Oil market power and United States national security

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Edited by Ronald W. Jones, University of Rochester, Rochester, NY, and approved November 11, 2005 (received for review May 4, 2005)

It is widely believed that an oil weapon could impose scarcity upon the United States. Impending resource exhaustion is thought to exacerbate this threat. However, threat seems implausible when we consider strategic deficits of prospective weapon users and the improbability of impending resource exhaustion. Here, we explore a hypothesis relating oil to national security under a different assumption, abundance. We suggest that an oil cartel exerts market power to keep abundance at bay, commanding monopoly rents [or wealth transfers (*wt*)] that underwrite security threats. We then compare security threats attributed to the oil weapon to those that may arise from market power. We first reexamine whether oil is abundant or scarce by reviewing current development data, then we estimate a competitive price for oil. From this, we derive wt_{2004} collections by Persian Gulf states ≈ \$132–178 × 10^9. We find that *wt* and the behavior of states collecting it interact to actuate security threats. Threats underwritten by *wt* are (*i*) the potential for emergence of a Persian Gulf superpower and (*ii*) terrorism. It is therefore oil market power, not oil per se, that actuates threats. We also describe a paradox in the relation of market power to the United States' defense doctrine of force projection to preempt a Gulf superpower. Because the superpower threat derives from *wt*, force alone cannot preempt it. A further paradox is that because foreign policy is premised on oil weapon fear, market power is appeased. Threats thereby grow unimpeded.

abundance | oil weapon | scarcity

Belief in an oil weapon has shaped U.S. perceptions of security threat since 1958. Impending resource exhaustion is thought to exacerbate this threat. Although the weapon has failed to harm the U.S. (ref. 1, pp. 89–140) and oil is abundant not scarce (2–5), belief in the weapon persists.

By contrast, the U.S. perceives no threat from a salient feature of the global economy, an oil cartel organized to keep abundance at bay. The Organization of the Petroleum Exporting Countries (OPEC) exerts market power by cooperating to restrain production. Cartel cooperation commands a noncompetitive price far above production cost (6). As a result, wealth transfer (*wt*) flows from importer to exporter states.

Here, we explore a hypothesis that the cartel's management of abundance, i.e., its exertion of market power, has U.S. national security consequences. Specifically, we suggest that *wt* is a source of instability in the Persian Gulf and funding for terror organizations.

A brief history of the oil weapon prefaces our research. We then reexamine whether oil is abundant or scarce via review of recent recovery cost and drilling data. From these we estimate a competitive price range for oil and *wt* collections by Persian Gulf states. Finally, we explore putative security consequences of *wt* by analyzing its relation to Gulf state revenue, recent conflicts, and the evolution of U.S. defense doctrine.

The Oil Weapon

The oil weapon appears in concept as early as 1935–1936 during League of Nations deliberations over prospective sanctions against Italy. The problem of third-country sellers outside the League was an obvious flaw. U.S. resistance to sanctions reduced

> . . . the League's real choice in further sanctions from an oil weapon to a blockade weapon. Experience has shown that without it there is not enough risk in the Italian trade now to discourage American exporters from nullifying the effect of the League's embargoes (7).

This problem applies to any selective embargo. Third-country sellers must be preempted to prevent customer swaps, implying the need for a blockade. Yet a blockade can undermine itself as price in the embargoed state rises in response to imposed scarcity. Potential arbitrage profits rise with price, raising incentives to run the blockade.

The first use of the oil weapon seems to have been in 1941 when the U.S. imposed an embargo on Japan over its occupation of China (8). Unlike Italy with its nearby German ally, Japan's supply routes were vulnerable. Moreover, U.S. exports were 80% of Japan's supply at the time. Capacity that could replace the U.S. fraction of Japan's supply did not exist.

Japan thus anticipated the oil weapon. It concluded that victory over the U.S. must be won within 18 months, the period Japan's forces could operate on stored supply. Yamamoto reasoned that only an early battle to disable the U.S. Navy might discourage the U.S. from waging a protracted war that Japan must lose (9). The Pearl Harbor attack was thus a countermeasure for the oil weapon. The episode suggests that if an importer's supply routes are vulnerable or if a single exporter can deny most supply, the oil weapon has power.

By the early 1950s, expanding global supply led by low-priced Middle East production combined with Marshall Plan regulations stipulating a competitive price for Gulf exports to Europe eroded market power the Seven Sisters cartel of Western firms had previously enjoyed. The demise of monopoly price that had kept smaller, high-cost U.S. producers profitable led them to lobby Congress for protection from imports (ref. 1, pp. 41–68).

To this end, they presented a *non sequitur* that recast abundance as scarcity. Low price disguised a trap. If the U.S. fell in by buying cheaper imports that foreigners might later withhold, this would "impair the national security." Rescue lay in suppressing competition to remove the temptation of low price. By this logic, a 1958 trade bill restricted imports (10).

The oil weapon of U.S. politics descends from this confection. Implicit is that the U.S. is as vulnerable to embargo as Japan had been, that some adversary could decline to sell a large fraction of supply or impose a selective embargo. Although the bill was understood to be protectionist rent-seeking at the time (10), it somehow legitimized these assumptions.

Two observers were not convinced.

> The national security argument . . . rang hollow at the time, as Mobil's president pointed out in 1950: "Fears that oil imports might make us dependent on distant sources of supply that would be cut off in an emergency

Conflict of interest statement: No conflicts declared.

This paper was submitted directly (Track II) to the PNAS office.

Freely available online through the PNAS open access option.

Abbreviations: *wt*, wealth transfer; OPEC, Organization of the Petroleum Exporting Countries; cOPEC, core OPEC states; b/d, barrels per day; *lrmc*, long-run marginal cost; S-SA, Shaybah, Saudi Arabia; AH-SA, Abu Hadriyah, SA; Kh-SA, Khurais, SA; aK-Q, al-Khaleej, Qatar; avg-I, average Iraqi capacity cost; *p*, price; *q*, production or quantity; *r*, revenue; Y, lifetime percentage yields discounted to net present value; GDP, gross domestic product.

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www.pnas.org/cgi/doi/10.1073/pnas.0503705102

seemingly ignore many important strategic considerations" (11).

By 1969, the thicket of tariffs, import quotas, and prorationing ostensibly enacted for national security had become so confused that President Nixon commissioned an effort to discover Congress' intent in their enabling legislation (10). Blair noted the incongruity that "constant repetition of the words 'national security' would have been enough, in itself, to bring about such a far-reaching changes in national policy . . ." (12). Change had just begun, however. The oil weapon had emerged from the fog of protectionism freed of constraints that might impair embargos of less important commodities. New powers could now be ascribed to it.

In 1973, James Akins, soon to be Ambassador to Saudi Arabia, grafted resource exhaustion fears to the older protectionist rootstock. In "The Oil Weapon: This Time the Wolf Is Here" (13) he offered a formulation of U.S. powerlessness that guides our Saudi policy to this day. Akins forecast that shortages would occur no later than the mid-1980s. Because remaining reserves were concentrated in the Middle East, defection of its states to the Soviet sphere would be catastrophic. Akins warned that King Faisal

> insists . . . that U.S. policy in the Middle East, which he characterizes as pro-Israeli, will ultimately drive all Arabs into the Communist camp. . . .

Since impending shortage conveyed to Arab states an oil weapon that Akins claimed could selectively punish the U.S. if it defied their wishes, appeasement was the reasonable course:

> Suppose that . . . a boycott is then imposed—which, if the Middle East problem [i.e., U.S. support for Israel] is not solved, cannot be called a frivolous or unlikely hypothesis. [U.S.] choices would be difficult and limited: we could try to block the boycott by military means, i.e., war; we could accede to the wishes of the oil suppliers [as Akins suggested]; or we could accept what would surely be severe damage to our economy, possibly amounting to a collapse. (13)

Yet despite the stark repercussions expected, the U.S. defied demands that Israel be forced to return to its 1967 borders and further traduced supplier wishes by providing arms to Israel during the October 1973 war. The oil weapon was soon unsheathed in response.

Arab producers promised a 5% cut every month until Israel returned to its 1967 borders and a selective embargo against the U.S. and Holland (ref. 1, pp. 89–140). However, the problem of third-country sellers soon impressed itself on the suppliers. By November, there was no further 5% cut. By January, Saudi Arabia and Kuwait, the only large producers participating, were increasing production (14). An earlier 1967 embargo had been abandoned just as quickly (ref. 1, pp. 89–140).

Yet the U.S. had no notion it had routed the oil weapon. The price shock engendered by the embargo apparently obscured the fact that supply was not sufficiently restricted to exhaust storage (ref. 1, pp. 89–140). A belief emerged that high price was a further OPEC punishment, which, "... if nothing is done about it, is mathematically certain to lead to a great financial smash and a brutal worldwide depression." Italy, Britain, and France were believed at risk of destabilization because of debts incurred to buy oil (15). "And the danger that the Middle East might become another Balkans involving the superpowers in a nuclear confrontation" was taken seriously (16).

Secretary Kissinger thus spent most of 1974 beseeching Arab leaders to end an embargo (17) they had actually abandoned in late 1973. In an interview that reflects the fears of the time, Kissinger was pressed to explain why no military action was taken to contain price. "A very dangerous course," he cautioned:

> . . . it is easier to get into a war than to get out of it. I am not saying that there's no circumstance where we would not use force. But it is one thing to use it in the case of a dispute over price, it's another where there's some actual strangulation of the industrialized world (18).

In the paranoiac atmosphere then prevailing, this specific injunction against force was taken as a provocation (19).

Yet supply was not greatly affected. Cuts were real but the high price owed also to hoarding and import controls. Supply contraction net of storage drawdowns may have been as little as 4% (ref. 1, pp. 89–140). However, diplomats misread the market:

> As the new decade [of the 1970s] began, world conditions of supply and demand shifted inexorably against the consumers . . . one way or another market conditions would have produced a price explosion. (20)

This was wrong. What had shifted against consumers was suppression of competition by the new cartel. As for Akins' scarcity forecast, proved reserves grew from 500×10^9 barrels (b) in 1973 (13) to $1{,}186 \times 10^9$ b in 2004, notwithstanding cumulative production of 764×10^9 b over the period (14).

Thus, the oil weapon is impotent, but belief in it is not. Neither practical failure nor intrinsic implausibility has ever diminished its perceived strength. Rather, characterizations of the weapon grow ever-more hyperbolic, e.g., "the energy equivalent of nuclear weapons" (21).

Scarcity or Abundance?

We hypothesize that threats do arise in the oil market, not from the oil weapon but from the cartel's management of abundance. Specifically, we suggest that *wt* collections by core OPEC states (cOPEC)[†] have U.S. security consequences.

If oil were scarce, the cost to recover it should rise over time. The opposite has occurred. Since 1970, real Saudi recovery cost has declined from \$3.86/b (ref. 22, pp. 269–301) to an "all-inclusive" \$1.50/b (1999\$) (11).[‡] More recent costs can be derived. A relatively new development at Shaybah, Saudi Arabia (S-SA) includes a 395-mile pipeline and three gas separation plants "beyond the field boundary," meaning pipeline, port, and processing infrastructure required to bring new barrels to market. Capacity costs inside and outside the field boundary comprise long-run marginal cost (*lrmc*). First, we derive S-SA capacity = \$5,000/b/day (d) (from ref. 23). From this, we estimate $lrmc_{\text{S-SA}} \approx$ \$0.74/b by assuming a high 5% depletion rate, 3% discount rate, 40-year well life, and operating cost equal to 5% of annual returns.

At Abu Hadriyah (AH-SA), in the relatively mature Eastern Province, cost is lower, \$2,000–3,000/b/d (derived from ref. 24), perhaps because downstream infrastructure is adequate to bring new AH-SA production to market. From \$3,000/b/d we derive $lrmc_{\text{AH-SA}} \approx$ \$0.45/b under the assumptions above. This is similar to \$0.50/b reported from north Iraq (no-I).[§]

Capacity at the largest new Saudi project, Khurais (Kh-SA), is anticipated to cost \$4,166/b/d (derived from ref. 25) or $lrmc_{\text{Kh-SA}} \approx$ \$0.62/b under the assumptions above. This investment also develops natural gas and gas liquids we could not value, so our capacity cost derivation is perforce somewhat high.

Because $lrmc_{\text{S-SA}}$, $lrmc_{\text{AH-SA}}$, and $lrmc_{\text{Kh-SA}}$ are much lower than \$1.50/b, this "all-inclusive" Saudi cost may be a national

[†]Saudi Arabia, Iraq, Iran, Kuwait, Qatar, and the United Arab Emirates.

[‡]Parra (11) cites a speech by Saudi Minister Naimi to the Houston Forum in which the \$1.50/b cost is reported. Saudi Aramco also publicized this cost in an October 3, 2001, online advertising supplement in the *Washington Post*.

[§]As reported by *Bloomberg News Service*, June 23, 2003.

average. That is, some Saudi fields are much older than S-SA, AH-SA, and Kh-SA, so a national *lrmc* should be higher than at the newer projects. If uncertainty as between national versus local *lrmc* can be accepted, a Saudi time series can be constructed: $lrmc_{\text{Saudi1970}} = \$3.86/\text{b}$; $lrmc_{\text{Saudi1999}} = \$1.50/\text{b}$; $lrmc_{\text{S-SA2002}} = \$0.74/\text{b}$; $lrmc_{\text{AH-SA2004}} = \$0.45/\text{b}$; and $lrmc_{\text{Kh-SA2005}} \approx \$0.62/\text{b}$. This series does not suggest scarcity.

Whether a general Gulf cost decline is indicated we do not know. Costs there can be very low, e.g., \$0.50 in north Iraq (no-I)[§] and \$2.04 at al-Khaleej, Qatar (aK-Q) (derived as above from ref. 23), but data are insufficient to construct a time series. However, regional decline would be consistent with a global decline in "finding and development" cost from \$21 in 1981 to \$6 (2001\$) (5).

Turning from cost to price (p), if oil were scarce and its market perfectly competitive, p should increase at no less than the rate of return on all assets used in production (ref. 22, pp. 241–267, and ref. 26). However, the market is not competitive, as we will show, so p might not indicate scarcity in a straightforward way. Nonetheless, insight can be gleaned from reserve price (p_r) in a competitive fringe of the market, North America.

Failure of North American p_r to rise indicates absence of scarcity rent (27). This appears to be related to the global market's success at adding reserves, which have increased in every decade since 1850. Because each reserve addition in excess of demand growth pushes resource exhaustion farther into the future, the ratio of scarcity rent to p_r, whatever it is, must perforce decline. In this economic sense, oil is becoming more abundant even though the absolute quantity underground is decreasing.

Even if technology were not adding reserves faster than they are being consumed there seems little reason to expect scarcity rents until development is more extensive. For example, only 17 of 80 Iraqi fields are in production (28), and their development was not cost-minimizing. Age-specific geological structures were targeted, Tertiary reservoirs in north Iraq for example, because such structures were known to produce nearby. Such practices suggest that Iraq may possess "reservoirs that have been completely overlooked" (29). What knowledge exists is "preliminary in nature since work was often interrupted by political problems, and the [exploration] technology used is now outdated" (28). Much of Iraq has not been explored at all (29). Similarly, of 80 Saudi reservoirs, only 23 are in production (30).

Oil rig distribution tells a similar story. Rigs are hired to drill new wells that replace annual production, natural decline, and demand growth. In 2003, cOPEC used 0.05 of total world rigs, yet these replaced 0.35 of world production (or quantity, q_{2003}). The rest of the world required 0.95 of rigs to replace the remaining $0.65q_{\text{world2003}}$, exceeding cOPEC effort/b by an order of magnitude. In Saudi Arabia, 0.01 of world rigs replaced $0.1q_{\text{world2003}}$ (derived from ref. 31), although most Saudi fields have been worked for decades.

Monetary Assessment of Abundance

Yields from hypothetical investment in Gulf capacity reveal aspects of abundance pertinent to putative security consequences of market power. From capacity costs derived above, we can construct a survey of regional investment yield. We add an average Iraqi cost (avg-I) to our survey from a report that "Development Investment Intensity" inside the field boundary is \$750–3,150/b/d and "average" cost is \$5,000/b/d, identical to the value derived for S-SA. Because average Iraqi cost is "similar to Saudi Arabia" (32), some confidence in our derivations can be inferred.

By using previous assumptions and today's market price, i.e., $p_m = \$67/\text{b}$, the numbers of days ($d$) required to recover initial investment are $d_{\text{AH-SA}} = 45$; $d_{\text{Kh-SA}} = 62$; $d_{\text{S-SA}} = 76$; $d_{\text{avg-I}} = 76$; and $d_{\text{aK-Q}} = 205$. At the 30-year price floor, $p_m = \$10$, $d_{\text{AH-SA}} = 300$; $d_{\text{Kh-SA}} = 417$; $d_{\text{S-SA}} = 500$; $d_{\text{avg-I}} = 500$; and $d_{\text{aK-Q}} = 1{,}375$.

With investment so quickly recovered, monopoly proceeds accrue for 36 to nearly 40 years. Cumulative percentage yields discounted to net present value (Y) at today's $p_m = \$67$ are $Y_{\text{AH-SA}} = 13{,}895\%$; $Y_{\text{Kh-SA}} = 9{,}978\%$; $Y_{\text{S-SA}} = 8{,}297\%$; $Y_{\text{avg-I}} = 8{,}297\%$; and $Y_{\text{aK-Q}} = 2{,}954\%$. At $p_m = \$10$, $Y_{\text{AH-SA}} = 1{,}989\%$; $Y_{\text{Kh-SA}} = 1{,}404\%$; $Y_{\text{S-SA}} = 1{,}153\%$; $Y_{\text{avg-I}} = 1{,}153\%$; and $Y_{\text{aK-Q}} = 356\%$.

OPEC coheres to restrict such opportunities. Absent cartel cooperation, investment would rush to such Gulf fields, production would rise, p_m would decline, and market power would evaporate. The chasm that separates capacity cost from investment returns suggests that the cartel exerts market power by investment restraint. If so, the weak descriptive power of short-run tests for OPEC noncompetitive behavior (33) is explained.

The Competitive Price of Oil

We begin to explore possible security consequences of market power by evaluating *wt* collected by cOPEC states. This requires a preceding estimate of what price would be in a competitive market.

Competitive price, p_c, should approach *lrmc* at equilibrium. As we have shown, Iraqi and Saudi *lrmc* are very similar. Therefore the \$1.50 we believe to be average $lrmc_{\text{Saudi}}$ seems a conservative proxy for $lrmc_{\text{cOPEC}}$. Yet whatever today's $lrmc_{\text{cOPEC}}$, it would increase if the market became competitive. That is, investment required to raise cOPEC capacity from 0.35 to $1.0q_{\text{world}}$ would increase $lrmc_{\text{cOPEC}}$. To account for this, we estimate $p_c \approx \$4\text{–}10$ f.o.b. Persian Gulf. The upper bound is the 35-year real price floor.

Our confidence that $p_c \approx \$4\text{–}10$ is not absolute. Our review shows that Gulf oil is sufficiently abundant that cost-minimizing effort has not always been needed to get it from the ground. Therefore in a competitive market, lower-cost opportunities might be found than some of those now producing. However, it cannot be known whether these opportunities, if they exist, might deflate competitive $lrmc_{\text{cOPEC}}$ once investments were sufficient for cOPEC to lift, process, and transport 1.0 q_{world}. All that is certain is that until Gulf production approached this level, $lrmc_{\text{cOPEC}}$ must rise.

Although p_c must exceed monopoly $lrmc_{\text{cOPEC}} \approx \$1.50$, by how much or for how long we cannot know. We infer that our upper bound, $p_c \approx \$10$, is high enough to account for the required infrastructure because $\$10 > lrmc$ of smaller, more difficult fields. For example, ExxonMobil characterizes Nigeria development costs as ≈\$6 for itself and \$7 for other companies (34). We derive a similar estimate, \$5.98/b, from pooled supermajor deepwater capacity cost for Angola and Nigeria, i.e., \$13,333/b/d (from ref. 35), assuming conservatively that depletion is 12% and well life is 10 years, but excluding finding and operating cost. At deepwater Bosi and Ehra fields, $\$2.8 \times 10^9$ b will lift 650×10^6 b (36), which reduces to \$4.31/b, probably excluding finding and operating costs. ExxonMobil characterizes Gulf of Mexico development as ≈\$7/b for itself and \$9/b for others (34).

It seems unlikely that $lrmc_{\text{cOPEC}}$ from large fields that deplete slowly would exceed $lrmc_{\text{Nigeria-Angola}}$ or $lrmc_{\text{Gulf of Mexico}}$ where smaller fields deplete quickly. However, for conservatism we use the \$10 long-run price floor as our upper bound on p_c.

Former OPEC Secretary-General Parra puts it all more simply:

> . . . the Middle East . . . could have, if it had been so minded, developed reserves to produce and sell enough oil to satisfy total world demand at under \$5 per barrel and still enjoy substantial government revenue. That is what would happen in a highly competitive world. (11)

Monopoly Rents, National Security, and the Problem of Appeasement

If uncertainties of our estimate can be accepted, we can now evaluate *wt* collected by cOPEC states. *wt* accrues when p_m is

noncompetitive, i.e., more than ≈$4–10/b. This causes *wt* flows from importer to exporter states:

$$wt_{\text{cOPEC}} = (p_m - p_c)q_{\text{exportcOPEC}}.$$

To find $q_{\text{exportcOPEC}}$, we subtract cOPEC annual demand (37) from q_{cOPEC} (14). We substitute Persian Gulf average cost f.o.b. (14) for p_{m}. Thus $p_{\text{m2003}} = \$25.17$. Then substituting for $q_{\text{exportcOPEC}}$ as described above and assuming $p_{\text{c}} = \$4$ we get:

$$wt_{\text{cOPEC2003}} \approx \$132 \times 10^9.$$

For $p_{\text{m2004}} = \$33.09$, $p_{\text{c}} = \$4$ as above, and assuming cOPEC demand growth of 2% (2004 cOPEC demand is unavailable), we get:

$$wt_{\text{cOPEC2004}} \approx \$178 \times 10^9.$$

More conservatively, if $p_{\text{c}} = \$10$:

$$wt_{\text{cOPEC2003}} \approx \$95 \times 10^9 \text{ and}$$

$$wt_{\text{cOPEC2004}} \approx \$141 \times 10^9.$$

Whether p_{c} is $4 or $10, these rents are substantial. As the Iran–Iraq War (1980–1988) first revealed, such rents have security consequences. The U.S. began to project force in the Gulf during this war. However, if the national security rationale for this action was that the tanker sinkings imposed some constriction on U.S. supply, that rationale was misapplied. Price declined steeply after 1981 as new non-OPEC supply glutted the market (Fig. 1).

What has disrupted supply is something else, warfare for monopoly proceeds. In such war, the aggressor's goal is not to deny supply but to gain more of it to sell, as in Iraq's invasions of Iran and Kuwait.

Although this logic escaped U.S. policymakers, it was plain to one economist:

> If the [Hussein] regime survives [the coming 1991 Gulf War], without a large U.S. presence . . . the whole region and a far more effective oil monopoly is his. Higher revenues will buy more arms, which will lead to more conquest and hence higher revenues. As he occupies one neighbor after another, he will absorb their wealth and gain territory for launching further attacks. (ref. 22, pp. 537–548)

Adelman's insight is that oil market power, not oil *per se*, creates instability in the Persian Gulf. More simply, each firm-state's monopoly proceeds are a potential war prize to another. This intrinsic threat latent in monopoly price remains obscure to U.S. policymakers but is clear enough to Gulf states themselves. Their rents at risk of capture both allow and compel them to sustain some of the world's highest military spending per capita (38). Iran's nuclear weapons program and Iraq's assembly of the world's fourth-largest armed forces in 1990 exemplify this association of hypermilitarization and market power.

Cartel states' military strength is attributable to market power by their ratio *wt*/state revenue (*r*). In Iran's case, for example, if $p_{\text{c}} = \$4$ and $p_{\text{m}} = \$25.17$ as above, then $wt/r_{\text{Iran2003}} = 0.48$. However, Iran's energy consumption equals 0.092 gross domestic product (GDP) (39) and is nearly 100% state-subsidized (40). If the value of this subsidy is added to both *wt* and *r*, a ratio of total market power effects (*mp*) to *r* can be derived; $mp/r_{\text{Iran2003}} = 0.63$ (from *wt* estimate and ref. 39).

U.S. defense effort to contain military power acquired with *wt* proceeds has been substantial. In 1992, the *Defense Planning Guidance* (or Wolfowitz Doctrine) recognized this imperative:

> . . . the new regional defense strategy . . . requires that we endeavor to prevent any hostile power from dominating a region whose resources would, under consolidated control, be sufficient to generate global power. (41)

Thus the rationale for Gulf force projection was no longer to protect supply, as is still commonly supposed, but to preempt the superpower that would emerge if one firm-state could aggregate monopoly rents of its neighbors via wars of seizure.

Although a reasonable policy in most ways, Wolfowitz has one outstanding flaw. While force projection has deterred wars of seizure, in so doing it inadvertently guarantees an orderly market for wt_{cOPEC} collections. Wolfowitz thus protects a *status quo* in which monopolist firm-states can accumulate *wt* sufficient to acquire weapons that confer near-superpower status, even without prerequisite wars of seizure. The U.S. has thereby been drawn to the web of market power as its protector, while within the protected states *wt* underwrites novel threats.

Precisely these threats have compelled transformation of security doctrine from a defensive to an offensive basis. The new National Security Strategy seems to grasp that security consequences associated with oil are no longer conditional, threats that might arise if one Gulf state could aggregate production of some others. Rather, threat is ever-present, even from a single firm-state (42). As Vice-President Cheney interpreted the National Security Strategy on the eve of the second Gulf War:

> Armed with an arsenal of these weapons of terror and seated atop 10% of the world's oil reserves, Saddam Hussein could then be expected to seek domination of the entire Middle East, take control of a great portion of the world's energy supplies, directly threaten America's friends throughout the region and subject the U.S. or any other nation to nuclear blackmail. (43)

Although this assessment was famously wrong with respect to terror weapons in 2003, it could have been realized had the Hussein regime escaped sanctions. More important, Cheney's scenario succinctly characterizes threats inherent in any firm-state's *wt*, whether or not it has nuclear weapons. Yet the new National Security Strategy repeats previous failures to recognize the underlying economic problem, market power.

Intervention in Iraq has thus done nothing to ensure against Iran's emergence as a superpower. Iran has applied *wt* to acquire nuclear weapons precursors (44), advanced anti-ship missiles, and Kilo-class submarines (45, 46). It may even be approaching regional parity with the U.S. given the vulnerability of aircraft carriers on which force projection depends. In a recent U.S. war game simulating Gulf conditions, carriers were repeatedly sunk by swarms of small, fast missile boats (47), precisely the surface fleet Iran claims to be building.¶

Perhaps a graver contingency enabled by passivity to market power is emergence of a rich, radical Saudi Arabia. This outcome might require no revolution, only the ascendance of the Nayef faction that already controls state security (48). Some predict that such a regime would use the oil weapon against the U.S. (49). We believe this unlikely.

First, recall the implausibility of selective embargo. Moreover, we derive $wt/r_{\text{Saudi2002}} = 0.78$ (from *wt* estimate and ref. 50) to illuminate the perils any Saudi state must survive should it use the oil weapon, i.e., the forfeit of 78% of its means to govern, defend itself, and provide employment. GDP would also be ravaged by no less than $wt/\text{GDP}_{\text{Saudi2002}} = 0.29$ (derived from *wt* estimate and ref. 50). Even a 10% supply cut such as the Iran–Iraq war briefly produced invites a price increase, reduced demand, and a price

¶*BBC Monitoring International Reports* of February 8, 2003, and December 31, 2004, relate claims by senior Iranian officials that Iran is now producing fast missile boats, fast torpedo boats, and a 41-knot destroyer.

collapse, as occurred 1982–1986. This may explain why firm-state leaders such as Chavez and Hussein occasionally threaten to use the oil weapon (51) but never do.‖ In any case, firm-state *wt* relations suggest oil dependence, theirs not ours.

The more serious threat is not that a radical Saudi Arabia might cease exporting but that it might continue. Tens of billions per year in *wt* proceeds could then be put to realization of global Wahabist ambitions. Terror via weapons of mass destruction seems the likely method, with a nuclear deterrent protecting the terror state. No U.S. policy exists to prevent or forestall this outcome.

Such a scenario differs from the present only in degree as *wt* already underwrites terrorism. A global religious propaganda network funded by the Saudi state promotes jihad against non-Muslims (52, 53). Secretary Rumsfeld considers this among the most formidable U.S. security problems (54). As derived above, 78% of Saudi state support for it is attributable to market power. Saudi state contributions to terror organizations (53) and quasi-states like the former Taliban government of Afghanistan (55) also derive from market power at this ratio. Private Saudi contributions to terror organizations are attributable to market power at $wt/\mathrm{GDP}_{\mathrm{Saudi2002}} = 0.29$. However, the ratio of public to private contributions to such groups is unknown.

Our point is that market power underwrites terror via *wt*, although how important *wt* may be compared to other funding we do not know. However, an al Qaeda discussion of its policy options toward Saudi Arabia is suggestive:

> There were those who said we must attack the invading forces that defile the land of the two holy places, and that we must turn the Americans' concerns to themselves and their bases, so they would not take off from there to crush Muslim lands and countries, one by one. There were others who said we had to preserve the security of this base and this country, from which we recruit the armies, from which we take the youth, from which we get the backing. It must therefore remain safe. It is also true that we must use this country because it is the primary source of funds for most Jihad movements. . . . (53)**

Of course, many potential threats to U.S. security have no relation to market power. For example India, Pakistan, and North Korea developed nuclear weapons as relatively poor countries. Moreover, weapons of mass destruction might be sold by or stolen from any state that has them, thence to become threats. Nonetheless, market power is the fiscal source of instability in the Gulf where most U.S. forces are committed and from where much terrorism is funded and directed.

What to Do?

The foregoing analysis suggests that if a policy to reduce market power were feasible, that is, if p_m could be driven down toward p_c, security benefits would accrue. Firm-states' attraction as war prizes should decline along with the potential that one could emerge as a superpower. Both Gulf force projection requirements and funds for terror organizations would decrease.

The notion that market power might be broken by policy intervention seems an attractive path to better security as an attack on price could compel firm-states to increase q to protect their total revenue pq, undermining p still further. However, modeling an optimal policy to do this seems impossibly complex. The complexity problem mirrors Gately's discussion of an optimal OPEC price path. Several parameters are too poorly known to allow optimal path formulation (56). These same unknowns preclude formulation of an optimal policy to attack price. Moreover, the degree of cooperation achievable by any coalition of states attacking price is unpredictable, as is cartel cooperation in response. In addition, the cartel can sacrifice market share to defend price; it could enjoy some *wt* collections even as price were forced to decline.

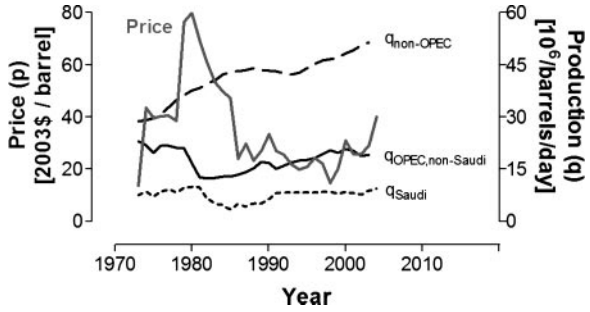

Fig. 1. Saudi policy 1982–1985 was to defend falling p by sacrificing q. The policy failed because (*i*) high p since 1973 called forth increased non-OPEC q and (*ii*) cOPEC states declined to share the p defense burden. A 75% revenue and market share decline from 1982 to 1985 forced the Saudis to reverse policy by increasing q 1985 to 1986. This led in turn to the steepest 1-year p decline in history. Increased OPEC q and persistent low p temporarily arrested growth of high-cost non-OPEC in 1988. Saudi market share did not recover until Iraq's 1990 invasion of Kuwait led to destruction of Kuwaiti and Iraqi capacity in turn. OPEC's historic difficulty prorationing q suggests that importer demand reduction might be capable of forcing a p decline.

Cartel dynamics suggest how a nonoptimal price attack policy might work. Saudi Arabia is OPEC's largest producer. It gains most from price increases and loses most when price erodes. Accordingly, its willingness to restrain q is greater than other cartel members. In its attempt to defend declining price from 1981–1986, the Saudis cut q such that their market share fell from 16% to 4% between 1981 and 1985. Their production declined from a high of 10.3×10^6 b/d in August 1981 to 2.4×10^6 b/d in June 1985. Despite this sacrifice, average annual price fell from $80 (2005$) in 1981 to $24 in 1986 (Fig. 1). Saudi annual revenue declined from $\$228.6 \times 10^9$ to $\$29.4 \times 10^9$ over the period (14).

It may be significant that although cartel states have made large production cuts to abet rising price, only Saudi Arabia has accepted large cuts to defend price while it fell, as in the mid-1980s. Of course, this does not preclude stronger cooperation to defend against some future price collapse. The cooperation challenge may explain OPEC's hostility to interventions by importer states that reduce demand. Consider the cartel's attack on fuel taxes in its *Who Gets What from Imported Oil* campaign:

> OPEC is perceived as being directly responsible for high gasoline or heating oil prices. Nothing could be further from the truth. Although there is a link between crude prices and product prices, it is neither direct nor proportional, and the main reason can be summed up in one word—TAXES. . . . It can thus be clearly seen that the real burden on the consumer is taxation, and the real profiteers are the governments of the consuming countries.††

OPEC is similarly hostile to the Kyoto Protocol. Sheikh Yamani warned OPEC that Kyoto implementation might reduce global demand by 20×10^6 b/d (57). The cartel subsequently claimed that it should be compensated for revenue lost to Kyoto-based demand reduction (58). OPEC's legal theory is that its prospective losses are equivalent to those of low-lying island states seeking compensation to manage sea-level rise. The U.S. supports OPEC (59).

‖In April 2002, Hussein announced a 1-month suspension of Iraqi exports to punish the U.S. for its support of Israel. This was reported as an exercise of the oil weapon (51). What actually commenced was a 6-month production reduction (14), this shortly after closure of a United Nations Oil for Food Program loophole that had facilitated kickbacks to the Hussein regime. Whatever this reduction was, it was not an Iraqi exercise of the oil weapon.

**Translation by permission of the Middle East Media Research Institute (www.memri.org).

††From *Who Gets What from Imported Oil* reports, 2000 and 2001 (OPEC, Vienna).

Cartel hostility to demand reduction policies may imply its fear of them. If so, conditions might be favorable for a policy to attack price despite the unknowns. Such a policy would probably have to offset global demand growth of ≈2.2% to force a demand decline, decline being a precedent to the 1980s price collapse. Last, price elasticity of demand is low but not zero. Price declines that resulted from policy would be conditioned by some demand increase.

Conclusion

The oil weapon seems an implausible threat when the economic, geographic, and military attributes of prospective user and victim are considered. This expectation is confirmed by the weapon's failure to meet actual tests of its power to harm the U.S. Likewise, we find no evidence for impending resource scarcity that might compensate for strategic deficits of prospective oil weapon users.

By contrast, tangible threats arising from market power follow simply from the magnitude of *wt* and behavior of states collecting it. Threats are (*i*) the potential emergence of a Gulf superpower and (*ii*) terror underwritten with *wt*. Despite the importance of these effects, market power's role as their actuator remains obscure.

Because the oil weapon's assumptions have never been questioned, this phantasm still commands fear. Hence, the cascading *non sequitur* that "access" to Saudi oil somehow constrains U.S. foreign policy: that we are powerless against the oil weapon, reliant on goodwill for Arab supply, and dependent on appeasement for that goodwill. Yet appeasement has secured no more than what other importing states have enjoyed for free, the right to pay monopoly price for as much oil as can be afforded along with the terrifying threats these payments underwrite.

Although fear of the oil weapon has changed little since Akins, appeasement has had to change with the times. Longstanding passivity to economic predation is now complemented by toleration of Saudi support for terror propaganda. Recently, the U.S. began to support the cartel's Kyoto formula: that monopoly rents are an entitlement owed by the world to OPEC (59). Thus, the 1958 law asserting that imports will "impair the national security" should some adversary decline to sell is balanced by a proposal to compensate the adversary should we decline to buy. If adopted, such a policy might perpetuate security threats no matter how low Kyoto forced demand.

More fateful policies have likewise come to cross-purpose. On one hand is our energetic, necessary but risky defense doctrine that a Gulf superpower must be preempted. On the other is passivity to market power, whose security consequences include the necessity to preempt. Because force projection inadvertently insures orderly *wt* collections by aggressive states, wars of preemption have had to be waged twice in 12 years. Absent some interruption to this syndrome, the U.S. seems likely to face the preemption imperative again but against richer, more radical adversaries than before.

Only forceful market intervention seems capable of interrupting the syndrome we describe. Unfortunately, most past and present interventions simply redistribute U.S. income from consumers to domestic producers to no security purpose (60). Whatever the demerits of intervention, passivity to market power seems worse, a concession to adversary states of the right to impose a de facto tax on U.S. consumption.

Whether more purposeful intervention could break market power we cannot know. Yet should it go unchallenged, the present may come to seem a peaceful time.

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