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Energy Alarmism The Myths That Make Americans Worry about Oil

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Executive Summary

Many Americans have lost confidence in their country's "energy security" over the past several years. Because the United States is a net oil importer, and a substantial one at that, concerns about energy security naturally raise foreign policy questions. Some foreign policy analysts fear that dwindling global oil reserves are increasingly concentrated in politically unstable regions, and they call for increased U.S. efforts to stabilize—or, alternatively, democratize—the politically tumultuous oil-producing regions. Others allege that China is pursuing a strategy to "lock up" the world's remaining oil supplies through long-term purchase agreements and aggressive diplomacy, so they counsel that the United States outmaneuver Beijing in the "geopolitics of oil." Finally, many analysts suggest that even the "normal" political disruptions that occasionally occur in oil-producing regions (e.g., occasional wars and revolutions) hurt Americans by disrupting supply and creating price spikes. U.S. military forces, those analysts claim, are needed to enhance peace and stability in crucial oil-producing regions, particularly the Persian Gulf.

Each of those fears about oil supplies is exaggerated, and none should be a focus of U.S. foreign

or military policy. "Peak oil" predictions about the impending decline in global rates of oil production are based on scant evidence and dubious models of how the oil market responds to scarcity. In fact, even though oil supplies will increasingly come from unstable regions, investment to reduce the costs of finding and extracting oil is a better response to that political instability than trying to fix the political problems of faraway countries. Furthermore, Chinese efforts to lock up supplies with long-term contracts will at worst be economically neutral for the United States and may even be advantageous. The main danger stemming from China's energy policy is that current U.S. fears may become a self-fulfilling prophecy of Sino-U.S. conflict. Finally, political instability in the Persian Gulf poses surprisingly few energy security dangers, and U.S. military presence there actually exacerbates problems rather than helps to solve them.

Our overarching message is simply that market forces, modified by the cartel behavior of OPEC, determine most of the key factors that affect oil supply and prices. The United States does not need to be militarily active or confrontational to allow the oil market to function, to allow oil to get to consumers, or to ensure access in coming decades.

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Introduction

Many Americans have lost confidence in their country's "energy security" over the past several years. Oil prices were already high by historic standards in 2005 when Hurricane Katrina ravaged the Gulf Coast and temporarily shut down the refineries, pipelines, and offload terminals at the large Gulf Coast port complex, highlighting the apparent vulnerability of U.S. oil infrastructure. Furthermore, growing chaos in Iraq reminds Americans of their country's limited ability to control events in the oil-rich Persian Gulf region. Finally, the reliability of even America's domestic oil supplies was called into question last year when poor maintenance temporarily closed the pipelines that carry oil from Alaska to the contiguous 48 states. That a foreign company (British Petroleum) manages the Alaska pipeline only reinforced the overarching feeling that the United States has little control over the energy supplies it vitally needs.

Because the United States is a net oil importer, and a substantial one at that, concerns about energy security naturally raise foreign policy questions. One set of arguments is based on fears about dwindling global oil reserves and their increasing concentration in politically unstable regions. Those so-called peak oil concerns have led some foreign policy analysts to call for increased U.S. efforts to stabilize—or, alternatively, democratize—the politically tumultuous oil-producing regions. A second concern focuses on the rise of China and Beijing's alleged strategy for "locking up" the world's remaining oil supplies through long-term purchase agreements and aggressive diplomacy. According to some analysts, the United States must respond to China's energy policy, outmaneuvering Beijing in the "geopolitics of oil," or else U.S. consumers will find themselves shut out from global energy markets. Finally, many analysts suggest that even the "normal" political disruptions that occasionally occur in oil-producing regions (e.g., occasional wars and revolutions) hurt Americans by disrupting supply and creating

price spikes. U.S. military forces, those analysts claim, are needed to enhance peace and stability in crucial oil-producing regions, particularly the Persian Gulf.

Each of those fears about oil supplies is exaggerated. Peak oil predictions about the impending decline in global rates of oil production are based on scant evidence and dubious models of how the oil market responds to scarcity. In fact, even though oil supplies will increasingly come from unstable regions, the ongoing investments designed to reduce the costs of finding and extracting oil are a more effective response to that political instability than trying to fix the political problems of far-away countries. Furthermore, fears of China are also overstated. Chinese efforts to lock up supplies with long-term contracts will at worst be economically neutral for the United States and may even be advantageous. The main danger stemming from China's energy policy is that current U.S. fears may create a self-fulfilling prophecy of Sino-U.S. conflict. Finally, political instability in the Persian Gulf poses surprisingly few energy security dangers, and the U.S. military presence there actually exacerbates problems rather than helps to solve them.

Those arguments do not mean that the United States can ignore energy concerns. Global demand for energy is soaring and shows no sign of relenting. Furthermore, oil supplies, though currently abundant, will eventually begin to run low, and the world will eventually need to develop other energy sources. But neither of those problems requires the sort of activist military policies that many foreign policy analysts suggest: specifically, U.S. oil interests do not require the United States to spread democracy across the Persian Gulf, confront China, or even maintain a peacetime military presence in the Persian Gulf.

The arguments in this paper do not rest on the (unreasonable) assumption that countries always act rationally, or that profit motives always determine foreign policy choices.¹ Our overarching message is simply that market forces, modified by the cartel behavior of

OPEC, determine most of the key factors that affect oil supply and prices. The United States does not need to be militarily active or confrontational to allow the oil market to function, to allow oil to get to consumers, and to ensure access in coming decades.

How Oil Markets Work

Oil markets appear more mysterious than they are. The details of the oil business are very complex (e.g., the various grades of oil, the complex contracts used to buy oil and hedge against volatility, and the benchmarks that are used to negotiate prices), but few of those details matter for a discussion of the links between oil and foreign policy. Oil companies care about those details because they are trying to earn a profit on each individual contract, but national policy depends only on the general availability and overall price of oil.

Because of the market's complexity, media accounts often suggest that oil markets move without a clear connection to economic fundamentals and that irrational fears or the actions of shadowy governments drive price and product availability. Although consumers' fears and suppliers' political decisions surely matter, their effects can be understood within a fairly traditional market framework. Two main processes determine oil prices: (1) the forces of supply and demand and (2) constraints on those forces created by political risk and cartel behavior.

Market Forces

Geologic features determine the location and quantity of oil deposits, but they do not determine "oil supply" in any meaningful sense. Supply depends on the difficulty (and hence cost) of oil exploration and production and on companies' economic decisions about how much money to spend looking for new oil fields, developing pumping capacity from the fields they find, and filling pipelines with oil. In any given region, geologic factors, such as the porosity of the rock, determine whether meaningful oil deposits exist and how expen-

sive they are to discover and tap. But geology merely creates the playing field for oil exploration and extraction. The amount of oil that can actually be "produced" at any given time, that is, extracted from the ground, transported to refineries, refined, and then transported in various forms to end users, depends on how much money oil companies have invested in a given field.

Prices drive fluctuations in oil supply. High prices encourage producers to pump their working fields at a higher rate to maximize profits before prices drop; lower prices lead them to reduce production. And companies with large inventories of oil generally respond to high prices by selling their stocks, unless they expect prices to rise even higher in the future. Price troughs encourage them to hold (or expand) their inventories, reducing supply in the short term.

Similarly, expectations about future petroleum prices shape long-term trends in oil supply. Oil companies, some of which are owned by the governments of countries with large reserves, decide how much to invest in exploration, new extraction technologies, and refining and transportation infrastructure and whether to pay large up-front costs to tap difficult-to-reach fields (such as those under deep water). Those major decisions, far more than geologic constraints, determine how much oil can be produced in the coming decades.² And in the oil industry like all others, investment decisions are driven by expectations about future prices: if the companies expect oil prices to be high, they will invest more heavily today since the enormous up-front expenditures will be recouped by high per barrel prices in the future.³ But if they expect prices to be low, they will trim investment, reducing future supplies.⁴

Oil prices do not merely affect oil supply; they also play a key role in determining global demand. In the short term, demand does not change much in response to price fluctuations. People need to drive to work and heat their houses even if oil prices soar, so they tend to cut expenses elsewhere rather than go without oil. But higher prices still reduce long-term

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demand: as prices increase, companies spend money on more efficient equipment and production processes, and individuals buy more efficient cars and improve the insulation in their houses. Finally, high prices spur investment in equipment that uses nonpetroleum energy sources, reducing the demand for oil.

Although rising prices generally dampen demand, in the short term climbing prices may actually spark *additional* demand. If the factors pushing up prices seem likely to continue, then consumers, brokers, and producers may decide to fill their inventories so that they can profit from the even higher price they expect in the future. Such speculation is the principal mechanism at work when fears of war or political instability drive up oil prices.⁵ But this dynamic occurs only in the short term: eventually inventories become full or the price rises sufficiently that speculators start to sell their inventories. Demand returns to a level commensurate with actual consumption, and the price is temporarily depressed because the market draws supply both from ongoing extraction and from the excess inventory. Day-to-day prices may bounce around quite a bit as consumption, extraction, and inventory strategies adjust, but that volatility is centered on a price level determined by “real” supply and demand.⁶

The overall point is that the oil market has its idiosyncrasies and arcane details, but it generally functions like other markets: Rising prices increase supply, stimulate investment, and reduce demand. Price fluctuations match up the amount of supply on the market at any given time with the amount of demand, such that there are no “gaps” between supply and demand on a day-to-day basis.

Political Risk and Cartels

Market forces shape oil prices, but they do not act alone. More than in most other industries, political risk tempers companies’ enthusiasm for making expensive investments because many oil-producing regions are politically volatile. Will local governments nationalize companies’ investments or raise taxes and fees for future extraction? Will ter-

rorists destroy key equipment, or will a war disrupt the flow of oil to markets? In essence, companies explore and drill less intensively in unstable regions than they would otherwise because the expected costs due to political risks must be added to the purely economic costs. Companies must expect oil prices to rise by an extra margin before they are willing to invest in volatile regions.

Oil companies understand political risk; they have made their profits by dealing with political risk for their entire history.⁷ The big corporations manage portfolios of investments in different parts of the world, increasing the likelihood that at least one of their investments will be affected by political events at any given time but reducing the probability that a substantial fraction of their oil revenue will be disrupted all at once. Because oil companies’ investments account for a baseline level of political risk, that baseline is built into the overall level of today’s available oil supply.⁸ But in especially “lucky” times when little goes wrong politically, an unexpectedly high level of oil will be available on world markets, and oil prices may fall; conversely, in especially “unlucky” times, oil prices may temporarily rise.

Market adaptations to risk are slightly more complex than implied by this picture of portfolio management. A decision by a nationalist or populist government to raise taxes on oil extraction or to take over an oil field will not always disrupt supplies much, because the oil firm may still continue to pump despite the higher taxes, and presumably a government that seizes a field does so with plans to sell the oil. As a result, short-term world oil supply will not change much in this scenario.⁹ However, the risk of nationalization or *ex post facto* renegotiation of fees and taxes depresses investment by international oil firms, so an increase in the estimated level of that risk can have a significant effect on investment and medium-term supply.¹⁰ Similarly, any increase in the expected frequency of physical disruptions at oil facilities, such as those caused by terrorist attacks or wars, will depress investment levels.¹¹

In sum, political risk affects the overall level and geographic location of investments in the oil industry, but it does not change the fundamental supply dynamic: The quantity of oil available today depends on the investment decisions made in previous decades. Future levels of supply hinge on current investments.

Supply disruptions and political risk are not the only necessary adjustments to the basic supply-demand framework in oil markets. The world's major oil exporters have formed a cartel, the Organization of Petroleum Exporting Countries, to try to affect prices by controlling supply. The cartel members negotiate agreements to mute the normal, competitive market pressure to produce up to the point where price equals marginal cost.¹²

Although the logic is simple, making a cartel work is difficult. First, even monopolists are uncertain about the actual strength of demand for their product, and OPEC members often disagree about how much to restrict supply.¹³ They also often disagree about how much production to expect from countries that are not members of the cartel.¹⁴ Second, even if the members can agree about the ideal level of production, they have to allocate market shares among themselves. Huge sums of money are at stake in this zero-sum negotiation; not surprisingly, agreements are often hard to reach.¹⁵ Finally, even when OPEC members completely agree about total production and the allocation of production quotas, each has a short-term interest in cheating, because each producer can increase its own profit by exceeding its quota.¹⁶

OPEC's difficulty managing oil supply varies depending on political and market conditions. If investment and production patterns or political events change the number of key players in the OPEC negotiations, the cartel management task will change, too. Agreements are easier to reach and cheating is easier to detect and punish if fewer players are involved.¹⁷ Moreover, cartels work better when the members are willing to sacrifice some of today's profits for the long-term benefits of a strong cartel, and the political

and market conditions in the OPEC member states determine how much each country will sacrifice for future gains.¹⁸ Each time the global oil supply-and-demand situation changes, OPEC members have to adjust their cartel agreement. Given that before the disruption the cartel was at least somewhat effective at increasing profits above the normal competitive level, most disruptions should hinder cartel cohesion.¹⁹ Each market disruption is an opportunity for intracartel conflict, hence an opportunity for the amount of oil flowing onto world markets to increase compared to the level that OPEC had preferred to offer in the past.

Like political risk, cartel behavior does not change the underlying importance of supply and demand in oil markets. Political risk and cartel behavior merely modify the expected responses across the oil industry to price changes and to political shocks. Overall, the framework we have described above for understanding the oil industry allows us to assess the likely effects of important trends—including the possibility of peak oil, China's new energy policy activism, and instability in the Middle East—on the prices that Americans pay, and that analysis should inform America's foreign policy.

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The Perils of Peak Oil

In the past decade, the authors of several widely read books and articles have raised alarms about the quantity of the world's remaining oil reserves. According to the peak oil hypothesis, the world has recently passed an ominous milestone: half of the recoverable oil has already been consumed, and the rate of global oil production has therefore begun, or will soon begin, an irreversible decline.²⁰ The implication, according to proponents of that hypothesis, is that in the coming decades oil prices will soar as supplies dwindle and demand grows.²¹ Some observers argue that the United States should use foreign policy tools to ensure access to the "American share" of oil supplies in that difficult environment;²²

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others ominously warn that it is exactly that sort of “mercantilism,” which they view as an inevitable consequence of passing the oil supply peak, that will draw the United States into resource wars.²³

The pessimistic claims about peaking oil supplies should be treated with skepticism. For decades, analysts have argued that oil supplies were dwindling and that the peak rate of production would soon been reached. In fact, the most eminent advocate of that argument today once predicted that the global production peak would occur in 1989, but since then global crude oil production has grown by 23 percent, and oil supply (crude oil and other petroleum liquids) has grown by more than 28 percent.²⁴ More telling, the world’s ultimately recoverable resources (URR) have been *growing* over time, largely because many fields contain substantially more oil than was originally believed.²⁵

One reason URR are growing despite the world’s continuing consumption of oil is that improved technology has allowed a far greater fraction of reserves to be extracted from oil fields. In 1980 only 22 percent of the oil in the average field was recoverable, but with better extraction technology average recovery is now up to 35 percent, effectively increasing URR by more than 50 percent. The results of the growing URR and recovery rate are striking: in 1972 the “life-index” of global oil reserves, the length of time that known reserves could support the current rate of production, was 35 years; in 2003, after 31 more years of accelerating oil extraction, the life index stood at 40 years.²⁶ In short, no one knows how much oil is ultimately recoverable from the earth, but there is no compelling evidence that reserves are running out or that production is near the peak.²⁷

Although the simplest version of the peak oil hypothesis exaggerates the likelihood of impending oil shortages, there is a subtler cause for concern that has some merit: the world’s remaining oil supplies are increasingly concentrated in politically unstable regions, particularly the Persian Gulf and Central Asia.²⁸ Fears of instability in those regions could suppress

investment in exploration and development of oil fields, which could increase prices.²⁹ Moreover, the pessimists argue, unstable future oil production could leave the United States vulnerable to sudden supply shocks.³⁰

Concern about the effect of peak oil on the geographic concentration of oil supplies has led foreign policy analysts to advocate costly policies to attempt to mitigate the instability in key oil-producing regions. One proposal is for the United States to do more to police the Persian Gulf and the oil-producing regions of Central Asia.³¹ More ambitious policies would aim at directly addressing the underlying political instability. Traditional realpolitik logic might suggest that the United States should support authoritarian leaders in oil-producing regions and even help them to quash unrest, although that option is rarely expressed openly.³² Alternatively, the United States could sacrifice the short-term stability provided by regional dictators in the hope that robust U.S. democracy-promotion efforts might enable peaceful democratic regimes to provide long-term stability.³³ All three strategies are based on the view that the growing concentration of the world’s oil reserves in unstable regions requires an enhanced U.S. effort to reduce that instability.

Those foreign policy prescriptions for responding to instability in oil-producing regions are unnecessary and unwise.³⁴ If oil production becomes increasingly concentrated in politically unstable regions, suppressing investment in the oil industry (raising prices) and increasing the frequency of supply disruptions (also raising prices), then possible policy responses should be evaluated on the basis of their ability to enhance supply and reduce price. Using that metric, investments in oil exploration and extraction technologies are far more attractive than foreign policies that support dictators or attempt to police or democratize violent regions.

Oil industry research and development has a good track record for increasing oil supplies. Decades of investment in exploration technology have made it easier to find deposits, and improvements in extraction technologies have made it possible (and economically feasible) to

recover oil from locations that were once inaccessible, such as under deep water. Improved extraction technology has also increased the fraction of the oil that can be recovered from fields. As a result, the average finding and development cost of a barrel of oil (adjusted for inflation) plummeted from \$21 in 1979–81 to \$6 in 1997–99.³⁵ The steady stream of technological innovation in the oil industry explains why URR has grown over the past half century.

In contrast, past efforts to increase stability in oil-producing areas by supporting dictators, policing violent regions, or spreading democracy have a dubious track record. Supporting dictators requires paying large ethical costs up front in the hope that those dictators will retain power and keep the oil flowing. Weighed against those guaranteed costs, the alleged benefit of supporting dictators is a gamble. The dictator might lose power anyway, or rebels might disrupt the flow of oil despite American support for the dictator. Even if the dictator does stay in power, the United States might need him more than he needs the United States, meaning that U.S. aid would free him to cooperate with OPEC to raise oil prices. If, on the other hand, revolutionaries seize power, they will blame the United States for the atrocities they suffered under the old regime. The United States still pays for its role in returning the shah of Iran to power in 1953 and for supporting his brutal government for decades.³⁶ The close American relationship with the Saudi royal family, accepting the regime's authoritarian side, has probably contributed to virulent anti-American Islamic radicalism, too.³⁷

Policing the oil-producing regions using U.S. military force is an even more suspect strategy. Policing missions are expensive because they require enormous force deployments, which typically number 1 percent of the policed population.³⁸ Furthermore, effectively policing unfamiliar countries is especially difficult, because local groups often embroil the outside power in their complex ethnic, religious, regional, and personal antagonisms. Too often third-party "police"

are tricked into settling scores, which escalates instability instead of ameliorating it.³⁹

Efforts to democratize countries or regions are also a dubious solution. The level of difficulty the United States has faced in Iraq is typical. In fact, the United States has led 17 efforts at democratic nation building since 1900. Two of those cases, Iraq and Afghanistan, are still under way, though neither appears promising. Of the other 15 cases, only 4 resulted in democracies lasting 10 years or longer.⁴⁰ The current 27 percent success rate will drop if Iraq and Afghanistan continue to spiral downward. Meanwhile, the democratization process itself may increase instability that interferes with the flow of oil, and even a successful democratization would not promise a smooth flow of oil: a democratic oil exporter might well find it in its national interest to cooperate with OPEC to keep the price of oil high.

The difficulty of creating stability in oil-producing regions is even more striking when compared with the relative ease with which the market deals with instability and political risk. Oil companies have access to the normal array of tools to protect their investments: diversification and insurance. For example, because political risk in the Persian Gulf is relatively high, oil companies wisely diversify their investments across the region as well as in other oil-producing parts of the world; through diversification they reduce the probability that violence or unrest will shut down all their profitable operations, and they can pay for the expected costs of localized shutdowns with their worldwide revenues. Furthermore, a temporary spike in prices following a supply disruption in one oil producer increases the value of undisrupted oil investments, giving oil firms an especially strong incentive to diversify their investments globally. Finally, oil companies can simply take the standard step for dealing with low-probability, bad-outcome events: purchase insurance. Insurance and diversification allow firms to cope with the effects of instability and to maintain a normal rate of investment.

In sum, the simple peak oil argument that suggests that the world is running out of oil is

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unconvincing; oil will remain the foundation of the global economy for decades to come. As demand for energy continues to increase, oil prices will likely rise in the long term, increasing incentives for new oil exploration, technology development, energy efficiency, and research on alternative energy sources. Meanwhile, concentration of oil production in unstable regions does pose a certain danger, but market processes, including diversification of sources of supply and investment to reduce the economic costs of finding and extracting oil, respond to the danger better than ambitious foreign policy options.

leap into the oil exploration and extraction business will either be economically neutral for the United States or, if Chinese investments increase aggregate global supplies, possibly advantageous to the U.S. economy. China's soaring demand for energy, and its implication for global oil prices, will adversely affect the United States and all other oil consumers (just as our consumption of oil also drives up prices). But there is little to fear from Beijing's energy policy and no reason for U.S. policymakers to expect, or initiate, the type of competition with China that analysts envision when they describe an international scramble over the "geopolitics of oil."

More broadly, U.S. policymakers should make sure that unwarranted fears that energy competition will breed a Sino-U.S. conflict do not become a self-fulfilling prophecy. In reality, no American interest in oil requires hostile relations with China.

Until the mid-1990s, China produced more oil than it consumed; since then, China's consumption has greatly outpaced domestic production. China's economic growth creates a voracious appetite for oil, especially because much of the manufacturing investment that fuels the Chinese expansion is energy intensive, and Chinese consumers view personal cars as a symbol of their middle-class status.⁴⁴ Each unit of Chinese GDP increase therefore bumps up global energy consumption more than a comparable GDP increase in many other countries. Many oil analysts believe that Chinese demand accounts for a substantial part of the oil price increase since 2000.⁴⁵

Meanwhile, as the appeal of communist ideology has faded, Chinese leaders have staked their political future on the country's economic performance and the ongoing rise in living standards. As a result, they have used price controls to insulate domestic consumers and industries from price increases for petroleum products.⁴⁶ Protected from rising prices, Chinese consumers and industries unabatedly increase their consumption.⁴⁷

The traditional geopolitics of oil argument goes like this: without a fundamental shift in Chinese political strategy, Chinese demand for

China and the Geopolitics of Oil

China's soaring demand for oil is one of the biggest changes to affect energy markets in recent times. China's growing thirst for oil, part of the broader global surge in energy consumption, will drive up prices, imposing costs on the U.S. economy.⁴¹ Some analysts see an even graver threat ahead stemming from Beijing's energy policy: China is negotiating preferential long-term purchase agreements that could deny Americans even the opportunity to bid for some oil.⁴² Those analysts fear that competition for oil supplies will lead the United States and China into a struggle they describe as "the geopolitics of oil."⁴³ They implicitly recommend that the United States shift its foreign policy to work against the Chinese strategy—in essence, creating our own preferential agreements to guarantee U.S. access to oil and perhaps exclude China.

Fears about the implications of China's energy policy are greatly exaggerated. First, on the demand side, China's efforts to reach long-term oil purchase agreements will not affect aggregate global demand for oil; the prepurchase agreements will merely change the patterns of global oil trade (i.e., which specific barrels of oil China consumes) but not the overall level of consumption. The long-term agreements, therefore, will not significantly affect oil prices. Second, on the supply side, China's

oil may threaten the energy security of other consuming countries, notably including the United States. Because the Chinese recognize their sustained need for oil, the government encourages companies to sign long-term contracts to buy large quantities of oil from producers around the world, allegedly establishing “preferential relationships.”⁴⁸ They have also bought access to overseas fields by investing in established foreign oil companies and obtaining concessions to develop oil fields and rights to explore for new fields.⁴⁹ Those acquisitions give the Chinese decisionmaking control over future oil supplies.

Meanwhile, Chinese diplomats cultivate relationships with the governments of countries with large oil reserves.⁵⁰ Some analysts allege that such statecraft is especially helpful in the oil industry, because government-owned oil companies control the fields in many countries, and perhaps those governments will be persuaded to sell to the Chinese at below-market prices, especially during an oil shock.⁵¹ And, finally, the Chinese government and oil companies are negotiating overland pipeline deals to bring oil to China from Russia, the Caspian basin, and even the Middle East.⁵² Other analysts and a number of American politicians fear that all of those moves reflect a coherent Chinese national energy policy, one that might lock up sources of oil supply, leaving less oil on the world market for relatively laissez-faire countries like the United States.⁵³

The economic arguments against those fears are compelling.⁵⁴ Whether or not China arranges its oil purchases years in advance, it will consume the same amount of oil. If China buys concessions from foreign governments to pump oil from their wells or to prospect for new fields on their territory and then chooses to ship the crude to Chinese customers rather than to sell it on the open market, the Chinese actions will simply free up oil pumped by other companies so that they can then sell to non-Chinese consumers.⁵⁵ In other words, the Chinese arrangements may lock up supply, but they also sate a substantial portion of world demand. Even the Department of

Energy study mandated by Congress in the wake of the CNOOC affair—a study prompted by an overwhelming congressional vote to “protect” American energy security—found that the consequences of the Chinese oil strategy are “economically neutral.”⁵⁶

Defenders of the geopolitics of oil argument attack those rebuttals by questioning a key assumption of the economic view. They ask, what if the Chinese government were willing to sacrifice profits to keep oil for the Chinese market—that is, what if China imported all of the oil from its foreign concessions, holding down oil prices on the Chinese domestic market, and refused to resell its oil, even if world market prices soared above the Chinese domestic price?⁵⁷ That would reduce the supply of oil available to non-Chinese consumers, dramatically driving up oil prices outside China. Current Chinese price controls on petroleum products, after all, demonstrate the Chinese government’s willingness to sacrifice economic efficiency for noneconomic goals, such as the political stability that they think cheap oil enhances.

What the pessimistic analyses overlook, however, is that a Chinese decision not to resell the oil China pumps (whether from foreign concessions or domestic production), despite the opportunity to make big profits, would be the same thing as China deciding to pay more for oil than other consumers.⁵⁸ In other words, China’s hypothetical decision not to sell oil to Americans even if world prices rose dramatically (e.g., during a supply disruption) would cost the Chinese the same amount of money that they could use to outbid Americans in a “free” oil market in which China had not made long-term deals with suppliers. The point is that China’s current activities, whether or not they are characterized as mercantilist efforts to lock up oil supplies, make no difference to Americans’ long-run ability to buy oil in the market. What might hurt American consumers is China’s growing *demand* for oil, because that demand drives up prices. Chinese ownership of oil does not matter much.

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Concerns about the future effectiveness of economic sanctions must be tempered by the fact that sanctions are not a particularly effective instrument of foreign policy.

Chinese firms have spent billions of dollars to purchase concessions in Angola, Canada, Ecuador, Equatorial Guinea, Kazakhstan, Kenya, Nigeria, and Peru (among others). Compared to Western oil firms, the Chinese seem willing to overpay for oil fields.⁵⁹ Some areas that the Western firms wouldn't consider likely to have a high enough return on investment still attract Chinese drilling. If those prospects pay off, more oil will enter the world market, driving down prices for all consumers; if the prospects fail, Chinese rather than American shareholders will cover the losses. Meanwhile, American investors can put their money into other projects (perhaps even outside the oil industry) that they judge more likely to be productive.

In sum, China's oil policy will not hurt the United States, and it may even benefit the U.S. economy. China's prepurchase agreements mainly move oil around: they alter trade patterns and dictate which specific barrels of oil arrive at China's ports; they do not affect the total amount of oil consumed or the market price determined by supply and demand. China may end up being disappointed by its investments in foreign oil fields: Western firms may be unwilling to pay as much as Chinese oil companies to explore and develop those concessions for good reasons. On the other hand, if Chinese investors were shrewd or they simply get lucky and their prospecting expands the world oil supply, the price of oil will drop for Americans, too. In effect, overzealous Chinese exploration could subsidize the rest of the world's consumers.

But makers of U.S. foreign policy may face another problem stemming from China's growing energy consumption and role in oil exploration and extraction: those trends may reduce the effectiveness of U.S. economic sanctions against oil-producing countries.⁶⁰ In the past, Western countries could try to coerce oil-producing nations by prohibiting Western corporations and citizens from providing them with critical oil technology or engineering services. Those prohibitions had real teeth because the major oil companies were American or European firms. In the

future, however, as the Chinese gain experience in the international oil business, coercive efforts will require agreement in Beijing as well, because Chinese oil companies will be able to move in and provide services denied by the West. Similarly, economic sanctions against oil exporters will be merely symbolic unless Beijing is on board. China now imports enough oil to "bust" the sanctions: a unilateral Chinese decision to import oil from a sanctions target would probably involve sufficient volume to use up the target's entire export supply, meaning that the sanctions would have essentially no effect on their target's economy. Finally, convincing Beijing to support economic sanctions will grow increasingly costly as China's oil consumption rises: if a U.S.-led embargo triggers any increase in the global price of oil, China will pay that premium for each barrel it consumes; China's growing demand, therefore, makes it more costly for Beijing to agree to sanctions, hence more costly for Washington to induce China to cooperate.

However, concerns that China's energy policy could blunt the effectiveness of U.S. economic sanctions are often exaggerated. First, to increase the political resonance of their claims, analysts often link the argument about economic sanctions to American "energy security," even though the issue here is not the price and availability of energy to Americans but is instead something quite different: the effectiveness of one tool of U.S. foreign policy. The concerns about the future effectiveness of U.S. economic sanctions do not suggest any threat to U.S. energy security.

Second, concerns about the future effectiveness of economic sanctions must be tempered by the fact that sanctions are not a particularly effective instrument of foreign policy.⁶¹ Economic sanctions usually fail. Frequently the target regime cares more about the issue at stake (say, regime survival) than about the greatest possible economic cost that foreign powers could impose. Furthermore, America's efforts to impose effective sanctions often fail because other countries refuse to sign on to the sanctions regime, which allows the target to

simply adjust its trade pattern to mitigate the pain. And target states are not passive as they are being sanctioned; they often work to create and then exploit divisions among the sanctioning states.⁶² Many factors already make sanctions a dubious tool of statecraft; adding one additional hurdle, increased Chinese resistance to cooperating due to China's demand for oil, would not lead to an appreciable drop in sanctions' effectiveness.

Finally, the United States cannot do very much to reduce China's ability to bust oil embargos, and any efforts in this direction would risk a major deterioration in Sino-U.S. relations. China's growing demand for oil is driven primarily by its rapid economic expansion. Even if Beijing were to eliminate energy subsidies, China's economic growth would push its energy consumption ever higher. The only way for the United States to stem China's energy consumption would be to significantly slow China's economic growth—a goal that would trigger enormous bilateral tension and, given the importance that the Chinese government attaches to steady economic growth, possibly war. It would be hard to imagine a more hostile and provocative U.S. policy toward China.⁶³

Overall, the United States should not worry that China is locking up oil supplies with prepurchase agreements or that China is investing to develop overseas oil reserves. The real energy “problem” that China poses for the United States is more quotidian: Chinese demand for oil is rapidly increasing—in fact, worldwide demand for oil is rapidly increasing—and that drives up global prices.⁶⁴ But because of the flexibility of the global oil market, there is no reason for the United States to copy China's energy policy; to try to block the development of China's oil industry; or, worst of all, to adopt policies to weaken the Chinese economy.

Oil Shocks and U.S. Military Policy

In addition to their fears about peak oil and China's energy policy, many foreign policy ana-

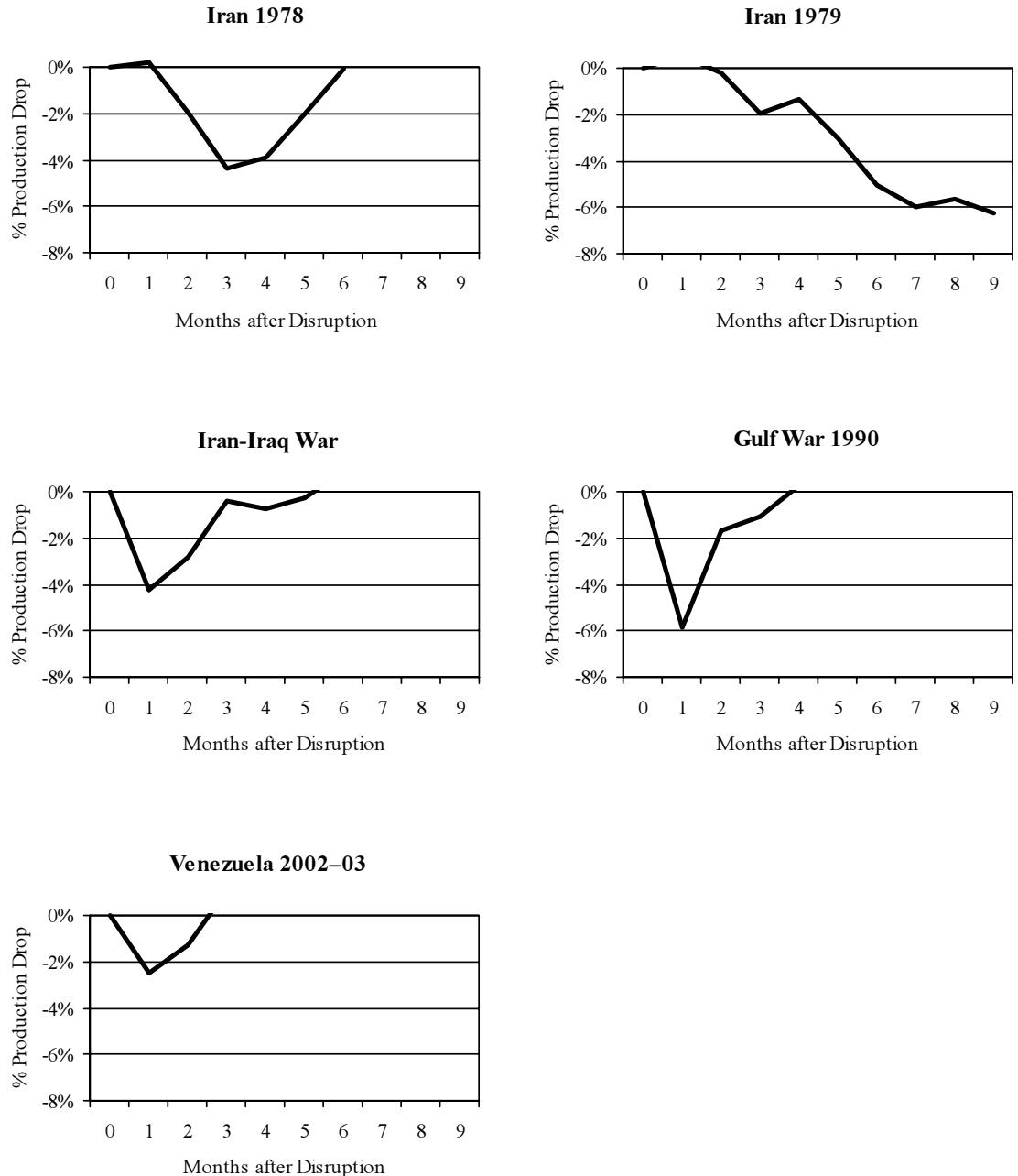
lysts worry that political disruptions in oil-producing regions might impose significant costs on major oil-consuming countries like the United States. Wars, terrorism, and revolutions interfere with oil markets, interrupting supplies and elevating short-term prices.⁶⁵ As a result, some analysts suggest that promoting stability in oil-rich regions is an important U.S. national interest.⁶⁶ Given the logic that governs supply, demand, and investment decisions in the oil industry, however, concerns about political disruptions are exaggerated. Furthermore, maintaining U.S. military forces in the Persian Gulf to reduce political instability, a common proposal from analysts concerned with “energy security,”⁶⁷ is unnecessary and would actually increase the danger of political disruption to oil markets.

In the five major oil supply shocks caused by political disruptions in the past 30 years, market dynamics quickly mitigated the costs borne by consumers.⁶⁸ Figure 1 tracks the decline and recovery of world oil production in the five cases: (1) the Iranian oil industry strikes in 1978, (2) the collapse of the Iranian oil industry in 1979, (3) the start of the Iran-Iraq war, (4) the 1990 Iraqi invasion of Kuwait, and (5) the 2002–03 strikes in the Venezuelan oil fields.⁶⁹

The cases reveal four key findings. First, in four of the five cases (the exception is the 1979 Iran disruption), major reductions in any country's oil production quickly triggered compensating increases elsewhere.⁷⁰ In all cases, the disruption triggered intense efforts in the disrupted country to restore its output.⁷¹ For example, in 1978 strikes in the Iranian oil industry deprived global markets of nearly 5 mb/d, which was then more than 4 percent of world production. But the world responded quickly, and global production had fully recovered in six months. The outbreak of the Iran-Iraq war removed 3.4 mb/d of Iranian and Iraqi oil from global markets (5.8 percent of global production), but total global supply did not fall by that full amount. Other producers increased their output within the same month, so net global supply only dropped by 4.2 percent. As adjustment efforts continued,

In the five major oil supply shocks caused by political disruptions in the past 30 years, market dynamics quickly mitigated the costs borne by consumers.

Figure 1
World Oil Production after Major Disruptions



Note: All data are from the U.S. Department of Energy's Energy Information Agency. Figures reflect total world oil production.

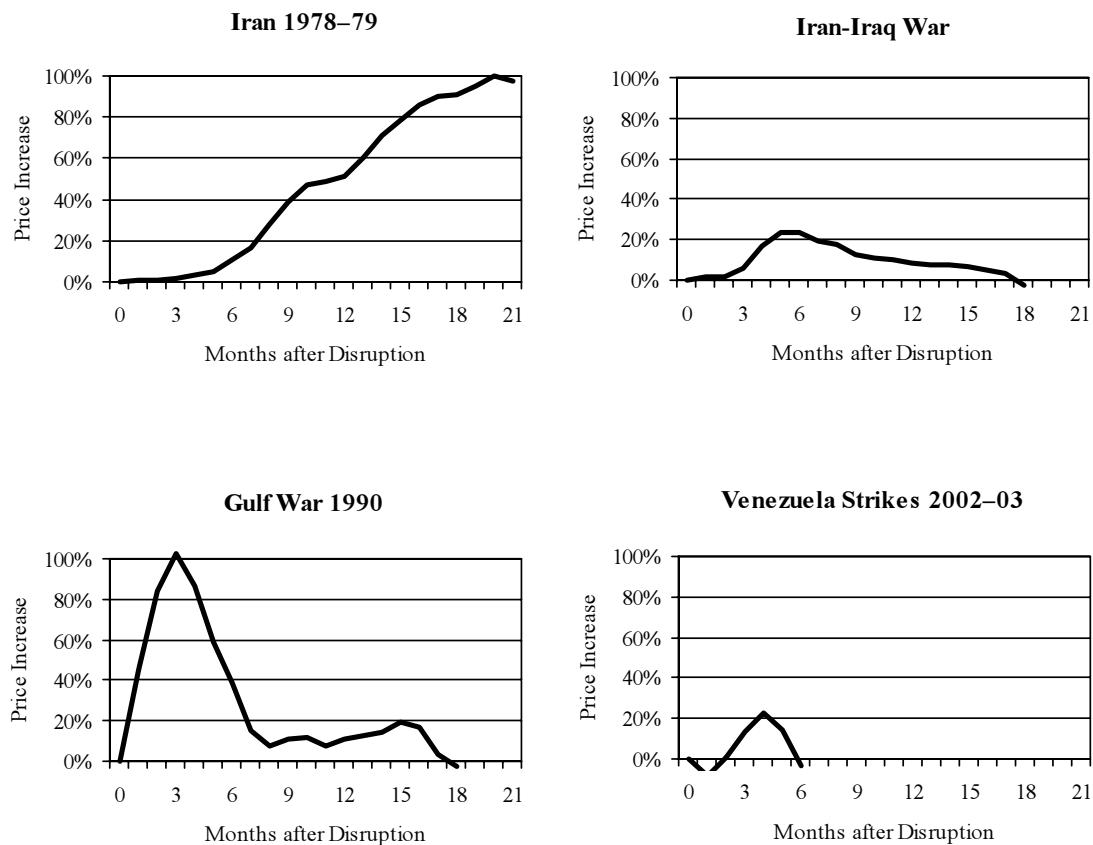
**Concerns
about political
disruptions are
exaggerated.**

the losses to the world market were nearly replaced in three months and fully replaced in five.

In the most serious disruption of all, which stemmed from Iraq's 1990 invasion of

Kuwait, United Nations sanctions eliminated 5.3 mb/d of Iraqi and Kuwaiti oil from world markets, a loss of 8.8 percent of world production. Again, total world supply did not drop that far, because other producers quick-

Figure 2
Price Shocks and Recovery after Major Disruptions



Note: Price changes are measured in real terms.

ly ramped up their output. One month after the Iraqi invasion, net world production was down by 5.9 percent, but a month later it was short by only 1.7 percent, and two months after that total global production had fully recovered. In the most recent case, it took only three months in 2003 to replace the 2.3 mb/d of Venezuelan production disrupted by strikes.

Second, in four of five cases (with the same exception), oil prices either remained nearly constant or quickly returned to pre-disruption levels. The 1978 Iranian oil strikes did not have a significant effect on prices; they remained in the \$27–\$28 per barrel level (in constant 2000 dollars) until the disruption was resolved.⁷² The outbreak of the Iran-

Iraq war triggered a jump in oil prices, but they returned to prewar levels in about 18 months. (Furthermore, during the Iran-Iraq war, the repeated attacks on shipping during the “tanker war” phase had no discernible effect on global prices.) Even after the Iraqi invasion of Kuwait and the subsequent UN embargo, oil prices dropped nearly to prewar levels in eight months. And the Venezuelan oil strikes caused only a brief spike in oil prices; within five months prices were back to their prewar level. Figure 2 shows the increase in oil prices after each of those disruptions and their recovery over time.

Third, international oil markets appear increasingly efficient at replacing disrupted oil supplies, thereby reducing the duration of

In four of five cases, oil prices either remained nearly constant or quickly returned to pre-disruption levels.

The invention of new international financial and investment tools since the 1970s has enabled sophisticated spot and futures markets for oil, facilitating quick market adjustments and allowing producers, wholesalers, refiners, and major consumers to smooth risks.

price spikes. Figures 1 and 2 show that the three most recent disruptions required the least time for markets to adapt—even though one of those three (the 1990 Gulf War) involved the greatest immediate shortfall. Specifically, the invention of new international financial and investment tools since the 1970s has enabled sophisticated spot and futures markets for oil, facilitating quick market adjustments and allowing producers, wholesalers, refiners, and major consumers to smooth risks.⁷³

Finally, the long Iran-Iraq War provides especially clear evidence about the intracartel bargaining problems that price spikes trigger. Five months after the war's sudden beginning, worldwide oil production matched prewar levels and then immediately exceeded them; OPEC proved unable to reverse the sustained price decline that followed. From 1981 to 1985 Saudi Arabia tried in vain to reestablish cartel discipline, but as war raged in the Gulf, as the belligerents pumped oil as quickly as possible, and as the other OPEC members chose sides, reaching OPEC agreements that the cartel members would keep became impossible. The West enjoyed the benefits of those disputes in the form of several years of cheap oil.⁷⁴

Critics might reply that those examples all come from a time when oil producers had slack production capacity, that is, when past investment in exploration and oil field development enabled them to pump more oil than consumers demanded at the preshock price level. At present, those critics fear, the increase in worldwide demand (especially from China and India) has taken up the slack, so producers could not increase output, even if a disruption were to create a price spike.⁷⁵

That criticism is misguided for three reasons. First, data on slack capacity are notoriously unreliable. Slack production capacity is sometimes reported as a static figure (e.g., 2 mb/d), but any reasonable measure must report the amount of extra oil that could be brought online in a given period of time and at what cost. Such details, unfortunately, are closely guarded secrets. Although industry

observers can make reasonable estimates of current production levels—for example, by counting the number and size of the tankers that dock at a given oil terminal—they cannot tell how full producers' inventories are or how aggressively the producers are drawing oil out of underground reservoirs.⁷⁶ And only producers can do the advanced scientific tests to try to determine the maximum flow rate that a given field can support using current technology.

Second, assertions about the lack of slack oil production capacity are inherently suspect because members of a cartel, and especially large cartel leaders, should generally maintain slack capacity. The entire purpose of a cartel is to help members produce less than the maximum amount possible in order to increase price. Furthermore, the enforcement mechanism that (imperfectly) holds the cartel together is the threat to respond to cheating with additional increases in output.⁷⁷ The same slack capacity that cartel members need to keep their partners in line can also be used to respond to a supply disruption.

Finally, the more the United States relies on market mechanisms to mitigate disruptions in the oil industry, the greater the incentive producers will have to create additional slack capacity. If the odds of supply disruptions increase, producers will be more willing to pay to maintain additional slack capacity so that they can pump more at post-disruption high prices. Similarly, large oil companies will maintain larger inventories because they, too, will want to be positioned to profit from a spike in prices. The result of those profit-driven responses is to create the slack that will mitigate the disruptions. There is clear evidence that slack capacity and inventory buildup are driven by expectations of future disruptions. Whenever political crises that could affect oil supply loom on the horizon, wholesalers fill their stocks, essentially creating slack capacity above the ground that they hope to sell when supply drops and prices rise.⁷⁸

Overall, as the historical cases suggest, market responses limit the costs that the United

States should pay to try to control instability in oil-producing regions with military force. In two specific situations, however, the market adjustment to political disruption would be painful enough to make energy supply a first-order national security concern.⁷⁹ But even in those scenarios, a peacetime forward military presence is not the best strategy to protect American interests.

The first scenario is a large-scale conquest in the Persian Gulf. One power dominating the Persian Gulf region would limit market adaptation, because a regional empire could lead OPEC more effectively than the current loose oligopoly and because other oil producers would not have enough capacity to compensate for a reduction in the empire's output. The majority of the world's oil reserves appear to be located in the Persian Gulf, close enough together that a regional empire could, conceivably, seize most of them. The good news is that the risk of major conquest in the Persian Gulf is at its lowest point in decades, and preventing that contingency does not require any peacetime military presence in the region.

In the unlikely event that a country seemed poised to make a bid for regional empire, the United States could issue a clear deterrent threat to the aspiring regional hegemon: if you try to take over your neighbor's oil, the United States will make sure you fail. That U.S. threat should be very credible because the United States has a powerful interest, as does any major oil importer, in Persian Gulf oil remaining divided, and that interest is evident to regional actors.⁸⁰ Second, if deterrence fails, the U.S. military could halt an offensive quickly, even if the United States had no peacetime forces in the region. Destroying armies on the move is one of the things that the U.S. armed forces do best.⁸¹ For example, an army advancing down the Saudi coastal highway would be highly vulnerable to U.S. carrier-based airpower and long-range bombers.

In the second scenario, the global economy and with it American national interests could be harmed by large-scale instability in Saudi Arabia: civil disorder could trigger

strikes in the oil industry or attacks on oil facilities. Although intrastate violence in another oil producer might temporarily affect global oil supply, as it did in Venezuela in 2002–03, other countries could make up the gap in output. But a major civil war in Saudi Arabia could disrupt enough of the world's oil supply that other producers could not expand output sufficiently to make up for the disrupted Saudi share.⁸² That disruption would impose a significant cost on the United States—enough cost that U.S. foreign policy decisionmakers should consider this scenario a serious threat.

Whether or not a Saudi civil war would justify U.S. military intervention, it makes no sense for the United States to position its military in the region before a Saudi civil war breaks out.⁸³ The forces required for on-the-ground intervention in a civil war would be vastly greater, and of a different type, than the forces that the United States has deployed to the Persian Gulf during peacetime.⁸⁴ An operation designed to pacify and stabilize Saudi Arabia could be an even greater undertaking than the deployment of 130,000-plus infantry-heavy forces in Iraq.⁸⁵

Even worse, U.S. military presence historically has been more likely to foment attacks on pro-American governments than to prevent them, and that problem would presumably be worse if the peacetime deployment were expanded to make it relevant to the civil war scenario. For example, the shah of Iran's close association with the United States and the large number of Americans in Iran during the shah's reign contributed to the popularity of his opponents.⁸⁶ More recently, al-Qaeda declared war on the House of Saud because the Saudis invited U.S. military forces to remain in the kingdom after the 1990–91 Persian Gulf War.⁸⁷ Not only would a U.S. military presence in the region be unhelpful in the event of massive civil unrest, but the presence might increase the likelihood of that scenario. The bottom line of this economic, military, and political analysis is that forward deployment of the American military in the Persian Gulf region is a poor

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response to the threat of civil war in Saudi Arabia.

More broadly, market adjustment to political shocks makes the magnitude of their cost to the United States low enough that military force is unlikely to be a wise policy response. Even in the few instances in which market dynamics are likely to be insufficient, peacetime military deployments will not protect the United States from the risk and, indeed, may even increase the risk of an oil market crisis. The best foreign policy strategy for energy security is to rely on a combination of the flexibility of markets and over-the-horizon military forces, which would be used only under certain, very narrowly specified conditions.

Conclusion

The coming decades *may* present serious energy-related challenges to the world. Global warming may require collective action on a global scale to reduce emissions, a daunting task. Furthermore, even though oil is nowhere near running out, the world's growing demand for energy and the finite nature of the petroleum reserves suggest that in the long term petroleum prices will rise. People will therefore need to develop alternative energy sources to supplement the energy reaped from current sources. Dispelling the myths that make Americans worry about the wrong energy issues is the first step toward confronting those real concerns.

The United States does not need an activist foreign policy to ensure U.S. access to affordable energy. There is no need to pacify or democratize tumultuous oil-producing regions to ensure that they will sell us their crude. Large oil firms compensate for the risk of supply disruptions through diversification and insurance, which allow them to invest and provide a steady flow of oil despite periodic disruptions to particular sources of oil. The United States also does not need to confront China because of its energy policy; Beijing's efforts will either merely shift around global consumption or perhaps even expand global

supply (which would benefit all consumers). And there is no need for U.S. military forces to maintain peacetime deployments in the Persian Gulf region to protect America's access to oil. At most, U.S. energy interests require an offshore air and naval presence nearby. Even imperfect markets like the oil market, threatened by political risk and distorted by cartel behavior, adapt to disruptions, and the adjustment process reduces the burden on the imperfect instruments of statecraft such as military intervention and peacetime presence.

Notes

1. It is conceivable, for example, that Iran would respond to a U.S. air attack on its suspected nuclear facilities by intentionally reducing its own oil production to punish the United States, even though that response would cost Iran tens of millions of dollars.
2. Economic decisions about past production rates also affect current production capacities. Pumping oil too rapidly from a field can reduce the future flow rate (or raise production costs tomorrow) and can even cut down a field's long-term total output (using current technology). For an accessible discussion of some of the technical background on investment and production, see Norman J. Hyne, *Nontechnical Guide to Petroleum Geology, Exploration, Drilling, and Production*, 2d ed. (Tulsa, OK: PennWell Corp., 2001), esp. pp. 405–12, 422–26, 439–49.
3. Other factors such as interest rates and environmental regulations also affect investment decisions.
4. Many analysts partly attribute the current high prices to the low rate of investment in the 1990s, when oil prices were low. See, for example, Daniel Yergin, "Ensuring Energy Security," *Foreign Affairs* 85, no. 2 (March–April 2006); and Philip E. Auerswald, "The Myth of Energy Insecurity," *Issues in Science and Technology* 22, no. 4 (Summer 2006).
5. Countries often do the same thing: if a crisis looms (and especially if those fears are driving up oil prices), governments sometimes try to insure against further increases by filling their reserves (e.g., the U.S. Strategic Petroleum Reserve). The ironic result is that governments often "buy high" and "sell low" because they become motivated to spend scarce resources on oil when threats have heightened prices. See Jerry Taylor and Peter Van Doren, "The Case against the Strategic Petroleum Reserve," Cato Institute Policy Analysis no. 561,

- January 12, 2006; see also Steve H. Hanke, "Over a Barrel," *Wall Street Journal*, October 21, 2004.
6. Kevin G. Hall, "Analyst Predicts Plunge in Gas Prices," *Seattle Times*, September 14, 2006; and Philip K. Verleger, "Explaining the Unexplainable: Crude Oil Prices—A Review of Theoretical Hypotheses, 1950–2006, and Empirical Evidence," *Petroleum Economics Monthly*, November 2006, summary available at <http://www.pkverlegerllc.com/PEM-WEB.PDF>.
 7. Daniel Yergin, *The Prize: The Epic Quest for Oil, Money, and Power* (New York: Simon & Schuster, 1991); and Gregory P. Nowell, *Mercantile States and the World Oil Cartel, 1900–1939* (Ithaca, NY: Cornell University Press, 1994).
 8. Fiona Hill, "Pipelines in the Caspian: Catalyst or Cure-All?" *Georgetown Journal of International Affairs*, Winter–Spring 2004, p. 24.
 9. Over the longer term, supply may decline, if the state oil company is inefficient or technically unsophisticated.
 10. Henning Bohn and Robert T. Deacon, "Ownership Risk, Investment, and the Use of Natural Resources," *American Economic Review* 90, no. 3 (June 2000): 526–49.
 11. For a useful discussion of different types of political risks in the oil industry and firms' adaptation to them, see Jedrzej George Frynas and Karnel Mellahi, "Political Risks as Firm-Specific (Dis)Advantages: Evidence on Transnational Oil Firms in Nigeria," *Thunderbird International Business Review* 45, no. 5 (September–October 2003): 541–65.
 12. Cartels increase profits for producers by cooperatively reducing production below the level predicted by competitive behavior, thus driving price up above the marginal cost of production. Producing an additional unit would be profitable on a one-off basis, but the increase in output would drive down the price of all units sold, so combined profits of all cartel members would drop if a member used its excess production capacity.
 13. Dermot Gately, "A Ten-Year Retrospective: OPEC and the World Oil Market," *Journal of Economic Literature* 22, no. 3 (September 1984): 1109; Paul Stevens, "The Determination of Oil Prices 1945–95," *Energy Policy* 23, no. 10 (1995): 867–68; and Theodore H. Moran, "Managing an Oligopoly of Would-Be Sovereigns: The Dynamics of Joint Control and Self-Control in the International Oil Industry Past, Present, and Future," *International Organization* 41, no. 4 (Autumn 1987): 602.
 14. Stevens, pp. 863–64.
 15. M. A. Adelman, "World Oil Production and Prices 1947–2000," *Quarterly Review of Economics and Finance* 42 (Summer 2002): 177; and James M. Griffin and William S. Neilson, "The 1985–86 Oil Price Collapse and Afterwards: What Does Game Theory Add?" *Economic Inquiry* 32 (October 1994): 544–45, 548–49, 556–58.
 16. Simon J. Evenett, Margaret C. Levenstein, and Valerie Y. Suslow, "International Cartel Enforcement: Lessons from the 1990s," *World Economy* 24, no. 9 (September 2001): 1223; M. A. Adelman, *The Genie Out of the Bottle: World Oil since 1970* (Cambridge, MA: MIT Press, 1995), pp. 4–5, 30; and Griffin and Neilson, pp. 545, 557–58. The decline in oil prices in the early 1980s is generally explained as a result of widespread cheating among OPEC producers. The Saudis tried to compensate for that cheating by cutting back their own production until 1986, when they gave up and opened the taps.
 17. Debora L. Spar, *The Cooperative Edge: The Internal Politics of International Cartels* (Ithaca, NY: Cornell University Press, 1994), p. 5; and Evenett, Levenstein, and Suslow, p. 1223.
 18. Spar, pp. 20–23; and James M. Griffin and Weiwen Xiong, "The Incentive to Cheat: An Empirical Analysis of OPEC," *Journal of Law and Economics* 40, no. 2 (October 1997): 302, 304, 307–08.
 19. Douglas R. Bohi and William B. Quandt, *Energy Security in the 1980s: Economic and Political Perspectives* (Washington: Brookings Institution, 1984), p. 18.
 20. According to the theory of Hubbert's peak, the rate of oil production will begin an irreversible decline when half of total reserves are consumed. That theory was originally published in K. M. Hubbert, "Nuclear Energy and the Fossil Fuels," Drilling and Production Practice series, American Petroleum Institute, 1956. More recently, see Kjell Aleklett and Colin Campbell, "The Peak and Decline of World Oil and Gas Production," *Minerals and Energy* 18, no. 1 (2003): 5–20.
 21. Matthew R. Simmons, *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy* (New York: Wiley, 2005).
 22. For a description of politicians' motivations along these lines, see Erich Follath, "Natural Resources Are Fueling a New Cold War," *Der Spiegel*, August 18, 2006.
 23. Matthew Yeomans, "Crude Politics: The United States, China, and the Race for Oil Security," *Atlantic Monthly*, April 2005, p. 49; and Michael T. Klare, *Blood and Oil: The Dangers and Consequences of America's Growing Dependence on Imported Petroleum*

(New York: Metropolitan Books, 2004).

24. The prediction of the 1989 peak is from C. Campbell, *Oil Price Leap in the Early Nineties* (Kingston-upon-Thames, UK: Noroil, 1989). According to the U.S. Department of Energy's Energy Information Agency (EIA), worldwide crude oil production grew from 59.8 to 73.6 million barrels per day (mb/d) from 1989 to 2005. In the same period, oil supply expanded from 65.5 to 84.4 mb/d. See *International Petroleum Monthly*, February 2007 update, Tables 4.1C and 4.4, <http://www.eia.gov/emeu/ipsr/supply.html>.

25. A study of 186 giant oil fields revealed that from 1981 to 1986 estimates of the oil in those fields jumped on average by more than 25 percent. Leonardo Maugeri, "Oil: Never Cry Wolf—Why the Petroleum Age Is Far from Over," *Science* 304 (May 21, 2004): 1115. For a good description of the theoretical weaknesses of the peak oil argument, see, for example, Michael C. Lynch, "Crop Circles in the Desert: The Strange Controversy over Saudi Oil Production," International Research Center for Energy and Economic Development Occasional Paper no. 40, 2006, [http://www.gasresources.net/LynchM%2006%20\(Crop%20Circles\).pdf](http://www.gasresources.net/LynchM%2006%20(Crop%20Circles).pdf). See also "Peak Oil Theory—'World Running Out of Oil Soon'—Is Faulty; Could Distort Policy & Energy Debate," Cambridge Energy Research Associates, news release, November 14, 2006, <http://www.cera.com/aspx/cda/public1/news/pressReleases/pressReleaseDetails.aspx?CID=8444>.

26. Maugeri, p. 1115.

27. This does not suggest that oil production will grow fast enough to satisfy growing demand without prices rising. But high prices do not suggest that oil supplies are running out. They merely suggest that demand is growing faster than past investment is increasing supply.

28. Klare emphasizes this argument.

29. Ian Rutledge, *Addicted to Oil: America's Relentless Drive for Energy Security* (London: I. B. Taurus, 2005), pp. 11–12, 138–49.

30. Joseph J. Romm and Charles B. Curtis, "Mideast Oil Forever? *Atlantic Monthly*, April 1997, pp. 57–60.

31. Council on Foreign Relations Independent Task Force, *National Security Consequences of U.S. Oil Dependency*, uncorrected proofs of report posted to the Web, October 2006, pp. 5, 9, 50–51, <http://www.cfr.org/content/publications/attachmen ta/EnergyTFR.pdf>; Steve A. Yetiv, *Crude Awakenings: Global Oil Security and American Foreign Policy* (Ithaca, NY: Cornell University Press, 2004), p.

59ff; and Sebastian Mallaby, "The Reluctant Imperialist: Terrorism, Failed States, and the Case for American Empire," *Foreign Affairs*, March–April 2002.

32. That logic was openly articulated during the Cold War, when prominent American conservatives argued that the United States should support anti-communists in the developing world, even authoritarians. The current U.S. relationship with oil-rich (and politically authoritarian) Kazakhstan provides an example of the sort of difficult choice faced by American leaders today, if they make oil market stability their top priority. Steven Lee Myers and Ilan Greenberg, "Balancing Act: U.S. Welcomes Kazakh Leader," *New York Times*, September 28, 2006, p. A1.

33. Again, few sources openly acknowledge the tradeoff with short-term instability implicit in proposals that emphasize political development. For some examples, see Council on Foreign Relations Independent Task Force, *National Security Consequences of U.S. Oil Dependency*, pp. 9, 27, 46, 51; and Amy Myers Jaffe and Robert A. Manning, "The Shocks of a World of Cheap Oil," *Foreign Affairs*, January–February 2000. Ian Rutledge suggests that the U.S. regime change policy in Iraq was motivated in large part by the expectation that only a democratic Iraq would allow enough investment in Persian Gulf oil production to keep up with American oil consumption. See Rutledge, pp. 175–77.

34. Any changes to U.S. domestic energy policy that may be warranted to hedge against the possibility of dramatic increases in energy prices or to respond to concerns about climate change should be evaluated separately from the foreign policy proposals assessed in this paper.

35. These figures are in 2001 dollars. Maugeri, p. 1115. Adelman, *The Genie Out of the Bottle*, pp. 19–28, also argues that the development cost for an additional barrel of oil has declined dramatically over time.

36. Kenneth M. Pollack, *The Persian Puzzle: The Conflict between Iran and America* (New York: Random House, 2005), pp. xxv–xxvi, 68–71, 322–23.

37. Rachel Bronson, *Thicker Than Oil: America's Uneasy Partnership with Saudi Arabia* (New York: Oxford University Press, 2006).

38. The seminal article is James Quinlivan, "Force Requirements for Stability Operations," *Parameters*, Winter 1995, pp. 59–69. Quinlivan shows that, historically, policing has required 6–20 soldiers per thousand population. If 10 per thousand is taken as an average case, that is 1 percent.

39. Daniel L. Byman, *Keeping the Peace: Lasting Solutions to Ethnic Conflicts* (Baltimore: Johns Hopkins University Press, 2002), pp. 187–88, 198–203; and Stathis N. Kalyvas, *The Logic of Violence in Civil War* (New York: Cambridge University Press, 2006), esp. pp. 173–81, 209, 346, 376–81.
40. Minxin Pei and Sara Kasper, “Lessons from the Past: The American Record on Nation Building,” Carnegie Endowment Policy Brief, May 2003. See also Francis Fukuyama, ed., *Nation-Building: Beyond Afghanistan and Iraq* (Baltimore: Johns Hopkins University Press, 2006).
41. Robert J. Samuelson, “Is There an Oil ‘Bubble?’” *Washington Post*, July 26, 2006, p. A17.
42. U.S.-China Economic and Security Review Commission, *2006 Report to Congress* (Washington: Government Printing Office, November, 2006), pp. 95–96, 107; Council on Foreign Relations Independent Task Force, *More Than Humanitarianism: A Strategic U.S. Approach toward Africa*, Report no. 56, 2006, pp. 40–41, 53; and Phillip L. Swagel and Dan Blumenthal, “Chinese Oil Drill,” *Wall Street Journal*, June 8, 2006.
43. Dan Blumenthal and Joseph Lin, “Oil Obsession: Energy Appetite Fuels Beijing’s Plans to Protect Vital Sea Lanes,” *Armed Forces Journal*, June 2006; Yeomans, “Crude Politics,” p. 49; and Minxin Pei, “China’s Big Energy Dilemma,” *Straits Times*, April 13, 2006.
44. Amy Myers Jaffe and Kenneth B. Medlock III, “China and Northeast Asia,” in *Energy and Security: Toward a New Foreign Policy Strategy*, ed. Jan H. Kalicki and David L. Goldwyn (Baltimore: Johns Hopkins University Press, 2005), p. 269.
45. Auerswald; Yergin, “Ensuring Energy Security”; and Philip K. Verleger, “Energy: The Gathering Storm,” Institute for International Economics, September 29, 2004, p. 4, <http://www.pkverlegerllc.com/PKVGSSUMMARY.PDF>.
46. Enid Tsui, “Sinopec Warns of Tough Year in Midst of Inflation Battle,” *Financial Times*, April 4, 2006, p. 18.
47. China’s price controls have not led to a reduction in supply on the domestic market because the Chinese government has subsidized firms to make up for their price control-related losses. Eric Ng, “Beijing Hands Sinopec a 5b Yuan Surprise; Unexpected Payout for Price Control Losses Sparks Rally in Company’s Shares,” *South China Morning Post*, December 28, 2006.
48. For example, Chinese firms have recently signed such agreements in Nigeria and Venezuela. See Jim Kennett and Manash Goswami, “State Firms Beating Big Oil for Reserves,” *Montreal Gazette*, February 8, 2006, p. B6; Mure Dickie and Dino Mahtani, “Nigeria Turns to China As It Claims US Defence Aid Falters,” *Financial Times*, February 28, 2006, p. 1. Although those deals have been signed, it is yet to be determined whether they will end up being “preferential” for China in any meaningful sense—specifically, whether China is getting oil at below-market prices or whether China is ensuring secure access to future supplies that could not be acquired more cheaply, even during crises, by simply bidding for oil on the open market.
49. China National Overseas Oil Corporation’s failed attempt to buy Unocal is the best-known such deal in the United States, but Chinese firms have successfully bought into oil companies and fields in many other places, including Kazakhstan, Indonesia, Angola, and Sudan. Jaffe and Medlock discuss a range of investments on pp. 277–80. For CNOOC and national security concerns, see Brad Foss, “Experts: CNOOC Bid Implications Unclear,” *Associated Press Online*, June 28, 2005; and James A. Dorn, “U.S.-China Relations in the Wake of CNOOC,” Cato Institute Policy Analysis no. 553, November 2, 2005.
50. David E. Sanger, “China’s Rising Need for Oil Is High on U.S. Agenda,” *New York Times*, April 19, 2006, p. A1. For examples in Africa, see Council on Foreign Relations Independent Task Force, *More than Humanitarianism*, pp. 41–45.
51. “Oil’s Dark Secret—National Oil Companies,” *The Economist*, August 12, 2006.
52. See, for example, Blumenthal and Lin; Jan H. Kalicki and Jonathan Elkind, “Eurasian Transport Futures,” in *Energy and Security*, pp. 158, 163–64; and Julia Nanay, “Russia and the Caspian Sea Region,” in *Energy and Security*, pp. 132–33.
53. The March 2006 version of the *National Security Strategy of the United States* points to the danger of the Chinese trying to lock up oil supplies (pp. 41–42). A number of senators and representatives also used similar phrases during the debate over CNOOC’s bid to buy Unocal. See also “National Security, China, and the Unocal Deal,” *Washington Times*, July 5, 2005, p. A18; Steve Lohr, “Who’s Afraid of China, Inc.?” *New York Times*, July 24, 2005, sec. 3, p. 1; and Steve Lohr, “Unocal Bid Denounced at Hearing,” *New York Times*, July 14, 2005, p. C1.
54. See, for example, Pei; and Swagel and Blumenthal. Cato Institute analyst Jerry Taylor also made these points at a July 13, 2005, congressional hearing on the CNOOC deal, but his comments were sadly overshadowed by alarmist testimony from James Woolsey, Richard D’Amato, and

- Frank Gaffney Jr. Lohr, "Unocal Bid Denounced at Hearing."
55. Texas A&M economist Jim Griffin provides a clear demonstration of these economic facts in a simple numerical model in an unpublished paper, "The Myth of Petro-Nationalism," May 2006. Manuscript in authors' possession.
56. U.S. Department of Energy, *Energy Policy Act of 2005, Section 1837: National Security Review of International Energy Requirements*, February, 2006, p. 3.
57. Foss; and U.S.-China Economic and Security Review Commission, pp. 97-98.
58. In other words, China may be able to accomplish the same thing by simply buying as much oil as it can in world markets today and hoarding it.
59. Even in the Unocal auction, CNOOC's losing bid was substantially higher than Chevron's. In other recent cases, the Chinese have "won" by spending more than Western oil companies thought a property was worth. Kang Wu and Shair Ling Han, "Chinese Companies Pursue Overseas Oil and Gas Assets," *Oil and Gas Journal*, April 18, 2005; and U.S.-China Economic and Security Review Commission, pp. 97-98, 100-104.
60. See, for example, Council on Foreign Relations Independent Task Force, *More Than Humanitarianism*, pp. 41, 49-52.
61. For a critical assessment of the effectiveness of economic sanctions, see Robert A. Pape, "Why Economic Sanctions Do Not Work," *International Security* 22, no. 2 (Fall 1997): 90-136. Even sanctions "optimists" acknowledge that sanctions do not cause significant political change in target regimes very often. Kimberly Ann Elliott, "The Sanctions Glass: Half Full or Completely Empty?" *International Security* 23, no. 1 (Summer 1998): 50-65.
62. Daniel W. Drezner, "Bargaining, Enforcement, and Multilateral Sanctions: When Is Cooperation Counterproductive?" *International Organization* 54, no. 1 (Winter 2000): 73-102.
63. There is one other concern that may fan U.S. fears about China's energy policy, though it is rarely articulated publicly. U.S. military planners may be concerned that Beijing's efforts to improve relations with foreign oil producers and purchase foreign oil concessions may partially protect China from a U.S. blockade during a future military conflict (not necessarily caused by tensions over access to oil). In a war over Taiwan, for example, the United States would likely use its naval power to try to sever China's energy supply lines. Perhaps China's foreign energy investments are partially intended to protect China from U.S. military coercion. It is critical to note, however, that few of China's overseas investments would help China in such a scenario. If the U.S. Navy successfully prevented oil tankers from reaching Chinese ports, China would be unable to access the oil it owned in (for example) Sudan or Venezuela. As a result, Chinese overseas investments need not precipitate any American foreign policy response. The main elements of China's energy policy that would reduce the effectiveness of a U.S. naval blockade are China's new strategic petroleum reserve and the pipelines it is building with its neighbors to transport Caspian basin oil to China. For a short review of these arguments, see U.S.-China Economic and Security Review Commission, pp. 98-99, 103-4. Overall, any concern about the effect of Chinese energy policy on American military leverage should be tempered by consideration of the (low) likelihood that the United States would apply military coercion to China and the enormous costs of such a military action.
64. Of course, a price increase would also stimulate additional exploration and exploitation of oil fields, which would increase medium-term supply and mitigate the price increase. Over time, the balance of shifts in both demand and supply determines the price of oil.
65. Chip Cummins, "As Threats to Oil Supply Grow, A General Says U.S. Isn't Ready," *Wall Street Journal*, December 19, 2006, p. A1.
66. For example, Daniel Yergin notes that oil is abundant underground; he argues that the primary threat to U.S. oil access arises from political disruptions rather than resource scarcity. See Yergin, "Ensuring Energy Security." See also Joe Barnes, Amy Jaffe, and Edward L. Morse, "The New Geopolitics of Oil," *National Interest*, Energy Supplement, November, 2004.
67. For example, see Council on Foreign Relations Independent Task Force, *National Security Consequences of U.S. Oil Dependency*, pp. 28, 50-51.
68. For a more detailed analysis of oil market disruptions and their implications for American military policy, see Eugene Gholz and Daryl G. Press, "Protecting 'The Prize': Oil and the U.S. National Interest," manuscript, June 2006. Manuscript in authors' possession.
69. To varying degrees, each event described here surprised world markets, so the disruption and adjustment can be observed using aggregate data on oil production and price. In contrast, the 2003 U.S. invasion of Iraq was widely anticipated, so oil markets gradually adjusted prior to the attack,

and the precise effects of the invasion on oil markets are therefore harder to tease out.

70. The surprise in the 1979 case was that Saudi Arabia responded to the Iranian output cutback by cutting Saudi production rather than increasing output. One plausible hypothesis is that the Gulf monarchs were stunned by the Iranian revolution, and increased concern about their own domestic stability made them, particularly the Saudis, susceptible to pressure from Islamic fundamentalists or Palestinian groups to punish the West by raising oil prices. William B. Quandt, *Saudi Arabia in the 1980s: Foreign Policy, Security, and Oil* (Washington: Brookings Institution, 1981), pp. 130–32; and Yergin, *The Prize*, p. 704.

71. All data on oil production levels and prices are from the U.S. Department of Energy's Energy Information Administration. Prices reflect the refiner acquisition cost of oil and are quoted in 2000 U.S. dollars.

72. The 1979 collapse of the Iranian oil industry closely followed the 1978 strikes, so those two incidents are combined into a single panel of Figure 2. The initial strikes did not have a significant effect on prices, but the later disruption (which became serious in the spring of 1979) is the exceptional case of a sustained increase in oil prices.

73. Douglas R. Bohi and Michael A. Toman, *The Economics of Energy Security* (Boston: Kluwer Academic Publishers, 1996), pp. 37, 81–87.

74. Yergin, *The Prize*, p. 748.

75. Bushan Bahree and Chip Cummins, "In Oil's New Era, Power Shifts to Countries with Reserves," *Wall Street Journal*, June 14, 2006, pp. A1, A12; and Jason Grumet, executive director of the National Commission on Energy Policy, Testimony before the Senate Committee on Foreign Relations, Hearing on Energy Security and Oil Dependence, May 16, 2006.

76. Matthew Simmons tries conscientiously to figure out the technical details of Saudi production capacity in his book, *Twilight in the Desert*, but the data for a full, reliable assessment are simply not available, as Simmons's heroic but ultimately unsatisfying attempts to divine information about Saudi production capacity make clear.

77. Griffin and Xiong, pp. 307–8.

78. Pressure to fill inventories contributed to the run-up to the peak in oil prices in the summer of 2006, and drawing down those inventories then contributed to the price drop in the fall of 2006. Bhushan Bahree, "OPEC Likely to Stand Pat on

Output—Chance of a Reduction Dims, But New Focus on Stockpiles Could Keep Oil Prices Aloft," *Wall Street Journal*, December 8, 2006, p. A4; and Stanley Reed, "Will Oil Stay Soft?" *Business Week Online*, September 12, 2006.

79. Gholz and Press consider these two important scenarios in detail along with a third important scenario, a blockade of the Strait of Hormuz, through which a large fraction of the world's oil supply passes each day. The analysis presented there shows that the United States could respond to any threat to the strait without prepositioning military forces on the ground in the Persian Gulf. That scenario is not included here because it mainly draws on military analysis rather than the logic of market response emphasized in the second section of this paper. From the perspective of the market response, the blockade of the strait would look very much like the case of a Saudi civil war—too large a disruption for the market to replace.

80. The bias in the region tends to explain most U.S. actions as attempts to secure (or steal) Gulf oil, so it should be easy to convince would-be aggressors that the United States would fight over the division of oil reserves.

81. Barry R. Posen, "Command of the Commons: The Military Foundation of U.S. Hegemony," *International Security* 28, no. 1 (Summer 2003): 5–46. Even analyses that highlight the limitations of U.S. airpower agree that American airpower can utterly destroy ground forces advancing in the open. For example, see Daryl G. Press, "The Myth of Airpower in the Persian Gulf War and the Future of Warfare," *International Security* 26, no. 2 (Fall 2001): 9, 12, 40.

82. Russia also produces enough oil that it would be difficult for other producers to provide substitute supply rapidly, so if Russia were consumed by civil war that interrupted oil production, the United States and other oil consumers might face a steep and extended price hike. Russia's size and nuclear arsenal would preclude American military intervention in a Russian civil war.

83. In most cases, the overthrow of the Saudi monarchy by domestic Saudi groups would not warrant U.S. military intervention to protect oil interests: the new government would be very likely to sell its oil. Two circumstances, however, might require intervention. First, if a pro-Al Qaeda group were winning the civil war, intervention might be justified to prevent such a government from obtaining the huge cash inflows associated with Saudi oil sales. Second, if the Saudi security forces lost the ability to protect the country's critical oil infrastructure, U.S. help might be appropriate.

84. From 1994 to 2003, the United States maintained approximately 150 combat aircraft, 5,000 Air Force personnel, and 8,000 U.S. Army soldiers on the Arabian Peninsula.

85. The seminal article on calculating force requirements for stability missions is Quinlivan. Using Quinlivan's method, which calculates force requirements as a function of population in the area of hostilities, a mission to stabilize all of Saudi Arabia (whose population is roughly 27 million) might require more than 270,000 U.S. troops, which is roughly twice the current deployment in Iraq. If the uprising in Saudi Arabia were confined to the oil-rich Eastern Province (population roughly 3.5 million), then a smaller U.S. force

might be adequate (e.g., 35,000–70,000), though the U.S. deployment might cause the uprising to spread to other regions of the country. And even the latter low-end estimates vastly exceed the peacetime U.S. deployment in the region, suggesting that the peacetime deployment cannot be justified by the need for rapid deployment during a Saudi civil war.

86. John D. Stempel, *Inside the Iranian Revolution* (Bloomington: Indiana University Press, 1981), pp. 5, 10, 120, 321.

87. Eugene Gholz, Daryl G. Press, and Harvey M. Sapolsky, "Come Home, America," *American Conservative* 3, no. 11 (June 7, 2004): 15–19.

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