The Petroleum Paradox: Oil, Coercive Vulnerability, and Great Power Behavior

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The Petroleum Paradox: Oil, Coercive Vulnerability, and Great Power Behavior

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Why do great powers fear oil coercion, and what explains the strategies they adopt to protect themselves from it? The paper identifies three types of anticipatory strategies great powers pursue: self-sufficiency, indirect control, and direct control. A state’s choice of strategy depends on its degree of vulnerability to oil coercion, which in turn is determined by two independent variables: the amount of oil the country possesses compared to what it needs to meet strategic objectives and the susceptibility of its imports to physical disruption. Great powers fear oil coercion not only because they worry about damage to their economies; petroleum denial also threatens a country’s military capabilities. Four case studies illustrate the theory, including Great Britain’s efforts to reduce coercive vulnerability at the close of the First World War and Adolf Hitler’s attempts across three periods to safeguard German oil access before and during World War II.

Mention the “oil weapon” and the 1973 Organization of Arab Petroleum Exporting Countries (OAPEC) embargo often leaps to mind, complete with its iconic images of long lines at American gasoline stations. Yet, international oil coercion, a strategy that aims to change an opponent’s political behavior by threatening its access to petroleum, rarely resembles the OAPEC oil crisis, and its use long predates 1973. The unfortunate overemphasis on this single,
famous case has contributed to decades of scholarly misunderstanding about how the “oil weapon” shapes international affairs.

In fact, great powers have faced the threat of oil coercion since the rise of military motorization during the First World War—and they have adopted costly and risky policies to avoid it. These measures, which I call “anticipatory strategies,” vary systematically, from domestic self-sufficiency efforts to actions as extreme as launching wars. Three of the more extreme examples show the military side of anticipatory strategies. Japan attacked Pearl Harbor and seized the petroleum-rich Dutch East Indies to secure oil after the US embargo cut off 80 percent of its supply.³ Determined to preserve its oil stockpile and viewing war with the United States as inevitable, Japan conquered its own supply and preemptively destroyed the lone naval threat to fuel shipments from the Indies—the US Pacific Fleet.⁴ Fear of oil coercion motivated the 1956 Suez crisis. When Egyptian president Gamal Abdel Nasser nationalized the Suez Canal, through which two-thirds of British oil imports traveled, Prime Minister Anthony Eden lamented, “The Egyptian has his thumb on our windpipe” and sent troops to capture the waterway before Nasser might decide to close it.⁵ Even the petroleum-rich United States has worried about oil coercion and adopted military measures to prevent it. When the 1979 invasion of Afghanistan generated alarm that the Soviets could expand into Iran and block oil shipments through the Strait of Hormuz, President Jimmy Carter threatened to use “any means necessary, including military force,” to repel a Persian Gulf attack.⁶ To back up this threat, Carter created the Rapid Deployment Joint Task Force (RD-JTF), the precursor of the United States Central Command (CENTCOM), the US regional command responsible for all military operations in the Middle East.

Scholars acknowledge oil’s role in these events but have failed to recognize the underlying pattern of strategic anticipation to blunt the oil weapon. This paper is the first to identify the phenomenon and propose a theory to

³ Jerome B. Cohen, Japan’s Economy in War and Reconstruction (Minneapolis: University of Minnesota Press, 1949), 134.
explain variation in great powers’ actions. While fear of oil coercion has spurred some great powers into war, others have instead sought domestic self-sufficiency. No explanation currently exists for their choice. Strategic anticipation itself is puzzling because oil coercion rarely targets great powers and seldom succeeds in attaining political objectives. Furthermore, prominent scholars suggest such worries are overblown. According to Eugene Gholz and Daryl G. Press, international oil markets quickly adapt to fill-in supply gaps caused by accidental or politically motivated disruptions. Because oil is fungible and traded globally, countries dependent on imported petroleum are no more exposed to price shocks than those self-sufficient in oil. Yet great powers nevertheless fear supply interruption.

This paper identifies three ideal-type categories that capture the most widely used anticipatory strategies: self-sufficiency, indirect control, and direct control. Two variables determine a great power’s coercive vulnerability, which, in turn, determines its choice of strategy: the susceptibility of its oil imports to military disruption and its “petroleum deficit,” meaning the difference between the oil it controls and what it needs to meet policy objectives. The greater the susceptibility and deficit, the more likely a country is to adopt an extreme anticipatory strategy because it is willing to pay high costs. In this rubric, oil is instrumental to other goals, not the end in itself. Strategic anticipation can only be understood by accounting for both the economic and military value of oil. Scholars commonly ignore the latter, but it explains much about why states fear oil coercion so deeply. Petroleum is so crucial for military mobility that denying oil to an adversary in wartime could paralyze its forces and threaten it with defeat. Because oil coercion is a double threat—losing oil access means losing wars, not just prosperity—its consequences are doubly dire, spurring great powers into costly anticipation.

By developing a systematic theory about how oil affects grand strategy, this article deepens our understanding of history and offers insight for understanding contemporary great power politics. China, an emerging superpower, appears to be pursuing an indirect control strategy to reduce its coercive vulnerability to an American naval blockade in the event of a confrontation. Because China relies so heavily on maritime transport for oil, a US

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7 The paper focuses on great powers because their superior capabilities afford them a full range of options to choose from, whereas minor powers may lack the means to pursue anticipatory strategies at all. Moreover, because weak states are at the mercy of the strong, the actions great powers take to reduce their vulnerability are likely to affect, or even determine, the oil access of minor powers. Importantly, this paper does not attempt to explain when and why coercer states wield the “oil weapon,” which would require developing a theory about the decision calculus of the coercer. Instead, it approaches the interaction from the point of view of the potential target. The paper also brackets questions about oil coercion’s effectiveness.


blockade could cut off up to 90 percent of the country’s petroleum imports. No wonder analysts warn that “China’s Achilles’ heel may well be imported oil.”\textsuperscript{10} Recently, China has made massive pipeline and infrastructure investments to build a “New Silk Road” for importing Russian and Central Asian petroleum.\textsuperscript{11} The major advantage of these investments is that the oil will travel to China overland—beyond the reach of US naval power.\textsuperscript{12} China has also pursued closer military and economic ties with Indonesia and Malaysia, the two countries that sit aside the Strait of Malacca, a critical “choke point” for China’s oil imports.\textsuperscript{13} According to a recent study, China’s military fuel requirements in an air war with Taiwan would be so massive that if a US blockade forced it to rely on indigenous jet fuel production alone, civilian aviation consumption would have to decrease by as much as 75 percent to maintain a full military effort.\textsuperscript{14}

This article briefly reviews the extant literature on oil and international security. Next, it lays out the theory, explaining the anticipatory strategies of direct control, indirect control, and self-sufficiency. Then, it illustrates the theory with four case studies. The first examines Great Britain’s direct control strategy in Mesopotamia at the end of World War I, while the remaining three evaluate how Germany’s strategy changed with its coercive vulnerability during the Nazi period. The article concludes by explaining further why the theory is relevant today, despite technological change and the lack of great power conflict since World War II and suggests directions for future research.

WHAT DO WE KNOW ABOUT OIL AND INTERNATIONAL SECURITY?

While many experts intuitively believe “oil matters” to geopolitics, consensus on when, why, and how it matters remains elusive. Although the aforementioned 1973 OAPEC embargo inspired a wave of scholarship in the 1970s and


\textsuperscript{11} In September 2013, China inked $100 billion worth of energy deals to refine and transport Central Asian oil. That October it concluded an unprecedented $85 billion equity agreement with Russia to import Siberian oil. Wayne Ma, “Russia Lets Down Guard on China,” \textit{Wall Street Journal}, 18 October 2013; Frank Ching, “China Leads in Race for New Silk Road in Central Asia,” \textit{Business Times} (Singapore), 9 October 2013.

\textsuperscript{12} Geoffrey Kemp, \textit{The East Moves West: India, China, and Asia’s Growing Presence in the Middle East} (Washington, DC: Brookings Institution Press), 175.


“Resource curse” literature connects oil wealth to domestic political ills such as civil war, despotism, and economic backwardness but overlooks its effects on foreign policy.\footnote{For example, Daniel W. Drezner, “Allies, Adversaries and Economic Coercion: Russian Foreign Economic Policy since 1991,” \textit{Security Studies} 6, no. 3 (Spring 1997): 65–111.} Jeff D. Colgan finds that revolutionary governments bankrolled by oil profits are significantly more likely to initiate militarized interstate disputes (MIDS), largely because oil revenue insulates them from domestic political accountability.\footnote{Michael L. Ross, \textit{The Oil Curse: How Petroleum Wealth Shapes the Development of Nations} (Princeton, NJ: Princeton University Press, 2012).}

But his story focuses on producer countries, not importing countries.

Numerous studies examine specific cases without trying to generalize from them. Recent work has assessed Iran’s ability to disrupt global oil supplies by closing the Strait of Hormuz or targeting Saudi production facilities.\footnote{Jeff D. Colgan, \textit{Petro-Aggression: When Oil Causes War} (Cambridge: Cambridge University Press, 2013).}


unique in its military preponderance and position as a major oil producer. Additionally, much of it focuses on policy prescriptions for what the United States should do rather than explanations of what the United States actually does to avoid disruptions. Excellent historical accounts of oil politics exist but do not make causal arguments.\textsuperscript{23} In sum, scholarly interest in how oil affects international security is increasing, but we lack systematic theories about oil coercion and its influence on strategy.

\textbf{SETTING THE RECORD STRAIGHT: WHY OIL COERCION IS DANGEROUS}

This paper explains when and why great powers use anticipatory strategies to thwart oil coercion. By identifying the most common anticipatory strategies and proposing a framework that explains variation, it aims to lay the foundation for future research on a poorly understood topic with broad analytical and policy implications. Before proceeding, however, the paper must dispel two popular myths fostered by the 1973 crisis that continue to generate confusion. The first myth is that coercers would use peaceful methods such as trade embargos and production cuts to interrupt access, as OAPEC did. Yet, military force can also interrupt access and may work better than trade embargos, given how tough these are to enforce. Second, the 1973 case created the false impression that producer countries are the “typical” perpetrators of oil coercion. To the contrary, because force can be used, coercers may be militarily strong, third-party states.

Dispelling these myths explains why great powers fear oil coercion despite the adaptive mechanisms of the global petroleum market. As long as the international market is functioning, and a state has access to the market, its oil supplies are secure. However, military force can supersede market mechanisms by physically preventing oil imports from reaching the target. In the anarchic international system, where force always lingers as a possibility and others’ intentions are unknowable, states must prepare for worst-case scenarios.\textsuperscript{24} Consequently, great powers worry that adversaries could forcibly cut off oil trade at a critical moment—for instance, when they need to defend themselves in war.

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This brings us to the matter of why oil coercion is dangerous enough to warrant costly anticipation. The default viewpoint, again influenced by 1973, assumes countries fear disruption because it causes oil price shocks that hurt economic prosperity. This represents a punishment strategy of coercion, which inflicts pain to change political behavior. While intuitive, this view is incomplete because it overlooks the supreme importance of oil for military power. Because mobility in the age of mechanized warfare depends almost completely on oil, disruptions can also coerce by denial, which compels by destroying an adversary’s physical capacity to resist. The dual threat of economic pain and military defeat makes oil coercion extremely dangerous and presents vulnerable countries with little choice but to act preemptively.

Mobility has key importance in land warfare on both sides of the conventional battlefield. Lacking it, militaries lose the element of surprise. Attackers may be unable to mass forces quickly enough to pierce enemy lines or exploit breakthroughs. Speed is just as important for the defender, who must rapidly shift reserves to counter incursions along its front. Petroleum is even more critical for military aviation, including pilot training, given the vast quantities of oil required to fuel aircraft. It also powers the massive and tightly integrated logistical apparatuses modern militaries rely upon for supply.

Petroleum’s high energy density translates into superior speed, range, reliability, and flexibility compared to other fuels. These performance losses can mean the difference between winning and losing wars. Lower-density energy sources, such as natural gas, coal, wood, and biofuels, can power internal combustion engines and were used widely by European and Japanese civilians to cope with World War II-related petroleum shortages. Although inferior to oil, these fuels sufficed to keep the war industries humming. A military running on such fuels, however, would have little hope of prevailing over a petroleum-powered enemy.

Compounding the problem, oil has unique physical characteristics that make it very difficult to replace for military transportation. Countries are

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26 On the distinction between punishment and denial, see Schelling, *Arms and Influence*, chap. 1.


better positioned to disable a military by attacking oil as opposed to other raw materials because it is scarce and cannot be renewed or recycled. Otherwise, the targeted country could stretch out supplies with scrap material drives, as is possible for steel and rubber. All told, oil disruption can wreak both military and economic havoc on great powers.

Because they are strategic actors, great powers recognize the potential danger from oil coercion and do not wait around to be victimized. Instead, they adopt anticipatory strategies to reduce vulnerability in hopes of avoiding being targeted in the first place. These strategies both deter coercive attempts and weaken their effectiveness when they do occur. Through this mechanism, strategic anticipation decreases the frequency of oil coercion as well as its success rate. Therein lays the petroleum paradox: great powers pursue anticipatory strategies even though oil coercion seldom occurs, and oil coercion is rare because it spurs strategic anticipation. Simply put, the rarity of oil coercion is endogenous to anticipatory behavior.

In this vein, oil parallels nuclear weapons in their impact on international politics. Nuclear war is so rare it has never occurred. Yet, the possibility of nuclear conflict was dangerous enough to profoundly shape US and Soviet conduct during the Cold War. Moreover, the absence of nuclear war was not independent of the superpowers’ behavior. An atomic World War III never materialized in part because American and Soviet leaders sought to avoid it.

THREE ANTICIPATORY STRATEGIES

Coercive vulnerability motivates great powers to safeguard petroleum access through anticipatory strategies, which I classify into three ideal-type categories: self-sufficiency, indirect control, and direct control (see Table 1). Each strategy is defined according to the logic underpinning its approach,

<table>
<thead>
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<th>Characteristics</th>
<th>Self-sufficiency</th>
<th>Indirect Control</th>
<th>Direct Control</th>
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<tr>
<td>Logic</td>
<td>Reduce reliance on external oil</td>
<td>Keep oil in “friendly hands,” away from adversaries; enhance cooperation</td>
<td>Directly annex foreign oil and transit routes</td>
</tr>
<tr>
<td>Means</td>
<td>Domestic policy</td>
<td>Threats, military aid, force if necessary</td>
<td>Military force</td>
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<tr>
<td>Costs and Risks</td>
<td>Low Limited</td>
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<td>High</td>
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<tr>
<td>Oil Security Benefits</td>
<td></td>
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</tr>
<tr>
<td>Examples</td>
<td>Stockpiles, alternative fuel subsidies, conservation</td>
<td>Security agreements, arms sales, basing</td>
<td>Territorial conquest, controlling sea lanes</td>
</tr>
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the means used, the costs the strategy entails, and the benefits it offers. The typology characterizes broad patterns of observed behavior—that is to say, it does not attempt to capture every prophylactic measure ever pursued by a vulnerable great power. Instead, it describes the most commonly employed anticipatory strategies so they can be recognized and explained. As a general principle, a state chooses its strategy with an eye toward minimizing the costs it must pay to reduce vulnerability. As the benefits of each strategy increase, so do the costs of pursuing it. The potentially most beneficial—direct control—is also the most costly, so states will only pursue it if they need to alleviate a high degree of coercive vulnerability. Importantly, the strategies are additive rather than mutually exclusive: states increasingly threatened by coercive vulnerability adopt costlier strategies without necessarily abandoning lower-level measures already in place.

Self-Sufficiency

Self-sufficiency uses domestic policy to make the state as independent of foreign oil supplies as possible. It decreases reliance on external sources by increasing domestic production, decreasing consumption, and/or building a supply cushion. The strategy resembles Kenneth N. Waltz’s concept of “internal balancing,” insofar as it enhances the state’s relative material capabilities in ways useful to its military power and security.30 Common policies adopted by states pursuing self-sufficiency include building strategic petroleum reserves, government investment in oil exploration, and subsidies for research and development of alternate fuels.

Self-sufficiency is the least costly of the three strategies. That is not to say it is cheap in an absolute sense; rather, it is cheap relative to the other two strategies. It avoids the direct military costs of taking territory that are associated with direct control. And, because it employs internal policy, it is the least provocative to other states and thus entails a low risk of broader international conflict and the costs such conflict entails.

Self-sufficiency can moderately decrease vulnerability but is generally inadequate for filling large gaps between petroleum needs and supplies. Technological limitations and diminishing marginal returns account for this deficiency. When it comes to powering combustion engines, petroleum is less substitutable than other fuels because it is highly energy-dense—that is, it naturally contains a large amount of energy per unit of volume.31 Therefore,


31 A common misconception is that petroleum has no general substitutes. In fact, the substitution problem applies specifically to transportation. Coal, wind, and natural gas closely substitute for oil in many non-transit activities, including electricity generation, heating, and industrial use.
the quantity of oil needed to produce a desired output of energy will be smaller than the quantities of other fuels required for the same energy output. Because one ton of coal produces roughly half the energy as a ton of crude oil, for example, it takes twice as much coal to perform the same amount of work.\footnote{On average, one barrel of crude oil contains 5.8 million BTUs of energy and weighs about .13 metric tons. It requires twice the weight of coal (about .26 metric tons) to yield the same amount of energy. For energy conversions, see http://www.eia.gov/energyexplained/index.cfm?page=about_energy_conversion_calculator. For volume-to-mass conversions, see BP Statistical Review of World Energy 2015, 44, http://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2015/bp-statistical-review-of-world-energy-2015-full-report.pdf}

The fundamental problem of energy density is very difficult to get around, creating stubborn trade-offs between fuel quality and quantity. Nazi Germany invested heavily in coal-to-oil synthetic fuel production. The process was costly and inefficient—requiring four to five tons of coal on average to produce one ton of synthetic oil—and the ratio worsened as fuel quality increased. As a result, Germany had to settle for producing 87 octane to yield enough synthetic aviation fuel to put the Luftwaffe in the air, but this created a disadvantage against Allied planes burning 100 octane fuel, contributing to Germany’s loss of the Battle of Britain.\footnote{Arnold Krammer, “Technology Transfer as War Booty: The U.S. Technical Oil Mission to Europe, 1945,” \textit{Technology and Culture} 22, no. 1 (January 1981): 69; Richard J. Overy, \textit{Why the Allies Won} (New York: W. W. Norton, 1996), 233.}

While self-sufficiency may satisfy the needs of low-vulnerability states, moderate- and high-vulnerability countries must pursue costlier strategies to improve their situation.

\section*{Indirect Control Strategies}

Indirect control reduces coercive vulnerability through security partnerships that deter rival great powers from intervening in oil-producing countries. The fundamental logic is to keep oil in “friendly hands” and away from adversaries that may interfere with access. It can be thought of as a type of external balancing in response to coercive threats.\footnote{External balancing consists of maneuvers “to strengthen and enlarge one’s own alliance or to weaken and shrink an opposing one.” See Waltz, \textit{Theory of International Politics}, 118.} The strategy may include formal military alliances, basing, arms sales, and military aid. Such measures improve the petroleum producer’s military capabilities and bolster the credibility of extended deterrence by establishing a public and physical commitment to the producer’s defense. This approach represented a major plank in American grand strategy toward the Persian Gulf during the Cold War, as the United States sought close relationships with Iran and Saudi Arabia to deter Soviet intervention. The expansion of the Rapid Deployment Force in the response to the USSR’s 1979 invasion of Afghanistan—which
brought the Red Army closer to the Strait of Hormuz—is a prime example of this approach.  

Indirect control also mitigates vulnerability by fostering cooperation. For example, in exchange for protection, the producer state may sit-out collective embargo attempts. The Shah of Iran, an American ally, abstained from the 1973 oil embargo and boosted output to compensate for lost supply. Similarly, Saudi Arabia, while publicly supporting the embargo, secretly provided oil for American forces in Vietnam.

Indirect control strategies potentially are more effective than self-sufficiency. They can expand wartime petroleum access significantly if the producer state remains friendly and the vulnerable state successfully defends the producer’s territory and oil transit routes. They are also less costly and risky than outright conquest. Because indirect control defends the status quo, it is less provocative to rival great powers than direct control, which changes the status quo. And, while the vulnerable state risks military costs by pledging to protect the producer, it only pays these costs if its security guarantee fails to deter aggression.

Though indirect control expands potential supplies, it cannot guarantee access. There is always some probability that the alliance could falter at a critical moment. An ally could withdraw cooperation or even switch loyalties, which the West feared Iran’s Mohammad Mossadegh might do in the early 1950s, given his perceived Soviet sympathies. Additional risks of indirect control include getting dragged into an ally’s conflict and provoking political backlash by supporting unsavory regimes.

Direct Control Strategies

Direct control strategies reduce coercive vulnerability in a straightforward manner: the vulnerable state conquers oil-rich territory and transportation routes that ship oil to its homeland or to military forces deployed abroad. Countries prefer direct control over proxy control of critical resources whenever possible to eliminate reliance on “other help” in a “self-help” system. The best of both worlds, the strategy combines the benefits of indirect control and self-sufficiency while minimizing their drawbacks. Like indirect control, territorial expansion increases the state’s total resources. Yet, unlike indirect

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35 States also may threaten or engage in unilateral intervention to protect oil-producing states in the absence of a formal alliance, but the lack of basing rights and military cooperation makes protection more difficult.


38 Pearson, *In the Name of Oil*, 14–39.

control, direct control guarantees access to this oil in an emergency, which is the chief advantage of self-sufficiency.

Although the prospects for increasing one’s oil security are great, direct control is very costly and risky. Absolute costs can vary greatly, but the relative costs of direct control practically always exceed those of indirect control. With direct control, the state has no choice but to pay the costs of fighting to take and hold oil resources, whereas indirect control may avoid those costs if deterrent threats successfully keep oil in “friendly hands.” Moreover, direct control could provoke military intervention by rival great powers anxious to restore a territorial status quo that favors their interests.

Perhaps the most infamous case of this strategy in action was Japan’s anticipatory invasion of the Dutch East Indies in December 1941, which bolstered Japanese oil resources in the short term, but at the cost of provoking a devastating war with the United States. That Japan took such a risk speaks to the desperation its coercive vulnerability engendered. Britain’s Mesopotamian campaign during the First World War, discussed below, is another example.

Due to the unavoidable costs of fighting and the risks of wider conflict, countries only pursue direct control when they face dire coercive vulnerability. But, success generates high payoffs: the vulnerable state controls the resource directly, rather than indirectly through a friendly regime.

EXPLAINING ANTICIPATION: DETERMINANTS OF COERCIVE VULNERABILITY

What explains variation in the anticipatory strategies great powers adopt? States select the least costly and risky strategy that promises to supply enough access to make them secure. Two independent variables determine the degree of coercive vulnerability, which in turn determines the anticipatory strategies chosen: the “petroleum deficit” and the susceptibility of oil imports to interdiction (Figure 1).

How Much Damage Would Disruption Cause? The Petroleum Deficit

The first and most important factor is the petroleum deficit, or the difference between indigenous oil resources and the amount of oil a state requires for its strategic objectives. It is a simple “have-minus-need” equation. As the size of the deficit grows, so does the magnitude of potential damage from disruption. Some level of deficit must exist to drive strategic anticipation.

INDIGENOUS OIL RESOURCES: THE “HAVE” PART OF THE EQUATION

Two factors measure the amount of oil a state has on its territory: current crude oil production, which is given by the market, and petroleum reserves,
FIGURE 1 The Theory

which are given by technology and nature.\textsuperscript{40} Current production determines
the quantity of oil available for immediate emergencies, while petroleum
reserves predict the future oil situation. Both factors are important because
states do not just worry about their coercive vulnerability today and tomo-
row; they are cognizant of long-term needs and threats. Reserve figures are
inherently uncertain, and at times, states have over- or underestimated them,
with broad foreign policy ramifications. What matters for assessing vulner-
ability are the official estimates based on the best knowledge and scientific
methods available at the time—regardless of whether or not these estimates
ultimately prove correct.

THE “NEED” PART OF THE EQUATION: SECURITY REQUIREMENTS

The amount of oil needed to meet foreign policy goals represents the other
side of the deficit equation. States generally determine their oil require-
ments in a rational manner. Given their strategic objectives and military
doctrine, they perform reasonable assessments of how much petroleum
they need, taking into account constraints and the expected responses of
others.\textsuperscript{41} Because this involves numerous uncertainties, leaders’ estimates
may or may not ultimately be accurate. In practice, precise estimates often are
unnecessary because states are too petroleum poor to meet wartime require-
ments of any size. During most of the twentieth century, for instance, Japan,

\textsuperscript{40} I exclude refinery capacity because it represents a lesser supply constraint; building new refineries
is easier than expanding recoverable oil reserves.

\textsuperscript{41} I take state goals as given, bracketing questions about their content and origins. This may introduce
endogeneity if states take oil availability into account when formulating their goals. The problem is not
unique to my theory. Endogeneity is almost always present in means-ends calculations; at the very least,
means influence ends by limiting the universe of realistic goals.
France, and Britain all faced obvious deficits owing to negligible oil output and virtually non-existent reserves. What matters, then, is not the accuracy of estimates, but the fact that states make them and pursue anticipatory strategies on that basis. Needs include both military demand and essential civilian requirements. In a true emergency, rationing can reduce civilian consumption drastically in favor of military purposes, but just how much petroleum a country can reallocate from its economy to the battlefield varies considerably. By 1944, for instance, Japan had squeezed civilian oil consumption down to only 3 percent of pre-World War II levels.\textsuperscript{42} Nazi Germany cut civilian consumption to one-tenth of peacetime demand during the war.\textsuperscript{43}

The key premise of the petroleum deficit is that oil resources must be indexed to security needs. Even a country with substantial indigenous oil resources may confront a deficit if its strategic requirements are also very large. Abundance alone is not enough; the country must have abundant oil relative to its strategic objectives. Consequently, the petroleum deficit can vary in two ways. New oil discoveries or the depletion of existing fields can alter the balance, but the deficit also may shift in tandem with changes in strategic goals.

What Is the Probability of Disruption? Physical Security of Oil Imports

The second driver of coercive vulnerability is the susceptibility of oil imports to physical interruption. This determines the likelihood that a disruption attempt actually could succeed in blocking the flow of oil to the vulnerable state. Several factors influence susceptibility to interdiction. Two of the most important are relative power—specifically, a country’s military capabilities for defending oil supply lines—and geography. A very powerful state could break a blockade or defeat attacks on its imports, lowering its coercive vulnerability. Geography matters in a variety of ways. Proximity to foreign oil enhances import security because shorter supply lines are easier to defend. Additionally, conventional wisdom suggests that overland transportation is safer than oceangoing commerce due to the possibility of naval blockade. Island nations, therefore, face especially high risk.

Coercive Vulnerability Theory and Its Predictions

Four potential outcomes arise from this theoretical framework (Figure 2). First, great powers with large deficits and imports that are highly susceptible to military interdiction face the greatest vulnerability and will pay the high costs of direct control. The British case discussed in the next section falls into this category. Second, countries with large deficits but secure imports

\textsuperscript{42} Cohen, \textit{Japan’s Economy}, 143.

\textsuperscript{43} United States Strategic Bombing Survey (USSBS), \textit{The Effects of Strategic Bombing on the German War Economy} (Washington, DC: US GPO, 1945), 40, 67, 77.
are moderately vulnerable to coercion and will choose indirect control. States will also pursue indirect control if the petroleum deficit is small but imports are highly susceptible to interdiction. Finally, states with small petroleum deficits and secure imports face the lowest coercive vulnerability. They will select self-sufficiency to safeguard access but will avoid costlier and riskier measures. In the three cases involving Nazi Germany, discussed below, Adolf Hitler progresses from self-sufficiency to indirect control to direct control, in line with theoretical expectations.

CASE STUDIES: STRATEGIC ANTICIPATION IN ACTION

Four case studies illustrate the theory. The first case reviews Great Britain’s response to high coercive vulnerability in the closing days of World War I. Conduct of the war made it obvious that oil would soon supplant coal as the dominant fuel. Britain’s severe petroleum deficit, combined with the susceptibility of its oil imports to German U-boat attacks, spurred the country into conquering Mesopotamia in 1918 to secure oil for future wars. I chose the British case because of its historical significance as the “original case” of strategic anticipation. Other great powers learned how threatening oil shortages could be by witnessing Britain’s harrowing ordeal, and they imitated Britain with anticipatory measures of their own. I also chose the case because
it is not widely known. The Japanese invasion of the Dutch East Indies, a prime example of anticipatory conquest, is already familiar to many scholars.

The remaining three cases examine Nazi Germany with longitudinal analysis, a technique that studies the same country over time to control for factors like culture or the personality of the leader.\footnote{Some might claim that Hitler was an outlier—an irrational actor motivated by such rabidly racist beliefs that little generalizable insight can be gleaned from his behavior. I reject this view. Many international relations scholars argue that Hitler’s foreign policies reflected “straightforward power calculations” that did not radically diverge from those of his predecessors. In other words, a different German leader would have behaved similarly if put in Hitler’s shoes—which is generalizability at its essence. Mearsheimer, \textit{Tragedy}, 181–82.} The cases cover three distinct periods of observation, reflecting the junctures at which Germany’s coercive vulnerability significantly changed—which should, and did, alter Hitler’s anticipatory strategy. Coercive vulnerability was low in the first period, which dates from March 1936 until Britain and France blockaded Germany on 3 September 1939, following Hitler’s invasion of Poland. In the second period, as a result of the blockade, Germany’s vulnerability rose to the moderate level and stayed that way until the end of December 1941, when the \textit{blitzkrieg} failed and the German invasion of the Soviet Union entered the phase of attrition warfare. The last period, when coercive vulnerability was high, covers events from the emergence of attrition warfare on the Eastern Front until Germany lost the war in May 1945. The German observations are especially compelling because they are counterintuitive. Given Hitler’s predilection for military expansion, we might expect him to favor direct control strategies to reduce coercive vulnerability. Yet, Hitler primarily pursued self-sufficiency and indirect control, resorting to direct control only when Germany reached a level of severe coercive vulnerability that less costly measures could not overcome, in congruence with the theory’s predictions.

This particular combination of cases is advantageous because they capture a broad range of values on the independent variables and provide examples of all three anticipatory strategies in action. The cases strongly support the claim that leaders feared oil coercion and chose anticipatory strategies based on the petroleum deficit and the susceptibility of imports to disruption. The higher the country’s coercive vulnerability, the higher the costs it was willing to pay and the more likely it was to adopt extreme strategies. The cases also show that prosperity concerns are not sufficient to explain states’ efforts to secure oil. Leaders based their calculations of the petroleum deficit on current and future military needs to a significant degree. Granted, these are likely cases for observing a military rationale because they occur during wars or just beforehand, when force is on decision-makers’ minds. But they are evidence nonetheless. Finally, the cases are valuable because they are historically important in their own right and demonstrate that oil coercion haunted states long before 1973.
Great Britain’s Strategy of Direct Control

Until 1917, the threat of oil coercion was poorly understood. Mechanized warfare was new and, resultantly, petroleum had not been targeted in previous conflicts. That year, however, Germany’s unrestricted submarine warfare destroyed large numbers of oil tankers destined for Britain, demonstrating that the evolution from coal-based fleets to ships running on petroleum—which Britain lacked—made the country exceedingly vulnerable to coercion in future wars. Behind this vulnerability lay two factors: Great Britain’s large petroleum deficit and the susceptibility of its oil imports to naval blockade. As my theory predicts, Britain took a direct control approach by annexing Mesopotamian oil resources and establishing a regional mandate following the war. The region produced no oil at the time and could not affect the Great War’s outcome, but it was believed to possess massive resources that could determine the winner of future wars. Direct control was costly and risky to the British; the invasion risked fracturing the Western alliance and provoking conflict with the United States over the division of Ottoman spoils.

Evolving Views on Oil’s Importance

Before 1917, few British officials anticipated that oil would become so indispensable to war that a country would be unable to prevail in a conflict without it. Nor did policymakers seem to grasp that oil’s unique military value meant that supply cutoffs could potentially be used for political coercion. Only a small number of individuals in the Admiralty had sensed oil’s new importance for warfare, with Admiral John Fisher perhaps the most influential member of this camp. During Fisher’s tenure as First Sea Lord from 1904–10, the Royal Navy embarked on a massive transition from coal-fueled ships to oil-burning vessels. The many performance advantages petroleum fuel had to offer, such as higher top speeds, faster acceleration, and increased range, had convinced Fisher that conversion was crucial for maintaining British naval superiority in the face of German competition.

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46 Long forgotten now, the United States was amid an oil scare prompted by geological studies suggesting that wartime demand—including the oil provided to Britain and France—had drained American oilfields dry, leaving the country unable to meet its petroleum demands. Britain’s monopolization of Middle Eastern reserves caused significant fear of British intentions in the United States, severely damaging relations between the two countries. John A. DeNovo, “The Movement for an Aggressive American Oil Policy Abroad, 1918–1920,” American Historical Review 61, no. 4 (July 1956): 857–61.
48 Ibid., 140.
disciple of Fisher who was appointed First Lord of the Admiralty in October 1911, expanded the program, and by 1912, all new destroyers, cruisers, and battleships ran on oil.\textsuperscript{49}

The problem associated with conversion, of course, was that it required Britain to switch from a fuel found in abundance domestically (coal) to one that it did not possess (oil). This raised enough concern to prompt the British government to buy a controlling share in the Anglo–Persian Oil Company, which held an exclusive oil concession in Persia.\textsuperscript{50} However, little else was done to protect access. The British did not yet appreciate the danger posed by petroleum cutoff, nor did they understand the extent to which the country’s lack of oil made it vulnerable to coercion by denial.

**BLOCKADE: COERCIVE VULNERABILITY DEMONSTRATED**

Everything changed in February 1917, when Germany strengthened its blockade of Great Britain by resuming unrestricted submarine warfare against merchant shipping in the North Atlantic. The Germans had tried this tactic on a much smaller scale in 1915, but the backlash it provoked from the United States and other neutral countries forced them to abandon the campaign. By the start of 1917, however, Germany was so desperate to end the war that its leaders were willing to run grave risks, and targeting raw material shipments crucial to Britain’s war effort, they believed, offered the best chance of forcing the British to the negotiating table.

The result was an immediate crisis. By 1917, Britain was relying upon the United States for nearly 90 percent of its total petroleum needs.\textsuperscript{51} American oil, of course, had no other way to reach Britain than by sea, and therefore it was entirely vulnerable to German submarine attacks. Petroleum shortages emerged in early spring and grew increasingly severe each month. Civilian rationing was imposed; yet the real danger the blockade posed was to Britain’s military power. Nearly all of the oil imported by Great Britain went directly to the armed forces.\textsuperscript{52} Tanker losses caused stockpiles of fuel oil to plummet from five months’ consumption in February to two months’ in May.\textsuperscript{53} By summer, the situation was precarious. Admiralty reports described Britain’s position as “very grave” and recommended “strictly limiting

\textsuperscript{50} Jack, “Purchase of the British Government’s Shares,” 139–46, 150, 167.
\textsuperscript{53} Sumida, “British Naval Operational Logistics,” 470.
the speed of all oil-burning vessels of the Fleet, except in the gravest emergency,” and reducing Fleet movements “to the utmost possible extent.”54

UNCOMFORTABLE DEPENDENCE ON “THE GOODWILL OF THE USA”

The British had little choice but to make desperate entreaties to the United States for emergency shipments of petroleum. Fuel shortages were so acute that British and French leaders warned that they might be forced to negotiate an end to the war with Germany if something was not done immediately to ensure the delivery of American oil. “The Germans are succeeding,” reported the US ambassador in London. “They have lately sunk so many fuel oil ships, that this country may very soon be in a perilous condition—even the Grand Fleet may not have enough fuel ... It is a very grave danger.”55 That same month, Arthur Balfour, the Foreign Secretary, sent a cable to Alfred Harmsworth, Lord Northcliffe, the British Commissioner in the United States, informing him that the British fleet would be immobilized by September unless three hundred thousand additional tons of oil could be obtained from the United States. Balfour cited two reasons for the crisis: the Royal Navy’s unexpectedly soaring demand for fuel oil combined with the loss of oil tankers to German U-boats.56

Although Britain’s coercive vulnerability was severe, pursuing a direct control strategy to remedy the situation was impossible at the height of the crisis for three main reasons. First, British forces could barely keep the Germans at bay on the Western Front, precluding any realistic chance of opening a new campaign to capture oil resources. Second, there was no readily attainable oil to be found. Global production was already dominated by distant great powers—namely, the United States and Russia—or countries within their spheres of influence.57 Third, and most important, the mistake had already been made. Britain’s weakness at the time reflected a failure to anticipate before the war just how quickly oil would supplant coal during the course of the conflict. Had Britain acted more strenuously to secure supplies prior to the war, perhaps it could have avoided such a situation through anticipatory measures, but by the summer of 1917 that opportunity had passed. In fairness to the British, anticipating the threat was probably impossible. No one foresaw just how much oil would be needed to fight,

55 Quoted in Yergin, The Prize, 177.
57 Russia and North America (the United States and Mexico) accounted for 91 percent of global production in 1917. The Middle East produced only 1 percent, virtually all of which came from the British concession in Persia. American Petroleum Institute, Petroleum Facts and Figures (New York: American Petroleum Institute, 1928–1971).
both because World War I was the first major mechanized conflict and because its conduct turned out to be unprecedented in scale. Perhaps more to the point, oil coercion had never been attempted before, and as such, states had not fully grasped the consequences. The British experience let the proverbial cat out of the bag, revealing to all the great powers the significance of the new threat.

Ultimately, Britain squeaked through the crisis thanks to three factors. The most important was the emergency delivery of additional oil from the United States, which more than doubled oil exports to the United Kingdom over the previous year. Harsh conservation measures adopted by the Royal Navy also played a role. Finally, the development of the convoy system curtailed losses to German submarines. By 1918, the worst had passed.

Britain narrowly escaped coming to terms with Imperial Germany, but the near miss shook up those in the highest echelons of government and convinced leaders that Britain could not be caught unprepared again. It was not lost on officials that the primary reason Britain survived the U-boat campaign was “the goodwill of the USA” in providing emergency oil supplies. This near-total dependence on the United States raised alarming questions. What if in the next war the Americans did not rush to the rescue? After all, the country had deep isolationist tendencies. Could Britain really count on another nation, even an ally, to come through in a crisis?

THE SLADE MEMO: AN EW COURSE FOR BRITISH GRAND STRATEGY

In wake of the crisis, the Admiralty released a lengthy memorandum advocating anticipatory measures to guard Britain against the threat of oil coercion in future conflicts. Written by Admiral Sir Edmond Slade in July 1918, the memo would guide decades of British strategy. In the piece, Slade demonstrated a clear understanding of Britain’s high coercive vulnerability, which was expected to worsen in future wars, and explained the need for strategic anticipation. British naval security, Slade argued, relied upon the control of oil. Because the superior performance of oil-burning vessels was quickly rendering coal obsolete, Britain had no choice but to fuel its navy with petroleum despite lacking domestic oil resources. At the same time, tightening global oil output was expected to prompt severe competition as the great powers struggled to access supplies. Only the Middle East, which at the time produced little oil but was believed to hold vast petroleum resources, could provide enough oil for future British needs in an age of oil-powered navies. “The Power that controls the oil lands of Persia and Mesopotamia,”

58 Ibid., 267; Sumida, “British Naval Operational Logistics,” 470.
Slade argued, “will control the source of supply of the majority of the liquid fuel of the future . . . and will be in a position to dictate its own terms to all shipping in case of war.” Strengthening British naval power was the only solution for defeating future blockade attempts and defending the far-flung Empire. Although Middle East oil was far away and could only reach the British Isles by sea, direct control would boost the capabilities of the Royal Fleet, already the world’s preponderant navy, to defend its supply lines from weaker foes such as Germany. Furthermore, Britain could use its exclusive control to ban sales of Middle East oil to rivals—extending its relative advantage even more. Therefore, Slade concluded that Britain must establish exclusive control over Middle East oil “at all costs” to secure its military position and “enjoy all the advantages that this will give us if we find ourselves forced into another war.”

**IMPACT OF THE SLADE MEMO**

Evidence suggests that Slade’s memo had a direct impact on British policy. Maurice Hankey, the Secretary of the War Cabinet, found the memo compelling and personally forwarded it to Prime Minister Lloyd George, Secretary of State for Foreign Affairs Arthur Balfour, and Eric Geddes, the First Lord of the Admiralty. Before the pivotal Imperial War Cabinet meeting on British aims in the Middle East, Hankey lobbied hard in favor of conquering oil-rich Mesopotamian territory beyond the current British lines. Balfour was a critical target because he was slated to give a speech at the meeting. Hankey wrote to Balfour: “As I understand the matter, oil in the next war will occupy the place of coal in the present war . . . The only big potential supply that we can get under British control is the Persian and Mesopotamian supply. The point where you come in is that the control over these oil supplies becomes a first-class British war aim. I write to urge that in your statement to the Imperial War Cabinet you should rub this in.” Balfour scribbled “I entirely agree” on his copy of Hankey’s letter.

At the meeting, Balfour echoed Hankey’s concerns and advocated for reopening the Mesopotamian campaign in order to seize petroleum resources. “I do not care under what system we keep the oil,” Balfour argued, “but I am quite clear it is all-important for us that this oil should be available.” Lloyd George agreed. Thus, the cabinet decided to occupy all oil-rich land.

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in Mesopotamia before the war ended—especially Mosul, which the Sykes–Picot agreement had shortsightedly ceded to France. Britain would need to move quickly to create “facts on the ground” to gain leverage in postwar negotiations over the city’s final status. British forces scrambled to advance as far up the Tigris River as possible but did not reach Mosul before hostilities with Turkey formally ceased. Nevertheless, British forces continued to fight until the city was captured several days after the armistice.

BRITAIN’S SUCCESS

Britain’s direct control strategy paid off handsomely. Once they officially won their claim to Mosul in exchange for ceding Syria to France at the 1920 San Remo conference, the British had acquired control over vast quantities of petroleum. That year, the oilfields of Mesopotamia were believed to contain reserves equal to those the United States was estimated to possess—about nine billion barrels. Before the war, only 5 percent of the world’s oil production came from territories under British control, but as a direct result of the British Middle Eastern mandate, 50 percent of known global oil reserves were now controlled by British companies.

Nazi Germany 1936–45

Nazi Germany from March 1936 to May 1945 presents a useful series of longitudinal cases because it offers ample within-case variation that is counterintuitive. Hitler was arguably the most conquest-obsessed leader of the twentieth century and, as such, one might expect him to follow a direct control strategy to reduce coercive vulnerability. Yet, he did not. Hitler never attempted to conquer Romania, the Reich’s most important source of petroleum during the war, instead pursuing self-sufficiency and indirect control as his primary strategies, in tandem with my theory’s expectations. Only when the blitzkrieg failed to bring quick victory over the Soviet Union in December 1941 did Hitler resort to direct control by turning south in a desperate 1942 summer offensive to seize the oil of the Caucasus and Caspian regions.

The German experience consists of three case periods. In the first, lasting from March 1936 to 3 September 1939, Germany faced low coercive vulnerability. The risk to imports was low while the Reich’s petroleum deficit was moderately low—in large part due to Hitler’s blitzkrieg strategy for fighting...
brief wars. As predicted, Hitler followed a self-sufficiency strategy in this period. The second era dates from 3 September 1939 to December 1941. The German petroleum deficit remained moderately low, but import vulnerability rose to moderately high because the invasion of Poland prompted an Anglo-French blockade, cutting off overseas oil supplies. As expected, Hitler shifted his strategy to indirect control, developing alliances with the two main European petroleum producers, whose oil could travel overland: Romania and the USSR (the latter up until the June 1941 invasion). Buoyed by the incredible successes of the blitzkrieg in France, Hitler concluded he could defeat Soviet forces rapidly enough to finesse German resource constraints; thus the petroleum deficit remained low for the first several months of the campaign against Russia. Only when Hitler finally acknowledged the failure of the blitzkrieg to produce a quick victory in December 1941, which ushered in a new phase of attrition warfare, did the petroleum deficit skyrocket and coercive vulnerability increase to high. Finally, I briefly discuss Germany’s situation of high coercive vulnerability from December 1941 until the end of the war.

PERIOD I: 1936–39

Germany’s coercive vulnerability from March 1936 to 3 September 1939 was low. As laid out earlier, coercive vulnerability depends on the petroleum deficit (the difference between oil needs and domestic resources) and the susceptibility of imports to cutoff. I argue that both the deficit and import vulnerability were small, leading Hitler to pursue self-sufficiency under the famous “Four Year Plan.”

Hitler’s Petroleum Deficit. Understanding the petroleum deficit requires comparing Hitler’s strategic goals to his anticipated needs. Hitler came to power with grand ambitions for German territorial expansion. His ultimate goal was to obtain “living space” in the East to encourage population growth among ethnic Germans, whom he viewed as “racially superior” to all other peoples. This was to come at the expense of the Soviet Union, a country that Hitler both reviled and feared. He coveted Russian territory for its abundant agricultural land and was preoccupied with quasi-Malthusian notions about agricultural productivity as a limit to population growth. Moreover, having lived through the WWI Anglo-French blockade that caused widespread starvation, Hitler believed self-sufficiency in food production

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67 On “race” and “space” as Hitler’s driving ideology, see Gerhard L. Weinberg, Hitler’s Foreign Policy 1933-1939: The Road to World War II (New York: Enigma Books, 2005), 6–13.

68 Contra the conventional view among historians that the USSR was Hitler’s primary enemy, J. Adam Tooze argues that by 1938, the United States had assumed that mantle. Adam Tooze, The Wages of Destruction: The Making and Breaking of the Nazi Economy (New York: Penguin Books, 2008).
was paramount to national survival and could only be achieved by acquiring Soviet territory up to the Ural Mountains.

However, in the period from March 1936 to 3 September 1939, Hitler knew Germany was too weak to challenge the USSR. Therefore, in the short term, his goal was to strengthen the Reich by gobbling up minor powers in Central Europe, specifically, Austria, Czechoslovakia, and Poland. Combining the economic resources of these states would put Germany on firmer footing for a later showdown with the Soviet Union. Ideally, Hitler hoped to achieve this with coercive diplomacy—threatening military action unless his demands for territory were met. But he was also willing to take territory by force in a series of short wars, if necessary. The problem, Hitler understood, was that expansion risked provoking war with Britain and France, which the Reich was unready to fight. Thus even as he planned for limited wars against minor powers, he sought to postpone any escalation to a European great power war.

How Much Oil Would It Take to Meet Hitler’s Goals? In the winter of 1935–36, the Reich experienced a foreign exchange crisis that caused severe shortages of imported raw materials including food and petroleum. The crisis prompted officials to review Germany’s raw material needs in the event of war and to update them in light of plans for rapid growth in the size of the armed forces. These projections set in motion efforts that would lead to the development of the “Four Year Plan” and a new agency for economic planning under the leadership of Hermann Göring, head of the Luftwaffe.

The person responsible for compiling the estimates was General Georg Thomas, the key Wehrmacht official on matters of rearmament and economic mobilization. He was also the most outspoken among Hitler’s generals in criticizing the blitzkrieg concept of war. Thomas argued that any major European conflict was likely to become a prolonged war of attrition—a “total war”—resembling World War I. He worried Hitler’s approach would push Germany into a long war its limited natural resource base could not support. Given this, Thomas advocated immediate and total economic mobilization as the only way forward.69

Unsurprisingly, Thomas’s office presented the situation pessimistically. In March 1936, it estimated that at current force sizes, Germany would need about three million tons of petroleum annually to wage total war, taking into account both military and essential civilian requirements. If Germany mobilized in 1938, taking into account plans to expand the military, it would need about five million tons per year. Domestic German oil production, which was increasing, could satisfy 30 percent of 1936 needs and 40 percent

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of 1938 needs—not shabby, but not enough.\textsuperscript{70} This left a deficit of about two million tons per year that would need to be filled with imports. Thomas did not emphasize, however, that if the military maintained its current force strength through 1938, the Reich would come very close to achieving self-sufficiency.\textsuperscript{71}

Annual petroleum consumption was a moot point to Hitler—at least in 1936. He agreed the Reich was poorly positioned for a long war and had no intention of fighting one.\textsuperscript{72} Despite resistance from his generals, Hitler remained convinced that a \textit{blitzkrieg} strategy of quick, successive strikes would enable Germany to defeat an opponent in a matter of weeks or months. From this perspective, the Reich would need far less petroleum than Thomas estimated because it would not be engaged in war for a full twelve months. In fact, given that both the Wehrmacht and German private industry held stockpiles of a few months’ supply at any given time, it was potentially possible to fight a \textit{blitzkrieg} war from stocks alone.\textsuperscript{73}

\textbf{How Much Oil Did Hitler Expect to Have?} Germany produced modest amounts of oil in 1936, and domestic output was expected to improve. Although conventional oil production that year was tiny relative to global output—just 450,000 tons, compared to nearly 250 million tons worldwide—it was enough to satisfy about 15 percent of Thomas’s projected needs.\textsuperscript{74} Several factors suggested that expansion was likely. First, the petroleum sector was already growing rapidly. Although output in 1936 was small, it represented a doubling of production over just three years. Second, the industry was undergoing technological modernization, emerging from a period of backwardness relative to its counterparts in major oil producing nations like the United States. And finally, oil discoveries were being made for the first time since 1919. Whereas before 1931 Germany had only four crude oilfields, discoveries beginning that year prompted the first government-sponsored geophysical surveys, which went on to discover nearly 250 fields by the end of the war.\textsuperscript{75} Additionally, coal-to-oil synthetic fuel technology developed by the German company I.G. Farben in the 1920s was starting to take off. Production in 1936 was over 600,000 tons—an additional 20

\begin{footnotes}
\item[71] Weinberg, \textit{Hitler’s Foreign Policy}, 273.
\item[73] Document 1301-PS, \textit{Nazi Conspiracy and Aggression}.
\item[75] Ibid.
\end{footnotes}
percent of Thomas’s projections—and I.G. Farben executives promised a quick scale-up if they received government support.\textsuperscript{76}

**Vulnerability to Import Cutoff.** Germany’s vulnerability to import cutoff from March 1936 to 3 September 1939 was low for two reasons. First, while Hitler recognized that preying on his weak neighbors could precipitate an Anglo-French intervention in the form of a naval blockade, he viewed the possibility as highly unlikely. Britain and France appeared to have little appetite for fighting another major war, and their credibility was in tatters. Despite their stated commitment to collective defense, they had punished violators of the League of Nations’ principles haphazardly, if at all. And they backed down repeatedly when challenged by Germany on significant provisions of the Peace of Versailles, including reparations payments, limits on German military power, and demilitarization in the Rhineland.\textsuperscript{77} Second, although 70 percent of Germany’s oil imports originated in the Western Hemisphere and thus were susceptible to blockade, the remaining 30 percent came overland from continental Europe, primarily Romania and Russia.\textsuperscript{78} Romanian exports in 1936 amounted to almost seven million tons, while Russia exported three million tons. The resulting ten million tons available from European sources was more than enough to fill Thomas’s projected deficit of two million tons.\textsuperscript{79} In other words, Germany could get all the oil it needed from Eastern Europe alone.

**Hitler’s Coercive Vulnerability Calculus.** All told, Hitler faced low coercive vulnerability from March 1936 until 3 September 1939. The petroleum deficit was small. Hitler’s expansionist goals risked military conflict that would boost fuel demand, but only briefly because campaigns were expected to be quick. Hitler also believed it likely that his targets would give up without a fight (Austria later did). Additionally, the risk to German oil imports was low. At worst, Germany would lose 70 percent of her prewar oil imports to an Allied blockade, but Romania and Russia could potentially replace them. However, Hitler believed Britain and France would stay on the sidelines. In this situation of low coercive vulnerability, the theory predicts Germany should follow a self-sufficiency strategy, which it did.

**The 1936 Four-Year Plan.** In August 1936, Hitler made up his mind on how to solve the Reich’s petroleum and natural resource issues. In an untitled memorandum found in Albert Speer’s possession at the end of the war (later


known as the “Four-Year Plan Memo”), Hitler announced a new initiative to make Germany self-sufficient in raw materials within two-to-four years and put Göring in charge of the program. The resulting “Four-Year Plan” placed special emphasis on achieving self-sufficiency in petroleum. Together, the conventional and synthetic oil industries attracted more funding than any other sector—comprising over 60 percent of government investment for raw materials under the plan. Increased investment was expected to boost annual petroleum production to six million tons (conventional and synthetic) by 1940. Extensive government subsidies were offered to encourage exploration and nearly doubled the yearly number of oil wells drilled over 1933 totals. More than one billion Reichsmarks were allocated to construct ten new coal-to-oil synthetic fuel plants; by September 1939, Germany had fourteen plants operating at full capacity and an additional six under construction. Finally, a strategic petroleum reserve of 2.2 million tons had been amassed by the time Germany invaded Poland.

PERIOD II: 3 SEPTEMBER 1939–DECEMBER 1941

The Anglo–French naval blockade, announced 3 September 1939, in reaction to the invasion of Poland, raised Germany’s coercive vulnerability to moderate. This is because the blockade was highly threatening to German imports, cutting off all supplies from the Western Hemisphere. Hitler had miscalculated, finally pushing the envelope with Britain and France too far. Although Romanian and Russian oil remained accessible, in an unforeseen twist, the export capacity of both countries had fallen. Romanian oil production had peaked in 1936 and was entering a period of steady decline; as a result, exports decreased to four million tons in 1939. Soviet oil production was expanding, but not enough to keep pace with domestic demand, leaving less than one million tons available for export.

80 Document No. 490: Unsigned Memorandum, DGFP.
82 Technical Sub-Committee on Axis Oil, Chiefs of Staff Committee, Oil as a Factor in the German War Effort, 1933–1945 (London: Offices of the Cabinet and Minister of Defence, 1946), 4. This target was not met.
86 Postwar estimates indicate that blockade leakages were small. At most, only three hundred thousand tons of oil produced outside of Europe made its way to Germany through neutral countries. Technical Sub-Committee on Axis Oil, Oil as a Factor, 11.
Fortunately for the Germans, the petroleum deficit remained small enough to be met by the lower level of European exports, assuming Romania and the USSR stayed friendly to Germany. Needs changed little, despite the Anglo–French declaration of war. This was “war” in name only; neither Britain nor France launched a substantial ground campaign in Poland’s defense (hence the “Phony War” epithet). Meanwhile, the speedy rout of Poland reinforced Hitler’s faith in the blitzkrieg and thus his belief that territory could be won quickly and with a small amount of oil. On the “haves” side, Hitler’s self-sufficiency campaign under the Four Year Plan had improved Germany’s situation. Total oil output (conventional and synthetic) had doubled in three years to 2.2 million tons, equaling 40 percent of all demand in 1939.  

Thus, although the susceptibility of imports to interdiction was now high thanks to the blockade, coercive vulnerability only increased to moderate because the petroleum deficit remained low.

As the theory predicts, the increase in German coercive vulnerability from low to moderate prompted a major escalation in anticipatory strategy from self-sufficiency to indirect control. Hitler did not abandon previous self-sufficiency efforts such as coal-to-oil synthetic production, which yielded success. But these alone no longer sufficed. Hitler thus scrambled to keep European oil producers friendly by solidifying economic pacts with Romania and Russia—the only countries whose exports could travel overland beyond reach of the blockade.

**Romania.** With an export capacity superior to the USSR, Romania emerged as the most important foreign source of oil to Nazi Germany upon imposition of the blockade. Although the country was officially neutral, interference by Germany’s great power rivals put access to Romanian oil in jeopardy, hence necessitating Hitler to take his relationship with the country to the next level. Two threats existed. First, Hitler worried that pressure from Britain and France would kill Germany’s oil trade with Romania. The two countries had longstanding influence in Bucharest owing to their dominance of the Romanian petroleum industry. British and French oil companies owned 75 percent of Romania’s oil production, whereas German firms owned less than 1 percent—a result of the World War I peace settlement. Now Britain and France were courting closer ties with Romania through arms sales and security guarantees against German aggression. At the same time, they were buying-up Romanian oil through advance purchases designed to

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88 Production includes Austrian output of 144,000 tons but excludes output from Polish territories occupied after the invasion. Gunther, “Chapter IV—Mobilisation Plans”; USSBS, *Oil Division Final Report*, 18. Demand figures represent actual civilian and military demand in 1939. Civilian fuels were not yet being rationed. Technical Sub-Committee on Axis Oil, *Oil as a Factor*, 165.

block sales to Germany. Second, Romania was under threat of Soviet invasion to reclaim Bessarabia, a former Russian territory ceded to Romania after the First World War. Bessarabia itself mattered little to Hitler, as it produced no oil. But any Soviet military action against Romania was dangerous because it could cause collateral damage to oil production and, even worse, might lead to Soviet occupation of the entire country. Given that Hitler still considered the USSR to be an enemy, Soviet consolidation of European oil resources would constitute an existential threat.

Hitler had tried to coax Romania into an alignment with the Axis before the blockade, but his efforts took on new urgency—and achieved greater success—from September 1939 onward. On 17 September, Stalin annexed eastern Poland (with secret approval from Germany) and massed troops along the Romanian border. Four days later, Armand Calinescu, Romania’s president, was mysteriously assassinated. Meanwhile, Romania watched in fear as Britain and France, who had lobbied hard for a security alliance, sat on the sidelines while the Polish drama unfolded.

Terrified of Soviet expansionism and dubious that the Western powers would live up to their security guarantees, Romanian leaders decided to accommodate German demands in exchange for protection. Negotiations began before the end of September. Through the process, Germany attained cooperation from the Romanian government to defeat interference from Britain and France. A major concession in December 1939 established export quotas to prevent any country from monopolizing Romanian oil sales, thus guaranteeing German access to exports. The Romanian government also cracked down on other creative measures by outside powers to deny oil to Germany—for instance, the French attempt to commission the entire fleet of barges that transported oil to Germany up the Danube. In May 1940, agreement was reached on a weapons-for-oil pact, whereby Romania pledged to deliver two hundred thousand tons of oil to the Reich per month in exchange for armaments.

In June 1940, a crisis erupted as the Soviet Union threatened war against Romania over the Bessarabian dispute. Behind the scenes, Hitler maneuvered assiduously to prevent a Soviet attack, hinting Germany would not stand idly by if military conflict erupted. He worked out a deal with the Soviets, agreeing to force Romania to cede Bessarabia to the Soviet Union in exchange for Soviet military restraint. In exchange for compliance with the deal, Hitler extended a security guarantee to cover Romania’s pre-World War I borders.

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92 Pearton, *Oil and the Romanian State*, 251.
Squeezed between two great powers, Bucharest had no choice but to accept. In addition to supplying arms and a security commitment, Germany sent a military mission to train Romanian forces and to deter any Soviet change of heart.95

Ultimately, Hitler’s alliance strategy paid off. Romania became Germany’s largest supplier. Its exports to Germany tripled from 450,000 tons in 1938 to 1.3 million tons in 1939, eventually reaching a height of nearly 3 million tons in 1941.96

Russia. No stranger to double-dealing, Hitler also pursued an oil-for-weapons alliance with the Soviet Union in the wake of the blockade. This was not a deep friendship but a marriage of convenience; Hitler intended to turn his sights on the USSR once the Western powers were crushed. In August 1939, Hitler and Stalin had signed the Molotov–Ribbentrop Pact; its fundamental value to Germany was that it would solve the two-front war problem that proved so devastating in the First World War. The pact also called for a general expansion of trade relations but left all details to be hammered out later.

The Anglo–French blockade set off frantic German attempts to immediately establish trade terms for importing Soviet oil under the pact. This urgency was underscored by Göring in a Reich Defense Council resolution the following day calling for “the further expansion of our economic relations with Russia . . . as quickly as possible.”97 The Germans attempted all manner of diplomatic maneuvers to get petroleum. For example, on 20 September, Ribbentrop, the German negotiator, appealed to change the agreed-upon boundaries of the Polish partition to cede an oil region to Germany instead of the USSR, to no avail.98 On 28 September, the Russians budged somewhat by agreeing to provide a “supplementary quantity of petroleum” from USSR-captured Polish fields to be delivered within a year. The Germans hoped to nail down a more extensive agreement within a few weeks, but the Soviets, aware of their superior bargaining position, dragged out talks for four months.99

A diplomatic breakthrough on 11 February 1940 secured the terms for the first major Nazi-Soviet economic pact, wherein the Soviets agreed to export oil, among other items, in exchange for “massive military support” from Germany, including gun turrets, mines, ships, combat aircraft including Dornier 115s, Messerschmitt 110s, and Junker JU-88s, and various other military equipment. By and large, the Nazis honored their export obligations to

97 Quoted in Ericson, *Feeding the German Eagle*, 68.
98 Weinberg, *Germany and the Soviet Union*, 56.
99 Ericson, *Feeding the German Eagle*, 71, 77.
the Soviets until the last months before the German invasion of the USSR on 22 June 1941. Göring and Hitler leaned on German firms to deliver agreed-upon items to Russia in order to ensure that the Soviets would deliver oil as scheduled. At times, Hitler was so eager to please that he yanked military equipment directly from Wehrmacht divisions and sent it to Russia in hopes of expediting reciprocal oil shipments, much to the consternation of his officers. The trade pact dramatically increased Soviet oil exports to Germany. In 1939, the USSR had exported a mere five thousand tons of petroleum to Germany; from February 1940 until Hitler’s invasion of the Soviet Union on 22 June 1941, Stalin had delivered nearly one million tons of oil to Germany under the auspices of the trade pact.100

THE END: DECEMBER 1941–MAY 1945

Finally, from December 1941 until the end of the war, Germany’s coercive vulnerability increased to very high. The petroleum deficit skyrocketed upon Hitler’s realization in early December that the blitzkrieg had failed, miring Germany in a long war of attrition with the Soviet Union. Oil import vulnerability also increased because, by betraying Stalin, Hitler lost access to one of the two sources of oil not jeopardized by the Allied blockade. At this stage, Hitler had no choice but to pursue oil through direct control, which he attempted to do by opening a campaign in June 1942 to capture the oil-rich Caucasus. It failed. German fuel requirements soared beyond the Reich’s ability to meet them, contributing to its ultimate defeat.

IMPLICATIONS

Oil’s importance for economic and military power casts a long shadow over world politics. Since mechanized warfare emerged in the early twentieth century, oil has played a crucial role in the capacity of nations to wage war. Because of its uniquely high energy density and naturally liquid state, oil offers superior performance over other fuels, especially for military mobility. Great powers are hard-wired to worry about oil supplies, lest they be vulnerable to coercion by denial in a conflict or crisis. Anticipating the danger, they pursue strategies of self-sufficiency, indirect control, or direct control according to their degree of coercive vulnerability. Two factors determine coercive vulnerability: the petroleum deficit and the susceptibility of the country’s imports to disruption. Despite the popular focus on oil’s economic value, this alone cannot account for states’ behavior. Military vulnerability plays a major, perhaps more important, role in spurring great power anticipation.

100 Ibid., 3, 105–14, 98; James E. McSherry, Stalin, Hitler, and Europe (Cleveland: World Publishing, 1968), 76.
A natural question raised by this paper concerns the applicability of coercive vulnerability theory to great power politics today and in the future. Two potential challenges exist. First, technological changes that significantly decrease oil’s importance for military power could limit the theory’s historical scope. If oil is no longer essential to war, this would diminish the impetus for strategic anticipation. Second, the theory would lose relevance if conventional military power itself no longer matters to great power politics, as proponents of the “obsolescence of war” thesis contend.101

An examination of these arguments suggests the theory remains applicable today. First, there is little reason to believe that technological change will reduce oil’s importance for economic and military power in the coming decades, and no evidence that oil is any less important now than in the past. Military transportation still relies almost exclusively on oil—in fact, requirements are increasing. In World War II, each US service member consumed, on average, one gallon of petroleum daily. By Vietnam, this number had jumped to about eight gallons. And by 2007, long after major combat operations officially ceased, American troops in Iraq were burning about twenty-two gallons of oil per service member per day.102 Furthermore, despite buzz surrounding the “Green Hornet,” a Navy fighter capable of burning up to 50 percent biomass, alternative fuel technology as yet holds little promise for replacing large portions of petroleum-based military fuels.103 However, the fact that the US government is attempting to find substitutes is telling.

Second, the obsolescence of war argument is far from conventional wisdom and has been disputed by prominent scholars.104 Nevertheless, if the argument were to prove correct, it would undermine a huge portion of the field of security studies, not just coercive vulnerability theory. Yet, skepticism remains warranted, not least because countries do not behave like war is obsolete. Today’s major powers maintain large, technologically sophisticated conventional militaries, even while possessing nuclear weapons. China, an aspiring superpower, continues to pour resources into military modernization. More to the point, observers believe that a key long-term goal of Chinese naval expansion is to protect China’s sea lines of communication (SLOCs) to Persian Gulf oil from a US naval blockade.105 The reciprocal

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US “pivot” to Asia indicates that American leaders likewise perceive military confrontation with China as a distinct, if distant, possibility.

Coercive vulnerability theory identifies and explains important patterns of strategic great power behavior previously overlooked. But when it comes to understanding oil’s effects on international politics, basic questions remain to be asked, let alone answered. For example, under what circumstances do countries attempt oil coercion, and how often does it succeed in extracting political concessions? Recently, the United States and the European Union embargoed Iranian oil sales to dissuade Tehran from pursuing a nuclear weapons program, with apparent success. Has success occurred in similar cases? As yet, scholars have no idea how often consumer nations have boycotted oil to change exporters’ policies, let alone devised theories about when and why boycotts might be effective. Third, my paper tacitly assumes that oil is “different” from other resources in its capacity to drive great powers into costly strategic anticipation. Could the anticipatory logic apply to other raw materials and, if so, which ones and why? These and other questions offer exciting possibilities for future research.

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