

China's Strategic Oil Reserves Program: Assessing the Impacts

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With an impressive average economic growth of 9% since 1979 (Wong, 2004) and assuming sustainable growth and expansion in the future, many have been looking at and relying on China to spur international trade and consequently reap profits from this growing giant (Intertanko, 2004). In fact, overbuilding in both containerized and bulk shipping is often justified in terms of meeting future demand of China's burgeoning economy (BRS, 2004; Mitra, 2004). Freight market booms in the bulk shipping market (both dry and wet bulk) are being fuelled by China's increasing demand for raw materials and expectations on future expansion. Due to the derived demand nature of sea transport, a further increase in trade in both raw materials and final goods definitely will impact the shipping market.

It is expected that an increase in economic activity, *ceteris paribus*, will lead to a further increase in energy consumption. Hence, one of the burning issues currently being discussed in China is its growing reliance on oil imports. In line with this concern, the idea of building strategic oil reserves has been raised numerous times at high-level decision-making bodies (Thomson and Liang, 2004; Xinhua, 2004).

The strategic oil reserves program will definitely have an impact on the shipping market, particularly in the tanker market. However, the exact effect will depend on how the Chinese government implements the project and this is the subject of the present paper. In this paper, we will try to predict the impacts of China's strategic oil reserves program on tanker freight markets by analyzing the possible ways that China can implement it. The next section discusses the situation of the oil market in terms of production and consumption in China and provides an overview of existing and floating plans regarding the program. Section III presents the rationale for building strategic oil reserves and the consequences in terms of risk-sharing and effects on world oil prices. Section IV analyzes the possible effects on the tanker freight market of different ways of implementing the strategic oil reserves program. The final section concludes.

II. China's Oil Market, Increasing Dependence on Oil Imports, and Strategic Oil Reserves Program

In the days of self-sufficiency, oil exports were considered as crucial sources of foreign exchange. Most of oil production was geared towards the export market in the 1980s. However, beginning in 1993, China lost its self-sufficiency in oil and became a net importer. Increased domestic

demand for oil was due to a combination of factors such as high economic growth, rising incomes, urbanization and increased automobile usage. Furthermore, the government promoted a campaign which has less emphasis on coal in favor of cleaner fuels. (Thomson, 2001)

Based on British Petroleum's *Statistical Review of World Energy 2004*, China's oil production in 2003 was 3,396,000 barrels daily—a 1.5% increase from the 2002 value. However, China's oil consumption (excluding Hong Kong SAR) in 2003 was 5,982,000 barrels daily—an 11.5% increase from consumption in 2002. The published data of China's oil imports in 2003 is registered at 2,607,000 barrels per day or 128.3 million tonnes for which ranks China as the third largest oil importer next to the United States and Japan.

Average projection of China's oil production from different sources is pegged at 179.78 million tonnes in 2010 (Medlock and Soligo, 1999; Cordesman, 1998; Asia Pacific Energy Research Centre, 2000; Jia *et al.*, 1999; Shi *et al.*, 1999; Gao, 2000; Zhou and Zhou, 1999) and 173 million tonnes in 2020 (International Energy Agency, 2000; Downs, 2000; Cordesman, 1998; Shi *et al.*, 1999; Zhou and Zhou, 1999). This represents an annual growth rate of 1.05% from the 162 million tonnes in 2000 (British Petroleum, 2001) in the 10-year period and 0.33% for the 20-year period. With regards to forecasts of demand, average projection is 298.56 million tonnes in 2010 (Medlock and Soligo, 1999; International Energy Agency, 2000; Cordesman, 1998; Jia *et al.*, 1999; Shi *et al.*, 1999; Gao, 2000; Zhou and Zhou, 1999) and 452.86 million tonnes in 2020 (Medlock and Soligo, 1999; International Energy Agency, 2000; Downs, 2000; Cordesman, 1998; Shi *et al.*, 1999; Zhou and Zhou, 1999). Average annual growth rates from the 2000 value of 227 million tonnes (British Petroleum, 2001) are 2.78% and 3.51% for the 10-year and 20-year period respectively. As we can easily see from these data, compounding growth rates of demand will substantially diverge from production growth rates hence indicating an alarming overdependence of China on oil imports in the future.

To complete the analysis, we need to identify the sources of China's oil imports in order to have some geopolitical substance. In 2003, 54% of China's oil imports came from the Middle East while 12% and 9% from West Africa and the former Soviet Union respectively (British Petroleum, 2004). Based on China Customs Statistics (Hong Kong Trade Development Council, accessed 2004), the top five sources for oil imports in 2003 are Saudi Arabia, Iran, Angola,

Oman, and Republic of Yemen¹. These five countries supplied almost 59% of China's oil imports and Saudi Arabia alone supplied 16%. China's oil imports are highly concentrated and thus contribute to the uncertainty of future stability of oil supplies.

In view of the supply uncertainty, officials from the National Development and Reform Commission announced a tentative plan of building four strategic oil reserves in Huangdao, Dalian, Dayawan, and Zhanjiang (Gao, 2003). The goal is to achieve an equivalent of 30 days' oil import supply by 2005 and 70 to 75 days' oil import supply by 2010. Furthermore, the government designated China National Petrochemical Co. (Sinopec) and China National Petroleum Co. (CNPC) to implement the oil stockpiling project. It is estimated that the Chinese government will provide assistance of more than 10 billion yuan (roughly US\$1.3 million) in which a majority of the cost consists of oil to be purchased. The reserves will be non-profit in nature and will remain under the supervision of the State Council's Development and Reform Commission. (Guangdong News Online, 2003)

Together with this stockpiling project, the government has encouraged the big national oil companies to "go out" and look for new and stable sources of oil outside China. According to Tan Zhuzhou, president of the China Petroleum and Chemistry Industry Association (CPCIA), the oil companies should actively explore and exploit new sources of oil especially in Africa and South America since diversification of oil sources reduces the risk of over dependency on a single major source and hence secure the stability of supply in the face of unexpected supply disruptions. Moreover, the government advises the oil companies to have a direct stake in overseas refineries, oil explorations, etc. instead of simply buying and importing the oil. In fact, oil and gas cooperation has been extended to Russia, Azerbaijan and Kazakhstan in Central Asia; Indonesia and Myanmar in Southeast Asia; Iran and Oman in the Middle East; Venezuela in South America; and Libya and Sudan in Africa. (Xinhua, 2004) Details of some of these projects will be further discussed in Section IV.

III. Rationale for Strategic Oil Reserves and Possible Consequences

Oil fuels the economy, both in the figurative and literal sense, and as such, stability of oil supplies is critical for continued growth and expansion. Hamilton (1983) shows that most post-war recessions were preceded by an oil shock and also that unanticipated shocks have greater negative

¹ In April, Russia became the third largest source of imported oil behind Oman and Angola (Lelyveld, 2004). This point is particularly important in Section IV.

effects on the economy (Hamilton, 1996). As an important example, the 1970 Oil Crisis brought about a worldwide decline in employment and output but also inflation². Furthermore, Mork (1989) observes that the economy is more sensitive to oil price increases compared to oil price decreases, hence exacerbating the effects of negative supply shocks. Huntington (2004) further studies the greater adverse effects of oil shocks in economies that rely heavily on oil and on economies in almost full-employment and thus unravels the greater vulnerability of such economies.³

One of the ways for an economy to be (partially) resilient to such supply shocks is by building up its strategic oil reserves (see Krapels, 1980 for perspectives on oil stockpiling policies in the United States, Japan, Germany, France, Italy, and the Netherlands; more comprehensive discussions on the Japanese oil program can be seen in Wu, 1977). Strategic oil reserves are actually not aimed to restrain fluctuations of oil prices but rather to provide continuous supply during wars, natural catastrophes, and other major supply disruptions (Jaffe and Soligo, 2002; Krapels, 1980). Based on Ford's (2005) simulations of the impacts of strategic fuel reserves (SFR) in California, SFRs are beneficial only in large, unanticipated disruptions rather than in small cyclical variations in supply. Hence, it can be deduced that strategic oil reserves are not built for commercial purposes. Such reserves serve a greater "strategic" (as opposed to simply economic) role. China's strategic oil reserves program is consistent with this belief.

In terms of risk-sharing, strategic oil reserves will not serve as a hedging instrument against daily fluctuations of oil prices. Futures contracts should serve this goal. Though crude oil futures trading is still banned in China, the recent launching of fuel oil futures on the Shanghai Futures Exchange on the 25th of August shall pave the way for further market reforms and eventually crude oil futures trading (CNN, 2004; China Economic Net, 2004b).

Strategic oil reserves are a form of internalizing the excess social cost derived from the 'disruption component' in the framework used by Broadman (1986). This disruption component refers to the costs associated with supply disruptions of oil imports. It can be divided into direct—effect on the economy's energy sector—and indirect—impact on macroeconomic performance—

² Hence the term "stagflation," which is characteristic of adverse supply shocks such as an oil shock.

³ Though in this paper we focus on supply disruptions rather than price volatility and high oil prices, IMF estimates show that a sustained \$10 increase in oil prices would decrease China's real GDP by 0.8%, increase inflation by 0.8%, and place the trade balance into a deficit worth 0.6% of GDP (International Energy Agency, 2004).

costs. According to Broadman (1986), the externality related to the disruption component stems from the inability of private agents to correctly estimate the prospects for a disruption and thus fail to optimize energy-use investment decisions. As evidence of the indirect costs of oil imports, during the summer of this year, “thousands of factories were asked to halt production for two days a week, shift work to non-peak hours or take mandatory week-long holidays” when faced with “the worst shortage in over 15 years” (Phar, 2004). Such large indirect cost is due to the fact that 54% of China’s economy is reliant on energy-intensive manufacturing, and it is expected that this will continue in the near future (Phar, 2004). Therefore, strategic oil reserves address this form of risk—risk from major unanticipated supply disruptions and not on cyclical volatility of oil prices.⁴

One of the main reasons why the strategic oil reserves program of China has not yet been executed is that both PetroChina⁵ and Sinopec are reluctant to purchase oil at a time when oil prices are reaching record highs (Pang, 2004) due to anticipated supply disruptions in Nigerian supply and intermittent disruptions from Iraq and Russia. As mentioned in the previous section, a large portion of financing will be for the actual purchase of oil for stockpiling. Furthermore, because the world is experiencing an extremely tight market, with demand growing at a rate unseen in 24 years (Pang, 2004) and production barely meeting this demand, additional pressure from China’s stockpiling project will obviously cause the oil market prices to soar.

IV. Possible Effects of China’s Strategic Oil Reserves Program on the Tanker Freight Market

For this section, three scenarios will be discussed according to the source of the additional oil imports for the stockpiling program: i.) Russia, ii.) Caspian Sea Region particularly Kazakhstan, and iii.) the Middle East. It is important to remember that in analyzing the effects in each of these scenarios, we must focus on the marginal effects of the strategic oil reserves program. In other words, we shall undergo a thought experiment whereby we assume that oil production and

⁴ One can argue that if the external costs are properly internalized and thus, expectations of major oil disruptions properly accounted in energy-use investment decisions, then oil price fluctuations might be reduced. However, the reduction in the volatility of oil prices is due to the demand side (speculating-side) and not the supply side (real-side), and hence this reduction might actually be too small to have an observable effect. Besides, a supply of 30 days’ worth of oil (or even 75) will not do much considering the fact that IEA requires its members to hold oil stocks equivalent to at least 90 days of net imports under Article 2 of the International Emergency Program Agreement (International Energy Agency, *accessed* 2004).

⁵ CNPC is the controlling shareholder of PetroChina.

consumption will be static, and the only change in quantity of oil imports would stem from the oil stockpiling project.⁶

Scenario 1: Russia is now seen as a critical source of oil for China considering the fact that it is the “world’s biggest oil producer after Saudi Arabia” (Bloomberg, 2004). Assuming Yukos settles its current problems with the Russian government, the former intends to increase its oil exports to China to at least 10 million tonnes in 2005. However, the oil to be provided by Yukos would be transported by rail⁷ and not by ships. Furthermore, there is a pending plan to build a US\$2.8 billion oil pipeline that runs through Angarsk to Daqing. This pipeline is to provide US\$150 billion worth of oil (Tschang, 2004). If the Russian-China pipeline is to be erected in time, then this entails a considerable diversion or substitution in terms of oil transport. In other words, demand for tankers would most probably decrease since there are alternative modes of transport and hence freight rates would also decrease, *ceteris paribus*.

Scenario 2: The Caspian Region scenario is similar to the Russian case. Prior to 2004, cooperation between China and Kazakhstan seemed bleak as can be seen from CNPC’s investment plans in Kazakhstan remaining relatively dormant (Andrews-Speed *et al.*, 2002) and the halting of Kazakhstan-China pipeline feasibility study in 1999 (Energy Information Administration, 2002). However, last 17 May 2004, China and Kazakhstan revived the plans for the trans-Kazakhstan oil pipeline project (see Lelyveld (2004) for details of the Kazakhstan-China pipeline plan). Though Kazakhstan provides only 1.3% of China’s oil imports, the pipeline project can be utilized for the sole purpose of the strategic oil reserves since CNPC⁸ will directly invest in the project and thus would have a stake in it rather than simply buying the imported oil. According to Andres-Speed *et al.* (2002), Kazakhstan provides China with “one of the best prospects of having an overseas oil supply which could be secured under Chinese ownership and control.” However with regards to the shipping market, as with the case of Russia, oil transport through pipelines will divert demand from tankers and thus may decrease tanker freight rates, *ceteris paribus*.

⁶ This is just your usual *ceteris paribus* assumption.

⁷ This is one of the issues in the recent export cuts of Yukos to CNPC. As evidence of Russia as a crucial source of oil, China is even ready to pay the rail fees associated with transporting the oil (Associated Press, 2004).

⁸ CNPC “shocked the industry” with its initial intention of investing US\$9.5 billion in Kazakhstan in 1998 (Lelyveld, 2004).

Scenario 3: The Middle East scenario is the most interesting case considering the fact that this is the only scenario which deals with tankers and sea transport, and also because, as mentioned, 54% of China's oil imports came from this region in 2003 (British Petroleum, 2004). At first glance, it seems that at last, we have a scenario in which the strategic oil reserves program will push the demand for tankers and increase tanker freight rates. However this is unfortunately not the case. There are two primary reasons for this. First, we can safely assume that China will be using its own fleet of VLCCs to carry the additional imported oil for the emergency reserves in accordance with the objective of having 50% of Chinese oil imports to be carried by Chinese-flagged ships by 2005 (Chinese Economic Net, 2004a), hence there will be no additional demand for existing (non-Chinese) tankers. This also implies that the aggressive enlargement (from 5.2 million DWT to 10 million DWT before 2005) of the Chinese VLCC fleet may depress tanker freight rates in the particular route served by these tankers, once deliveries come in. Second, and most important, there seems to be a strong intention in behalf of the Chinese government to bypass the Straits of Malacca⁹ due to security concerns over the Straits (Ching, 2004; Phar 2004). One of the ten proposals recommended by Li Lianzhong, vice-director of the economic bureau of China's Central Policy Research Center, and Professor Li Chengyang for alternative strategies to secure China's energy supplies is a Sino-Myanmar oil pipeline. According to the proposal, the Sino-Myanmar pipeline will start from Myanmar's western deep-water port of Sittwe and end at Kunming, the capital of Yunnan province in southwest China. (Phar, 2004) Plans were initiated last 11 July when Chinese Premier Wen Jiabao and Myanmar Prime Minister Khin Nyunt met in Beijing. The pipeline is said to reduce the oil route by 1,820 nautical miles¹⁰ and since demand for tankers is in tonne-miles, the additional tonnage required for the strategic oil reserves might be offset by the decrease in miles traveled. Furthermore, if the Sino-Myanmar pipeline works out well, crude oil shipments to Japan, South Korea, and the Philippines might be diverted away from the Straits (Phar, 2004). This will have a great impact in the tanker market as average haul decreases, especially if Japanese imports will not go through the Straits.

V. Conclusion

Though we have put a grave picture of the tanker freight market in the previous section, remember that we only analyzed the marginal impacts of the strategic oil reserves. Definitely,

⁹ Sixty-percent of China's oil imports passes through the Straits of Malacca (Phar, 2004)

¹⁰ The Arabian Gulf (AG)-East trade is shorter than the AG-West trade and developments with regards to the Straits will further decrease the AG-East trade route and hence might have an adverse impact in the tanker freight markets since average haul will decrease.

demand for tankers will increase in the near future due to the expansion of the Chinese economy and its appetite for crude oil and oil product imports. However, even though we analyzed marginal impacts, the whole strategic oil reserves program is not solely about stockpiling and importing additional oil temporarily. The strategic oil reserves program, as the name implies, is part of a wider energy security policy framework. Though marginal direct effects can be small, the indirect consequences of Chinese policy will definitely affect how things are currently done. Policies such as VLCC fleet-building, focus on pipelines, and the plan to bypass the Straits of Malacca can have large impacts on the tanker eastbound trade. It has been noted that most of Chinese energy-related policy adopts a “strategic” approach rather than a “market” approach (Andrews-Speed *et al.*, 2002), hence evaluation of Chinese policy should be done in light of strategic concerns rather than with plain economic rationality. Though some of the proposals with regards to the strategic oil reserves program might be deemed as uneconomical, it is better to keep in mind that these proposals might have more strategic basis which may outweigh economic issues in the eyes of China’s policy-makers.

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