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The limits of energy independence: Assessing the implications of oil abundance for U.S. foreign policy

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ABSTRACT

How will energy abundance affect U.S. policymakers' willingness to underwrite the international energy system? This paper uses the correlates of support for energy independence in domestic U.S. oil policy to identify the marginal effect of oil import dependence in shaping the external behavior of the United States in relation to oil. An econometric study is carried out of an original panel dataset of votes on oil-related legislation in the U.S. Senate from 1992 to 2007. The paper finds that support for reducing the risk of oil import dependence is clustered around more unilateralist legislators who prefer to maximize freedom of action in U.S. foreign policy. By extension, this suggests the transformation of oil supply in North America to oil abundance is likely to have some effect on U.S. foreign policy, but this effect will be conditioned by the diversity of policymaker positions toward the importance of oil import dependence, and the variety of motivations driving policymaker support for intervention in oil markets. The findings are robust across a battery of different estimation strategies, including an instrumental variables approach using unique characteristics of the oil industry to control for potential problems with endogeneity.

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1. Introduction

How will oil abundance affect U.S. policymakers' willingness to underwrite the international energy system? For decades oil import dependence has been offered by policymakers as an important reason the United States remains militarily engaged in the Middle East. Yet the United States is projected to vastly reduce imports of oil due to the rise of shale oil production in North Dakota, Texas, and elsewhere. The International Energy Agency (IEA) estimates that North America as a whole will become a net exporter by 2030 [25]. The shift to abundance thus raises the question of how it will affect U.S. policymakers' commitment to promote stability in the Middle East and elsewhere.

The possibility that a rise in oil production in the United States could affect its foreign policy behavior has generated debate in the popular media. Levine [32] notes the possibility that the U.S. may be unwilling to support military intervention to protect Kuwaiti oil, such as occurred in 1990, given the reduction in oil imports implied by greater domestic production. A commission composed of former senior diplomatic and military leaders argues in favor of retaining a forward presence in the Middle East despite the increase in domestic production, but notes that "the rapid growth in domestic supplies and a declining import requirement have created a perception that America is primed to disengage from the Middle East" [14]. Congress has also debated the geopolitical implications of this change [44].

Theory suggests there is a relationship between levels of oil imports and the national security strategies states adopt, with governments investing in energy security-related measures when they are large energy importers [13]. Rovner and Talmadge [37] note that the United States, in particular, has used military power to secure access to Persian Gulf oil since at least 1980.[1] Hughes [23] discusses how the United States has used domestic and foreign policy instruments in response to the perceived risks associated with oil imports.[2] The increase of non-conventional oil production in the United States, coupled with rising imports in the Asia-Pacific, thus brings into question the balance of power that underwrites stability in the global oil market [24].

Inferring a relationship between changing levels of oil imports and U.S. security and foreign policy is nevertheless difficult because the perceived risk associated with oil imports is only one of a number of motivations for U.S. policymakers' willingness to support

[1] See also [15].
[2] On U.S. energy market governance see also [39].

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military engagement internationally. Leiby [30] notes, for example, that "military activities, even in world regions that represent vital sources of oil imports, undoubtedly serve a broader range of security and foreign policy objectives than simply protecting oil supplies." In the case of the Middle East, policymakers have a number of reasons for remaining engaged in the region in addition to oil security, including managing terrorist threats, and protecting Israel's security interests, and each of these could shape foreign policy decision-making. Understanding the policy implications of oil abundance thus requires us to isolate the *marginal* effect of security of oil supplies on the policy preferences of U.S. policymakers, and ultimately U.S. foreign policy. Yet there is no obvious strategy that allows us to disentangle the multiple goals policymakers pursue in foreign policy. To take one example, it is plausible that presidents and legislators have an incentive to use oil security to mask for other interests when making public speeches, and may be seeking to pander to domestic constituents by talking about energy independence. This makes speech evidence an unreliable indicator.

This article offers a novel strategy for resolving this problem. Rather than attempting to separate the role of oil from other factors in shaping the foreign policy preferences of U.S. policymakers, the article focuses on *domestic* U.S. oil policy preferences. This is a valid approach because, as described below, policymaker support for increasing oil produced domestically has historically been treated as a complement to the use of foreign policy by policymakers as they seek to manage the perceived national security risks associated with oil import dependence.[3] A preference for increasing domestic oil production should thus be associated with supporting foreign policies designed to manage the perceived risks of oil import dependence. It should *not*, on the other hand, be systematically associated with other reasons for supporting U.S. intervention in the Middle East and elsewhere, such as the defense of Israel or managing terrorist threats. Identifying who supports energy independence in *domestic* U.S. oil policy therefore offers a strategy for investigating whether changes in oil import dependence are likely to shape the *external* behavior of the United States in relation to oil.

Focusing on domestic oil policy nevertheless introduces at least two challenges of its own. First, while scholars show that the Congress matters in the design and implementation of foreign and security policies, a full accounting of the implications oil abundance for U.S. foreign policy requires analysis of the executive branch [31]. Empirical studies also show that whether control over the executive and legislative branches is united under a single party or not matter for U.S. trade policy, and it is plausible this is the case in oil policy as well [33]. Evidence also suggests the characteristics of presidents matter in determining choices over military intervention, which is one expression of U.S. security policy [38]. A study that focuses on congressional oil policymaking thus represents only a partial analysis of the foreign and security policy implications of increased oil production.[4] Nevertheless, there is substantial evidence that the Congress plays an important role in foreign policymaking, including in relation to national security issues, justifying the approach used here [20,34].

Second, while domestic oil policy preferences should be correlated with preferences toward oil-related security and foreign policy, but be uncorrelated with other, non-oil related factors, focusing on domestic oil policies requires us to account for factors other than oil import dependence that could plausibly shape the preferences of policymakers toward domestic oil policies. We control for these in the analysis. We also employ an instrumental variables approach – drawing on unique characteristics of the oil industry – to address endogeneity concerns.

Our results suggest that the shift from oil import dependence is likely to have an important, but conditional, effect on the collective preferences of policymakers. We present evidence that support for reducing oil import dependence by promoting domestic production is clustered around legislators who have unilateralist tendencies, defined as those that prefer maximizing freedom of action in the international system. By extension, this suggests the transformation of oil supply in North America toward greater oil abundance is likely to have an effect on the foreign policy preferences of these legislators. This effect is balanced, however, against the diversity of policymaker positions toward the importance of oil import dependence in U.S. foreign policy, as well as by institutional factors. Taken together, this suggests that while the shift toward oil abundance in the United States may have some effect on U.S. foreign policy, that effect will be muted.

We proceed in three sections. In the next section we describe how U.S. policymakers have responded to the perceived national security risks associated with importing oil, emphasizing the complementarity of foreign and domestic policy instruments. We then outline our strategy for isolating the marginal impact of oil on U.S. foreign policy, and presents the empirical analysis. In the third and final section we discuss the policy implications of the findings, and suggest avenues for further research.

2. Oil import dependence and U.S. policy

Oil differs from manufactured products because it is a nonrenewable resource that is distributed unevenly around the world. This has caused policymakers in the United States and elsewhere to identify risks associated with oil imports as an important national security problem. As early as 1918, a study by the United States Geological Survey estimated domestic recoverable reserves in the United States would be exhausted by 1928 [48]. This led the State Department to support U.S. firms seeking to increase their control over oil reserves in the Middle East and elsewhere.[5] Following the Iranian Revolution of 1979–1980, when Iranian oil production was shut in and oil prices increased markedly, President Carter declared that stability in the Middle East was of vital interest to the United States. In his State of the Union Address of January 23, 1980, President Carter drew a direct link between oil imports and national security, stating that any attempt "by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America, and such an assault will be repelled by any means necessary, including military force."

Oil import dependence has thus been framed as an important factor shaping U.S. military and foreign policy engagement in the Middle East [26]. This policy choices has had important implications for foreign policy. According to data from SIPRI, a mean of almost 3.2 billion dollars in arms were exported from the United States to the Middle East between 1980 and 2012, including 763 million dollars in arms exports annually to Saudi Arabia. Studies also suggest that oil import dependence has been an important driver of U.S. military spending designed to maintain force projection capabilities capable of ensuring stability in the Gulf States [37]. Stern [41] estimates the United States spends billions of dollars annually in order to manage the perceived national security costs associated with oil imports.

[3] We make no claims about the efficacy of either of these approaches to managing security of oil supplies.

[4] See [7,27,17] for discussions of oil foreign policy-making that incorporates the role of both the executive and legislative branches.

[5] For a review of U.S. support for firms internationally see [1].

The reversal of the decades-long decline in the production of oil in the United States thus has the potential to transform U.S foreign and security policy. The International Energy Agency (IEA) projects that oil imports into the United States will fall from over 12 million barrels per day (mbd) in 2005, to 3.4 mbd in 2035, as a result of the rise in oil production. North America as a whole is also expected to become a net oil exporter [25, p. 120]. The connection drawn by policymakers between oil import dependence and national security suggests the shift to oil abundance could affect their willingness to invest in ensuring the stability of the global energy system, with profound implications for international energy politics.

Assessing the implications for policy of the shift toward falling oil imports faces an important empirical challenge: U.S. policymakers have multiple reasons for intervening in the Middle East, North Africa, and elsewhere, in addition to oil security. Two commonly cited alternative problems that affect U.S. security policy in the Middle East, for example, are the threat presented by terrorism, and the defense of Israel. Identifying the implications of the fall in U.S. oil imports thus requires us to isolate the *marginal* effect of changes in oil import dependence on foreign policy. Yet there is no obvious way to isolate the role of oil in shaping the policy preferences of policymakers from these other factors.

This article takes advantage of the fact that security policy is not the only instrument used by policymakers to respond to the perceived risks associated with oil import dependence. Instead, complementing the use of foreign and military policies are domestic policies intended to increase domestically produced oil as a ratio of total consumption, with the stated goal of mitigating oil security risks by reducing imports. The United States became a net importer of oil in 1948. Congress responded to the rise in oil imports by giving the president the authority to restrict imports in order to protect domestic production [8]. The Eisenhower administration established quotas on oil imports in 1957, stating that "the basis of the new program, like that for the voluntary program, is the certified requirements of our national security which makes it necessary that we preserve to the greatest extent possible a vigorous, healthy petroleum industry in the United States" [46]. Mandatory quotas were imposed on oil imports in 1959, and remained in place until 1973.

The federal government has used three policy instruments to increase the level of domestic production as a percentage of total consumption. First, it has increased the share of federal lands and the outer continental shelf (OCS) available for exploration and production. Second, it has used fiscal incentives – allowances, tax credits, and subsidies – to increase domestic oil production. In 2007 alone, depletion allowances worth $1.2 billion annually were in place for oil, gas, and coal, in addition to tax benefits associated with drilling costs worth $1.1 billion, enhanced oil recovery tax credits of $200 million, among others. Third, the government has imposed trade barriers – tariffs and quotas – that raise the cost of foreign oil or actually restrict imports. The federal executive can set quotas and tariffs on crude oil imports by virtue of the 1953 Trade Agreements Adjustment Act and of Section 232 of the Trade Extension Act. Section 232 has been invoked as justification for intervening in oil markets: between 1962 and 2004, eight of the 26 investigations conducted under Section 232 focused on the national security implications of oil imports [12]. These policies have consistently been justified by the desire to reduce U.S. vulnerability induced by rising imports [23].[6]

Domestic oil policies have thus been used as a complement to foreign and security policies in attempting to manage the perceived risks associated with oil import dependence. The complementary character of these policies means policymakers who perceive a national security risk associated with relying on oil imports are likely to support *both* the use of foreign and military policy in order to reduce the perceived national security risks associated with the dependence on oil imports, *and* increasing domestic oil production. By extension, an increase in domestic production should mean these policymakers should be less interested in investing resources in policies designed to secure oil.

Support for increasing domestic oil production should thus be correlated with support for managing U.S. oil import dependence using foreign policy. Domestic oil policy choices should *not*, on the other hand, systematically affect the likelihood policymakers will support other U.S. foreign policy goals, such as terrorism or the defense of Israel. Identifying the characteristics of policymakers who support for energy independence in domestic U.S. oil policy thus offers one strategy for isolating the importance of oil import dependence, relative to other factors, in shaping policymaker preferences toward U.S. military and foreign policy.

Focusing on domestic oil policy nevertheless introduces challenges of its own. Most importantly, it is necessary to control for other factors informing U.S. domestic oil policy decisions. The first focuses on the role of "Big Oil" [29]. The strong version of this theory, proposed by Stigler [42], holds that the emphasis on oil import dependence in U.S. policy is influenced by firms, which provide policymakers with votes and monetary contributions in return for policies that increase economic rents. Indeed, Stigler motivates his seminal article on economic regulation citing the example of the capture of policymaking by the oil industry.[7]

Government incentives to increase the domestic production of oil certainly benefit firms, which benefit from gaining greater access to federal lands, as well as from receiving tax credits to offset the technological, geological, and financial risks of drilling for oil. The two industry peak associations in the United States, the American Petroleum Institute (API) and the Independent Producers Association of America (IPAA), consistently lobbied before Congress on the merits of providing subsidies to oil firms throughout the post war period.[8] The oil industry is also powerful and can influence public officials to provide beneficial legislation and regulation. Studies show that U.S. foreign oil policy is also influenced by industry interests [16].

A second factor that requires controlling for is district-level benefits. Policymakers are motivated by reelection [19], and domestic oil production produces employment and growth. The United States has many oil-producing and prospective oil-producing areas, and regional distributional questions are therefore relevant to many legislators and constituents. In the case of the United States 33 states have some level of oil and gas production on federal lands. Royalties and other fees paid on mineral leasing reached 24 billion dollars in the same year, with total employment in oil and gas extraction, refining, distribution, retail, standing at 1.95 million people [28]. The details of domestic oil policy can thus impact local economies significantly, and it is plausible that legislators respond with domestic measures that have positive distributive effects for

[6] In addition to these supply-side measures, governments have also introduced policies designed to promote the more efficient use of energy, including oil.

[7] "The 'protection of the public' theory of regulation," says [42], "must say that the choice of import quotas is dictated by the concern of the federal government for an adequate domestic supply of petroleum in the event of war – a remark calculated to elicit uproarious laughter at the Petroleum Club" (p. 4).

[8] Their position on the merits of oil import quotas has differed because many API members have internationalized and diversified operations, while members of the IPAA tend to be focused on domestic production alone.

states in terms of employment and economic growth. Support for energy independence could therefore reflect the positive distributional implications for electoral districts, with legislators rewarded with votes for their work on behalf of their constituents.

The next section describes the empirical strategy used to isolate the role of oil import dependence on policymakers, including how we control for these domestic factors, and solve potential issues with endogeneity.

3. Empirical strategy

Our empirical strategy focuses on voting behavior in the Congress, centered on an econometric study of an original dataset that includes every vote in the U.S. Senate related to votes on enhancing domestic oil production between 1992 and 2007.[9] Panel data were gathered for votes on domestic oil production policy in the United States Senate between 1992 and 2007, a total of eighteen votes and 1800 observations. A binary dependent variable accounts for each senator's vote, where 1 denotes support for increasing incentives for domestic oil production and 0 signifies lack of support (including abstentions).[10]

Identifying votes that offer a clean measure of preference for higher domestic oil production incentives presents several challenges. Most importantly, some policies are included in broader fiscal legislation unrelated to the question of energy independence. To manage this votes were selected that specifically focus on increasing or decreasing the incentives for oil production domestically. Subsequently, votes that showed variation on the dependent variable were selected. In other words, unanimous or nearly unanimous votes were excluded. Applying this criteria yielded a total of 18 votes focusing on adjusting the incentives for exploration and production within the United States. The first vote took place in 1992 and the last in 2007, rendering a total of 1800 observations. No votes between 1981 and 1991 were identified that satisfied the two criteria outlined above. While the Omnibus Tax Legislation passed in 1986 did provide incentives for domestic oil production, for example, the large number of industries and issues affected by the bill made it unrealistic to isolate preferences related to the oil industry in particular. A vote from 1980 from the dataset was also excluded due to the lack of availability of several key explanatory variables for that year.[11]

The analysis also employs an instrumental variables approach. This is necessary because studies on campaign contributions face the challenge that contributions can be caused by, as well as cause, voting decisions. The analysis also recognizes potential endogeneity in another explanatory variable: the ratio of oil production to state GDP. If legislators are voting in favor or against increasing domestic oil production, then the oil-to-GDP ratio may also be partially determined by the dependent variable. Two instruments are employed: the total operable refining capacity in each state, and the size of each state as a percentage of the total size of the United States, to manage this problem.

The model can be stated formally in the following terms:

$$y_{i,j} = \mathbf{x}_{i,j}\mathbf{B} + \mathbf{z}_{i,j}\mathbf{\Gamma} + \mathbf{q}_{i,j}\mathbf{\Psi} + c_i + d_j + \varepsilon_{i,j} \quad (1)$$

[9] The dataset was constructed the using data from 1981, however no votes between 1981 and 1991 satisfied the criteria for vote selection described below. A full list of the votes in the study is included in the appendix.

[10] The paper focuses on the Senate, in part due to data limitations. Many of the variables are available at the state-level only. Redistricting in the House across time complicates a panel data study like the one provided here.

[11] The decision rule required variation in at least 10% of the votes in order for them to be included. This is the same strategy adopted by Poole and Rosenthal [36, p. 27] A list of the votes is included in an appendix.

4. Dependent variable and sample selection

The dependent variable, $y_{i,j}$ is a binary indicator that equals 1 if the legislator from seat i supports legislation to increase domestic production in vote j; $\mathbf{x}_{i,j}$ is a vector of legislator characteristics; $\mathbf{z}_{i,j}$ is a vector of constituents' characteristics; and $\mathbf{q}_{i,j}$ is a vector of industry characteristics, representing the key explanatory variables identified above. The dummy variables c_i and d_j capture unobserved characteristics at the district level or at the time when each vote takes place.

5. Operationalization of explanatory variables

5.1. Legislator characteristics

The idea that the shift to oil abundance could lead to changes in U.S. foreign policy is based on the theory that policymakers understand oil imports as a national security threat to the United States. Given this, we can hypothesize that the approach policymakers adopt toward managing oil import risks should reflect their preferences toward national security policy more generally.

One likely source of variation in policymakers' approaches to foreign policy is the extent to which they believe it is the interests of the United States to maximize its independence within the international system. Policymakers adopting this view are likely to be skeptical that the existing international order is sufficiently robust to ensure oil is supplied adequately, and are thus less likely to be willing to depend on others to ensure oil is supplied. They should thus be more willing to invest resources in promoting "energy independence," both by increasing domestic oil production, and by supporting a strong security policy in order to guarantee access to oil. By extension, a shift to oil abundance should make them less interested in investing resources in the Middle East and elsewhere with the purpose of securing oil.

In contrast, legislators who believe that the existing international order can supply the oil required to meet the growth and military needs of the United States are, by definition, more likely to be willing to depend on other states to ensure this oil is supplied. They should thus be less interested in expending resources to promote energy independence. In contrast to unilateralist policymakers, we can describe legislators with these characteristics as multilateralist, in that they believe states cooperate in order to achieve mutual gains achieved through institutionalized cooperation. By extension, policymakers with these characteristics are unlikely to be affected by changes in the ratio of oil produced domestically to total oil used.[12]

Following Uscinski et al. [45] we use the rankings published by the *National Journal* on foreign policy votes to capture this relevant difference in the preferences of policymakers.[13] The *National Journal* rankings are calculated annually using a selection of votes, and decompose legislator policy preferences across economic, social, and foreign policy dimensions. Votes are categorized as conservative (liberal), and legislators are then ranked according to how conservative (liberal) they are relative to the rest of the chamber using a 0–100 scale, where higher values represent more conservative senators.

The index represents a useful measure of policymakers' ideological preferences. It focuses on whether legislators support enhancing the freedom of action of the United States in foreign

[12] We thank Brendan Green for extended discussions on these points.

[13] The *National Journal* rankings from 1981 – the first year the rankings were created – to 2007 were collected. Charlie Green, Editor of the National Journal, provided unpublished data.

policy. Votes in which support is defined as conservative – which we term unilateralist – favor defunding international organizations and limiting US behavior through international agreements. The expectation is that more unilateralist senators should be interested in policies that increase U.S. freedom of action. They should thus be likely to support measures to improve the freedom of action of the U.S. in oil markets through both domestic and foreign policy instruments.[14]

In addition, following convention, the legislator's party identification is used to control for overall ideological positioning, with Republicans scored as "1" and Democrats scored as "0." Independent senators are coded along with the party with which they caucus.

5.2. Constituency characteristics

Isolating the role of oil in foreign policy preferences requires us to control for a range of material incentives that could also plausibly affect domestic voting behavior. First, policymakers in states with substantial oil and gas production are likely to be more supportive of increased incentives for domestic production because of the state-level economic benefits this will produce. This possibility is controlled for in the analysis using the percentage of the gross state product from oil and gas production. Data is drawn from the Bureau of Economic Analysis of the U.S. Department of Commerce.

Constituents' views on the desirability of increased domestic production are also likely to be influenced by the price of gasoline in their districts, which changes incentives for political representatives. The variable on gasoline prices was collected at the state level from the data published by the Energy Information Administration of the U.S. Department of Energy, and was adjusted for inflation using the consumer price index made available by the Bureau of Labor Statistics. Two possibilities exist. On the one hand, legislators' concerns that price increases are politically unpopular might lead them to indicate their concern about high gasoline prices by increasing drilling opportunities and, in consequence, raising the supply of oil.[15] Constituents may also perceive gasoline prices as a source of "windfall" profits for the oil industry. To capture any nonlinearity of these effects, this variable was squared and included it in the model.

Voter opinion also plausibly matters. The 2006 Cooperative Congressional Electoral Study (CCES) [3] sampled respondents from each of the 50 states on the question: "Would you support the use of U.S. military force in order to secure sources of oil?" Given the lack of availability of alternative data, in this instance the additional assumption was made that the preferences of voters are time-invariant in the 1992–2007 period.[16]

Finally, two state-level control variables were included to account for differences in education and income across states. These are operationalized as the percentage of the state population ages 25 and over with at least a bachelor's degree and the state's median income, and they were obtained from U.S. Census data. Several of the estimation models include specifications that account for the presence of unobserved heterogeneity across states.

5.3. Industry preferences

The inclusion of industry-level characteristics recognizes industry may also affect voting behavior. This is measured using the amount of campaign contributions legislators received from political action committees (PACs) associated with that industry [6,4,43,18]. The provision of information is also identified as an important as a source of industry influence [5]. There is likely to be a strong correlation between the level of contributions and the amount of "face time" that an industry is likely to be able to obtain. The expectation is thus there is a positive relationship between industry contributions and increased support for domestic oil production. Nevertheless, since previous research on legislative voting has consistently found that campaign contributions are not a statistically significant predictor of voting [22,47,4,6], the null hypothesis is to find no significant effects. Data on campaign contributions comes from the Federal Election Commission.[17]

One difficulty with identifying the effects of industry interests is dealing with endogeneity. Specifically, campaign contributions may be given to legislators who would have voted to support the industry to begin with [4,6,10]. There is also potential endogeneity in the ratio of oil production to state GDP: if legislators are voting in favor of increasing domestic oil production through enhancing subsidies for enhanced oil recovery, for example, then the oil-to-GDP ratio may also be partially determined by the dependent variable.

An instrumental variables (IV) approach is used in response, leveraging specific characteristics of the petroleum industry: the total operable petroleum refining capacity in each state and the size (in squared miles) of each state as a percentage of the total size of the United States. Refining capacity is a reasonable instrument because decisions concerning the location of refineries tend to respond to the characteristics of consumer markets rather than domestic oil production. Senate votes on domestic oil production should thus not affect the level of refining capacity in a state. Higher refining capacity in a state is likely to increase the overall attention of oil and gas industry PACs to that state, however, and raise the amount of their contributions to the respective senators.

Similarly, the relative size of a state – as a share of the total size of the United States – is a valid instrument for the oil production-to-GDP ratio for two reasons. First, senatorial votes on domestic oil production, evidently, do not affect the size of a state. Second, the size of a state is positively correlated to the amount of oil production by virtue of the fact that larger states have a greater probability of containing oil reserves, for two reasons. First, a larger territory provides more squared miles to explore. Second, the areas with better geological prospects for oil production are largely in the central and western United States (plus Alaska), and states in this part of the country are larger for historical reasons unrelated to present-day senate votes.[18]

6. Estimation methodology

The panel nature of the data enables us to account for unobserved heterogeneity across legislative districts and time periods. The unit of analysis is the Senate seat of each legislator. If the legislator leaves the seat, the voting model specified in Eq. (1) is still

[14] The votes that compose the *National Journal* rankings do not include legislation on oil production, ensuring unilateralism is not directly related to the dependent variable.

[15] Increasing incentives for domestic production has a marginal impact on the price of gasoline, however this does not preclude politicians from adopting this rhetorical stance.

[16] We ran the estimations without this variable included as a robustness check, given the difference in time period between the CCES and vote data, with no substantial change in results.

[17] The data is available at http://www.fec.gov/finance/disclosure/ftpdet.shtml. We used the list of PACs compiled by the Center for Responsive Politics to identify which PACs are affiliated with the oil and gas industry.

[18] Not all policies are immediately relevant to changing production today, somewhat weakening the need to instrument for votes and oil production-to-GDP. It is nevertheless included, given that increasing (decreasing) subsidies for enhanced oil recovery, or increasing (decreasing) depletion allowances affect the short-term performance of small and medium-sized oil producers.

Table 1
Estimation results.

	(1) Pooled probit	(2) Dummy probit	(3) RE logit	(4) FE logit	(5) RE probit	(6) IV probit
Ideology	0.016***	0.006*	0.020***	0.007	0.011***	0.017**
	[0.004]	[0.003]	[0.006]	[0.006]	[0.003]	[0.007]
Party	0.707***	1.455***	2.046***	2.684***	1.128***	0.782
(Republican)	[0.213]	[0.218]	[0.320]	[0.382]	[0.179]	[0.773]
Oil-to-GDP	10.334***	0.861	19.410***	0.696	10.647***	11.544
ratio	[2.271]	[4.574]	[4.735]	[11.739]	[2.482]	[7.129]
State education	−0.028	0.396***	−0.087**	0.712***	−0.046**	−0.027
	[0.018]	[0.141]	[0.042]	[0.225]	[0.023]	[0.023]
Median income	−0.940*	3.249***	−0.267	5.880***	−0.191	−1.198
(ln)	[0.529]	[1.185]	[1.262]	[2.188]	[0.698]	[2.197]
CCES	−0.026	−0.438***	−0.032		−0.019	−0.029
	[0.020]	[0.074]	[0.043]		[0.024]	[0.023]
Oil PAC	0.009**	0.007*	0.016**	0.014*	0.009**	−0.011
(thousands)	[0.004]	[0.004]	[0.007]	[0.008]	[0.004]	[0.172]
Gas prices	−0.483	−0.932	−1.342	−1.419	−0.815	−0.527
	[0.903]	[0.919]	[1.524]	[1.713]	[0.845]	[1.170]
Gas prices	−0.067	−0.095	−0.176	−0.176	−0.088	−0.068
(squared)	[0.117]	[0.120]	[0.198]	[0.208]	[0.109]	[0.151]
Observations	1800	1800	1800	1800	1800	1800

Cluster–robust standard errors in brackets.
All estimations include time dummy variables for each bill or amendment.
* $p<0.1$
** $p<0.05$.
*** $p<0.01$.

used to estimate the propensity of the person occupying the seat to vote to expand domestic drilling. In a way, the model is analogous to analyzing seats as "vote producing" firms, where the chief executive officer may be replaced over time but other firm-level and contextual characteristics remain.[19]

The use of panel data models for a binary dependent variable presents challenges that do not exist for continuous dependent variables. Fixed-effects probit is biased and should be avoided, and random-effects logit is less efficient than random-effects probit [21,49]. Fixed-effects logit and random-effects logit can also render coefficients that vary significantly from each other in unexpected ways. In other words, no approach is accepted as necessarily superior to others. Thus, the best way to proceed with the analysis and ensure robustness in the findings is to estimate the theoretical model in a variety of ways and to compare the results.

As a baseline, a pooled probit is estimated for every observation in the sample. A cluster–robust variance–covariance matrix is estimated in order to account for serial correlation of the errors due to the clustering of observations for each Senate seat across time (model 1). Next, for comparison sake, the pooled probit model is run using dummy variables for each state (model 2). Subsequently, a random-effects logit model (model 3), a fixed-effects logit model (model 4), and a random-effects probit model (model 5) are estimated.

Model 6 then addresses the potential endogeneity of two explanatory variables – PAC contributions and oil-to-GDP ratio – with the instrumental variables (IV) approach outlined above. One additional estimation challenge remains, as no standard approach exists for instrumental variables estimation for panel data binary response models. A IV pooled probit approach is thus used. Since there is more than one endogenous explanatory variable, the minimum chi-squared two-step IV estimator [35] is used, and the standard errors for the clustering of observations at the "seat" level is adjusted using the jackknife method.[20]

7. Results

Table 1 presents the results. Starting with Model 1, pooled probit with cluster–robust standard errors, several of the coefficients are statistically significant and operate in the expected direction. A more unilateralist ideology, a Republican Party identification, a higher oil-to-GDP ratio, and greater oil PAC contributions are all statistically significant and increase the probability that a Senator will vote to raise incentives for domestic oil production. The ideological preference variable is also robust across different estimation techniques, even after controlling for other factors that are likely to affect voting behavior. It remains statistically significant in all except for the fixed-effects logit and its coefficient generally hovers around similar values. Party identification is also highly significant in most models, although not in the IV probit estimation. Model 6, which addresses the endogeneity of the explanatory variables, adds confidence in this finding, as the foreign policy preferences variable is still highly statistically significant.

Moving beyond the variables that proxy for the ideological predisposition of legislators, the results show that oil-to-GDP ratio also has significance in most models, and it barely misses significance at the 10%-level when using instrumental variables. The range of values that the point estimate takes, however, is much larger. The

[19] Descriptive statistics for the dependent and the explanatory variables are shown in the appendix.

[20] As a check against the use of "weak instruments," it is generally advisable to report the results of the first-stage regression or include a robust test for the coefficient of the instrumented variable (e.g., [40]). However, no procedures have been developed to check against "weak instruments" in the presence of more than one endogenous explanatory variable. First-stage regression results can be presented for cases of only one endogenous variable, but in the present context they are not helpful as the second endogenous variable would remain in the model – preserving the problem of biased coefficients. As a result, the theoretical justification for the instruments is relied on. Fortunately, the model is just-identified – a situation that has been found less likely to lead to "weak instrument" bias [2].

coefficient for the oil industry PAC contributions is also positive across all estimations, and it is significant at least at the 10%-level in most of them. However, it is not significant in the IV approach. Interestingly, neither gasoline prices nor constituents' support for military action to secure source of oil is significant. The results of the CCES variable, on the other hand, are somewhat puzzling, given the small, negative, and insignificant coefficient across the board with the exception of the fixed-effects logit estimation, where it is large, positive, and highly statistically significant. From one perspective, it underscores the lack of reliability of fixed-effects estimates with binary dependent variables. Perhaps more generally, it may also suggest that the assumption of time-invariance may not be a valid one. We ran the models excluding this variable and results did not change. Party identification and oil-to-GDP ratio are also no longer significant in Model 6, although they are close to significance at the 10%-level. Additionally, the Oil PAC variable is now estimated rather imprecisely and is far from achieving significance.

What can we conclude from these results? Setting aside the incentives to support oil for industry or constituency reasons, two conclusions stand out. First, the data shows that an increase in the unilateralist predisposition of legislators is associated with an increase in support for increasing domestic oil production. Second, it is also clear that Republican senators are considerably more likely to support increasing incentives for domestic drilling, even after controlling for material and other potentially confounding factors.

8. Discussion

Analysts propose the shift to oil abundance in the United States has the potential to alter the willingness of U.S. policymakers to continue to invest resources in seeking to enhance energy security by maintaining an interventionist security and foreign policy toward the Middle East. An important problem in identifying the implications of this shift, however, is that policymakers have multiple reasons for intervening in the Middle East and elsewhere, and there is no obvious strategy for separating these multiple foreign policy goals from one another.

This paper proposed a strategy for isolating the marginal effect of oil abundance on U.S. policymakers' foreign policy preferences that focuses on identifying the character of congressional support for domestic oil policy. We argued this is a useful strategy for identifying policymakers oil-related foreign policy preferences because promoting domestic oil production has been treated as a complementary strategy for managing the risks of oil import dependence. Thus support for domestic oil production measures should be associated with support for foreign intervention in order to manage the perceived risks associated with oil import dependence. It should not, on the other hand, be correlated with other foreign policy goals such as managing the risks of terrorism or defending Israel. Identifying the correlates of support for oil production domestically thus offers a strategy for identifying the importance of oil import dependence, relative to other factors, in legislative preferences toward the external behavior of the United States.

Using roll call data, we presented evidence suggesting that support for increasing energy independence is clustered around legislators whose ideological preferences can be characterized as favoring unilateralism. By contrast, more multilateral senators are less interested in supporting domestic oil production, even after controlling for important confounding variables. This finding is robust across a variety of different estimation approaches. The paper also found evidence that Republican senators are also more likely to support increasing incentives for domestic drilling. By extension, an increase in domestic oil production should reduce the intensity of unilateralist legislators toward both domestic and foreign policy measures designed to enhance energy security of supplies. The preferences of legislators that favor multilateralism, on the other hand, should be unaffected by the increase in domestic oil production.

What are the significance of these findings? In an integrated oil market the primary economic effect of the rise in US oil production is to expand global supplies [11]. In policy terms, on the other hand, the shift to oil abundance in the United States raises fundamental questions about the stability of the foreign policy strategies used to underwrite stability in global energy markets. The national security implications of U.S. oil import dependence, in particular, have been consistently offered as a core justification for policymakers' interest in intervening in the Middle East and elsewhere. The shift to oil abundance thus brings into doubt their willingness to continue to underwrite the international energy system.

The results presented here suggest that the perceived relationship between oil and national security in the United States does play a role in shaping the policy preferences of some members of congress. For these legislators, the rise of oil production in the United States is likely to influence their foreign policy preferences. For other congressional members, however, oil dependence plays a less important role in shaping their policy preferences. In these cases, the shift to oil abundance in North America is less likely to have an important effect on their policy preferences. The effect of oil abundance on U.S. foreign policy is thus likely to be conditioned by the ideological predisposition of legislators.

The analysis of how oil abundance affects U.S. foreign policy presented here is limited in three ways. Most obviously, this paper focuses on congressional voting behavior, and specifically the U.S. Senate. A complete understanding of the implications of the rise in oil independence for US foreign policy requires additional analysis of the House of Representatives, and an examination of the role of oil import dependence on foreign policy preferences in the executive branch, as well as the interaction between them in energy policymaking. Domestic political institutions play an important role aggregating these preferences to produce policy outcomes.

Second, the empirical strategy used here may not perfectly capture the implications of oil abundance on congressional opinion. It is plausible, for example, that there are also a subset of policymakers who are disinterested in promoting domestic production, but may nevertheless see value in using foreign policy to manage perceived energy security risks associated with oil dependence. While this cannot be directly tested given data limitations, if such policymakers exist the result can best be understood as identifying one subset of policymakers whose preferences are likely to be shaped by the effect of oil abundance.

Third, while the paper provides evidence showing that the oil policies supported by some members of congress are motivated by their approach to foreign policy, this does not predict the types of strategies these members will adopt following a shift to oil abundance. In fact, it could have two different effects, either causing unilateralist legislators to support *greater* international foreign policy activism as beliefs about the importance of stabilizing oil markets given rising domestic production no longer constrain security and foreign policy behavior. Alternatively, it could also lead to *less* activism, as oil is no longer considered an important national security issue.

The findings nevertheless have two important policy implications for current debates on the historic change in the position of the U.S. within the international oil economy. First, they suggest that the fall in oil imports that is following the rise of unconventional oil production in the United States is likely to reduce the willingness of some legislators to expend resources in order to manage the perceived national security implications associated with those imports. They also suggest however, that the effect of

the marginal reduction of the role of oil in some policymakers' preferences is likely to be tempered. The shift to oil abundance is unlikely to have an effect on those policymakers for whom oil import dependence is unimportant in their policy preferences. The transformation of oil supply in the United States from a situation of net oil import dependence to one of oil abundance is thus likely to have a conditional effect on U.S. foreign policy.

There is a second implication that emerges from this study. An important question in the next decade given the sharp rise in domestic production from unconventional sources concerns whether congress could consider allowing crude oil exports.[21] A simple "Big Oil" explanation would argue that legislators would allow crude oil exports because the domestic oil industry would be significantly affected by it. However, once the role of the foreign policy preferences of congress is taken into account, it is plausible that for some legislators, economic arguments or industry pressure may not suffice to overturn their lack of trust in the international petroleum market and will refuse to allow domestically produced oil to leave the country while foreign crude is still being imported. Whether or not an crude oil export ban is eventually lifted or kept in place would depend on the balance between the ideological predispositions of legislators – along with the confounding factors mentioned above.

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Appendix A. Votes used in analysis

Vote 1

Vote Date: February 19, 1992

Question: On the Amendment (Johnston Amendment No. 1647)

Vote: Senate Amendment 1647 to Senate Amendment 1646 to S. 2166 (National Security Act of 1992)

Vote Number: 24

Statement of Purpose: To provide for a leasing moratorium off Southern Florida, and for other purposes.

Vote 2

Vote Date: February 19, 1992

Question: On the Motion to Table (Motion To Table Amendment No. 1648)

Vote: Senate Amendment 1648 to S. 2166 (National Security Act of 1992)

Vote Number: 25

Statement of Purpose: To restore balance to the Outer Continental Shelf Lands Act.

Vote 3

Vote Date: July 29, 1992

Question: On the Motion to Table (Motion To Table S.Amdt. 2782)

Vote: Senate Amendment 2782 to H.R. 776 (National Energy Efficiency Act of 1991)

Vote Number: 159

Statement of Purpose: Striking repeal of minimum tax preferences for depletion and intangible drilling costs.

Vote 4

Vote Date: October 27, 1995

Question: On the Motion to Table (Motion to Table Baucus Amendment No. 2988)

Vote: Senate Amendment 2988 to S. 1357 (Balanced Budget Reconciliation Act of 1995)

Vote Number: 525

Statement of Purpose: To strike the provision authorizing oil and gas development in the Artic National Wildlife Refuge while preserving a balanced budget by 2002.

Vote 5

Vote Date: September 23, 1999

Question: On the Amendment (Hutchison Amendment No. 1603)

Vote: Senate Amendment 1603 to H.R. 2466 (Department of the Interior and Related Agencies Appropriations Act, 2000)

Vote Number: 290

Vote Purpose: To prohibit the use of funds for the purpose of issuing a notice of rulemaking with respect to the valuation of crude oil for royalty purposes until September 30, 2000.

Vote 6

Vote Date: July 11, 2001

Question: On the Motion to Table (Motion to Table Durbin Amdt. No. 879)

Vote: Senate Amendment 229 to H. Con. Res. 83

Vote Number: 229

Statement of Purpose: No Statement of Purpose on File. (Motion related to prohibiting the use of funds for the conduct of preleasing, leasing, and related activities within national monuments established under the Act of June 8, 1906, with the goal of disallowing drilling in these areas.)

Vote 7

Vote Date: July 12, 2001

Question: On the Motion to Table (Motion to Table Nelson (FL) Amendment No. 893)

Vote: Senate Amendment 893 to H.R. 2217 (Department of the Interior and Related Agencies Appropriations Act, 2002)

Vote Number: 231

Statement of Purpose: To prohibit the use of funds to execute a final lease agreement for oil and gas development in the area of the Gulf of Mexico known as "Lease Sale 181".

Vote 8

Vote Date: April 18, 2002

Question: On the Cloture Motion (Motion to Invoke Cloture on the Murkowski Amendment No. 31323)

Vote: S.Amdt. 3132 to S.Amdt. 2917 to S. 517 (National Laboratories Partnership Improvement Act of 2001)

Vote Number: 71

Statement of Purpose: To create jobs for Americans, to reduce dependence on foreign sources of crude oil and energy, to strengthen the economic self determination of the Inupiat Eskimos and to promote national security. Murkowski Amendment sought to allow gas and oil development in a portion of the Arctic National Wildlife Refuge.

Vote 9

Vote Date: April 23, 2002

Question: On the Cloture Motion (Motion to Invoke Cloture on the Daschle Amdt. No. 2917)

[21] Most types of crude oil exports have been banned in the United States since the 1970s. See [9].

Vote: S.Amdt. 2917 to S. 517 (National Laboratories Partnership Improvement Act of 2001)

Vote Number: 77

Statement of Purpose: To provide for the energy security of the nation.

Vote 10

Vote Date: April 25, 2002

Question: On Passage of the Bill (H.R. 4, as amended)

Vote: H.R. 4 (Energy Policy Act of 2002)

Vote Number: 94

Statement of Purpose: A bill to enhance energy conservation, research and development and to provide for security and diversity in the energy supply for the American people, and for other purposes.

Vote 11

Vote Date: July 31, 2003

*Question:*On Passage of the Bill (H.R. 4, as amended)

Vote: H.R. 6 (Energy Policy Act of 2003)

Vote Number: 317

Statement of Purpose: A bill to enhance energy conservation and research and development, to provide for security and diversity in the energy supply for the American people, and for other purposes.

Vote 12

Vote Date: November 21, 2003

Question: On the Cloture Motion (Motion To Invoke Cloture – H.R. 6 Conference Report)

Vote: H.R. 6 (Energy Policy Act of 2003)

Vote Number: 456

Statement of Purpose: A bill to enhance energy conservation and research and development, to provide for security and diversity in the energy supply for the American people, and for other purposes.

Vote 13

Vote Date: June 21, 2005

Question: On the Amendment (Nelson (FL) Amdt. No. 783)

Vote: S.Amdt. 783 to H.R. 6 (Energy Policy Act of 2005)

Vote Number: 143

Statement of Purpose: To strike the section providing for a comprehensive inventory of Outer Continental Shelf oil and natural gas resources.

Vote 14

Vote Date: June 28, 2005

Question: On Passage of the Bill (H.R. 6 As Amended)

Vote: H.R. 6 (Energy Policy Act of 2005)

Vote Number: 158

Statement of Purpose: A bill to ensure jobs for our future with secure, affordable, and reliable energy.

Vote 15

Vote Date: July 29, 2005

Question: On the Conference Report (Conference Report H.R. 6)

Vote: H.R. 6 (Energy Policy Act of 2005)

Vote Number: 158

Statement of Purpose: A bill to ensure jobs for our future with secure, affordable, and reliable energy.

Vote 16

Vote Date: August 1, 2006

Question: On Passage of the Bill (S. 3711)

Vote: S. 3711 (Gulf of Mexico Energy Security Act of 2006)

Vote Number: 219

Statement of Purpose: A bill to enhance the energy independence and security of the United States by providing for exploration, development, and production activities for mineral resources in the Gulf of Mexico, and for other purposes.

Vote 17

Vote Date: June 21, 2007

Question: On the Cloture Motion (Motion to Invoke Cloture on the Baucus Amdt. No. 1704)

Vote: S.Amdt. 1704 to S.Amdt. 1502 to H.R. 6 (CLEAN Energy Act of 2007)

Vote Number: 223

Statement of Purpose: To amend the Internal Revenue Code of 1986 to provide for energy advancement and investment, and for other purposes.

Vote 18

Vote Date: June 19, 2007

Question: On the Amendment (Kohl Amdt. No. 1519)

Vote: S.Amdt. 1519 to S.Amdt. 1502 to H.R. 6 (CLEAN Energy Act of 2007)

Vote Number: 215

Statement of Purpose: To amend the Sherman Act to make oil-producing and exporting cartels illegal.

Appendix B.

Descriptive statistics.

Variable	Obs.	Mean	Std. dev.	Min	Max
Votes	1800	0.55	0.50	0.00	1.00
Ideology	1800	46.08	27.33	0.00	94.00
Party (Republican)	1800	0.50	0.50	0.00	1.00
Oil-to-GDP ratio	1800	0.01	0.04	0.00	0.25
State education	1800	22.93	4.94	12.30	39.07
Median income (ln)	1800	10.50	0.36	9.59	11.09
CCES	1800	20.90	3.51	10.31	29.17
Oil PAC (thousands)	1800	6.35	13.50	0.00	88.31
Gas prices	1800	2.30	1.40	0.77	5.40
Gas prices (squared)	1800	7.23	8.40	0.60	29.21

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