

How Will Future Oil Prices Affect Geopolitics?

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Abstract: This paper takes the low-world-oil production/high energy price scenario from the US Department of Energy's 2007 International Energy Outlook (IEO) and uses the International Futures Model to speculate about geopolitical futures to 2030. It finds that if non-OPEC oil production is low, a malign dynamic of shifting alliances, increased cartelization, and even de-marketization of the global system could ensue. In particular, the scenario analysis suggests that OPEC, especially Saudi Arabia, might not be very interested in increasing oil production anywhere near as much as that suggested in the IEO's reference case (and moderate price) scenario.

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1. Introduction

Two standard sources of long range forecasts of world energy demand and supply are the OECD's International Energy Agency (IEA) and the US government's Energy Information Agency (EIA). Both groups produce annual energy forecasts that project world energy demand and supply by country and by fuel source. Both basecase—or reference--forecasts are benign—energy supplies continue to grow at a pace sufficient to fuel continued rapid world economic growth for the next 25 years at market-determined prices that are less than those of today.

These forecasts are based on geological estimates that there is enough oil, gas, and coal available to meet steadily rising world demand without a large increase in the relative price of energy. Unstated in these forecasts, however, are the underlying assumptions about global security arrangements and national security policies of the key energy producers and consumers. Implicitly global security and economic relationships remain unchanged: a) most energy crosses international borders in response to voluntary market transactions, and b) OPEC, if it continues to exist, does not try to exert significant upward pressure on prices by restraining supply.

I have used the International Futures Model to examine the geopolitical future if the benign basecase energy future proves too optimistic. I will show that if oil production growth in the non-OPEC countries is less robust than the EIA/IEA basecase projections, OPEC's economic interests will tempt it to limit its own production increases, making the

EIA's low production/high price scenario much more likely than the basecase scenario. I further show that an Islamist political realignment in the Middle East—as posited in the National Intelligence Council's *Mapping the Global Future*—could result in further OPEC production cuts, shifting more economic and geopolitical power toward that region, away from the OECD countries. OPEC would be motivated in this case to reach out to Russia to build an even more inclusive energy cartel that could further drive up prices while still generating higher revenues for the oil exporters. In one of many possible responses to sharply higher energy prices I show how the Chinese quest for energy security could finally destroy the current market-oriented energy economy.

2. The Basecase Scenario—IEA and EIA

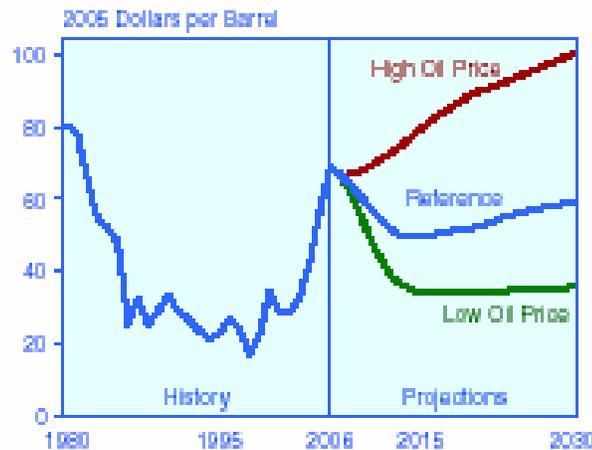
Every year, the Energy Information Agency (EIA) of the US Department of Energy publishes an *Annual Energy Outlook* and an *International Energy Outlook* that project world energy demand and supply under a variety of economic and technological assumptions. While these publications are extremely useful to the energy analyst, they do not delve deeply into the economic and political interconnections implicit, or potentially implicit, in the widely varying price and production scenarios. To examine those interconnections I adapted the International Futures Model¹ (IFs) to reproduce the price paths in the International Energy Outlook 2007 (IEO2007), and tried to build detailed economic, political, and geopolitical scenarios around them. The IFs model is a hugely complex computational device that is helpful for keeping a vast amount of detail

¹ See <http://www.du.edu/~bhughes/ifs.html> for details, also Hughes and Hillebrand (2006).

consistent, but to build scenarios this complex and involving assumptions about the actions of so many decision-makers the final analysis reflects mainly the judgment of the author, not the mechanical workings of the IFs or any other model.

In the EIA work (see figure 35, reproduced below) world oil prices are assumed to take three possible widely divergent paths, from mid 2006 to 2030. Divergent price paths could be motivated in many different ways, such as differences in growth of demand, differences in assumptions about the technology of energy usage, or most importantly, differences in assumptions about the geological accessibility of oil. In the IEO2007 the different price paths result mainly from the assumption of different oil-production paths outside of the United States. Further, it is assumed that those paths are dictated more by geological considerations than by policy choices or political constraints.

Figure 35. World Oil Prices In Three Cases, 1980-2030



Sources: History: Energy Information Administration (EIA), *International Energy Annual 2004* (May-July 2006), web site www.eia.doe.gov/iea. Projections: EIA, *Annual Energy Outlook 2007*, DOE/EIA-0383(2007) (Washington, DC, February 2007).

I constrained the IFs model to roughly replicate the world oil production assumptions portrayed in the IEO2007 scenarios. These scenarios show world oil production in 2030 ranging from 101.9 million barrels per day (mbd) in the high price/low production scenario, to 117.8 mbd in the reference case, to 127.7 mbd in the low price/high production case. The IEO scenarios are not integrated with a world economic model, nor are alternate fuels considered except in the US case. Thus I had to fill in the details, as it were, using the IFs model, which does integrate global demand and supply of 6 fuel sources (oil, coal, natural gas, hydro, nuclear, and other) with economic growth and energy demand in 182 countries. In the IFs model, economic growth in every country responds endogenously to change in energy production and energy prices. In addition, the IFs model projects quite substantial shifts among energy sources given large swings in relative prices. Thus the final results cannot be in any way construed to be implied by the DOE analysis: the DOE results are too sparse for that. The results reported are my own scenarios—based loosely on the DOE price and oil production assumptions—but using the IFs model as the basic platform for analysis. The different oil market assumptions, it will become clear, have quite dramatically different implications for global economic and political futures.

In this work, as in the IEO2007 and in most other long-run forecasting work,² the basecase is for continued strong global economic growth and some degree of convergence between the OECD and non-OECD countries. Growth rates are projected basically as a continuation of trends: strong technological growth in the OECD countries,

² See, for example, the economic growth projections underlying the IPCC climate change projections at <http://sedac.ciesin.columbia.edu/ddc/sres/index.html> (2000), or Maddison (2007). One major exception is Meadows *et al.* (2004)

strong investment coupled with continued modernization in non-OECD Asia, but a gradual slowing from the very high growth rates of recent decades. For the other non-OECD regions, the forecast assumes a gradual improvement in economic governance that leads to a more efficient use of capital and more domestic competition. Embedded in the base case is increasing globalization, a lack of major conflicts, and reasonably successful fiscal management by OECD and non-OECD governments.

Table 1
Economic Growth In the IEO2007 Reference Case¹
average annual growth

	2006-2030	1980-2005
World	4.1	3.2
OECD	2.5	2.6
Non-OECD	5.3	3.9
United States	2.9	3.1
China	6.5	7.6
Russia	3.7	0.1
OECD Europe	2.3	2.0

¹Real GDP, Purchasing Power Parity Terms

Source: Projected data from Reference Case, Table A3, IEO 2007

Historical data from author's extensions of Maddison's 2003 estimates

Note: The IEO scenario assumes energy prices remain roughly equal to the 2006 price, on average.

I imposed these energy and economic numbers on the IFs model³ and used the model to generate its own long range geopolitical scenario. The IFs model projects variables such as the level of democratization, geopolitical power, risk of domestic instability, and the risk of war⁴. Under the base case energy and economic assumptions, and under the myriad assumptions underlying the IFs model, the geopolitical landscape shifts in a benign direction.

³ Approximately. Differences in base year purchasing power parity GDP numbers and difference in coverage between the IEO and the IFs model make it impossible to exactly line up the numbers.

⁴ See the appendix for details on how these variables are measured.

Table 2

Key Geopolitical Measures

Calculations and Projections with the International Futures Model, Basecase

	Democracy		Political Power		Risk of Extreme Internal Instability		Risk of Interstate War	
	2005	2030	2005	2030	2005	2030	2005	2030
World	11.6	15.5	100	100				
OECD	19.3	19.9	63.9	47.5				
Non-OECD	9.9	14.7	36.1	52.5				
United States	20.0	20.0	28.6	21.5	0.0%	0.0%	10.6%	8.6%
China	3.0	8.6	8	17.9	4.9%	0.6%	5.9%	5.8%
Russia	17.0	19.6	4.6	4.9	50.0%	0.9%	11.3%	9.0%
EU27	19.6	19.9	21.3	15.4	0.0%	0.0%		
Middle East-OPEC	3.1	9.0	2.3	3.8	5.3%	3.4%		
Iran	6.0	9.0	0.7	1.1	9.4%	2.5%	7.4%	5.4%

Note: See Appendix 1 for detailed descriptions of the measures reported above.

Rising GDP per capita and generational change leading to larger percentages of populations growing up without want lead to growing democratization (Inglehart, 2000). Faster economic growth in China and the other non-OECD countries leads to a gradual decline in the share of world power held by the United States and the EU and a rise by China. Economic growth and consolidation of democracy lead to a diminution almost everywhere in the risk of internal war (Goldstone, 2004). The rise of great powers such as China and India compared to the relative decline of US power could lead to an increase in the risk of interstate war (Tamen, 2000), but this scenario assumes China and India, in particular, are satisfied powers (Kugler, 2006), that have adapted peacefully to the existing international order and see no need for warfare to validate their rising status. This result also conforms with Gartzke's "Capitalist Peace" (2007) in which spreading economic interdependence erodes incentives for interstate war.

What if the oil supply situation was not so promising? What if an extra 20 or 40 mbd of oil are not forthcoming, resulting in far higher prices for the available oil? The IEO report posits one such price path but it does not draw any geopolitical inferences—world politics are unchanged in IEO scenarios. But could a tightening of the world energy market upset the benign political outcomes of the base case?

3. Alternate Scenario 1: A More Aggressive OPEC

In the IEO low oil production, high oil price scenario, world oil production rises by only 4.1 mbd between 2005 and 2015, 9 mbd less than in the basecase. Almost all of the shortfall in production in this scenario compared to the basecase is accounted for by OPEC and especially by Saudi Arabia. Because the Middle East oil producers clearly have the potential to increase production much more over the next decade than this scenario portrays (CERA, 2008) I choose to interpret this scenario itself as a more aggressive OPEC:⁵ OPEC has chosen to keep production low and prices high in order to increase revenues.⁶

⁵ The EIA does not explain why oil production is so much less in this scenario. (pg 12-15)

⁶ All the cutbacks in production are assumed to originate in the OPEC countries, thus oil production remains the same as in the reference case for Mexico, Russia, and the Caspian region. This assumption necessitates a further 1.1 mbd OPEC production drop in 2015 and a 2.1 mbd drop in 2030, compared to IEO's reference scenario.

Table 3

World Oil Production Projections, IEO 2007, mbd

	2005	Reference Case		High Price Scenario	
		2015	2030	2015	2030
World	84.3	97.4	117.7	88.4	103.4
OPEC	35.3	42.1	56.8	35.6	43.2
non-OPEC	49.0	55.3	60.9	52.8	60.2
World Oil Price	57	50	59	80	100

Source: DOE/EIA International Energy Outlook, 2007, Tables G1 and G4
Oil price per barrel, in constant 2005 prices.

Under this low-production assumption, market forces will push up oil prices dramatically, and OPEC revenues will rise dramatically as well. Assuming that the major oil exporters make good use of their increased revenues, these alternative oil revenue figures will have a large positive impact on OPEC economic growth as well as a noticeable negative economic impact on OECD growth.

Table 4

Economic Growth Comparisons¹

average annual growth, 2006-2030

	Base Case	High Price Scenario
World	3.8	3.7
OECD	2.5	2.3
Non-OECD	5.1	5.0
OPEC-Middle East	5.2	5.6
United States	2.9	2.7
China	6.6	6.3
Russia	3.8	4.5
EU27	2.1	1.9
Iran	5.1	5.7
India	4.5	4.1

¹Real GDP, Purchasing Power Parity Terms; IFs simulations

OPEC production is 6.5 mbd less in 2015 and 13.6 mbd less in 2030, while oil prices rise \$25 per barrel in 2015 and \$42 per barrel in 2030 (adjusted for inflation in the price of other goods and services), compared to the reference case. Assuming 80% of the revenue rise goes to Middle East governments and firms, Middle East revenue rises about 4.5 trillion 2005 dollars, 2006-2030, and calculations using the International Futures Model suggests that revenue increases of this magnitude--spent efficiently-- could boost real GDP growths by 0.4 percent a year through 2030, and push up per capita consumption rates even more. Iran's GDP growth rate would be about 0.6 percentage point a year higher. The huge wealth transfers resulting from this use of market power will probably tend to increase military spending in the region (Stern, 2006). The region gains global political power—up by about 1 point on the 100-point global share index. If the region chose to use its new wealth and power to accumulate nuclear weapons, the Middle East OPEC regions cumulative power index could increase by two thirds from the basecase estimate.

Simulations with the International Futures Model also suggest that the risk of domestic instability would be reduced because of increased economic growth and the risk of interstate wars would be roughly unchanged.

The geopolitical clout of the region, and especially the major exporters—Saudi Arabia, Iran, and Iraq grows. The Western importers become even more beholden to OPEC because politically motivated short-term restrictions in oil supply could have a devastating economic impact.

This simulation assumes the Middle East states only spend half the extra revenues on private consumption and fixed investment, accumulating the rest in sovereign wealth funds. Starting from about \$1.6 trillion in 2007⁷, the value of these funds rise to about \$11 trillion (in 2005 prices) by 2030 in the base case, and \$13 trillion in the high-price scenario. Assuming this money is invested mostly in the OECD countries, the rise in holdings of government bonds, equity stakes, and outright control of companies will increase the leverage of the oil-rich states.

Table 5

A More Aggressive OPEC

all results compared to basecase forecast, either 2006-2030 averages, or 2030 level

	Change in average annual GDP Growth rate	Percent Change in Real GDP Level, 2030	Change in Aggregate Power Index, 2030	Change in Power if OPEC Middle East goes nuclear
OPEC Middle East	0.4%	10.0%	0.9	2.4
Iran	0.6%	15.7%	0.3	0.5
Russia	0.7%	17.0%	1.1	0.5
China	-0.3%	-6.8%	-1.3	-1.5
EU27	-0.2%	-5.2%	-0.2	-0.3
USA	-0.2%	-5.5%	-0.5	-0.9

Source: simulations with the International Futures Model

OPEC might be tempted to pursue this low-production strategy which seems to generate significant economic and geopolitical gains, but there are several key uncertainties that might restrain it: uncertainty over oil demand and supply elasticities, lack of faith in the cartel itself, and fear of violence.

⁷ *The Economist*, Jan 19-25, 2008, pg 78.

Elasticities. The DOE high price scenario envisions a 12.3 percent production decline in 2030 and a 72.4 percent price increase, with world GDP unchanged. This suggests an implicit price elasticity of about -0.25 over 25 years. This is a forecast that may be correct (IMF, 2005), but there is great uncertainty about the long term price sensitivity of oil and some analysts think it is much higher, perhaps approaching -1 (Energy Modeling Forum, 1981). Given that OPEC's 2005 share of the world market is only about 42 percent, an elasticity higher (in absolute terms) than -.5 or so would suggest that production cutbacks, while raising the world price of oil would result in a reduction in OPEC revenues and hence investment, consumption, and GDP growth.⁸

Cartel fragility. Another constraint on this strategy is the age-old problem of cartel cheating. If Saudi Arabia or some combination of OPEC exporters really commits to this strategy of low or no growth in production, other OPEC producers have a powerful incentive to cheat on the agreed-upon cutbacks. Saudi Arabia has been in that position before (1984-1986) and is reluctant to find itself in such a position again.

Free riders. While this production scenario could have significant gains for OPEC, the greatest gainers would be non-OPEC exporters such as Russia. Russia's cumulative oil export revenues (2006-2030) are almost \$2 trillion higher in this scenario. Simulations with our growth model suggest an additional economic growth of 0.7 percent

⁸ The long-range energy price elasticity imputed from the IEO2007 and used here implicitly assumes only a modest amount of technological change enhancing the attractiveness of alternative energy sources. A more optimistic assumption about technology would of course reduce the negative implications of these scenarios.

per year. Saudi Arabia becomes the number two oil producer to Russia, which has given up nothing and profited heavily by OPEC and Saudi Arabia's cutbacks in production.

Despite these risks, the results from this scenario suggest that OPEC, especially Saudi Arabia, might not be very interested in increasing oil production as much as the IEO basecase scenario requires. OPEC has little to gain financially—given these elasticity values—from an effort to dramatically increase oil production.⁹

4. Alternate Scenario 2: A New Caliphate

A big drawback to OPEC cashing in on its market power is the fragility of the cartel—the temptation and tendency of each member to cheat on its agreed quota. This weakness could be reduced if the Persian Gulf oil exporters became more unified politically. Such a scenario was explored in the National Intelligence Council's *Mapping the Global Future* in which a spiritual Caliphate was declared and was honored throughout the region but had not yet—by 2020—established a unified government. But what if such a unified Islamist government was established, including Egypt, Saudi Arabia, the United Arab Emirates, Kuwait, and if not Iraq and Iran, at least more closely aligning those countries with the Sunni lands than now? It might also include Muslim oil exporters that are not now part of OPEC, such as Bahrain, Oman, Azerbaijan, and Kazakhstan.

⁹ Stern (2006) argues that OPEC has long been exerting its market power by constraining investment, not production.

If the new Caliphate was as interested in economic gains as the current governments then the only difference from the first scenario would be less fear of cartel cheating. In this new order, only a very small part of the cartel's total output would not be under the direct control of a single authority. Thus reaching for the gains outlined in scenario 1 would be much less risky an undertaking.

If, however, the new regime was more interested in spiritual/psychological and/or political gains than economic ones, the impact of Islamic unification could be much more severe for the oil-importing nations. In this case punishment of the West might take policy priority over long-term economic calculations.

In alternate scenario 1 OPEC did not increase production over the next 25 years sufficiently to meet demand without a rise in real prices—the changes were gradual and long-term and the economic pain to the oil-importers was not severe. In alternate scenario 2, I assume that for political and economic reasons OPEC starts to withhold oil from the market in 2015, both to enjoy higher revenues and to punish the West for its support of Israel and/or other perceived misdeeds. The new Caliphate would have an enormous amount of power to inflict damage on the oil importers without suffering much, if any, economic damage itself.

If OPEC (or OPEC and some of the newly aligned Caliphate states) cut oil production by 5 mbd in 2015¹⁰, I estimate¹¹ that the world oil price would rise 114

¹⁰ Compared to estimated production levels in Scenario 1.

percent in 2015, to \$171 per barrel (in 2005 prices). This price spike would cause an enormous shift in revenues between the oil-importing and the oil-exporting states. Oil prices would adjust downward after 2015 because of lags in response to the price surge response, but it would still be \$27 higher in 2020, than in the previous scenario.

This production cut would result in a boost in Middle East GDP growth, 2016-2020, a larger increase in per capita consumption, and \$1.5 trillion new infusion over 5 years to OPEC sovereign wealth funds.¹² The United States, on the other hand, would plunge into recession¹³, with real GDP dropping an estimated 7 percent over two years. The EU would be hurt nearly as much.

Russia, again, is a big winner from the OPEC action. The Kremlin can keep selling all the oil it produces at the new higher price, despite the slowdown in economic activity in Europe and the United States. Gas export volume is similarly unchanged while gas prices increase some. Total energy export revenues, 2015-2020 increase by about \$550 billion. Russian GDP growth increases by an average of about 0.3 percent per year, 2016-2020, and private and government consumption increase far more, as do holdings of overseas financial assets.¹⁴

¹¹ Using the IMF's short-term oil demand elasticity of -0.05, and the DOE's implicit long-term price elasticity of -0.25.

¹² This assumes that a quarter of the new revenue goes to consumption, a quarter to investment, and half to the sovereign wealth funds.

¹³ See Hamilton (1996) and Blanchard and Gali (2007), for differing views on the impact of oil prices on the macroeconomy.

¹⁴ These results assume that the additional energy export revenues go in equal shares to private consumption (much of it imported), government consumption (much of it for the military), investment, and overseas financial asset accumulation.

Aggregate national power, as measured by the IFs model, continues to shift away from the United States and the EU toward the Middle East and Russia, all based on policy choices that were perhaps easy and costless for the Middle East. Russia gains as free rider, it does nothing at all for its increase in power except choose to invest its windfall wisely. China suffers a sharp decrease in growth from higher energy prices and lower OECD growth, but it, like the United States and the EU, is assumed to not respond politically to the OPEC/Middle East actions.

Table 6
A New Caliphate
all results compared to Aggressive OPEC scenario except column 4

	Change in average annual GDP Growth rate (2016-2020)	Percent Change in Real GDP Level, 2020	Change in Aggregate Power Index, 2020, from Aggressive OPEC Scenario	Change in Aggregate Power Index, 2020, from Basecase Scenario
Caliphate	0.4%	5.8%	3.5	4.3
Iran	0.4%	3.7%	0.2	0.4
Russia	0.4%	2.0%	0.5	0.7
China	-0.4%	-2.5%	-0.4	-0.7
EU27	-0.5%	-2.9%	-0.5	-0.7
USA	-0.4%	-2.0%	-0.6	-1.4

Source: simulations with the International Futures Model

Notes: Caliphate is defined here as OPEC Middle East plus Egypt, Syria, Oman, and Bahrain, Azerbaijan, and Kazakhstan.

This scenario assumes the Middle East states have acquired nuclear weapons.

The change in power for the Caliphate uses OPEC Middle East as the comparator.

5. Alternate Scenario 3: A More Aggressive Russia

The previous two scenarios assumed Russia was a passive actor, enjoying the increase in revenues brought about by the supply-constraining policies of OPEC or parts of OPEC. Assuming that the extra revenues are split evenly between consumption, military spending, domestic investment, and foreign investment, Russian average real

GDP growth increases by about 1.0 percent per year from 2007, and the sovereign wealth fund accumulates another \$700 billion (in 2005 prices) by the year 2030.

Russia, acting alone, can push up world oil prices by cutting production, but given its small share of the market, it will only reduce its oil export revenues by doing so, even though it can benefit greatly from being a free rider on OPEC's actions. Starting from the low-production scenario, there is much more incentive for Russia to cooperate with OPEC and for OPEC (or the Caliphate) to encourage—or even insist on—Russia joining OPEC in supply cuts.

Starting from the already low world production figure of 88.4 mbd in 2015 in the New Caliphate scenario, if Russia and the Caliphate agreed to cut production further, proportionately (the Caliphate would cut production by about 4 times as much as Russia), oil export revenues would go up for both partners. If Russia cut oil production and exports by about 0.5 mbd and the Caliphate cut production by about 2 mbd, Russian net export revenues would increase by about \$150 billion, 2015-2020, from the estimated revenues in the Caliphate scenario, and Caliphate revenues would increase by about \$600 billion, and the gains would continue to mount through 2030.

The price of a barrel of oil in 2015, in 2005 real terms, would increase from \$170 a barrel in the Caliphate scenario to \$215 a barrel. Russia and the Caliphate might be tempted, in 2015, to attempt such cooperation purely on economic grounds. The scenario is based on the assumption that supply opportunities are limited in the non-OPEC

countries—the IEO high price scenario. The new Caliphate scenario assumes that a new, more aggressive, Islamist regime reaches ascendancy in the Middle East and that it is not dependent on the West for its security. Rather it eagerly seeks to redistribute political power from the West to the East. In the Russian scenario I go one step further in assuming that Russia aligns itself economically with the Caliphate to improve both its economic position and its relative geopolitical strength.

Table 7
A More Aggressive Russia
all results compared to Scenario 1 except column 4

	Change in average annual GDP Growth rate (2016-2020)	Percent Change in Real GDP Level, 2020	Change in Aggregate Power Index, 2020, from Aggressive OPEC Scenario	Change in Aggregate Power Index, 2020, from Basecase Scenario
Caliphate	0.6%	3.4%	4.0	4.8
Iran	0.6%	3.8%	0.2	0.5
Russia	1.1%	5.4%	0.8	1.1
China	-0.5%	-2.5%	-0.5	-0.8
EU27	-0.5%	-2.8%	-0.8	-1.0
USA	-0.4%	-2.3%	-1.0	-1.8

Source: simulations with the International Futures Model

6. Alternate Scenario 4: A More Aggressive China

The previous three scenarios, all diverging from the IEO’s high price scenario, envision the major oil-exporting states exploiting their market power to enhance their economic and geopolitical positions and, perhaps, to punish the West. The consuming nations have been assumed to be passive reactors to the actions of the oil exporters—they have paid the new price, borrowed more money, and watched their economic fortunes and their geopolitical power shrink.

China, however, is already acting in ways that reflect its fear for the long-run dependability of the global oil market. China has chosen to establish long-term supply and production relations with Middle East as well as African and Latin American nations (USCC, 2007, pp 175-181). In the short term these policies tend to increase the global supply of oil; in the long term it is not clear that they can protect China very much from the vagaries of the market and OPEC's market power (Gholz and Press, 2007). But in these bleak scenarios, where world oil prices have been pushed above \$200 a barrel by a combination of disappointing non-OPEC production and OPEC and Russian supply restraint, China might be tempted to act more aggressively.

In such a scenario, global confidence in the ability of the market to deliver needed energy supplies and confidence in the United States to continue to undergird the physical security of the global energy market (Yetiv, 2004, pp 55-76) are undermined by years of diminishing US financial clout and its weakening geopolitical power.

I assume that in these circumstances China attempts to ensure its energy supplies at prices it wants. This could mean outright military force in the Middle East or Africa, but more likely it would mean putting political and economic pressure on weak African states to honor old, concessionary contracts they have with the Chinese, rather than attempt to modify them in response to higher oil prices as they would be tempted to do in light of much higher world market prices. In this scenario, China's long-declared policy of non-interference in domestic affairs of foreign states would be cast aside when it

becomes geopolitically possible—because of waning US power--and desirable—because of soaring oil prices.

Apart from the geopolitical dangers associated with this shift of the Chinese to statecraft-driven energy acquisition, such a Chinese move would affect the rest of the global market because it would only be undertaken so that China could enjoy less-than-market prices. At these lower prices China will naturally consume more oil than it would at the higher, global market price. This higher demand causes the burden of adjusting to constrained supply to fall more heavily on the United States and other oil consuming nations, through higher prices, reduced economic activity, and probably an intensified arms race as confidence in a peaceful international economic system recedes.

Competition over resources, in this scenario, could at its worst lead to a breakdown in the “Capitalist Peace”. Gartzke (2007, p 170) said, “Governments, like individuals, choose between trade and theft in obtaining goods and services”. In the resource-constrained world we have described here, the choice is not as clear-cut as it has been for the last half century.

7. Conclusions

I have used the International Futures Model to show the importance of oil futures to geopolitics. All of the quantitative results reported here are merely indicative of the potential problems that may develop based on a less benign energy forecast than the ones reported as the EIA and the IEA’s basecase forecasts. If oil production does not rise

sharply in the non-OPEC countries 2008-2030, OPEC might easily find it in its own interest to go very slowly in developing new productive capacity as envisioned in scenario 1 above. A general hesitancy to expand production when doing so might lead to enhanced revenues that might be much more easily achieved by the Cartel than agreeing to shut-in capacity that is already available and saleable at a high price. In alternate scenarios 2 and 3 I showed how political realignment in the Middle East could encourage oil producers there to use their enhanced market power to capture new economic and political rents, and, even, perhaps, encourage Russia to join in production-restraining agreements. In alternative scenario 4 I posit that China might respond to these aggressive actions by the major oil exporters in ways that would fundamentally upset the existing global system of voluntary exchange and state sovereignty.

Appendix: Geopolitical Measures

The geopolitical measures—democracy, political power, risk of internal war, and risk of interstate war—referred to in Table 2 and in the text are based on historical measures taken from standard sources and projected into the future by the IFs model

The **democracy** variable is based on the Polity IV data bank from the Center for International Development and Conflict Management (CIDCM) at the University of Maryland. The data base is found at <http://www.systemicpeace.org/polity/polity4.htm>.

The CIDCM data base assigns a value to each year for each country on a scale of 0 to 10 for democracy (10 is more democratic) and 0 to 10 for autocracy (10 is more autocratic). In 2004, the US scores a 10 for democracy and a 0 for autocracy, China scores a 0 for democracy and a 7 for autocracy. For simplicity, the IFs Model combines the two scores into one by adding 10 to the democracy score and subtracting the autocracy score, hence the US scores 20 and China scores 3.

The IFs model's basecase assumes there is a strong world-wide trend toward democracy following the findings of Huntington (1991) and Diamond (2003), but the trend for each country is influenced by changes in GDP per capita and changes in a sociological value called the survival/self expression index. Inglehart and Baker (2000) have suggested that it is not just higher levels of economic welfare *per se* that leads to the development of democratic institutions but also the duration of time various age cohorts have lived in societies where basic economic needs seem more or less assured.

Attempts to quantify **political power** have produced a large literature surveyed by Kugler and Arbetman (1989) and Tellis *et al.* (1999) but no consensus and a wide variety

of opinions from using very parsimonious measures (Kugler and Arbetman favor using GDP alone) to extremely elaborate measures quantifying dozens or scores of indicators of actual or potential power as shown in Pillsbury’s translation of Chinese works on comprehensive national power (Pillsbury, 2000). The IFs model allows the user to choose among (and weight) up to seven variables that are often mentioned in the literature and that are projected in model simulations. This paper uses the following measures and weights:

Measure	Weight
GDP in 1995 purchasing power parity dollars	.25
GDP in nominal dollars	.25
Population	.125
Military spending in constant dollars	.25
Nuclear weapons	.062
Technological sophistication	.062

The **risk of extreme internal instability** is based on work by the State Failure (now Political Instability) Task Force at the University of Maryland and available at <http://cidcm.umd.edu/inscr/stfail>. The IFs model has attempted to use insights from the Political Instability Task Force’s decade-long effort to model various forms of state instability (see especially Goldstone *et al.*, 2004). The IFs model projects changes from the historical likelihood of each country falling into instability as a function of infant mortality, trade openness, democratization, and the level of education.

The IFs model estimates the **risk of interstate war** based on historical data from the Militarized Interstate Dispute (MIDS) data base compiled by Jones, Bremer, and Singer (1996), work on power transition theory by Tamen *et al.* (2000), and work on trade and war by Mansfield (1994). The model calculates the dyadic risk of war as a function of power asymmetries, political structure, and trade interconnectedness.

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