Navigating the U.S. Oil Export Debate

Report Findings

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In collaboration with the Rhodium Group
The Origins of US Export Restrictions
A Relic From the 1970s
The Origins of Price Controls and Export Restrictions

- Import quotas begin to be relaxed in late 1960s
- Price controls introduced in the early 1970s to cope with declining domestic production, growing imports, high inflation and unemployment
- Four phases of price and wage controls introduced between 1971 and 1973
- As global oil prices rose above US price, export restrictions needed to prevent US producers from bypassing price controls
- Price controls gradually phased out during Carter and Reagan administrations, but accompanying export restrictions remain in place to this date
Arab Oil Embargo Leads to Export Restrictions

- **Emergency Petroleum Allocation Act (1973):** codified earlier “temporary” price controls and introduced export restrictions to tackle shortages after the embargo; crude oil subject to “short supply” controls + licensing by BIS

- **Trans-Alaska Pipeline System Act (1973):** facilitated domestic production of Alaska North Slope, but banned exports of production shipped via TAPS

- **Energy Policy and Conservation Act (1975):** directed POTUS to prohibit oil exports but provided POTUS discretion to make exceptions with national interest finding

- **Other Laws:** government sought to expand production in other laws (e.g., OCSLA) but included export restrictions

**Short supply controls have dwindled over the years**

- Short supply controls currently only cover:
  1. Crude oil
  2. Unprocessed western red cedar from federal or state lands
  3. Horses exported by sea for the purpose of slaughter
The Current Regulatory Framework Crude Oil

Executive branch actions have created exceptions to export ban

- Exports from Alaska Cook Inlet
- Exports to Canada (for use therein)
- Exports of heavy oil from California (up to 25,000 b/d)
- Exchange of oil from SPR
- Exports under certain international agreements
- Exports authorized by the president under applicable statute
- Re-exports of foreign oil (if not comingled with US crude)
- Exports pursuant to an exchange meeting statutory criteria

Crude exports also approved if BIS determines it in the national interest

Swaps considered in national interest when:

- Complemented by crude or refined product imports of equal or greater quantity or quality
- Contracts may be terminated if US supplies interrupted or threatened
- Cannot be reasonably marketed in the US for economical or technological reasons
## The Current Regulatory Framework

### Refined Products and Condensate

<table>
<thead>
<tr>
<th>Refined Products</th>
<th>Condensate</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Refined product exports are allowed and do not require license</td>
<td>• Generally defined as hydrocarbon liquid with API gravity higher than 50</td>
</tr>
<tr>
<td>• Distinction between crude oil and refined products: processing through a crude distillation tower</td>
<td>• Different treatment of lease vs. plant condensate</td>
</tr>
<tr>
<td>• BIS FAQs (Dec 30, 2014) identified 6 factors of distillation including that the process materially transforms crude oil into:</td>
<td>• Summer 2014 BIS rulings found that Eagle Ford condensate stabilized and processed through field distillation towers is considered a refined product and thus can be exported</td>
</tr>
<tr>
<td></td>
<td>• BIS FAQs confirm lightly processed condensate (much cheaper than in refinery) is exportable</td>
</tr>
<tr>
<td>• A chemically distinct output</td>
<td>• Crude oil too?</td>
</tr>
<tr>
<td>• of different API gravity</td>
<td></td>
</tr>
</tbody>
</table>
The Current Debate Over Exporting US Oil
Mismatch Between Domestic Supply and Refinery Demand
The Shale Boom Has Redrawn the US Energy Landscape

- Rapid domestic production growth and weak demand has sharply reduced the US petroleum trade deficit
- The US has gone from being the world’s largest product importer to largest (gross) exporter. Will likely remain a net crude importer for foreseeable future

Source: EIA
Mismatch Between Domestic Supply and Refinery Demand

- Nearly all US domestic production growth is “light tight oil”
- Increasing LTO share of crude slate is economically challenging
  - Processing limits on “light ends”
  - Lower valued light products from LTO
  - Idle high cost processing equipment for heavy oil
- Once “point of saturation” reached, price discount likely required to incentivize US refiners to absorb additional LTO

Global Refining Capacity (2013)

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of Refineries</th>
<th>Capacity (operable, th bbl/d)</th>
<th>Nelson Complexity Index</th>
<th>Bottom of the Barrel Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>124</td>
<td>17,815</td>
<td>9.88</td>
<td>0.52</td>
</tr>
<tr>
<td>Other North America</td>
<td>23</td>
<td>3,497</td>
<td>8.54</td>
<td>0.38</td>
</tr>
<tr>
<td>South America</td>
<td>64</td>
<td>5,860</td>
<td>5.33</td>
<td>0.28</td>
</tr>
<tr>
<td>Western Europe</td>
<td>94</td>
<td>13,582</td>
<td>7.67</td>
<td>0.27</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>89</td>
<td>10,602</td>
<td>5.72</td>
<td>0.15</td>
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<tr>
<td>Africa</td>
<td>45</td>
<td>3,218</td>
<td>4.01</td>
<td>0.11</td>
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<tr>
<td>Middle East</td>
<td>44</td>
<td>7,393</td>
<td>4.27</td>
<td>0.14</td>
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<tr>
<td>Asia Pacific</td>
<td>162</td>
<td>25,279</td>
<td>5.26</td>
<td>0.20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>645</strong></td>
<td><strong>87,246</strong></td>
<td><strong>6.87</strong></td>
<td><strong>0.28</strong></td>
</tr>
</tbody>
</table>

Source: Oil & Gas Journal
Adjustment to the New Normal Displacing Imports

- Foreign light crude has been almost entirely backed out of the US refining complex (West African exporters have been most severely hit).
- Lighter “medium” crude imports have also fallen significantly (further displacement limited by the economics of blending and Saudi preference for market share).

Source: EIA
Adjustment to the New Normal Increasing Exports

- The biggest outlet for US light crude to date has been exports to Canada (permissible under EPCA)
- Rose to 400,000 b/d (currently 350,000 b/d)
- Other outlets (e.g. re-exports) are considerably smaller
- Flexible approach by BIS could provide outlet for 300,000 to 500,000 b/d of condensate exports

Source: EIA
When Will the US Refining System Saturate with LTO

- US export restrictions can temporarily distort market outcomes, but we have not yet reached the point of saturation
- Turner Mason, ICF, NERA expect saturation when US crude production reaches 10 to 11 mn b/d (IHS uses a lower estimate of 9 to 10 mn b/d) -- US production at 9.1 mn b/d

Source: Bloomberg
The Economic Impact of Allowing Exports
Theory, Evidence and Modeled Estimates
Economic Theory and Empirical Evidence

- Theory suggests refined product prices would fall, not rise, if US crude exports were allowed.
- Recent infrastructure-driven price dynamics provide empirical support.
Direction is Clear, Magnitude is Uncertain

Various crude export studies arrive at markedly different conclusions with respect to domestic production, refined product prices and US GDP impact.

- Largest difference among various studies is in the impact on US GDP
- Directionally, all show higher oil production, lower gasoline prices, higher GDP if export ban is lifted
Understanding the Variables

1. Global Oil Price
2. US Resource Base
3. Refinery Economics
4. Global Oil Market Response
Oil Price Projections Are Key Variable

- Oil price assumptions are not the main factor explaining the difference in study results
- Existing studies explored a fairly narrow range of oil price futures, which appear increasingly outdated, given the recent oil price drop
US Resource Base

- Existing studies use a wide range of methodologies to forecast future production in a free crude trade scenario
- All production forecasts made prior to crude price collapse and will need to be revised
US Oil Supply Elasticity

- Wide range of estimates of the price elasticity of domestic oil supply
- Academic estimates range from 0.15 to 0.25. EIA estimates range from 0.1 to 0.5 depending on price. Rystad ranges from 0.1 to 1.0.

*Change in crude production/change in wellhead price, 2015–2025 average*
Refinery Economics

- Impact of oil export ban depends on the cost of new refining investment + speed of capacity additions
- Inducing such private sector investment through export restrictions is economically inefficient
### Global Oil Market Response Between 2015-2025

**International Crude Price Response**

2013 $ per barrel reduction per million b/d increase of US production

<table>
<thead>
<tr>
<th>Scenario</th>
<th>ICF</th>
<th>IHS</th>
<th>NERA</th>
<th>MAPI</th>
<th>GS</th>
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<tbody>
<tr>
<td>Low Differential</td>
<td>2.4</td>
<td>3.2</td>
<td>2.7</td>
<td>2.5</td>
<td>3.0</td>
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<tr>
<td>High Differential</td>
<td>2.2</td>
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<td>Base Production</td>
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<td>High O&amp;G Resource</td>
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**Global Reduction of Refined Product Prices**

2013 cents per gallon reduction per $1 per barrel reduction in international crude prices

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**Key Findings**

- Estimates of international crude price + refined petroleum price responses are similar
- Recent OPEC behavior demonstrates significant uncertainty in reaction to US production increase
Implications of the Recent Crude Price Drop

- Oil prices have dropped sharply since mid-2014
- It is too early to assess the magnitude of the impact of this decline on the US crude production outlook
- Directionally, the crude price drop (if sustained) will reduce production growth and delay the point at which the domestic market reaches saturation
- If US production holds up, resource estimates used in most existing studies are incorrect
- Supply curve may be flatter at lower prices, making domestic production more sensitive to price discounts

Source: EIA, Rystad Energy and Rhodium Group
Energy Security and Geopolitical Implications
From Lifting Crude Export Restrictions
Today’s Oil Market is Different From That of The 1970s

Most oil sold under long-term contracts in the 1970s, disruption in contractual shipments could result in physical shortages. This has been mitigated by:

- **Deep and liquid global crude markets**: price indexed to benchmark spot crude prices and mature pricing hubs; supply disruptions increase crude prices globally, reducing demand and bringing new supply to market

- **Global refined product markets**: gasoline, distillates, LPG, fuel oil sold globally at mature refined product spot markets in New York, Rotterdam, Singapore, and elsewhere

- **Strategic Petroleum Reserves and the IEA**: major oil consuming countries established SPRs and the IEA to coordinate responses to oil supply emergencies
The Benefits of Interdependence

- Elimination of US producer price discount facilitates quicker adjustment during supply disruptions: US tight oil is less capital intensive than other marginal sources and can be quickly ramped up -- can respond faster to shocks than conventional production (if price signals are not distorted)

- The US benefited from its participation in global oil markets: during times of extreme weather (Rita and Katarina) and disruptions (e.g., Venezuelan strikes), US could quickly replace volumes – would not be possible if other countries adopted similar export restrictions, which are inconsistent with US enjoying benefits of open markets and free trade

- US oil is a secure source of global supply: to the extent free trade boosts US production, share of stable oil supply increases in the global market
Economic Security Implications of Trade and Demand

- Oil price shocks impact the US economy in three ways:
  - increased business costs / reduced real household income
  - Inflationary pressures (inducing tighter monetary policy)
  - Increased current account deficit
- Macroeconomic impact of oil price shock is reduced if lifting of export ban boosts US productions and lowers net imports
- Demand response to lower gasoline prices may offset some of the gains
- High cost insurance in case of severe physical shortages, and exports can be restricted in emergency

Source: White House Council of Economic Advisers
Geopolitical and Trade Policy Considerations

**Existing trade commitments**

- Crude export restrictions call into question US commitment to free trade principles and adherence to GATT/WTO rules

**Current and future trade talks**

- Upholding restrictive US trade policies may undermine future efforts to challenge similar practices elsewhere

**Geopolitical implications**

- Lower oil prices can reduce the economic power of major oil producers, but can also destabilize them

**Improved trade relations**

- Lifting crude export restrictions can extend US influence by generating new trade relationships through US oil exports

**Diplomatic leverage**

- US oil export restrictions may hinder credibility & future attempts to build international support, e.g., sanctions
Environmental Considerations
Local and Global Impacts
Increased US Production Carries Environmental Risks

- Local environmental risks can be addressed at state and federal levels
- Global CO2 impact of 1.2 mn b/d additional US LTO production is between -57 and 168 Mt of CO2 equivalent
- Trade policy is an expensive way to achieve global climate objectives, but serious alternatives are needed

**Well-to-Wheel GHG Emission of Various Crude Grades**

- Refined Product Combustion
- Crude Refining
- Upgrading
- Refined Product Transport
- Crude Transport
- Crude Production

Source: IHS
Policy Options
Executive and Legislative
Policy Options to Ease Crude Export Restrictions

- **Presidential national interest authority**
  - The president could permit crude exports to FTA partners or NATO allies, for example; he could also permit the exports of light crude only, or lift the export ban altogether.

- **Flexible interpretation of existing rules**
  - The Commerce Dept. could grant classification rulings for condensate exports, approve licenses for swap transactions and permit crude exports case-by-case.

- **Administrative modification of existing regulations**
  - The Commerce Dept. could change the definition of crude oil under existing regulations, e.g., to allow the export of condensates without further processing.

- **Congressional action**
  - Congress could change the law; necessary to completely remove export restrictions, but not likely to happen any time soon.
Thank you

For more information contact

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Appendix
The original rationale for crude export restrictions no longer applies

If US production boom continues, domestic refiners will hit capacity limits, producers will face discounts and long-term E&P investment may suffer -- the recent oil price drop will slow down this process

Crude exports may hurt the profitability of refiners, but it will likely reduce fuel prices for Americans and benefit the US economy as a whole

Lifting crude export restrictions could increase US production by 0 to 1.2 mn b/d through 2025, and reduce US gasoline prices by 0 to 12 cents per gallon

Greater integration into global markets would make the US more resilient, not less, to global oil supply disruptions

Lifting export restrictions would enhance US credibility in trade talks

Increased US production can strengthen American leverage and weaken the geopolitical power of other major producing countries

Oil-related CO2 emissions may increase, but there are more cost-effective means to achieve global climate objectives