THE IMPORT-CONTROL SOLUTION

Could a "limits" policy succeed in disconnecting the U.S. from foreign embargoes in the world crude market and protect it from the costs of such supply disruptions?

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The domestic crude oil market is among the most strategic markets for sustaining gross domestic product (GDP) growth. However, its vulnerability to disruption makes petroleum product prices volatile, speculative and inefficient. Because the law of one price for crude prevails worldwide, a series of targeted reductions by foreign suppliers, even in a remote producing country, can create price spikes on both the Houston spot crude market and the New York commodity exchange.

With 94% of known crude reserves controlled by foreign nations, there is no way the U.S. can prevent a sovereign nation's production shutdown or a terrorist-initiated outage from affecting crude prices globally and disrupting energy and other consumer markets. As recently as February 2006, there was an attack on Saudi oil facilities that, if successful, would have taken out half of its oil exports (some six million barrels per day). In July 2010, there was an unsuccessful attempt to sink a tanker in the Straits of Hormuz that also could have upturned markets to that extent.

It is conceivable that a three-month reduction of 10 million barrels a day in the world market could lead to a price spike of more than $400 per barrel in U.S. markets; one economist has put that estimate as high as $795 per barrel. A spike to $400 per barrel could cost consumers some $282 billion (calculated simply as 19.55 million barrels per day x three months x 30 days per month x ($400 - $80.00)/2 = $282 billion). A six-month disruption could cost the U.S. about $566 billion.

Limiting imports

To assess these measures of cost of disruptions, we first must ask how we can defend ourselves in responding to the threat—not by going after the perpetrators (an unlikely scenario), but rather by preventing spikes in the world price from affecting the domestic price. Prevention is costly as it requires the exclusion of imports from domestic markets. Therefore, the question is whether the cost is more (in demolished dollars) than the self-generated response of limiting imports over a 10-year period.

The "limits" policy outlined here would disconnect the U.S. from the world crude market (and price) and thus would reduce the costs of disruption in its markets. For terrorists to achieve their goals, they would have to blow up shipping in Houston or refineries in New Jersey; it would no longer be as effective to destroy shipping in the Straits of Hormuz or oil wells in the Caucasus.

The limits policy is straightforward. It calls for the phased withdrawal of U.S. crude and products imports from the world oil market. In a 10-year period—for example, from 2010 to 2020—imports from all parts of the world except Canada would be reduced from present-day levels to zero. We include Canada in the ongoing U.S. market simply because Canada's primary export market is the U.S. The Cana-

Right, crude oil prices follow these paths after the beginning of a supply disruption. Far right, these price scenarios emerge when imports are restricted.

Crude Oil Prices After A Supply Disruption Of 10 MMbbl/d For 3 Months
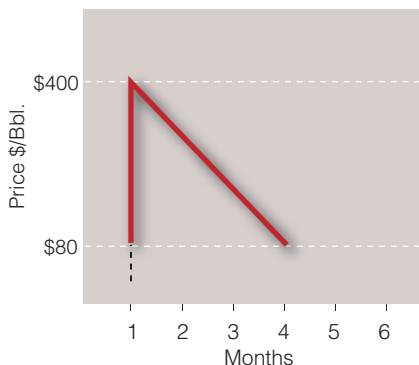
Evolution Of Price From The Restriction Of Imports
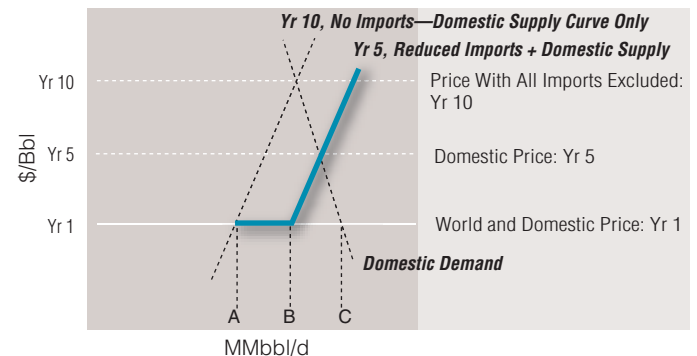
Notes: A to C is current level of U.S. imports, Year 1; A to B is reduced level of U.S. imports, Year 5; in Year 10, domestic price increases to "price with all imports excluded."

dian Association of Petroleum Producers notes that currently planned pipeline expansions are all directed at serving the U.S. markets and, in fact, directing heavy Canadian crude to U.S. refineries capable of processing heavy crude. The foregone imports would be at least partially replaced through U.S. domestic expansion in crude production and in products from domestic liquefied natural gas (LNG), ethanol, coal and Canadian oil sands. This limits policy would be achieved through a presidential Executive Order presumably, but not necessarily, followed by legislation justified as in the interests of national security.

A higher domestic crude oil price would provide greater stability to domestic markets not just for crude oil producers but also for producers of crude oil substitutes. Using the supply model published by the Energy Information Agency of the Department of Energy and other DOE publications, we estimate that imports would be replaced as shown in the table below.

EIA estimates (in its 2009 March High Price Reference Case) that based on crude prices rising to $182.50 per barrel over the decade from 2010 to 2020, domestic crude plus imports, gas plant liquids, refinery processing gains, etc., will approximate 19.3 million barrels per day. Imports will decrease over the decade, from 8- to 5.4 million barrels of oil per day.

The embargo policy to eliminate imports over 10 years would result in a series of backward shifting domestic supply functions, at the end of the annual truncated foreign horizontal supply curve. The final supply curve would be at the point equal only to domestic production. Domestic markets would clear in 2020 at this price of $262 per barrel. The price increases would reduce demand (with an arc elasticity of −.125) by approximately 1 million barrels per day. A price of gasoline in excess of $6 per gal-

lon (excluding fuel taxes!) would be the domestic economy cost of energy security.

The cost of limiting imports is the difference between lost consumer surplus from higher prices and gained producer surplus, also from higher prices. The lost consumer surplus is the reduced consumption due to higher prices. The producer surplus is the gain associated with the higher price and domestic production—not only from existing domestic production, but also from eliminated imports now sourced by new domestic substitutes. In sum, the limits policy alone provides a net gain of $187 billion for the decade if there are no shocks in this example (limiting imports from 2010 to 2020 costs $40 billion in consumer surplus but generates $227 billion in producer surplus gains).

The U.S. has suffered policy-related and technical disruptions with some frequency since 1974. While we have not estimated the risk of a supply disruption, a Rand monograph on oil and national security discusses various scenarios and sets out high probabilities of significant supply disruptions. The Rand study shows an 8% probability of a one- to six-month supply disruption of at least 10 million barrels per day; and an almost 50% probability of a one- to six-month supply disruption of at least 5 million barrels per day, which would be more than the U.S. Strategic Petroleum Reserve could replace. The probability of a longer disruption of six to 18 months is 35%, and the probability is 15% for a disruption of more than 18 months.

However, if there is a shock caused by a significant disruption (10 million barrels per day resulting in a price per barrel of $400 or more), and that shock occurs before all imports are eliminated, the cost, while significant, would not be as great as if the limits were not in place. The accompanying table shows that the total deadweight loss (in billions) associated with a six-month shock to the U.S. economy (over three

Effects of U.S. Elimination Of Crude Oil Imports
Source of Supply (MMbbl/d)

	2010	2015	2020
1) EIA Crude Oil Demand/Production Forecast			
(March High Price Case)			
Domestic Crude Oil Production	5.62	5.87	7.16
Crude Oil Imports	8.02	7.49	5.44
Crude Oil Substitutes	5.77	6.20	6.69
Total	19.41	19.55	19.28
2) EIA Crude Oil Price Forecast			
(2007 $s - March High Price Case)	$88.8/bbl	$157.7/bbl	$182.5/bbl
3) Authors' Crude Oil Demand/Production Forecast			
(Elimination of Imports Case)			
Domestic Crude Oil Production	5.78	6.06	7.85
Crude Oil Imports	7.63	5.54	-.06
Crude Oil Substitutes	5.89	7.71	10.46
Total	19.29	19.31	18.25
4) Authors' Crude Oil Price Forecast			
(2007 $s - Elimination of Imports Case)	$100/bbl	$181.3/bbl	$262.5/bbl

Source: EIA

different time periods) under business as usual is always greater than under the limits policy.

Are costs reduced?

Does the limits policy in a shock reduce the costs? Three answers follow from our estimates. First, if there were a 2010 shock lasting six months, the impact on U.S. consumers would be $543 billion under the limits policy, reduced from $566 billion under business as usual. The deadweight cost to the U.S. under the limits policy is $215 billion versus $234 billion under business as usual. The policy reduces shock costs by $19.2 billion, to which is added the net gain of domestic production (calculated separately) of $0.56 billion for a total net gain of $20 billion.

If there were a 2015 shock, the deadweight loss from the shock would be $116 billion under the limits policy, rather than $172 billion, plus the cumulative net gain of $20 billion, for a total savings of $76 billion.

But in 2020, the deadweight loss from the shock is zero under the policy, saving the deadweight loss of $113 billion under business as usual plus the cumulative gain of $187 billion throughout the decade—assuming that the U.S. has not become a net exporter of crude or crude substitutes. We come out $300 billion ahead if the shock is in 2020; this scenario assumes that consumers would not be facing insufficient foreign supply at any price in the future.

These gains increase if there are two or three shocks in the decade. For example, if there are three shocks, then the gains total $376 billion.

Energy policy

Apart from costly military campaigns, U.S. energy policy has been counterproductive or remarkably ineffective during the past 40 years. The DOE was founded in part to promote energy independence, and this was a fool's errand, because it was founded while pre-existing crude oil and natural gas price controls were allowed to continue for years. DOE was handicapped from the start, as the U.S. from these controls lost domestic production and dramatically increased imports.

As well intended as they were, not one of these initiatives accomplished energy independence. Many were not sustainable. Tax incentives and subsidies are not effective solutions. Not one of the current proposals addresses the most fundamental problem: the nation's dependence on foreign sources of crude oil in a market that is subject to manipulation by government suppliers and by terrorists.

Taking no action will cost billions of dollars more. A shock in 2020 under the business-as-usual, do-nothing scenario costs consumers $400 billion with a deadweight loss to the U.S. economy of $113 billion, while the limits policy provides a gain of $187 billion.

Under the limits policy, the U.S. would not be spending additional billions to protect shipping lanes and to defend "friendly" oil-produc-ing nations. The gains to the U.S. current account, U.S. employment and tax receipts would be a bonus. The limits policy is an alternative to business as usual, which continues to leave the U.S. with the unnecessary risk of global oil-market supply disruptions. Nothing proposed here is novel. The U.S. has restricted oil imports as a matter of national interest before, and it has restricted imports for many other commodities and products as a matter of national interest. It should do so again. □

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Business As Usual Vs. Limits Policy
$ Billion

	Business As Usual			Limits Policy		
	Consumers' Surplus Lost	Producers' Surplus Gain	Deadweight Cost	Consumers' Surplus Lost	Producers' Surplus Gain	Deadweight Cost
2010	$566	$332	**$234**	$543	$328	**$215**
2015	$449	$277	**$172**	$403	$287	**$116**
2020	$400	$287	**$113**	$ 0	$ 0	**$ 0**

Note: The calculations associated with the limits policy do not account for the gains during the period when the shock does not occur.

The total deadweight loss (in billions) associated with a six-month shock to the U.S. economy (over three different time periods) under business as usual is always greater than under the limits policy.

Energy Independence Initiatives

Nuclear Technology
Clinch River Breeder Reactor (1970-1983)
Advanced Liquid Metal Reactor Program (1989-1994)
Global Nuclear Energy Partnership (2006)

Vehicle Technology
Virtually Pollution-Free Car (Nixon 1970)
Reinventing The Car (Carter 1977-1980)
Partnership For A New Generation Of Vehicles (Clinton 1993-2000)
Freedom Car (Bush 2003)

Biofuels
Alcohol Fuels (Energy Security Act 1980)
Oxygenated Fuels (Clean Air Act Amendments 1990)
Biofuels (EPAct 2005; EISA 2007)

Coal Utilization
U.S. Synthetic Fuels Corp. (1979-1985)
Clean Coal
Clean Coal Power Initiative (2001)
FutureGen (2003)

Crude Oil Imports
(1958-1972)

Crude Oil Price Controls
(pre-1972 and post-1972; 1973-1979)

Strategic Petroleum Reserve
(1973-present)

Source: National Academies Summit on America's Energy Future