to about 3.7 million.[9] Fourth, the price of oil has recently fallen below $100 per barrel, as reflected at the gas pumps. An additional tax on gasoline at this time would not impose an undue burden on the consumer since the tax would be offset by the lower gasoline prices.

Together these four events have significantly changed US interests in Middle East oil. The United States became less dependent on that oil through establishing more self-sufficiency and by increasing its use of oil from Canada, a stable and peaceful northern neighbor. To a great extent, these changes have permitted China to replace US interests in assuring safe access to Middle East oil. Even so, the United States maintains a significant military presence in the Middle East despite these substantial changes, its withdrawal from Iraq, and its ongoing departure from Afghanistan.

Consequently, the smallest and least direct consumers of petroleum are hit with the heavy tax externality that does not discriminate between the biggest and most direct beneficiaries of US military expenditures in the Middle East. Ironically, these expenditures are increasingly subsidizing China, the United States' major trade rival, by providing

it safe access to Middle East oil at the expense of all US federal taxpayers. This occurs even though the United States imports less oil from the Middle East than does China.[10]

By historic standards, petroleum prices are quite high. On 4 March 2014, spot prices were selling for about $103.30 per barrel.[11] In June 2008, the price of crude spiked as the world watched the United States ease monetary policy to combat the Great Recession. In today's prices, the cost actually reached $143.02 per barrel. In a 20-year period from October 1993 to October 2013, the price rose from $27.06 per barrel to over $100.[12] Recently, this price has fallen.

Historically, high oil prices have enabled the provision of oil from more costly sources, especially the tight oil deposits in shale, the tar sands of Canada, and oil from deep-ocean drilling. Concerning US oil shale deposits for some fields, "Energy producers on average need oil prices of about $96 a barrel to break even on wells drilled in the Permian layers known as the Cline Shale and Mississippi Lime. Other areas of the Permian [in Texas] need a price of just $70 to $74."[13] For Canadian tar sands, the estimated minimum price of international crude oil necessary to maintain a 10 percent profit return is $70 per barrel.[14] The high oil prices have led to decreased energy use in the United States. Despite its large population and growing economy, America uses about as much total energy as it did in 2000—less than 98 quadrillion BTUs per year.[15]

Methods

A coherent and viable US energy policy has yet to be put forward. Commentaries on why oil prices are so high vary.[16] Many people fail to appreciate that gasoline prices would be much higher were it not for the implicit subsidy that exists because of the US military presence that safeguards oil shipments in the Gulf.

This article proposes two more estimates; however, they exclude the costs of recent US involvement in Iraq. Were we to include US military expenditures in the recent Iraq war, we would have to consider a cost on the order of 1 trillion US dollars. Therefore, we limit ourselves to an estimate of costs *without* that military involvement. Thus, our two estimates are on the conservative side.[17]

Pinpointing the real military cost is problematic because data on military expenditures specifically targeted to protect access to Middle East oil are difficult to determine. Moreover, the mere presence of US forces and the projection of American military power influence and affect both the futures market and traders. Ultimately, reducing the risk premium lowers prices.[18] Nevertheless, the importance of this issue has led to our policy recommendations, which would allow for more transparency and a retail price of gasoline that would reflect the full cost of delivering gasoline from the Middle East to the US consumer—unlike a gasoline price that now hides it.

Estimated Dollar Cost of US Military Presence in the Middle East

Through its military expenditure in the Middle East, the United States has helped to insure stable petroleum supplies to purchasers throughout the world.[19] The full cost of

this insurance is difficult to estimate, but this is no excuse for ignoring the significant, positive externality it provides consumers, middlemen, and countries that produce petroleum. One factor complicating the price of this insurance is the cost of the war on terrorism declared by the United States after the attack on the World Trade Center and Pentagon on 11 September 2001. Since this subsidy has existed long before declaration of the war on terrorism, one could argue that both costs—of insurance and of the war on terrorism—are inextricably bound. This notion seems true since an unsuccessful waging of that war would jeopardize stable access of the petroleum-dependent nations of the world to Middle East oil.

US concern about that access has existed for decades. Perhaps the major demarcation of America's interest began in 1943 when it declared that Saudi Arabia was "eligible for direct 'Lend-Lease' economic assistance, even though Saudi Arabia was a noncombatant."[20] Two years later, on 14 February 1945, on the Great Bitter Lake in Egypt, President Roosevelt met with Abdul Aziz bin Abdul Rahman Al Saud (Ibn Saud), founder of Saudi Arabia and its king from 1932 to 1953.[21] The king raised the question about how much he could rely upon the support of the United States militarily.[22] Two years later, "his Majesty wished to know how and in what manner he might rely on the United States" to protect the Kingdom of Saudi Arabia from possible uprising.[23]

The United States appreciated the kingdom's loathing of godless communism and felt, therefore, that Saudi Arabia would offer a bulwark against communist expansion in the Middle East.[24] In 1951 the US Department of State outlined a "Comprehensive Statement of the United States Policy" toward Saudi Arabia, the major oil producer in the Persian Gulf at that time:

> It is a major objective that Saudi Arabia's economic possibilities be developed to provide more services and diversify national income, since it is a primitive country which needs development in every kind of public enterprise to raise the standard of living, stabilize the economy, and promote trade and diversification of domestic industry. It is also our purpose to assure for ourselves and our friends and allies the strategic advantages of Saudi Arabia's geographical position, petroleum resources, and the continued general antipathy of the Saudi Arabs for communism.[25]

James Mann reported that as early as 1977, during the beginning of the Carter administration, Paul Wolfowitz—then a Democrat and employed at the Pentagon—produced the "Limited Contingency Study," which outlined Department of Defense (DOD) contingency planning involving US protection of the oil-producing capability of the Persian Gulf nations.[26] Furthermore, James Baker, secretary of state during the first Bush administration, clearly indicated that our interest in the 1991 Gulf War with Iraq was oil:

> Q: But some people have used the posthumous line "Hey it [Kuwait during the 1991 Gulf War] was just a gas station, and the gas station had changed hands." You didn't see it like that?

> Baker: No, we did not see it that way, absolutely not. No. Let me say the reason we didn't see it as a case of the gas station just changing hands is because it has been a policy in the

United States for a long time that we had a *vital national interest at stake in preserving free access to the oil of the Persian Gulf*. I think everybody in the United States—I'm not aware of anybody in our government [who] has said "This is just a gas station changing hands."[27] (emphasis added)

Thus, history indicates that the United States has purposefully maintained a military presence in the Middle East to insure stable supplies of oil. Further, the cost of that presence is financed through the US tax system but remains mostly absent at the gasoline pump. Consequently, the general taxpayer subsidizes the large, direct consumers of gasoline, resulting in greater gasoline demand than there would be if the cost of US military presence were embodied in the price at the gas pump.

Existing Estimates

Several energy specialists have made estimates of what the price per barrel of oil should be if the cost of the US military presence in the Middle East were included in the price of petroleum (table 1). According to Amory Lovins and Joseph Romm, "Even before Iraq invaded Kuwait, U.S. forces earmarked for gulf deployment were costing [US] taxpayers around $50 billion a year—nearly $100 per barrel of oil imported from the Persian Gulf."[28] Adjusting for inflation to 2013 dollars, these costs are about $84 billion and $130 per barrel.[29] Given that each barrel of oil yields 42 gallons of gasoline, if the cost were passed on to consumers, the pump price would come to $3 more per gallon than the present pump price.

Table 1. Estimates of the increase in the price of oil by including US military costs in the Middle East (2013 US dollars)

Author	Year of Estimate	Annual Military Cost	Persian Gulf	US Oil Imports	Estimated US Consumption	
		billions	Cost per barrel[a]			Cost per gallon
Lovins and Romm[b]	1992/93	$84	$130	$27	$13	$0.31
Hall[c]	2003	$129	$148	$29	$18	$0.42
NDCF[d]	2003	$57	$66	$13	$8	$0.19
Delucchi and Murphy[e]	2004	$33–91	$39–107	$7–20	$5–13	$0.11–0.30

[a] The cost per barrel is derived by dividing the annual military cost by the average annual number of barrels imported or consumed during the period of time five years before to five years after the year of the estimated cost. See US Energy Information Administration, "Annual Energy Review," tables 5.1 and 5.4, accessed June 2013, http://www.eia.gov/totalenergy/data/annual/index.cfm#petroleum.
[b] Amory B. Lovins and Joseph J. Romm, "Fueling a Competitive Economy," *Foreign Affairs* 71, no. 5 (Winter 1992/1993): 49.
[c] Darwin C. Hall, professor of economics at California State University, cited in Laura Cohn et al., "Taming the Oil Beast," *Business Week*, 23 February 2003, 106, http://www.bloomberg.com/bw/stories/2003-02-23/taming-the-oil-beast.
[d] Milton R. Copulos, *America's Achilles* [sic] *Heel: The Hidden Costs of Imported Oil; a Strategy for Energy Independence* (Alexandria, VA: National Defense Council Foundation, 2003), 32, 36.
[e] Mark A. Delucchi and James J. Murphy, "U.S. Military Expenditures to Protect the Use of Persian Gulf Oil for Motor Vehicles," *Energy Policy* 36, no. 6 (2008): 2253–64.

This price, of course, refers only to the petroleum imported from the Persian Gulf states. Once averaged in with total domestic petroleum consumption, the Lovins and Romm figure adds only about 31 cents to the domestic price per gallon at the pump.[30]

However, their estimate might be low in light of the escalation of US military presence in the last several years, as noted earlier in the example of US engagement in Iraq.

Simply by adding in the more than $100 billion cost of having troops and fighting wars in the Persian Gulf, California State University economist Darwin Hall determined that oil should cost at least $13 per barrel more.[31] This military approximation adjusts for inflation to $129 billion, and the cost per barrel of US consumption is estimated at $18 in table 1. Again, assuming 42 gallons per barrel, this would mean approximately 42 cents more per gallon of gasoline—a "rock bottom, lowball estimate," according to Hall that does not include other externalities such as possible costs associated with climate change.[32]

In its report *America's Achilles* [*sic*] *Heel: The Hidden Costs of Imported Oil; a Strategy for Energy Independence*, the National Defense Council Foundation (NDCF) estimated military expenditures for United States Central Command (USCENTCOM) at about $87 billion annually.[33] The command covers more territory than the Middle East and has other purposes besides defending oil. Therefore, the NDCF attributes half of USCENTCOM's budget to protecting the flow of oil from the Persian Gulf as a reasonable assumption and estimates a cost of about $57 billion (in 2013 inflation-adjusted dollars).[34] Dividing this figure by US oil consumption amounts to only 19 cents more per gallon.

Using earlier estimates, Mark Delucchi and James Murphy assume that the peacetime costs of defending the Persian Gulf were about $30–60 billion in 1991. They then estimated a small growth in expenditures of 0.5–1.5 percent per year and added wartime spending of $15–25 billion each year, based on the assumption that a trillion-dollar war would happen every 50 years. Thus, unlike the other estimates, theirs implicitly takes into consideration the cost of the Iraq war.[35]

Further, Delucchi and Murphy addressed the amount of military spending if there were no Persian Gulf, estimating savings in 2004 of $47–98 billion. Since not all expenditures in the Persian Gulf are for oil, they then examined the amount of military spending if the Gulf did not have oil, estimating savings in 2004 of $27–73 billion; that is, $20–25 billion of the military spending was for interests other than oil.[36] The figure of $27–73 billion of military spending for oil interests was adjusted for inflation to $33–91 billion in table 1. By means of a stepwise procedure, they eliminated other interests in oil and estimated the cost of defending the use of oil by motor vehicles in the United States at only $6–25 billion.[37] Table 2 summarizes their estimates of the cost of defending oil for these various purposes.

Table 2. The cost of defending each US interest in the Persian Gulf in 2004

Cost of defending (billions of dollars per year)	Low	High
Use of oil by motor vehicles in the United States	$5.8	$25.4
Use of oil by other sectors in the United States	$7.6	$21.6
Interests of US oil producers in the Persian Gulf	$4.5	$11.7
World economy from the effects of disruptions in the supply of oil from the Persian Gulf	$8.8	$14.7
US interests other than oil in the Persian Gulf	$20.3	$24.5
All US interests in the Persian Gulf (sum of the above)	*$47.0*	*$97.8*

Source: Mark A. Delucchi and James J. Murphy, "U.S. Military Expenditures to Protect the Use of Persian Gulf Oil for Motor Vehicles," *Energy Policy* 36, no. 6 (2008): 2253–64.

Numbers may not add exactly since they are displayed as rounded.

New Estimates of the Military Cost to Protect Oil in the Persian Gulf

Estimating the military cost is difficult because DOD budgets reflect function and service rather than region. Data on oil imports and consumption, however, are readily available. Once military expenditures are estimated, the cost per barrel is easily calculated.

Using more recent approximations of military expenses to protect oil in the Persian Gulf, we have made two new estimates of the military cost per barrel and per gallon over two periods of time (table 3). Much more comprehensive and complicated valuations of the cost of *conflict* in the Middle East come from the late Thomas Stauffer, who determined that from 1956 to 2002, this expenditure has been about $3 trillion (2002 constant dollars) or $4 trillion (2013 constant dollars).[38] However, these are "estimated costs . . . [and] can only illustrate an order of magnitude, and they will no doubt be subject to much disagreement, especially given the sensitivity of the subject matter."[39] The expenditures concern the conflict in the Middle East and are not limited to the costs of the US military presence. Stauffer's figures are comprehensive, including those associated with the following programs and events: Project Independence, the strategic petroleum reserve, the Iran-Iraq War, the Six-Day War of 1967, and the Yom Kippur War of 1973.

Table 3. New estimates of the additional increase in the price of oil by including US military costs in the Middle East (2013 US dollars)

Author of military cost estimate	Stauffer[a]	Stern[b]
Period of estimate	1956–2002	1976–2007
Military cost over period	$4.0 trillion	$3.4 trillion
Billions of barrels of oil during period		
Imported from the Persian Gulf	19	21
Imported from all sources	103	105
Consumed in the United States	264	211
Cost per barrel[c]		
Imported from the Persian Gulf	$206	$167
Imported from all sources	$39	$33
Consumed in the United States	$15	$16
Cost per gallon[c]		
Imported from the Persian Gulf	$4.91	$3.97
Imported from all sources	$0.92	$0.78
Consumed in the United States	$0.36	$0.39

[a] "US Cost of Conflict in the Middle East since 1956 Totals $3 Trillion, Says Stauffer," *Middle East Economic Survey* 46, no. 9 (3 March 2003), http://markt-daten.de/download/kriegskosten_stauffer.htm.
[b] Roger J. Stern, "United States Cost of Military Force Projection in the Persian Gulf, 1976–2007," 7, article in press, doi:10.1016/j.enpol.2010.01.013, accessed 13 April 2015, http://www.princeton.edu/oeme/articles/US-miiltary-cost-of-Persian-Gulf-force-projection.pdf.
[c] Military cost in the Middle East to defend oil divided by the quantity imported or consumed. See US Energy Information Administration, "Annual Energy Review," tables 5.1 and 5.4, accessed June 2013, http://www.eia.gov/totalenergy/data/annual/index.cfm#petroleum.

However, one might argue that any conflict in the Middle East could escalate into regional fighting that would threaten US access to Middle East oil. Stauffer's cost estimates began in 1956, the time of the Suez crisis, which involved control of the Suez Canal, on the main route of most oil tankers running from the Persian Gulf to Europe. If one accepts the premise that US expenditures in the Middle East are designed to maintain stability and thus prevent a major escalation of conflict that would endanger US access to oil, then it appears reasonable to include military costs from 1956 to 2002 in the calculation of gasoline per gallon.

According to the Department of Energy, the United States imported about 103 billion barrels of oil from 1956 to 2002.[40] Given Stauffer's estimate of $4 trillion (2013 US dollars) for US engagement in the Middle East from 1956 to 2002, we estimate that if that figure had been included in the price of gasoline, each gallon would cost about 92 cents more. Since imported oil eventually will be mixed with domestic oil, the actual price at the pump would have to be 36 cents higher.[41] This is the low end of our estimate because if expenditures in the Iraq war were included, it would be considerably more.

If we were to look at total imports of the United States from OPEC countries and factor in the additional cost per gallon at the US pump, we would find that the price per gallon for OPEC oil would have to increase by $1.82. However, when that oil is mixed

with the rest of imported oil and domestic production, the ultimate price increase at the gas pump would be the same—36 cents per gallon.[42]

Finally, the price adjustment for oil coming from the Middle East would remain the same as far as cost at the gas pump is concerned, but it is the most expensive oil if taken alone. The true cost per barrel of the 19 billion barrels of oil imported from the Middle East from 1956 to 2002 is more than $200 per barrel (almost $5 per gallon) higher than the market price. It represents the highest cost for imported oil on a per-barrel basis. Clearly, the United States does not get its money's worth while subsidizing domestic consumption and the rest of the world as well.

This estimate calls for a clear US energy policy that takes these expenditures into account. That policy should recognize that even though the share of oil imports from the Middle East has decreased over time, the region still plays an important role in terms of the worldwide oil supply. Reliance on Middle East oil is forecast to increase in the years to come with more demand from developing economies such as China's.[43]

Roger Stern claims to have made the first estimate of projecting military force in the Persian Gulf derived entirely by quantitative methods. Since DOD budgets reflect function and service rather than region, he uses the proportion of aircraft carriers allocated to the region as a proxy for the proportion of DOD budget allocated to that area since Army and Air Force units are rarely deployed to combat operations without Navy units. Stern calculates the cost of Persian Gulf force projection at about $6.3 trillion for 1976–2007 and $351 billion in 2007 (both in 2008 dollars).[44]

The Stern estimates apply to all of USCENTCOM, which includes the Persian Gulf and Southwest Asia. The NDCF multiplied its estimate of the command's expenditures by about 70 percent to arrive at the amount applicable to the Persian Gulf.[45] Since the United States has interests in the Persian Gulf other than oil, the NDCF multiplied its estimate of USCENTCOM expenditures by about 50 percent to determine the amount applicable to oil in the Gulf.[46] We assume the same factor in table 3.

Stern also included supplemental spending for the Persian Gulf beginning in 2001. We assume that these supplemental budgets were for the Iraq war. Although many people argue that the war might not have occurred if not for oil, to be conservative and consistent with our previous estimate, we did not include costs associated with it.

Results: Summary of Estimates

Most of the six estimates discussed in this part of the article are fairly consistent, suggesting that if the military expense of defending oil in the Persian Gulf were added to the price of gasoline, the latter would cost about 30–42 cents more per gallon.[47] Although these estimates include the cost of military conflicts, they do not include the full expense of the second Iraq war, which began in 2003.[48] Joseph Stiglitz and Linda Bilmes estimated that the cost of the Iraq war, including expenditures likely to be incurred in the future (e.g., caring for injured veterans), will likely exceed $3 trillion.[49] Adding this cost and the above estimates to the pump price of gasoline would likely increase it by more

than a dollar per gallon. Our estimates using the adjusted Stern data are similar to those from the Stauffer data (table 3).

Discussion

Addressing the Free Rider Problem: Nations, Middlemen, Refineries, Distributors, or Consumers?

In the previous sections, we showed that the United States historically has designed policy to help insure safe and stable access to Middle East oil for itself and the rest of the oil-importing world. US military expenditures in the Middle East continue to protect the rest of the world from a serious disruption of oil flow. In defending this free flow of petroleum, the United States, in effect, has provided the world a public good. Nations that have enjoyed this flow have benefited from US expenditures and cheaper oil but have not contributed to the insurance policy, having paid none, or an insignificant share, of the costs. In the traditional sense of the concept, they are "free riders."

The traditional method of taking care of a free-rider problem has been to employ, in Garrett Hardin's words, "mutual coercion, mutually agreed upon."[50] One way of doing so would involve deploying a multinational military force in the Middle East to carry out what the United States has been accomplishing on its own. The only multinational agency capable of such action is the United Nations. Funding for that organization comes from the treasuries of member states but ultimately from the citizens of member countries in the form of taxes or decreased domestic expenditure. Unfortunately, the strategic aims of the United States and the politics of the United Nations have often been at odds. The multinational defense option is neither a likely nor a realistic option.[51]

Because oil is a fungible resource, all nations that purchase it in the international market have benefited from lower prices than they would have paid if this source of oil had been constricted or blocked. In a sense, the international market for oil is one large market. The oil that one nation does not buy, another nation will. Any decrease in the supply of oil in the international market is almost immediately felt internationally since purchases are made from this large, interconnected market.

The "middlemen" or the international oil companies also enjoy benefits from US military expenditures in the Middle East. Such expenses are a subsidy to international oil companies, insuring them safe and stable access to Middle East oil. This insurance is a cost they do not incur and thus do not pass on to customers.

There are at least two ways to include the cost of the US military presence in the price that consumers pay at the pump: tax the middlemen for each barrel imported from the Persian Gulf or tax the US consumer at the pump. Taxing the middlemen or the international oil companies for each barrel they sell in the United States would dissuade international oil companies from making that sale. It would divert the sale to oil-importing countries that do not tax the commodity—the equivalent of a tariff. Exactly who (consumer or international oil company) would bear the burden of the tariff would depend

upon the relevant elasticities of supply and demand for oil coming from the Persian Gulf. These elasticities, of course, would become more elastic with the passage of time.

In the short run, both consumers and suppliers would find it arduous to adapt to a tariff on imported oil were it imposed on an entity other than the consumer. Microeconomic theory argues that the more flexible side of the transaction would carry the smaller burden of the tax. But just who would be the most flexible in response to a higher tax is not clear since several transaction stages are involved in getting oil from the exporting nation to the ultimate consumer of petroleum products.

The sales chain runs as follows:

1. The petroleum-exporting nation's sale of the crude oil to the international oil company
2. The international oil company's sale of the crude oil to the refinery
3. The oil refinery's sale of the refined oil to the gasoline distributor
4. The gasoline distributor's sale to the gasoline retailer
5. The gasoline retailer's sale to the consumer

These transactions are also complicated in that petroleum-related businesses vary in the degree to which they are horizontally integrated and outsourced.

To avoid this complexity, we suggest the following. The US Department of Energy would keep account, as it does now, of how much oil comes from the conflict-ridden nations of the Middle East. The Pentagon would estimate the cost of US military presence and activity there, dividing it by the total barrels of oil imported to the United States from the Middle East and added to each gallon of gasoline sold in the United States at the gas pump.

Ultimately, consumer demand influences the quantity of petroleum supplied. In the long run, a higher price would dampen consumption. Proceeds from the tax would be used to defray the costs of US military presence in the Middle East. We realize that recommending such a policy is not easy because politicians are afraid to deal with any issue that involves raising taxes to reduce the federal deficit and debt—one that plays out in almost every presidential election.[52]

One criticism against this approach maintains that the gasoline tax is regressive since a larger percentage of a poor person's income is likely to be spent on gasoline than that spent by a rich person. To remedy this problem, federal personal income taxes could be reduced on lower-income earners proportionate to the increase that the gasoline tax would typically take from that person's total income. Doing so would restore some income equity to the program.

Advantages of the Additional Gasoline Tax

This approach offers several distinct advantages that fall into three broad categories: economic benefits, international political benefits, and resource benefits.[53]

Economic benefits. The economic benefits involve a more equitable and efficient allocation of the petroleum resource. Consumers of petroleum are not necessarily the

ones who pay the cost. American taxpayers in general subsidize heavy users of petroleum and petroleum-based products—an inequitable practice. The tax that we suggest above would move the tax system nearer to fulfillment of the "benefit principle," involving a closer correspondence between those who use the resource and those who pay.

State gasoline tax policy already employs this principle to support state road and highway construction and maintenance. Those who pay the tax—namely, drivers and owners of motor vehicles—benefit mostly and directly from the resulting roads and their maintenance.

On the other hand, when consumers pay less than the actual cost of petroleum, inefficiency results, leading to an allocation of petroleum not to the most preferred users but to all users who receive the implicit subsidy. Considerable waste of this nonrenewable resource occurs because the price does not reflect its true external cost, and the resource is overused.

International political benefits. A price of petroleum that better reflected actual costs than it does now would provide international political benefits. Perhaps the greatest would be that the United States would enjoy more petroleum independence. This reduction in dependency would occur as a higher price, reflecting actual costs, would lessen the quantity of petroleum demanded from the Persian Gulf. Imports of oil would then tend to come from other, more politically stable areas of the world.

We have recently seen evidence of this phenomenon. As oil prices breached $100 per barrel, oil from tar sands in Canada and from domestic US shale became feasible, lessening American dependence on Middle East oil. Tacking on an additional charge to the price of gasoline at the pump to reflect the cost of US military presence in the Middle East would likely lead to a lessened engagement of the US military there.

It is often forgotten that one of the main stimuli to Osama bin Laden's radicalism was the presence of US forces on the holy ground of Islam (i.e., the Saudi Peninsula up to, during, and after the 1991 Gulf War). That presence resulted from US concern about the possible invasion of Saudi Arabia by Saddam Hussein's Iraq. The United States had an interest in assuring the safety of the Saudi regime, maintaining world access to Saudi oil reserves, and preserving Saudi oil-producing capabilities. Because of Muslim antipathy toward the US military presence in Saudi Arabia, the United States has significantly reduced its military presence on Saudi soil. Discouraging the use of Middle East oil would lessen the need for deployment of US troops in the Middle East and thus lower the ire of Islamic militants.

Resource benefits. The days of low-priced petroleum are over. Although proven world oil reserves are more plentiful than they have ever been, international consumption of oil is also at an all-time high. China and India, the world's two most populated countries, are adding significantly to world demand for petroleum as their economies (gross domestic products) continue to grow rapidly—India in excess of 5 percent annually and China around 7.5 percent. Improved oil exploration and extraction technology have continued to keep the amount of proven world oil reserves ahead of world consumption.

According to the latest British Petroleum *Statistical Review of World Energy*, the world's established reserves of petroleum grew from 117.6 trillion cubic meters in 1992 to 187.3 in 2012.[54]

Even with improved exploration and extraction technology, world production of petroleum will soon reach a peak—a cause for concern. Some individuals have suggested that this apex may occur as soon as the next decade. Several recent books in the popular press have touted this message.[55]

A common reference in these books is to the Hubbert Curve. In 1956 M. King Hubbert developed a forecasting curve in the shape of a normal curve that traced the trajectory of US oil production. Hubbert published forecasts in the 1960s based on this curve, showing that US production of petroleum would peak in the 1970s. His prediction seemed correct as late as 2008, but with continued high petroleum prices worldwide and ongoing improvements in oil- and gas-extraction technology, more reserves are now available. As mentioned above, they are approaching their highest levels ever. Alarmists have made similar predictions about international oil production peaking within the next decade.[56]

Others, such as Vaclav Smil, take a less alarmist view.[57] Like the alarmists, Smil points to Hubbert's Curve. However, he notes that even if the alarmists accept that analysis, Hubbert's curve still suggests that over half of the international petroleum production will take place after the peak is reached:

> Categorical declarations of an early end of the oil era—ushered by an imminent and fairly precipitous decline of global oil extraction—are just the latest additions to a long list of failed predictions concerning the future of oil. . . . Their authors have continued to overlook the fundamental fact that the timing of oil's demise depends not only on the unknown quantity of ultimately recoverable crude oil resources (which has been, so far, repeatedly underestimated) but also on the future demand whose growth they have usually exaggerated and that is determined by complex interplay of energy substitutes, technical advances, government policies, and environmental considerations.[58]

In other words, uncertainty exists about the future of recoverable petroleum deposits. However, we are certain that when a price for an item is below its actual costs, the resource will be overconsumed and undersaved. A higher price, reflecting the external cost of the US presence in the Persian Gulf, would encourage less petroleum consumption. Since no one knows the amount of ultimately recoverable petroleum remaining in the earth, caution brought about by a more realistic price seems only prudent.

In any case, a higher price for petroleum would also induce the use of alternate sources of energy, such as hydrogen or electricity, or a hybridization of the two. It would induce substitute forms of transportation such as more carpooling, the use of jitneys (if local taxicab monopolies would allow them), bicycling, and other forms not yet conceived that the spontaneous dynamics of the market economy would create.

Conclusion and Policy Implications

Clearly, US taxpayers foot the bill for the projection of US military power in the Middle East—particularly in the Gulf. However, consumers worldwide, Middle East oil-producing nations, and international oil companies all enjoy the benefits of this US taxpayer expenditure. Placing a tax on gasoline would more accurately reflect the true costs of the resource of US military presence. We would then expect to see several of the following results:

1. Improved rates of resource use
2. Quickened development of alternative energy resources
3. Less dependency on Middle East oil
4. More substitution for petroleum and energy conservation
5. Less need for the US government to subsidize alternative sources of energy
6. Relief for US taxpayers
7. Less Islamic militancy due to a smaller US military footprint in the region
8. Environmental benefits (not discussed in this article)

US taxpayers carry the burden of the cost of US military presence in the Middle East that seeks to insure stable and secure access to the oil there. Petroleum-exporting nations, petroleum-importing nations, international oil companies, refining companies, oil distributors, oil retailers, and petroleum consumers all enjoy this implicit subsidy. The US taxpayer gives them this external benefit. The benefit principle implies that those who benefit more from the provision of a public good or externality should also pay more for the benefit they receive. A tax on gasoline that better reflects the cost of US military presence in the Middle East would help move us closer to this objective.

Notes

1. "According to [the benefit principle] dating back to Adam Smith and earlier writers, an equitable tax system is one under which each tax payer contributes in line with the benefits which he receives from public services." Richard A. Musgrave and Peggy B. Musgrave, *Public Finance in Theory and Practice*, 2nd ed. (New York: McGraw-Hill Book Company, 1976), 211.

2. Since this article focuses on petroleum, it uses the term *Middle East* interchangeably with *Persian Gulf*. We feel justified in doing so since other "Middle East" countries export inconsequential quantities of oil while this article addresses US military expenditure to protect access to oil in the Persian Gulf. See Thomas W. Lippman, *Inside the Mirage: America's Fragile Partnership with Saudi Arabia* (Boulder, CO: Westview Press, 2004), 7–38.

3. The price is distorted not only for the United States but also for the rest of the oil-consuming countries. The United States is essentially subsidizing the rest of the world since it incurs the bulk of the cost.

4. Throughout our discussion, we refer to imports from the Middle East but include the whole Gulf region as well as North Africa.

5. "The Energy Information Administration (EIA) in its September Short-Term Energy Outlook expects U.S. crude oil production to increase from an average of 6.5 million barrels per day in 2012 and 7.5 million barrels per day in 2013 to 8.4 million barrels per day in 2014, which is an average growth rate of almost 14 percent per year." Institute for Energy Research, "U.S. Oil and Natural Gas to Reach Levels Not Seen in Decades . . . Again," Canada Free Press, 5 October 2013, http://canadafreepress.com/index.php/article/58365.

6. Brian Spegele and Matt Bradley, "The Middle East Oil Fuels Fresh China-U.S. Tensions," *Wall Street Journal*, 11 October 2013, A1.

7. See "U.S. Imports by Country of Origin," US Energy Information Administration, 30 March 2015, http://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbblpd_m .htm.

8. Spegele and Bradley, "Middle East Oil," A1.

9. Ibid.

10. Ibid.

11. This price—$103.33 per barrel on 4 March 2014—was reported by the US Energy Information Administration, based on the price at Cushing, Oklahoma, West Texas Intermediate (WTI) spot price free on board (FOB). See "Cushing, OK Crude Oil Future Contract 1," US Energy Information Administration, accessed 8 March 2014, http://www.eia.gov /dnav/pet/hist/LeafHandler.ashx?n=PET&s=RCLC1&f=D.

12. All prices are adjusted for inflation to current prices using the gross domestic product deflator provided by the St. Louis Federal Reserve. See "Gross Domestic Product: Implicit Price Deflator," US Bureau of Economic Analysis, accessed October 2013, http://research .stlouisfed.org/fred2/data/GDPDEF.txt.

13. Joe Carroll and Edward Klump, "Low Prices Could Pop a Bubble in Texas," *Bloomberg Business Week*, 4–10 November 2013, 49–50.

14. Jeremy Van Loon and John Lippert, "Oil Abundance in Canada Provokes Anxiety over Fossil Fuel Lust," *Bloomberg Business*, 21 November 2011, http://www.bloomberg.com /news/2011-11-22/oil-abundance-in-canada-sands-provoking-anxiety-over-lust-for-fossil-fuels.html.

15. "Table 1.1, Primary Energy Overview," Monthly Energy Review, US Energy Information Administration, March 2015, http://www.eia.gov/totalenergy/data/monthly/pdf/sec1 _3.pdf.

16. The consensus is that although the three previous shocks (1973, 1979, 2000) were all supplied-induced, the 2005 shock is the first demand-driven shock, China being the principal driver behind it.

17. Since the estimates vary, we are leaving out the cost of the engagement in Iraq for the moment.

18. Ironically, the presence of US troops in Iraq has led to more unrest and has added to more—not less—uncertainty and security; thus, it has added a risk premium to the current oil price. Normally, the presence of the US military in the Gulf should tend to reassure markets, not make them nervous. This principle is true when these forces are there to insure safe passage of oil.

19. Our estimates in this section do not take into account the past cost of the US engagement in Iraq.

20. Lippman, *Inside the Mirage*, 27.

21. Ibid.

22. Ibid., 274.

23. Ibid., 273.

24. Ibid., 276.

25. Ibid., 280.

26. In James Mann, "Enter the Persian Gulf," *Rise of the Vulcans: The History of Bush's War Cabinet* (New York: Viking Press, 2004), 79–94.

27. Ibid.

28. Amory B. Lovins and Joseph J. Romm, "Fueling a Competitive Economy," *Foreign Affairs* 71, no. 5 (Winter 1992/1993): 49.

29. The cost per barrel was derived by dividing the $84 billion by 650 million barrels—the average annual number of barrels of oil imported from the Persian Gulf from 1988 to 1998. This calculation is not the same as adjusting the $100 per barrel to 2013 dollars. See US Energy Information Administration, "Annual Energy Review," tables 5.1 and 5.4, accessed June 2013, http://www.eia.gov/totalenergy/data/annual/index.cfm#petroleum.

30. This figure is derived from dividing the annual military cost of $84 billion by the average annual US consumption of oil of about 6.4 billion barrels during 1988–98 and by 42 gallons per barrel. See US Energy Information Administration, "Annual Energy Review," tables 5.1 and 5.4 (see note 29).

31. Darwin C. Hall, professor of economics at California State University, cited in Laura Cohn et al., "Taming the Oil Beast," *Business Week*, 23 February 2003, 106, http://www.bloomberg.com/bw/stories/2003-02-23/taming-the-oil-beast.

32. Ibid.

33. Milton R. Copulos, *America's Achilles [sic] Heel: The Hidden Costs of Imported Oil; a Strategy for Energy Independence* (Alexandria, VA: National Defense Council Foundation, 2003), 31. The NDCF released a report of the findings of its yearlong investigation of the economic and security costs of oil imports as well as a strategy to reduce our dependence.

34. Ibid., 31, 32, 36.

35. For earlier estimates, see William W. Kaufmann and John D. Steinbruner, *Decisions for Defense: Prospects for a New Order* (Washington, DC: Brookings Institution, 27 April 1991); and Earl C. Ravenal, *Designing Defense for a New World Order: The Military Budget in 1992 and Beyond* (Washington, DC: Cato Institute, 1991). See also Mark A. Delucchi and James J. Murphy, "US Military Expenditures to Protect the Use of Persian Gulf Oil for Motor Vehicles," *Energy Policy* 36, no. 6 (2008): 2253–64.

36. Delucchi and Murphy, "US Military Expenditures."

37. Ibid.

38. "US Cost of Conflict in the Middle East since 1956 Totals $3 Trillion, Says Stauffer," *Middle East Economic Survey* 46, no. 9 (3 March 2003), http://markt-daten.de/download/kriegskosten_stauffer.htm.

39. Ibid.

40. See US Energy Information Administration, "Annual Energy Review," 2011, http://www.eia.doe.gov/emeu/aer/petro.html. For the years 1956 to 1960, we assumed that the years 1956–59 were similar to 1960 since data for those years are not available.

41. This is a rough estimate, given the nature of the data, but the fact that the current price currently does not reflect the true cost of oil is important. The actual price adjustment will be much higher were we to include the cost of our engagement in Iraq and any cost associated with the rebuilding. Not only are we subsidizing US domestic consumption but also we are subsidizing world consumption of oil—China in particular at this very moment when that country is partly responsible for the sudden surge in demand, which pushed oil prices up. Allowing the true costs of oil to be reflected at the gas pump would go a long way toward reducing US gas consumption and would be a start in developing a sensible energy policy that would lessen dependence on foreign oil in these uncertain times.

42. Once again, without the cost of the current Iraq war.

43. Spegele and Bradley, "Middle East Oil," A1.

44. Roger J. Stern, "United States Cost of Military Force Projection in the Persian Gulf, 1976–2007," 7, article in press, doi:10.1016/j.enpol.2010.01.013, accessed 13 April 2015, http://www.princeton.edu/oeme/articles/US-miiltary-cost-of-Persian-Gulf-force-projec-tion.pdf.

45. Copulos, *America's Achilles* [*sic*] *Heel*, 31.

46. This assumption is consistent with Delucchi and Murphy's article "US Military Expenditures" (see note 35), which estimates that up to 75 percent of Persian Gulf military expenditures is for interests related to oil. The National Defense Council Foundation (NDCF) assumed that 70 percent of USCENTCOM's expenditures were for the Persian Gulf (70% × 75% = 53%).

47. In response to an anonymous referee's comments, we wish to stress that our estimates are for an increase in the prices of oil and thus gasoline. These are inputs, not outputs. Personal computers and cars, as noted by the comments of the referee, are outputs, not inputs in the production chain. Some people would argue that it would be politically impossible to raise gasoline taxes by as little as a few cents. Our argument, however, is that it does not change the fact that the US energy policy is affected by not internalizing the full cost of imported oil, thus making for a flawed policy that serves only to further increase our dependence on foreign oil. The National Defense Council Foundation's (NDCF) estimate (see note 33) was 19 cents, and the Delucchi and Murphy estimate (see note 35) ranged only from 11 to 30 cents.

48. Most of the estimates occurred before the second Iraq war; the Delucchi and Murphy estimate (see note 35) added an average $20 billion per year for military conflict, assuming that a $1 trillion war would happen only every 50 years.

49. Cited in Peter Maass, "The Ministry of Oil Defense," *Foreign Policy*, 5 August 2010, http://foreignpolicy.com/2010/08/05/the-ministry-of-oil-defense/.

50. Garrett Hardin, "The Tragedy of the Commons," *Science* 162, no. 3859 (13 December 1968): 1243–48, http://www.sciencemag.org/content/162/3859/1243.full.

51. Furthermore, the United States carries the largest share of funding of the United Nations, roughly 22 percent of that organization's budget. See United Nations Secretariat, "Assessment of Member States' Advances to the Working Capital Fund for the Biennium 2014–2015 and Contributions to the United Nations Regular Budget for 2014," 27 December 2013, 6, http://www.un.org/ga/search/view_doc.asp?symbol=ST/ADM/SER.B/889. Thus, a significant burden of protecting access to oil in the Middle East lands on the backs of US

taxpayers even though it is a smaller share through the United Nations than they incur when America carries the burden as it does now.

52. For example, in the 1992 presidential election, a commercial accused Senator John Kerry of suggesting a tax of 50 cents on gasoline to help the deficit in 1991. Kerry did propose such a tax, but because of its unpopularity, he abandoned the idea.

53. We are fully aware that this proposal is difficult to advance politically, but it does not change the fact that either we allow the price of oil to fully reflect all costs or we find other ways to correct for the "wrong" price signal that the present arrangement produces.

54. British Petroleum, *BP Statistical Review of World Energy, June 2013* (London: British Petroleum, 2013), 21, http://www.bp.com/content/dam/bp/pdf/statistical-review/statistical _review_of_world_energy_2013.pdf.

55. For example, see David Goodstein, *Out of Gas: The End of the Age of Oil* (New York: W. W. Norton, 2004); Kenneth S. Deffeyes, *Hubbert's Peak: The Impending World Oil Shortage* (Princeton, NJ: Princeton University Press, 2003); Richard Heinberg, *The Party's Over: Oil, War, and the Fate of Industrial Societies* (Gabriola, BC: New Society Publishers, 2003); and Stephen Leeb and Donna Leeb, *The Oil Factor: Protect Yourself and Profit from the Coming Energy Crisis* (New York: Warner Business Books, 2004).

56. See especially Deffeyes, *Hubbert's Peak*. Deffeyes, a colleague of Hubbert, applied the latter's technique on a worldwide basis. This information came from Leeb and Leeb, *Oil Factor*, 36.

57. Vaclav Smil, *Energy at the Crossroads: Global Perspectives and Uncertainties* (Cambridge, MA: MIT Press, 2003), 196.

58. Ibid.