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PAPER

Oil for the Lamps of China: Managing Uncertainty and Vulnerability in World Energy Markets

Isaac B. Kardon

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Abstract The oil and gas resources at stake in China's maritime disputes in the South China Sea are among the key drivers of conflict in this domain, but little is known about their underlying value and potential to address claimant states' energy security dilemmas. There appear to be significant opportunity costs in China's approach to these disputed zones and resources, both in the form of damaged regional political relationships and foregone opportunities to exploit more lucrative resources. This essay offers an explanation of China's behavior with respect to these resources, finding structural conditions in the regional political and economic environment to be a central concern for Chinese leadership and energy firms. Uncertainty about world energy markets and vulnerability to American market and military power are forwarded as crucial drivers of China's efforts to secure control over offshore hydrocarbons. This argument is developed through comparison to Japan's management of energy security, and evaluation of the geostrategic circumstances that shape China's approach to world energy markets.

Keywords China · South China Sea · Maritime disputes · Energy security · Offshore oil and gas · CNOOC · US–Japan alliance

JEL Classification A14 · D22 · D74 · D81 · F02 · F15 · F52 · F55 · H56 · O25 · P16 · Q34 · Q40

Introduction: A Story about Uncertainty and Vulnerability

Once upon a time in East Asia, there was a fast-growing, rapidly industrializing country that we can call "State X" for dramatic purposes. State X was a rising power

I. B. Kardon (✉)
Cornell University, Ithaca, NY, USA
e-mail: ibk22@cornell.edu

with rapidly increasing influence on regional and global affairs, but relied on foreign supplies of crucial natural resources. Most critically, its insatiable demand for energy to fuel its breakneck growth resulted in significant and growing dependence on imported oil. By geographic necessity, that oil was conveyed largely through the crowded shipping lanes of the South China Sea. Motivated by the trauma of a massive global economic shock, a highly efficacious, technocratic State X government dominated by a single political party set out to better manage this liability by incentivizing energy firms to go out and invest in oil all over the globe. Complementing this attempt to diversify the nation's geographic sources of energy, a revamped and empowered State X energy bureaucracy sought diversity in the types of fuels used (including natural gas, nuclear and renewables) while pursuing ambitious plans to improve its domestic energy system. Infrastructure projects to improve refining and distribution throughout the country, policy initiatives to improve energy efficiency and develop renewable and synthetic sources of fuel, accumulation of strategic petroleum reserves, and generous state-driven financing for energy firms in the hopes of improving their technological, engineering, and managerial capacity were all among measures in a comprehensive strategy to secure a steady supply of low-cost energy for State X's churning industrial engine of economic growth. State X undertook these efforts knowing that oil could never be produced domestically in sufficient volume to support its industrial policy goals of developing globally competitive automobile, heavy manufacturing and shipbuilding industries, among other energy-intensive ambitions. Energy security thus became an obsession for State X; it was not at all content to sit on its hands and pray that the global energy market would always and unfailingly provide for its urgent and growing energy needs.

Complicating these pressing energy concerns, State X had fraught relations with its regional neighbors—expressed most clearly in its multiple disputes over sovereignty and jurisdiction in possibly energy-rich maritime space. Despite its centrality to Asian production networks and regional economic development more generally, State X was burdened by a reputation for bullying other states in the region. This compounded long-standing animosity between State X and its neighbors, who relied mostly on outside powers to constrain and pacify State X. Even as these small states were eagerly forging and deepening economic ties with the strong, capital-rich, resource-hungry State X, they excluded it from regional security arrangements and sought to bargain collectively against its increasingly dominant market power. In this context, hawkish elements in State X encouraged it to break out of its quiescence and modernize its military, which despite a long period of deliberate neglect was now capable of projecting power through disputed zones. However severe State X's thirst for energy supplies and however tepid its relations with its neighbors, it did not to prosecute claims to disputed maritime space with potentially rich offshore oil and gas deposits; instead it remained inert, preferring to ignore the disputes and pursue its diversified, market-based strategy to secure reliable access to energy [and everyone lived happily ever after].

Until the very last sentence, the protagonist of this story could be easily mistaken for China in the period since 2004—but in fact, State X is Japan in the 1970s. The Chinese story differs only in the PRC's relentless prosecution of its several

contested maritime claims and "assertive" maneuvering in energy markets and on the water to seize valuable offshore hydrocarbons in the disputed seabed. Why have the Chinese pressed their claims and sought to secure exclusive rights over these resources where the Japanese were content to simply invest in their development (even in offshore China) without activating disputes about contested resource rights? After all, both had overwhelming energy needs exacerbated by long-standing disputes over energy-rich offshore areas.

Japanese firms, supported by the state, negotiated commercial joint ventures to develop resources in zones disputed with South Korea (1974) and the Soviet Union (1975); China's state-owned oil enterprises entered two informal agreements to jointly develop disputed resources, one "joint seismic undertaking" with Vietnam and the Philippines (2005)[1] and a "principled consensus" with Japan (2008).[2] Both Chinese agreements were non-starters due to Chinese domestic political opposition to a perceived compromise on a maximal PRC claim.[3] Why have the Chinese, unlike the Japanese, been unable to "shelve disputes and pursue joint development" (搁置争议,共同开发)? After all, this has been the explicit policy line since paramount leader Deng Xiaoping first prescribed it in 1978, and was adopted as China's official foreign policy mantra for dealing with its many maritime disputes.

Delay, not conflict or cooperation, has been the norm in China's maritime disputes over the past 70 years.[4] The contested resources remain underdeveloped even as they become more recoverable due to sustained high energy prices and improved upstream technology; there is, however, little foreseeable prospect for bargained solutions. This essay offers a partial explanation for this phenomenon, focusing on the role of structural forces that condition China's interest in controlling littoral maritime space and resources. China's behavior shares the pattern of relatively quiet market participation that marked Japan's quest for energy security, but also varies notably in its simultaneous pursuit of politically costly efforts to exclude other market actors from critical oil and gas supplies. This pattern is understandable in light of China's *vulnerability* to American power over markets, allies and strategic space coupled with the intrinsic *uncertainty* of price, supply, and exogenous shocks to energy markets.

Political and Technical Challenges for China in World Energy Markets

China's assertive posture towards disputed marine resources results in part from vulnerability to American power, which compounds existing uncertainty about

[1] "Oil Companies of China, the Philippines and Vietnam signed Agreement on South China Sea Cooperation," *PRC Ministry of Foreign Affairs (MFA) statement,* 15 March 2005, http://www.fmprc.gov.cn/eng/wjb/zwjg/zwbd/t187333.htm.

[2] "China, Japan reach principled consensus on East China Sea issue," *Xinhuanet*, 18 June 2008, http://news.xinhuanet.com/english/2008-06/18/content_8394206.htm.

[3] Zhang (2011) Ministry of Foreign Affairs of the People's Republic of China, "Oil Companies of China, the Philippines and Vietnam Signed Agreement on South China Sea Cooperation," March 15, 2005, http://www.fmprc.gov.cn/eng/wjb/zwjg/zwbd/t187333.htm.

[4] Fravel (2008).

changes in world energy markets.[5] Japan's relative calm may be explained by the observation that it faced—and, indeed, continues to face—a very different type of energy insecurity. Whereas Japan in the 1970s through today has been like other large energy importers in its sensitivity to supply shocks and price volatility, it is not highly vulnerable to unexpected political disruptions to its energy supply[6] due largely to its stable, cooperative relationship with the United States, formalized in a treaty alliance. China, by contrast, feels acutely vulnerable to such a politically-motivated disruption. Japan has sacrificed a considerable degree of autonomy in order to reduce its vulnerability; China prioritizes autonomy bordering on autarky—a choice conditioned by its historically- and politically-determined exclusion from the structure of alliances and partnerships in the region. Both China and Japan are deeply dependent on secure sea-lanes and stable supplies of oil from the Middle East and other politically volatile regions, but only China is engaged in a mercantilist effort to secure full ownership of these potentially lucrative maritime properties.

China's Structural Vulnerability

Unlike the US and Japan, China's ongoing process of industrialization does not leave it the option of reducing its energy consumption in the foreseeable future. Due to mature domestic fields (e.g. Daqing, once the main domestic source of oil for China)[7] and declining domestic production, China also has little prospect of reversing the trend of importing an increasing proportion of its energy. In consequence, the possibility of even a temporary severance of this economic lifeline is a critical unknown that shapes China's feelings of vulnerability. The narrowing but still vast technological advantages of western oil majors further vex Chinese economic and military planners, who are eager for Chinese firms to develop profitable, indigenous technology for finding domestic sources of energy. A capacity to exploit those resources with home-grown technology could limit Chinese vulnerability—all the more so if the resources are under China's jurisdiction. Considerable attention is thus devoted to resources in disputed zones, which hold out the tantalizing prospect of reducing its vulnerability by dramatically increasing China's domestic production and generating the positive externality of spurring the growth of a key strategic industry and a host of peripheral sectors (e.g., refining, transport, fishing), energy.

Yet no matter how lucrative those disputed resources may be (discussed in detail below), China will become ever more reliant on imported oil conveyed to its

[5] As will become clear below, this argument seeks only a partial explanation of the complex pattern of Chinese behavior observed with respect to disputed resources; the structural factors identified are not determinate—they create conditions of possibility or reasons for action that would not exist otherwise.

[6] Vulnerability and sensitivity are concepts developed by Keohane and Nye (1977) to explain how power operates in interdependent relationships. Sensitivity is a country's degree of responsiveness to changes in its interactions (usually economic relations) with another—specifically the "liability to costly effects" produced by those changes within a given policy framework (Keohane and Nye 1977: 12). Vulnerability is the more important political aspect of interdependence and is defined as an actor's liability to costly effects even after it has changed its policy to adapt to the new relationship.

[7] Tang et al. (2010).

burgeoning coastal cities by sea-going tankers passing through vulnerable chokepoints and the contested South China Sea (SCS). The prospect of deliberate intervention by the United States Navy and/or other major strategic or technical interruptions to China's supply, however remote, is an explicit preoccupation for Chinese leadership.[8] However, improbable, Chinese leaders fear that tense relations with the US expose it to the possible interruption of seaborne shipments transiting the Straits of Malacca and the SCS, the source of over 80 % of China's imported oil. This vulnerable supply represents almost half of the total oil consumed in China and is rising due to overwhelming demand growth (especially in the transport sector) and declining onshore production.[9] China is projected to account for over half of world growth in oil demand over the next two decades, and will import some 70 % of its oil by 2020.[10] Thus, for the foreseeable future, the PRC's growth and development—and by extension, political stability—will depend on a functioning world energy market, which in turn depends on secure sea lanes and willing suppliers. In this marketized domain, decisions about where, when, and how energy resources will be exploited are undertaken on the basis of deliberate, if imperfect, assessments of risk on the part of energy firms and governments.[11] China and its national oil companies (NOCs) cannot avoid operating in this world of risk. More so than other big consumers, however, China's risk is more of an unknown given the market's embeddedness in a global political system dominated by actors wary of China's rise.

However, efficient and stable world energy markets may be under normal circumstances, China cannot rule out the failure of one or more relatively vulnerable parts of this complex market system, all of which the United States might plausibly target or otherwise obstruct: leasing, project finance, surveying and exploration, production, transport, refining, distribution, and all of the engineering, managerial, and political tasks that knit them together, are among many moving parts capable of malfunction. US leaders have demonstrated that geostrategic impulses can override their laissez-faire approach to markets (Iraq is frequently cited by Chinese analysts to this effect); America is capable of coercing key producer nations as well as the highly politicized, western energy firms who make this system work. Chinese leaders need not expect the entire system to break down for the US and its allies to discriminate against China, leading not to a market failure but to a positive externality diverted to China's disadvantage (Oye 1993). America's growing domestic energy production and (possible) relative decrease in dependence on an efficient global market reinforce this prospect.

[8] Hu Jintao famously warned of a "Malacca Dilemma" and the capacity of "certain major powers" to interdict China's energy imports. See, for example, Chen (2010).

[9] Data from "China Country Analysis," 2012. *United States Energy Information Agency*, http://www.eia.gov/countries/cab.cfm?fips=CH. One study by the state-run think-tank, the Chinese Academy of Social Sciences, projects that by 2020 China will depend on foreign imports for 65 % of its oil consumption. See: Michael Economides and Xina Xie, "China's Oil Imports Continued Upward Climb in' 09," Energy Tribune, January 26, 2010, www.energytribune.com/articles.cfm?aid=2982.

[10] "BP World Energy Outlook 2030," http://www.bp.com/content/dam/bp/pdf/statistical-review/EnergyOutlook2030/BP_Energy_Outlook_2030_Booklet_2013.pdf.

[11] A good example of how firms approach global risk management in allocating their capital and resources to new projects can be found in Delfiner (2012); or Solis et al. (2004).

Whether the probability of such a major malfunction is very high or not, Chinese leaders speak and act as though they are highly averse to this "tail risk" and unwilling to leave China's economic and strategic fate to chance. China's assessment of this risk, already shot through with uncertainty due to garden-variety instability in world energy markets, is compounded by the perceived threat of American interference. The PRC is thus vulnerable to a change in its relationship to the United States, which would adversely impact its access to energy. This essay seeks to describe China's behavior with respect to disputed resources and to forward some limited explanations for why China acts as it does and not otherwise in this increasingly lively maritime domain.[12] Before examining some of the relevant behaviors, a brief summary of the context in which they arise is warranted.

Maritime Disputes Driving Risk of Sino—US Conflict

At present, Chinese NOCs have produced virtually no oil or natural gas in disputed blocks,[13] but these contested areas are the subject of an increasingly active exercise of state jurisdiction. While the People's Liberation Army Navy (PLAN) has been a silent but steadily more capable partner in this enterprise to exercise effective control over disputed maritime space, China's coast guard, law enforcement, fisheries, surveillance, and safety vessels—as well as PRC-flagged fishing boats—are engaged in a steady consolidation of Chinese control over disputed zones. This civilian "white-hulled fleet" is the vanguard of a coordinated effort to avoid military confrontation over this space while establishing Chinese administrative control. "Kinetic" military conflict occurred in the form of naval engagements with Vietnam in 1974 and 1988, when the PLAN engaged in combat operations to seize disputed islands and rocks in the South China Sea. Popular nationalism in support of China's "indisputable sovereignty" over the vast majority of the SCS is likewise a potent

[12] There is no ambition to identify a causal relationship between disputed energy resources and China's dispute behavior, still less to provide a sufficient explanation of China's overall behavior to manage its energy security. The sheer overdetermination of both of these possible "dependent variables" makes such a task impossible; there is no way to control for the various political, economic, and strategic drivers influencing a highly diverse set of behaviors. An attempt to make claims about disputed resources influence on behavior would target variation in exploration and production in contested zones, but these data are unavailable due to political sensitivity; moreover, any inference drawn from these data would not address the structural circumstances that account for the perceived need for energy securing resources and maritime space. The argument ventured in this essay highlights how structural features of the modern international system—complex interdependence in global energy markets and the distribution of military power—generate insecurity for China. That insecurity can be observed in what appears to be a disproportionate interest in securing energy resources in the South China Sea. This behavior may be interpreted as an attempt to shape in the international environment rather than accept the uncertain fate it portends; it may be understood as a kind of speculative play to influence the structure of regional energy supply and distribution and therefore balance against American naval and diplomatic power.

[13] CNOOC officials claim that Malaysia, Indonesia, Vietnam, and the Philippines have done so while China has not moved to exploit contested resources. See Amrutha Gayarathi, "South China Sea: Chinese, Philippine and Vietnamese Oil Tenders Escalate Tensions," *International Business Times* 2 August 2012, http://www.ibtimes.com/south-china-sea-chinese-philippine-and-vietnamese-oil-tenders-escalate-tensions-737304. See also CNOOC 2012 Shareholder Report. http://www.cnoocltd.com/encnoocltd/tzzgx/dqbd/nianbao/images/2013481075.pdf.

political force. It has complicated already badly frayed PRC diplomatic relations with other claimants (Vietnam, the Philippines, Malaysia, Brunei, Indonesia, Japan, and in a slightly different way, Taiwan) with whom ties have suffered as contests over sovereignty and jurisdiction in these key waterways play out in regional diplomatic forums, corporate board rooms, and increasingly, in the public media.

This pattern of "assertive" behavior[14] has triggered alarm throughout the region and raised hackles throughout the international community. It is also among a small handful of contingencies that threaten to escalate tensions between the United States and China. American treaty allies in Japan, South Korea, and the Philippines are engaged in active disputes with China; the United States has an outstanding maritime dispute of its own with China over the freedom of navigation. Their conflicting interpretations of that set of rules are now tested in the waters and airspace of China's exclusive economic zone (EEZ), both in increasingly vocal official objections and in physical interference by military aircraft and surface vessels (including civilian agencies and fishing boats). Such incidents are not always intentional, but may flow from lack of agreement about expected procedures on the open waters. Lacking anything like an "Incidents at Sea Agreement" (like the one negotiated with the Soviets when their navy modernized and expanded in the 1970s), friction and possible escalation involving American ships in Chinese waters is a growing likelihood.[15]

As such, the South China Sea is a telling geographic space in which to analyze China's concerns about energy security. It is an area of acute Chinese vulnerability given the local strategic "preponderance" of the US, its utter necessity for transport of energy (and trade more generally), and as a possible new frontier for energy exploration (a "second Persian Gulf" according to many Chinese analysts and the popular press). China's behavior is recognizably distinct from other claimants in the region, who have not shied away from jointly developing disputed resources (only China among all southeast Asian claimants has failed to enter such an agreement). China is also distinct in the scope of its claim (all of the islands and some ambiguous claim to jurisdiction or "historic rights" in some 80 % of the sea area),[16] and its assertive behavior in seizing contested features and interfering with exploration, fishing, and military activities in disputed zones. If vulnerability to the US' capacity to restrict its energy supply is influencing China's behavior, this is a prime domain to observe it.

Territorial Disputes in an Opportunity Cost Framework

The large body of work on territorial disputes may provide a diving-off point for understanding how resources in the seabed influence disputes. Such conflicts are not rare, and indeed most states with maritime claims have at least some issues with boundary delimitation and sovereignty over offshore features. Interestingly,

[14] Fravel and Swaine (2011), pp. 1–32, Johnston (2013).

[15] Goldstein (2013).

[16] As circumscribed by the now-infamous "U-shaped line." For a sober treatment, see DeLisle, Jacques. 2012. "Troubled Waters: China's Claims and the South China Sea." *Orbis*: 1–29.

maritime disputes are generally less militarized and less prone to conflict (Huth 1996; Hensel et al. 2008; Hensel and McLaughlin Mitchell 2005). Such disputes should in principle be amenable to joint development schemes—i.e. "issue divisibility" (Fearon 1995)—of the material resources under dispute even if the underlying issues of sovereignty remain unsettled.[17] In economic terms, the higher the expected value of the contested resources, the greater the opportunity cost entailed in forgoing settlement in favor of a maximal claim. Compared to "intangible" elements under dispute—the ethnic, national and/or symbolic salience of the territory[18]—such tangible resources offer, in theory, multiple Pareto-improving solutions. Maritime disputes typically exhibit less intangible salience because the space in question is uninhabited and mostly devoid of social significance. They are therefore a most-likely case for an essentially economic view of instrumentally rational, utility-maximizing actors in zero-sum competition for scarce resources. If the central actors are profit-maximizing firms rather than political groups with mixed motives, all the better for the applicability of this theoretical model of dispute behavior.

This market logic belies the observed pattern of Chinese behavior in the South and East China Seas, where the development of seabed hydrocarbons has largely been limited to shallow, territorial waters. Among claimants, only China has outright failed to work out cooperative schemes to jointly develop contested energy resources. Meanwhile, the vast geographic scope of Chinese claims has limited other actors' joint development to peripheral areas. Taking a contextually informed view of the disputes in question, it may be that such a "market failure" is not altogether surprising: not all babies can be split in half.[19] If China has some dominant non-market motives—which I will argue they do—the behavior is less puzzling. There are also technical reasons that this rationalist framework may fall down in this context. For one, oil and gas are "fugitive resources" that may lie in geologic formations straddling multiple jurisdictions. Modern horizontal drilling techniques can exploit resources far from the rig, meaning there are incentives to produce from undisputed areas and capture whatever fugitive resources that formation allows. Moreover, profit- or production-sharing schemes necessary to any joint development[20] are prone to legal and technical complication.[21] The market will not necessarily operate to China's benefit.

[17] e.g. The American and Canadian coast guards alternate days "administering" the uninhabited Machias Seal island. Interview with Naval War College professor, 4/8/2013.

[18] Hensel and McLaughlin Mitchell (2005). http://www.springerlink.com/index/10.1007/s10708-005-5803-3 (December 11, 2012); Hensel et al. (2008).

[19] As Kirshner (2000) argues, politics may render indivisible many theoretically divisible issues, territory included.

[20] Tara Davenport, "Joint Development in Asia: Some Valuable Lessons Learned," in *Maritime Energy Resources in Asia: Legal Regimes and Cooperation,* ed. Clive Schofield, National Bureau of Asian Research Special Report (2012), pp. 129–160.

[21] See Zhang (2011) for the complex domestic problems following the 2008 Sino–Japanese principled consensus.

High Opportunity Costs in Disputing Resources

Arguably, the strict market logic of this theoretical frame implies that we should actually expect market failures—not a Pareto-improving, cooperative solution—under dispute conditions, given the ample opportunities to exploit uncontested resources all over the globe. Only if the expected value of the resources, less the transaction costs of negotiating a deal, were greater than the expected value of other unexploited resources would we expect a profit-maximizing energy firm to make a concerted political and commercial push to forge a deal. It is relatively cheap to maintain a claim on disputed maritime territory[22]—legally, it requires only an official demonstration that sovereignty or jurisdiction is contested[23]—and so long as these costs remain lower than the expected costs of negotiating a deal, we should expect the resources in question to remain underwater. There are considerable opportunity costs to ignoring attractive alternatives (like onshore shale plays or any number of conventional opportunities that are available when oil prices are high, discussed below). Expensive, low-yield and technically challenging[24] deep-water plays swimming in economic uncertainty and political risk look commercially inferior to the myriad alternatives. Particularly given the lack of seismic survey data for most of the disputed areas,[25] energy firms' risk assessments are even more tenuous and less likely to attract capital.

While doubtless aware of these opportunity costs, Chinese energy firms have made strenuous efforts to indigenously develop or joint-venture into technology suitable for deep-water projects. The drivers for this behavior appear largely non-economic. CNOOC's chairman referred to China's first deep-water rig as "our mobile national territory and a strategic weapon"[26] amid great state fanfare.[27] Since 1992, CNOOC has offered leases on some disputed blocks and in 2012 moved ahead with its first major tender on disputed oil and gas blocks.[28] The state, meanwhile, routinely threatens diplomatic and commercial consequences for foreign oil firms who lease disputed blocks from Vietnam or the Philippines and has made a habit of interfering with seismic survey vessels operating in its claimed

[22] Fravel (2008, 2010).

[23] In customary international laws of sovereignty, the "will of the state" is a crucial quantity: so long as the state does not demonstrably "acquiesce" in another states ownership of its claimed property, the dispute endures—no matter how little effective control the contesting state is able to achieve.

[24] Exploration and production of deepwater oil and gas is much more expensive and low-probability than it is in shallower waters or virtually all onshore plays. To be economic, most energy firms require a 90 % probability that exploration yields a viable project, far higher than the industry standard 10% for more conventional exploration.

[25] Owen and Schofield (2012).

[26] "China begins deep-water drilling in the South China Sea," *Xinhuanet* (May 9, 2012). http://news.xinhuanet.com/english/china/2012-05/09/c_131576610.htm.

[27] A representative example is this May 2012 China Central Television special report on the rig. http://www.youtube.com/watch?v=X_lfVUxU0ZQ.

[28] Randi Fabi and Che Aizhu, "Analysis: China unveils oil offensive in South China Sea squabble," *Reuters* (August 1, 2012).

waters.[29] Firms contracting with CNOOC to jointly develop these resources, however, are guaranteed the full support of the PLAN.[30] Such behaviors are difficult to square with any opportunity cost framework because they are undertaken instead of pursuing ample uncontested resources that do not entail political conflict or require expensive deep-water technology for exploration and production.

The analytical value of a market approach might be rescued by attempting to quantify Beijing's other "equities" in disputed offshore oil and gas. Such an effort would require some weighting for China's inflated estimates of the value of resources in disputed areas,[31] the extent to which popular nationalism is likely to impose costs on Beijing for compromise, the prospect of economic rewards from Chinese NOCs developing new technologies for challenging deep-water projects, and a whole host of possibilities for unconventional hydrocarbon resources that may one day be recovered from the disputed continental shelves.[32] This enterprise quickly becomes absurd (or at least wholly subjective), given the intrinsic unquantifiability of the "intangible" aspects and the high degree of uncertainty about the undiscovered potential resources. While it is possible that policy planners in Beijing have a unified field theory of all the costs, benefits, risks, and expected values for all of these quantities, it cannot be a very stable or accurate model. The behavior is not Pareto-improving.

The springs of China's behavior vis-à-vis disputed energy resources more plausibly lie in *ideas* about how world energy markets function—ideas influenced by a healthy dose of uncertainty about the future trajectory of world energy and the sense of long-term vulnerability stemming from an incapacity to secure sea-lanes and reliable suppliers and the imprudence of expecting America to do so on China's behalf. It may therefore be that Chinese leadership values its autonomy more highly than its short-term prosperity, its long-term energy security over efficiency in obtaining primary inputs. This essay makes the argument that a combination of structurally-rooted uncertainty and vulnerability offer the best explanation for observed patterns of Chinese behavior in this domain.

Ideas about Markets in Theory and in China's Experience

Setting aside, then, the market-failure arguments as indeterminate in the Chinese case, a more politically-informed theoretical frame seems apt. Two key concepts, vulnerability and uncertainty, provide useful interpretations of China's beliefs about energy security and may partially explain state and firm behavior in maritime disputes. *Uncertainty*, in the abstract, refers to an unknown probability distribution over different outcomes (Luce and Raiffa 1957). It inheres in the economic domain when unknown exogenous shocks produce changes in supply and demand; as that

[29] Fravel (2011).

[30] Jian (1997).

[31] Chinese estimates are often an order of magnitude greater than commercial and foreign surveys indicate. See for example "Contested areas of South China sea likely have few conventional oil and gas resources," *Today in Energy,* US Energy Information Administration (April 3, 2013). http://www.eia.gov/todayinenergy/detail.cfm?id=10651.

[32] Ruppel (2011).

market exists only in the given political order, it is also a feature of the international political economy. After all, one source of uncertainty in this market is the unknown likelihood of a conflict with the United States, with all its purported diplomatic and military capacity to interrupt China's energy supplies. Our capacity to imagine the policy options that will be available and attractive to Chinese leaders is limited by this uncertainty. Put differently, that uncertainty adds urgency to Chinese vulnerability: if there is some possibility of a major change to China's relationship to world energy markets, China will need to make plans for adjusting to that new reality. The costs of doing so may be decreased if China hedges against that outcome.

Embedded Markets and the Uncertainty of Change

The notion that all markets are embedded in broader socio-political structures is well-established among political economists and sociologists. However, helpful an assumption exogenously given markets may be for explaining instrumental behavior in highly stable political contexts, many markets are embedded in complex political structures that may change dramatically over time. Naturalizing the energy market as a stable and permanent fixture of world order is a problematic move when describing the long-term behavior of a major actor in that market, which is often a function of oligopoly, monopsony and a whole host of other market-distorting maladies. Though China may have temporarily embraced the political order in which global energy markets are situated (Steinfeld 2010), there is simply nothing "natural" to a Chinese leader about the continued existence of these markets in their current form. This section discusses why this could be so in theory by leveraging concepts of uncertainty and vulnerability, then offers a potted history of China's distinctive historical experience in the international energy trade to probe plausibility.

Among ideas about how markets shape actors' preferences and thus the choices they make, and how those choices reciprocally shape the market itself, a few more precise formulations are instructive in this case. Following Polanyi (1944), we should attend to the empirical fact and logical necessity that the efficient world energy markets we know today did not spontaneously appear out of the trade in whale oil just because petroleum became the dominant energy input. The market itself is endogenous to the behavior and beliefs of market participants. As such, there is within every market the seed of its own dissolution; price-makers in the market are generally more capable of sustaining it or hastening its decay, while the price-takers are vulnerable to such changes. Even the most powerful actors are subject to some degree of uncertainty, as the properties of the market are an emergent phenomenon. Perhaps the price signal makes it unnecessary and undesirable to seek a comprehensive grasp of all the moving parts constituting the market (Hayek 1945). The sensitivity of that price to political disruption, changes in technology and consumption patterns, and the unknown geographic distribution of the commodity being priced make energy a less than ideal sector for a long-term reliance on the spot-price of oil. In consequence, market participants face the possibility of partial or total "disorientation and dislocation of interests."[33] Some market participants are (or believe themselves to be) more vulnerable to such change, and are therefore likely to hedge against that possibility.

[33] Epstein, Rachel. 2008. *In Pursuit of Liberalism: International Institutions in Postcommunist Europe,* Johns Hopkins University Press 2008), p. 14.

In markets as large and fundamental to all economic production as the global energy market, the likelihood of such change and its probable effects are unknown. This is systemic uncertainty, not calculable, unit-level risk. This concept helps us understand energy security with Chinese characteristics. A brief glance over decades of energy forecasting by major firms and international institutions is sufficient to appreciate how uncertainty bears on this market. As Cohen and Kirshner (2012) note, it is easy to "contest (or perhaps even ridicule) the expectations"[34] of participants in this market. The volatility of yearly projections in the IEA World Energy Outlook and industry forecasts like the BP Statistical Review of World Energy bear out the historical fact that this market is susceptible to massive shocks on supply- and demand-sides emanating from exogenous political, economic, technological, and environmental factors that no model can predict.[35] Introducing the endogenous effects of market participants continuously shaping the market itself only complicates this picture (e.g., OPEC collusion in the 1970s, massive mergers of oil majors in the late 1990s, the tight market and sustained high prices of the 2000s as Chinese and Indian demand and energy intensity skyrocketed, etc.). Near-term forecasts of $250/barrel oil[36] and $20/barrel oil[37] from reputable sources are suggestive of the highly erratic nature of global oil supply and demand patterns.

Given these dynamics, it is probably reckless to assume that all market participants are "optimizing" in the same way. Even without tinkering with the utility-maximizing assumption, we need only look to oligopolistic settings to find an array of equilibria that may appeal to different actors depending on their position in the market. Relaxing that assumption somewhat, we might concede that the incentives in a market are not uniform for all actors: some will prioritize security or autonomy over wealth-maximization—especially where such maximization increases vulnerability to major shocks to the system. China is acutely vulnerable to such shocks and thus prioritizes its security and autonomy. If uncertainty about the dynamics of energy markets is endemic and impossible to directly manipulate, China's motivation to reduce its vulnerability to such costly changes becomes more explicable.

[34] Cohen, Danielle, and Jonathan Kirshner. 2012. "The Cult of Energy Insecurity." In *Nexus of Economics, Security, and International Relations in East Asia*, eds. Avery Goldstein and Edward Mansfield (Stanford: Stanford UP, 2012), p. 147.

[35] The IEA's Oil Market Report for February 2013 radically revised its model for estimating China's energy consumption, and offered the old Heisenberg uncertainty chestnut to account for this dramatic change: "Oil statistics, like science according to Werner Heisenberg, proceeds from error to error, not from truth to truth," cited in Rob Minto, "How Do You Measure China's Oil Demand? IEA goes "from error to error," *Financial Times,* 13 February 2013. http://blogs.ft.com/beyond-brics/2013/02/13/how-do-you-measure-chinas-oil-demand-the-iea-goes-from-error-to-error/#axzz2RVUn0cUr.

[36] Mark Shenk, "Bets on $250 Oil Rise as Traders See Saudi, Suez Risk," *Bloomberg*, 3 February 2011. http://www.bloomberg.com/news/2011-02-03/investors-increase-bets-for-250-oil-on-saudi-disruption-fears.html.

[37] Grant Smith, "Verleger Sees $20 Oil this Year on 'Devastating' Glut," *Bloomber*, 16 July 2009. http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aQBXqFcd5gJo.

China's Inescapable Vulnerability

Chinese leaders speak and behave as though they are familiar with the consequences if not the concept of vulnerability.[38] Vulnerability is the cost of adjusting to a major disruption to an economic relationship. Particular attention is paid to vulnerability under conditions of asymmetric interdependence—that is, when one of the parties to that economic relationship will face significantly higher costs if the relationship is severed. Such asymmetry confers influence on the less vulnerable actor, who might credibly threaten to disrupt the relationship knowing that his counterpart will suffer greater costs. The greater the state's need for the good transacted in this relationship and the more costly it is to find a substitutable good or alternative supplier, the more vulnerable it is. The applicability to the China–US case should be clear, especially so if we expect relative US energy independence in the medium-term.[39]

Although vulnerability should be limited in an efficient market affording ready access to alternative suppliers, oil generates inescapable vulnerability due to its lack of substitutability and non-uniform distribution around the globe. Certainly, alternative suppliers are readily available, which mitigates vulnerability to some degree and produces only sensitivity to changes in price, which may be costly in the short run but do not generate major security risks. If suppliers are cartelized and act in concert to restrict supply (i.e. sever an economic relationship with a purchaser), as occurred in the 1973 OPEC oil crisis, vulnerability is considerable. If supply depends on sea-lanes and pipelines in a tense security environment, that vulnerability is further compounded. This is a clear case of "need fulfillment that would be costly to forego,"[40] and because China cannot rule out political or environmental change that might limit its access to oil, every drop of imported oil entails vulnerability and uncertainty. Prudence demands careful management of these factors, which is one way to describe China's overall pattern of behavior with respect to disputed resources.

A Potted History of China's Energy Sector

A quick examination of the history of China's interactions with international energy markets establishes the plausibility of this interpretation. Though China is typically credited with inventing bore-hole drilling and possibly being the first society to use petroleum for fuel,[41] the modern Chinese nation did not indigenously develop oil extraction technology and was a late-adopter of the various practical and industrial applications of fossil fuels. Moreover, China has always had a testy relationship with international oil producers and distributors. The first oil imports to China

[38] I use the concept here roughly as developed by Hirschman (1945), examined by Waltz (1970), and operationalized by Keohane and Nye (1977), though with more emphasis on politico-military issues than purely economic interdependence.

[39] Levi (2012).

[40] Baldwin, David A. 1980. "Interdependence and power: a conceptual analysis." *International Organization*, Vol. 26 (October 1973), p. 476.

[41] Tom, K.S. (1989). *Echoes from Old China: Life, Legends, and Lore of the Middle Kingdom*. Honolulu: The Hawaii Chinese History Center of the University of Hawaii Press.

arrived in 1863, and during the early decades of the twentieth century as oil ascended toward its current indispensable status, petroleum reserves in China's arid western regions attracted little attention. The western, and principally American, interest in supplying petroleum the Chinese market "may have influenced the 'scientific assessments' of China's potential oil reserves."[42] This exploitation was dramatized in the 1932 American novel[43] (and 1935 film)[44] "Oil for the lamps of China." It is a picturesque account of China's thoroughgoing dependence on foreign oil; it is also a bitter critique of western commercial interests' unscrupulousness and enduring obsession with tapping into the lucrative Chinese domestic market. Framed as a part of China's "century of humiliation," the exploitative nature of this relationship is just one among a litany of sources of Chinese distrust of Westerners and their liberal market ideology. International energy markets have always had a strong political connotation for China, and a corresponding preference for relative autonomy took root early on.

Only in the 1950s did China's indigenous oil industry begin in earnest, and even then only due to absolute necessity. Since the outbreak of hostilities in Korea, the US had imposed a trade embargo on China, oil included. China's vulnerability to American whims about world energy trade is therefore founded in very real empirical experience (and reinforced by Japan's even more dramatic excommunication from the international trading system). In concert with a host of state-led efforts at industrialization, Chinese upstream projects began under a heavy Soviet yoke and met little success.[45] The "non-economic" policy goals[46] promoted during Mao's sustained drive towards national self-reliance (自力共生) drove infant energy companies to exploit China's substantial labor force in search of domestic oil, leading ultimately to the discovery of major formations in its remote western provinces (the Daqing field was the most productive, and had "blown the theory of oil scarcity in China sky high,"[47] according to the Chinese Communist Party mouthpiece, the *People's Daily*). By 1963 China was producing enough oil for all the lamps (and nascent industries) of modern China, and had debunked "the so-called theory that China is poor in oil [which] only serves the US policy of aggression and plunder,"[48] as the *China Youth Daily* put it. With Japan as a principle export destination, petroleum became a key source of foreign exchange revenue during the early decades China's export-led growth miracle. In fact, the PRC was a net exporter of oil from 1963 to 1993, after which the sobering reality of dependence on foreign oil quickly took hold of Chinese policy planners and energy firms.[49]

[42] Willums, Jan-Olaf. 1974. "Prospects for Offshore Oil and Gas Developments in the PRC." In *Offshore Technology Conference*, Dallas, TX, p. 544.

[43] Alice Tisdale Hobart, *Oil for the Lamps of China* (New York: Bobbs-Merrill, 1933).

[44] http://www.imdb.com/title/tt0026805/.

[45] Wang (2007), Willum (1974).

[46] Naughton, Barry. "A political economy of China's economic transition." In Brandt and Rawski, eds. *China's great economic transformation* (2008):91–135.

[47] Cited in Yergin (2011), Part 1, Chapter 9 (Kindle edition).

[48] Yergin (2011), Part 1, Chapter 9.

[49] Zha (2006).

Interpreted as an abject failure of self-reliance, the state energy firms were quickly tasked with "going out" to secure equity stakes in petroleum resources throughout the globe. Principally, these plays were confined to underexplored areas in far-flung corners of the developing world.[50] The propensity for Chinese NOCs to muddle into politically complex, technically challenging projects was and remains in large part a function of China's late arrival into a crowed global energy market. Major investments in Sudan, Iraq, throughout central Asia and elsewhere were undertaken with substantial peripheral assistance from the PRC, which provided cheap credit for the NOCs, generous loans to the target state to support the infrastructure needed to deliver oil to ports (repayable in oil), and state security and diplomatic support for projects in unstable areas. The state also stepped into develop ports and pipelines (from central Asia, Russia, Burma, Pakistan and possibly Iran)[51] that could reduce Chinese reliance on sea-lanes and diversify the geographic origins of its oil imports. Yet simultaneously, the NOCs were disciplined by their foreign shareholders, the need to acquire foreign technology, and the overall competitiveness of the sector. In their investment decisions and operations, they increasingly resembled western firms operating almost exclusively according to the dictates of the market (rather than as an instrument of foreign policy).[52] The need to adopt the "best practices" of the industry is a continuing theme in the Chinese energy sector, and if anything became more pronounced after 2004 when China's (and India's) massive demand growth triggered supply shortages and domestic bottlenecks in energy distribution.[53]

Especially as Chinese petroleum analysts believe its conventional onshore fields have peaked, Chinese firms anxious to compete in the global energy sector must seek out offshore oil—especially in deep water.[54] These more costly and technical fields are among the few remaining attractive conventional plays available to Chinese firms, with the vast majority of proven fields having been snatched up by western oil majors.[55] Because the PRC State Council formed CNOOC in 1982 and granted it a monopoly over China's offshore hydrocarbon resources, it has a less direct lineage within the energy ministry than do the other two NOCs (Sinopec and CNPC) and might be considered a more "marketized" firm.[56] Still, CNOOC lacked capital, technology, and expertise to undertake offshore projects and was authorized to offer concessions on oil and gas blocks offshore Hong Kong and in the northern

[50] Zha (2006), Part 1, Chapter 9.

[51] Erickson and Collins (2010).

[52] See Lewis (2007); Thurber, Mark C., and David R. Hults. 2010. "Risk attitudes shape national oil company strategies." Management & Strategy 233(6); and Xu, Xiaojie. 2007. "Chinese NOCs' Overseas Strategies: Background, Comparison and Remarks." *Baker Institute for Public Policy Special Report.*

[53] Wang, Yanjia, Alun Gu, and Aling Zhang. 2011. "Recent development of energy supply and demand in China, and energy sector prospects through 2030." *Energy Policy* 39(11): p. 6750.

[54] Wang, Yanjia, Alun Gu, and Aling Zhang. 2011. "Recent development of energy supply and demand in China, and energy sector prospects through 2030." *Energy Policy* 39(11), p. 6746.

[55] Shu Xianlin [舒先林]. 2004. "Oil: The Core of China's Energy Security and International Strategy [石油:中国能源安全的核心与国际战略]," Journal of Petrochemical Technology and Economics [石油化工技术经济] 20(3), p. 2. See also Lewis (2007).

[56] Lewis (2007).

part of the South China Sea, making it the first firm in the energy sector to invite foreign direct investment .[57]

Under these conditions of rising demand and insufficient production, China has imported an increasing proportion of its national energy needs since 1993, principally in the form of oil in tankers originating in the Middle East then transiting the Persian Gulf, Indian Ocean, Straits of Malacca, and finally the South China Sea before reaching Chinese markets. As discussed in the introduction, this state of affairs induces substantial vulnerability, which is felt acutely by Chinese leadership. Beyond the aforementioned "Malacca dilemma," piracy, terrorism, natural disasters and other acts of god are also listed as possible causes of disruption.[58] However, unlikely this outcome, Chinese leaders and strategic analysts fixate on the risk of profound disruption of the normal flow of vital resources to quench near-insatiable Chinese energy demand.[59] Evidence of China's unease about this circumstance is legion,[60] and lends further plausibility to the argument ventured here.

A Chinese energy sector analyst notes that "the top 20 world oil companies have monopolized 80 % of the world's proven reserves—thus the resources available to China are rapidly diminishing. So it must compete for these resources globally, develop economic and political relationships, and exploit the certain advantages of sea power, while moving expeditiously to compete for resources in the Middle East, North Africa, Central Asia, and the oil-rich South China Sea…in an effort to broaden the international space for China's energy security."[61] Fear of supply-side limitations, both technical and political, in Chinese strategic writings reflect an acute awareness of China's vulnerability and corresponding need to independently shore up political relationships and sources of supply.

Three important considerations emerge from this quick recap of the Chinese energy business: (1) the state and its energy firms have a history of distrust of foreign firms and governments when it comes to energy, producing a strong impulse towards self-reliance and wariness of the reliability of international markets to

[57] Qin Wencai, Shiyou shiren: zai haiyang shiyou zhanxian jishi (Beijing: Shiyou gongye chubanshe 1997).

[58] Storey, Ian, 2006, "China's 'Malacca Dilemma'", China Brief 6(8), April 12; Shaofeng, Chen. 2011. "Has China's Foreign Energy Quest Enhanced Its Energy Security?" The China Quarterly 207(386): 600–625. (April 6, 2013).

[59] For some representative examples, see Wen Han, "Hu Jintao Urges Breakthrough in 'Malacca Dilemma,'" Wei Wen Po, January 14, 2004; Yao Wenhuai, "Build a Powerful Navy, Safeguard China's Maritime Strategic Interests," Guofang 7 (2007): 6; and Da Wei, "China's Maritime Security Strategy," in CICIR, Sea Lane Security and International Cooperation (Haishang tongdao anquan yu guoji hezuo; 海上通道安全与国际合作), (Beijing: Shishi chubanshe, 2005). This book is the result of a conference sponsored by the Ministry of State Security think tank, China Institutes of Contemporary International Relations (CICIR); Zha 2006; 章明 [Zhang Ming], "马六甲困局与中国海 军的战略抉择" [The Malacca Strait Problem and the Future Strategic Choices of the Chinese Navy], 现代舰船 [Modern Ships] (October 2006); 赵宏图 [Zhao Hongtu] (China Institute of Contemporary International Relations), "'马六甲困局'与中国能源安全再思考" [The "Malacca Dilemma" and Rethinking China's Energy Security], 现代国际关系 [Contemporary International Relations], no. 6 (2007); 陈安刚,武明 [Chen Angang and Wu Ming], "马六甲: 美国觊觎的战略前哨" [Malacca Strait: The U.S. Covets a Strategic Outpost], 现代舰船 [Modern Ships] (December 2004).

[60] See Cohen and Kirshner (2012), Downs (2004) and Chen (2010) for representative examples.

[61] Shu (2004), p. 4.

provide for a critical need; (2) tight global competition and peak oil domestically have made offshore oil an important target, and most of the low-hanging fruit in the offshore sector is dominated by western firms; and (3) Chinese energy firms have evolved dramatically—they are internationalized and disciplined by markets for foreign capital and technology, but retain important characteristics as instruments of economic statecraft.

$$\text{Uncertainty} + \text{Vulnerability} = \text{Irrationality}$$

Cohen and Kirshner (2012) argue that this Chinese fixation on its energy insecurity is irrational. The term "cult of energy security" rests on faulty assumptions about "the power and efficiency of energy markets"[62] and a failure to appreciate the opportunity costs of trying to secure its energy future by taking direct equity ownership of oil fields throughout the world. Due to the depth, liquidity, and self-equilibrating properties of this market, they claim, the price of oil in Timbuktu and Taishan cannot sustain a large spread for very long; any attempts to "lock up" oil to guard against price volatility or supply shortages will be paid in the form of a "shadow price of oil"—that is, any distortion of the price represents a forgone opportunity to buy or sell at the global price. Following military analysts, they are unimpressed by the capacity of the US Navy or any coincidence of other factors to severely disrupt China's access to world energy markets. This gives China, like all other big energy consumers, a bad case of interdependence *sensitivity*: price elasticity and supply disruptions can be costly in a pecuniary sense, but do not threaten access in a fundamental way and thus do not imply vulnerability to a sudden need to find a new system for energy inputs. This is their fate and learning to live with it is the authors' reasonable prescription. However ambitious Chinese efforts to control access to energy, they cannot escape being "servants to the real cost of using it."[63]

Cohen and Kirshner view this as pathological behavior and implicate the "cult of energy insecurity" for producing these distorted perceptions. They find it roughly analogous to American and Japanese energy security hyper-vigilance and call attention to some of the distinguishing factors that lead China to adopt an even more cultish attitude. Attributing it in large part to regime insecurity and "the vulnerability of the [Chinese] economy to external shocks,"[64] they offer a persuasive explanation for why this cult persists. The argument forwarded in this essay extends their claims into the maritime domain, where some of the structural features of China's insecurity are better observed. The scale of its demand and its fraught relationship with America—both key factors distinguishing it from Japan—make the Chinese "cult" distinct from those of other key actors in the world energy market.

A focused, structured comparison of the Japanese and Chinese cases supports the view that Chinese behavior in maritime disputes is driven in no small part by a potent combination of uncertainty about and vulnerability to change in world energy

[62] Cohen and Kirshner (2012), p. 149.

[63] Cohen and Kirshner (2012), p. 155.

[64] Cohen and Kirshner (2012), p. 202.

markets. Dwelling on the "irrationality" of this behavior—due to the opportunity costs, market efficiency, and the relatively trivial resources in question—does not fully explain its origins in Chinese perceptions of the international environment.

"Two Hungry Giants" and One Discriminating Hegemon

Raymond Vernon's 1982 book *Two Hungry Giants* forwards a Katzensteinian argument about why the United States and Japan adopted distinctive approaches to their common dilemma of inadequate natural resource inputs. The core claim is that both are "prisoners of their national environment,"[65] powerless to escape the historical, institutional and ideological forces that create the opportunities and constraints on political action. These domestic-level structures in turn determine their different responses to the international environment. Japan's distinctive foreign economic policies on resource trade and acquisition thus reflect not only its economic interests but also its political limitations. The upshot for Japan was its adoption of a canny strategy of relying on the market mechanism to provide desperately needed inputs, shunning large equity investments in overseas extractive ventures in favor of diversifying sources of supply and providing capital for local producers in the form of loans and purchase contracts.[66] China's inordinate focus on "equity oil" as a partial hedge against an unreliable market is already a marked contrast.

Kudrle and Bubrow (1987) pursue a more systemic level of analysis, lauding Japan's foresight in creating "asymmetric self-enforcing agreements" that limit the capacity of any one supplier or group of suppliers to exercise undue coercive influence on Japan.[67] Recognizing their vulnerability, Japan coordinated industrial policy (through MITI, a key institutional endowment) to not only pump up supply abroad but to increase efficiency at home and diversify the sources of fuel required to keep its economic engine running. The global LNG trade owes a significant debt to concerted Japanese efforts to make a market for it, investing heavily in Indonesia, Brunei and other Southeast Asian gas fields and developing LNG terminals and LNG tankers to connect production to end-users.[68] That it is now the world's leading consumer of LNG and supports the world's largest LNG infrastructure[69] is a testament to the durability of this strategy and continuing willingness to chance its energy fate on the security of the sea-lanes through which LNG tankers must transit.

In a comparative sense, there is much to be gleaned from Japan's demonstrated capacity to make a virtue out of its inescapable vice of vulnerability. In comparison to the United States' more fragmented polity and society—which produced a less disciplined, more *ad hoc* approach to securing resources—we can clearly recognize

[65] Vernon (1983).

[66] Vernon (1983). Chapters 1–3.

[67] Kudrle, Robert T. and Davis B. Bobrow. 1987. "How Middle Powers Can Manage Resource Weakness: Japan and Energy War II world has seen the transformation." *World Politics* 39(4): 536–565.

[68] Kudrle, Robert T. and Davis B. Bobrow. 1987. p. 560; Interview with Nicole Weygandt, 4/10/2013.

[69] "World gas: EIU's monthly LNG outlook," *The Economist Intelligence Unit,* 21 February 2013, p. 1.

the significance of economic activity led by firms rather than bureaucrats, the blessing and curse of abundant domestic resources, and the uneven effects of interdependence. With no other option than to rely on the market, Japan avoided costly undertakings aimed at seizing control that would ultimately be surrendered to market forces. As Vernon observed, "it is indeed for the very purpose of taking advantage of the market mechanism that Japanese industry normally shuns heavy equity investments in overseas extractive ventures and that its strategy is to diversify the supply sources of resources as widely as possible and to assist local producers to expand their extractive capacities by way of loans and purchase contracts."[70]

Yet, in using this comparison to evaluate Chinese behavior in this domain, it is not clear that the Vernon comparison of Japan and the United States is totally apt. Because Japan was an American ally and was effectively in the same canoe with respect to the security and stability of world energy markets, its vulnerability was more economic than political in nature. Thus, Japan's state-level behavior is endogenous to its international security environment. China, standing on the outside —and, indeed, as the ostensible target of that security partnership—has no such magnanimity about the costs it faces in the uncertain event of change in America's strategic posture. The security of sea-lanes and the continued economic relationships with key suppliers is thus a source of asymmetric vulnerability for China. That asymmetry becomes more pronounced as China's energy dependence deepens and America's lessens as the "shale gas revolution" and expanded domestic production more broadly take hold.[71] Prudence dictates that China must plan for this worst-case scenario.

This is not to say that Japan does not fret about uncertainty in the crude oil markets. Dangerous supply disruptions threatened by possible international conflict with Iran, the fiscal crisis in the EU, structural slowdown in the economies of developing countries, the "natural gas revolution," and so on are all of pressing concern.[72] But in a broad structural sense, Japan is not afraid of being denied this public good of deep, efficient energy markets and secure sea-lanes for its transport. It has already experienced the suffocating influence of the US Navy and the vulnerability of a severed economic relationship with America and its allies; its attempt to overcome that vulnerability failed abjectly in World War II. As a "commercial superpower" under America's aegis, Japan has relatively stable expectations at the strategic level—certainly it does not fear US naval interdiction.

Not so for China. While the interdependence between the Chinese and American economies is staggering in many dimensions, there is little question in the minds of Chinese strategists that its incapacity to secure its sea-lanes and lack of sufficient domestic energy (and resources more broadly) present an asymmetric threat. Whether America is truly capable of excluding China from the provision of this public good (or whether or not it is in fact providing it) is unknown. It may be that

[70] Vernon (1983), p. 128.

[71] Stevens (2010).

[72] See, for example Ken Koyama, Yoshikazu Kobayashi, Ichiro Kutani, Tetsuo Morikawa, "Outlook for the International Oil and Gas Markets in 2013," The Institute of Energy Economics, Japan (April 2013), p. 1.

the US cannot "divert the externalities" of such a dramatic act of discrimination,[73] but the inability to believe this with total certainty provides a compelling account of China's feeling of vulnerability.

Maritime Dispute Behavior and Energy Insecurity

Maritime disputes provide an interesting window through which to examine this anxiety. Among issues implicated by those disputes is the rising tide of Sino–US "crisis instability,"[74] rooted in a variety of contingencies are conceivable in the contested waters of the East Asian littoral.[75] The United States' relationships with its several treaty allies engaged in maritime disputes with China (Japan, South Korea, and the Philippines) complicate the operational possibilities for interdicting oil and gas with a distant blockade because the waters of the SCS are vital to all of those allies' seaborne trade. To shore up those alliances and assert freedom of navigation, pointedly deemed a "national interest" by the current administration, the US has a long-standing policy of exercising rights of navigation and overflight and engaging in regular (though increasingly frequent and operationally intrusive) military exercises with its allies and partners in the region within China's EEZ. A series of physical and diplomatic incidents have reinforced the concern that escalation is not inconceivable, most notably in the EP-3 spy plane collision in 2001 and the USNS Impeccable run-in in 2009.

However low the probability of such a dramatic collapse in this essential bilateral relationship, the "potentially catastrophic consequences of this scenario provide good reason for analysts to better understand its dynamics and for policymakers to fully consider its implications."[76] Chinese analysts are only mildly reassured by the operational difficulties of executing a naval blockade, and recognize the diplomatic near-impossibility of curtailing exports from China's oil-rich continental neighbors (Russia, Iran, Kazakhstan, etc.).[77] Nonetheless, straits can be mined and weak states can be coerced into cooperation if an embargo is imposed. America's "Prompt Global Strike" conventional ballistic missile capabilities are a keen concern among Chinese military analysts, and are in principle capable of severely crippling China's overland oil and gas pipeline, rail and road networks.[78] No responsible Chinese military planner can ignore this possibility, so over the long term, they seek to control the crucial maritime approaches to China's coastal engine of industrial productivity. Economic planners are likewise impressed by this remote contingency, and despite the clear need to "integrate into the global [energy] pricing system,"[79] there is an unmistakable drive to establish a parallel supply system.

[73] Oye (1993), pp. 17–33.

[74] Goldstein (2013).

[75] Guo (2003), p. 31; Wang (2007).

[76] Goldstein, p. 50.

[77] See, for example: Liu (2004), Wang (2011).

[78] Gompert (2013), p. 108.

[79] Wang (2011).

The preceding analysis represents an initial "plausibility probe" into the argument that China is positioning itself close to the doors in case "exit" is necessary. This behavior does not preclude China from exercising "voice"—that is, shaping the dynamics of the world energy system from within rather than seeking a separate order—but it is suggestive of an increasingly consequential hedge in that direction.[80]

Conclusion

This discussion aimed to establish a structural explanation for China's "assertiveness" in pursuing oil and gas resources in the South China Sea despite opportunity costs manifested in economic and political domains. Japan's behavior under comparable circumstances provides a helpful foil for understanding China's dramatically different approach to its energy insecurity. Uncertainty about the future dynamics in world energy markets and unavoidable dependence on imports are among the key commonalities, but China's case is intensified by significant vulnerability to US naval interdiction or political interference with China's access to imported energy. The Chinese state has pursued market options on the whole, but has simultaneously foregone cooperative measures and provided ample economic and military support for its leading offshore firm, CNOOC, to expand its operations into contested maritime zones.

The extent of this behavior is difficult to observe due to the highly politicized nature of the contested areas and consequent unavailability of reliable data on firm and state activities in disputed waters. Nonetheless, future research on the firm's behavior could substantiate an argument that China's well-documented efforts to integrate with and compete in world energy markets are accompanied by a fairly aggressive bid for exclusive control over space. While the reasons for such a bid are no doubt overdetermined (it is impossible to disentangle nationalist, strategic, and other motives for such behavior), it is clear that control of these resources may limit Chinese vulnerability to unexpected disruptions in the functioning of that market. The history of such disruptions and China's special sense of vulnerability—due to its insatiable energy demand and unstable relations with the most powerful single actor in this market—reinforce the claim ventured here. The opportunity costs of pursuing not-so-impressive resources in the SCS[81] are either ignored, or as this essay has argued, framed in a broader geopolitical context that requires a strong hedge against the tail risk of a major malfunction in China's energy supply.

The question remains of whether China's efforts to limit its vulnerability in this fashion are in fact solutions to the problem at hand. It is possible that capturing

[80] That "exit" option might be thought of as the flip side of China's vulnerability, representing a choice to replace one economic relationship with another. See Hirschman, Albert O. 1970. Exit, voice, and loyalty; responses to decline in firms, organizations, and states. Cambridge, Mass.: Harvard University Press.

[81] US Energy Information Administration, "Contested areas of the South China Sea likely have few conventional oil and gas resources," *Today in Energy* (April 3, 2013). http://www.eia.gov/todayinenergy/detail.cfm?id=10651; see also Owen and Schofield (2012) for an in-depth discussion about the medium-term production possibilities for SCS resources.

important space and potentially substantial resources is a way to a secure energy supply for some period of time, but there is little doubt that this will be a temporary fix, at best. It has been and will continue to be difficult to implement in a coordinated way due to loud signals about the opportunity costs of those policies and behaviors. The global price of oil looms in the background of any decision to undertake costly diplomacy, deep-sea exploration, or naval saber-rattling, and this price signal will continue to promote strong countervailing tendencies among Chinese energy consumers. For actors without concern or responsibility for managing uncertainty in the system as a whole, the existing market order is always preferable.

The state, however, is responsible for limiting those consumers' vulnerability to a capricious market. This costly, speculative enterprise undertaken by an energy-anxious state relies on producers of energy, whose interests are also countervailing in the sense that they are not eager to engage in non-economic projects. The state must fill the role of providing sufficient resources, capital, and security for these producers to offset the opportunity costs of ignoring more attractive opportunities overseas or away from contested territory. Intended or not, this behavior sends powerful signals to the existing market about the potential for China to disrupt its normal functioning. The overwhelming weight of Chinese power in this market—both as the leading source of demand growth and as an increasingly important player on the supply side—suggests that their behavior need not be as disruptive as it is sometimes construed to be. Absent an overt conflict with the United States (a very remote possibility), Chinese actions to insulate itself from that contingency may serve to make it less likely. Firmer control over its energy fate through increased domestic production and improved capacity to secure its imported supplies will reduce Chinese vulnerability and therefore decrease the structural incentive for the United States to exploit that vulnerability.

Such a stable outcome relies on many heroic assumptions about several dimensions of the Sino–US relationship, as well as a relatively static conception of the functioning of world energy markets. If America becomes energy independent, or even significantly less dependent, discriminating against China in the energy sector may appear more attractive. If significant unconventional gas resources are discovered and exploited in disputed zones, as many Chinese analysts hopefully predict, China may have less urgency in its search for secure supplies.[82] Thus uncertainty remains regarding what sort of disruption to the normal functioning of world oil markets might occur, across what period of time, and within what sort of broader international strategic and political environments.

Due to the unknowability of the market's future trajectory, this is a story about power moreso than wealth—or rather one in which power to set the political parameters of the market system is the crucial capacity for ensuring long-term prosperity. Maritime disputes will remain an important venue for observing China's approach to market institutions under conditions of asymmetric vulnerability. China's pattern of behavior in securing off-shore energy supplies is conditioned by structural opportunities and constraints emerging from American power and an

[82] Ruppel (2011).

uncertain world energy market. These circumstances do not determine the choices Chinese leaders make in managing maritime disputes, but they meaningfully shape the politics of this increasingly important arena of regional strife.

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