

What Would \$120 Oil Mean for the Global Economy?

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Washington, D.C.
April 2006

The price of oil has been hovering in the range of \$60 to \$70 a barrel in recent months and there is evidence that these high prices are starting to dampen real disposable income growth. In the year ending in the fourth quarter of 2004, for example, real disposable income increased by a robust 4.1%. With oil prices rising throughout 2005, however, real disposable income growth was a bare 0.4% in the year ending in the fourth quarter of 2005. Higher oil prices also are contributing to the sharp deterioration of the U.S. trade balance—oil and petroleum products accounted for nearly one third of the country's \$726 billion trade deficit during 2005, up from about a quarter of a smaller deficit in 2004. And despite strong corporate profit growth in the past year, the Dow Jones Industrial Average was essentially unchanged in 2005. Historically, strong profit growth, as in 2005, has been accompanied by sizeable stock market gains, but higher oil prices appear to be a key reason for this weak and atypical stock market response.

From this starting point, this short analytical note is designed to give an overview of the broad economic effects of a scenario in which oil prices surge to \$120 a barrel due to coordinated terrorist attacks on global oil transportation infrastructure. It is not intended to be an exhaustive analysis. This scenario was the basis for a recent simulation exercise conducted by Securing America's Future Energy (SAFE) at the World Economic Forum Annual Meeting 2006 in Davos, Switzerland. Dr. Neil McMahon, a prominent oil analyst at Sanford C. Bernstein LLC, provided independent in-depth analysis on the price of crude oil based upon this scenario. In his analysis, the price of oil was somewhat volatile and climbed above \$120 a barrel at certain points, but for simplicity in this note, it is assumed that the oil price remains constant at \$120 for one year. The main conclusion of this note is that \$120 oil would have profound negative effects on the world economy and global financial markets. →

Effects of High Oil Prices on the World Economy

THERE ARE AT LEAST FOUR MAIN CHANNELS THROUGH WHICH HIGH OIL PRICES INFLUENCE AN ECONOMY

1. Demand Effects

Higher oil prices reduce the spending power of consumers and cause a reduction in demand for all of their spending categories. More spending to fill one's gasoline tank means that less income is available for movie tickets, furniture, or other items.

2. Supply Effects

Rising oil costs eat into companies' profit margins when they are not able to pass these costs on to their customers. This is especially true for firms in energy-intensive sectors, causing them to reduce services or cut production levels. For example, an airline facing a 100% increase in energy costs will be cash-squeezed and will cancel flights, lay off workers, and cancel orders for new planes.

3. Policy Effects

Although central bankers around the world pay more attention to "core inflation" than "headline inflation," higher oil prices will spark fears of a price-wage spiral, and will cause monetary authorities to tighten credit conditions. This, in turn, will weaken investment spending, housing, and sales of durable goods, like automobiles.

4. Effects on Confidence and Financial Market Psychology

Higher oil prices hurt both consumer confidence and investor confidence. As equity prices decline, household wealth declines and the economy is weakened. These effects will be especially strong when the cause is a major geopolitical event, such as a terrorist attack.

Most studies of the effects of higher oil prices on the world economy focus on demand effects, because these are most easily captured by traditional economic models. In this severe oil shock, however, it is likely that supply effects and effects on consumer confidence will be the dominant forces in the first 3-6 months after the attacks. Unlike periods when oil prices jump by \$10 or \$20 a barrel, a spiking of prices to \$120 will lead to substantial non-linear responses by consumers and producers

around the world and will cause disruptions in normal economic activity. Some factories will simply shut down. Some companies will cancel corporate travel. And many families will put off vacations that require long-distance travel. Layoffs in key industries will spread to the rest of the economy. This is consistent with research that finds sudden oil price increases have more negative economic effects than gradual shifts in prices over many months or quarters.¹

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THE CURRENT OIL PICTURE

- The U.S. is the world's largest consumer of oil. It accounts for 25% of global daily consumption, but holds less than 3% of the world's proved oil reserves. The Middle East, by contrast, holds more than 61% of the world's proved oil reserves.¹
- Oil production in the U.S. has been in gradual decline since 1970 and this decline is projected to continue.² At the same time, oil imports have increased steadily and now account for 58% of total U.S. consumption. This trend is also expected to continue.
- The current production system is under considerable strain and has virtually no spare capacity to quickly increase output in the event of a supply disruption.³
- U.S. and world demand for oil are expected to increase substantially over the next 20 years. Demand in the U.S. is expected to grow by 24%—from 21 million barrels per day (MBD) to 26 MBD—between 2004 and 2025. Total world demand is projected to increase even more substantially, by more than 34%—from 82 MBD to 110 MBD—over the same period.⁴
- Demand growth is likely to be especially strong in developing countries, notably China and India. This growth has already affected world oil markets, where the price per barrel more than doubled between 2003 and 2005 (prior to Hurricanes Katrina and Rita).
- The world will increasingly rely on unstable, undemocratic regions to supply the oil needed to meet future demand. In contrast to projections of slightly reduced output in industrialized nations, OPEC production is expected to increase from 30 MBD to 40 MBD (a 34% increase) and production in Russia and the former Soviet Union is expected to increase from less than 12 MBD to more than 17 MBD (a 49% increase) between 2004 and 2025.⁵
- The U.S. economy is in a better position to weather oil price shocks than in the past because it is less "oil intensive." The U.S. uses half as much oil to produce the same amount of GDP as it did in the 1970s. The rate of decline in oil use relative to the economy, however, has slowed in recent years as vehicle fuel efficiency has stagnated.⁶
- Despite past progress, oil still plays a significant role in the U.S. and world economy. The U.S. transportation sector relies on oil for 97 percent of its energy needs and accounts for 68 percent of total U.S. oil demand.⁷ Because the transportation sector remains nearly wholly dependent on oil, consumers cannot quickly reduce consumption in response to higher prices.

¹ See for example, Hilliard G. Huntington, "The Economic Consequences of Higher Crude Oil Prices," Energy Modeling Forum, Stanford University, October 3, 2005

¹ BP p.l.c., "BP Statistical Review of World Energy June 2005," pages 4 and 9

² Department of Energy, Energy Information Administration, "Annual Energy Outlook 2006," Year-by-Year Reference Case Tables, Table 11: Petroleum Supply and Disposition Balance, available online at http://www.eia.doe.gov/oiaf/aeo/pdf/aeotab_11.pdf

³ Ibid., page 2 of full report (DOE/EIA-0383)

⁴ Ibid., page 163

⁵ Ibid., page 162

⁶ The National Commission on Energy Policy, "Ending the Energy Stalemate, A Bipartisan Strategy to Meet America's Energy Challenges" (December 2004), page 3, Figure 1-2

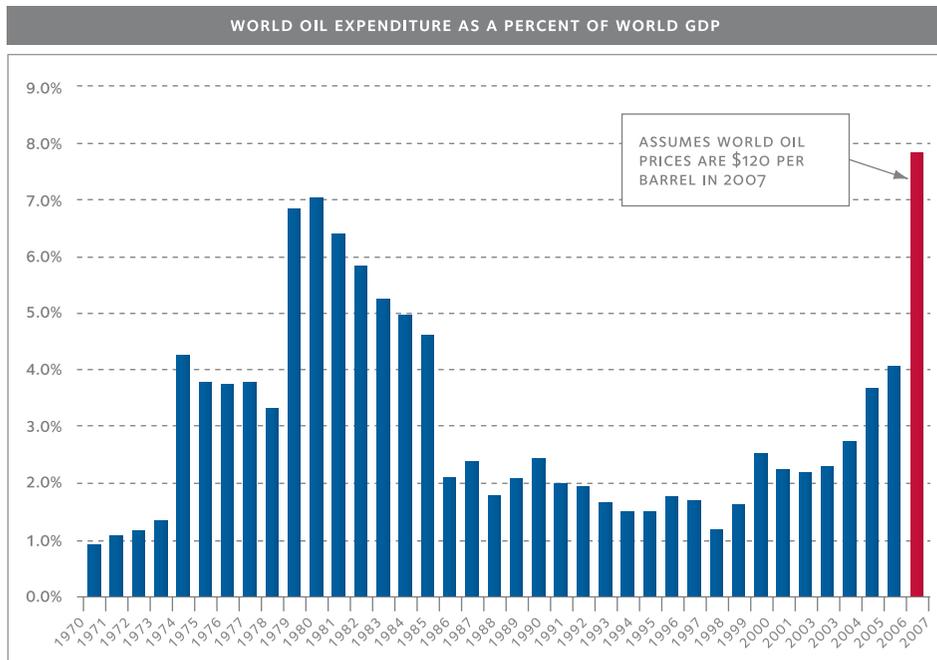
⁷ Department of Energy, Energy Information Administration, "Annual Energy Review 2004" (DOE/EIA-0384), pages 42 and 154

1. Demand Effects



The following chart shows total world expenditures on oil as a share of total world GDP. Historically, these expenditures (the world's "oil bill") have been in the range of 1-3% of GDP. When they have been 4% or more, global recessions have occurred (1974-75, for example). And when they have been 7% (1980-82, for

example), the result has been a severe global recession. In fact, 1980-82 were the worst three years back-to-back for the global economy since the Great Depression years of 1933-35. With oil at \$120 a barrel for a full year, the world's oil bill will be about 8% of world GDP.



For the U.S. economy, the world's largest, each \$10 increase in oil prices reduces household spending power by about \$35 billion, or about 0.4%. Therefore, a \$60 increase in oil prices (from \$60 to \$120 a barrel) will impose an extra \$210 billion cost on U.S. households virtually overnight.¹ Even in the large \$13 trillion U.S. economy, a consumer-led recession will likely result from this impact alone.

The median U.S. family income is about \$40,000 a year. In 2003, the median family spent about \$1,900 (or about 4.8% of its income) on gasoline and natural gas/heating oil.² In the winter of 2006, with oil prices averaging \$60 a barrel, these expenditures will increase by

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roughly 50% to nearly \$3,000 a year (or about 6-7% of median family income). Given that the average household saving rate in the U.S. is negative, even middle income families have remarkably little capacity to "dig into savings" to sustain their consumer spending. With oil jumping to \$120 a barrel, household energy bills will roughly double to about \$6,000 a year, or about 15% of total annual income for the median family. Most families will have little choice but to sharply curtail other spending. This same pattern will be mimicked around the world. Although absolute energy use is lower in other advanced countries than it is in the

U.S., income levels are also lower, so the fraction of median family budgets devoted to energy in most countries will roughly double to 10-15% as well.

Recent analysis by the Research Department at the International Monetary Fund finds that a permanent \$5 a barrel increase in oil prices would decrease global GDP by up to 0.3 of a percentage point.³ This means that a \$60 increase in oil prices, from \$60 to \$120, would cut the level of world GDP by up to 3.6 percentage points. Similarly, the U.S. Federal Reserve estimates that a \$20 a barrel increase in oil prices reduces U.S. GDP by about 0.75 of a percentage point, suggesting that a \$60 increase would lower GDP by 2.3 percentage points.⁴ World GDP growth in the past 30 years has averaged 3.5% and when growth slows to just 1% to 2%, a global recession is considered to have occurred. Therefore, a reduction in world GDP of 2.3% to 3.6% due to \$120 oil will likely represent the onset of a global recession.

¹ This estimate assumes no change in demand in the short run, or an elasticity of zero. Most estimates of elasticity of demand for oil in the short run are very low (0.1 or so).

² Data are from the U.S. Bureau of Labor Statistics' Consumer Expenditure Survey, 2003 report (available at <http://stats.bls.gov/cex/csxanno03.pdf>) and 2004 tables (available at <http://stats.bls.gov/cex/2004/standard/multiyr.pdf>). First quarter 2006 estimates were obtained by applying the 2004 to present change in prices of fuels (from the U.S. Dept. of Energy's Energy Information Agency) to 2004 fuel expenditure figures. Household income for a middle quintile household was assumed to grow at the same rate as wage and salary disbursements (from the Bureau of Economic Analysis)

³ See "International Monetary Fund, World Economic Outlook", April 2005, p.9

⁴ See October 15, 2004 speech by Fed Chairman Alan Greenspan to the National Italian-American Foundation, [www. http://federalreserve.gov/boarddocs/speeches/2004/20041015/default.htm](http://federalreserve.gov/boarddocs/speeches/2004/20041015/default.htm)

2. Supply Effects



On top of the debilitating effects on demand, economy-wide supply disruptions will be severe with oil at \$120 a barrel. At this price, gasoline will cost about \$5 a gallon in the U.S. and \$8-9 a gallon in Europe.

→ Demand for SUVs and light trucks—which combined currently account for about two-thirds of some U.S. automobile companies' total sales—will drop sharply. Already with gasoline at around \$2.35 a gallon in the U.S., sales of some large SUVs have declined by 50% or more, for example.¹ Because some companies have oriented their production plans around large vehicles, they have little flexibility to shift production to smaller, more fuel-efficient vehicles in the short run. Although they will lower prices of large vehicles to try to maintain production, financial losses on each vehicle will soon require production cutbacks, and the companies will lay off tens of thousands of workers. Even if companies that make mainly smaller cars ramp up production in their facilities and provide a partial offset, these vehicles have lower selling prices and will result in lower consumer spending. The net result will be a sharp reduction in global automobile-sector employment.

→ Global airlines are presently under extreme financial pressure with the current level of fuel prices. The total combined expenses for all U.S. air carriers (both domestic and international routes) are about \$125 billion a year.² With oil currently at \$60 a barrel, jet fuel costs U.S. air carriers approximately \$30 billion a year, or about one-quarter of total expenses. With oil at \$120 a barrel, jet fuel will represent about one-half of total expenses (assuming no reduction in demand). Even if airlines were to impose fuel surcharges, they are still likely to cancel routes, lay off workers, cancel orders for new airplanes, or enter bankruptcy.

→ The travel and tourism industry (including airlines, cruises, rail, restaurants, hotels, entertainment, etc.), which accounts for more than 10% of world GDP, will be especially hard hit.³ Faced with sharply higher fuel surcharges for airlines, many corporate trips will be rescheduled as video conferences and many pleasure trips will be canceled. The result will be a sharp reduction in revenues for travel and tourism businesses, and potential bankruptcies for many hotel chains, cruise lines, and other tourism firms.

→ Transportation companies (trucking firms, package delivery firms, local delivery firms, etc.) will begin to cancel services, scale back promised delivery schedules, and many firms would simply declare bankruptcy.

→ Chemical companies, locked into fixed price output contracts, will find their profits squeezed and many will suspend operations.

→ Thousands of businesses in many sectors of the economy will declare “force majeure” and break contracts. There will be massive waves of legal suits and a surge in bankruptcies.

→ Layoffs in these vulnerable industries will spread throughout the economy because of traditional economic multiplier effects.

¹ See, for example, “SUV Sales Down Sharply; GM, Ford to Shift Production to Cars,” Washington Post, Sholnn Freeman, December 2, 2005, Page D01

² Data for this analysis from “Aerospace Facts and Figures 2004/2005” from the Aerospace Industries Association, at http://www.aia-aerospace.org/stats/facts_figures/ff_04_05/facts_figures0405.cfm

³ See estimate from World Travel and Tourism Council, <http://www.wttc.org/2005tsa/pdf/World.pdf>

3. Policy Effects



Monetary authorities around the world are charged with the responsibility of maintaining price stability. With inflation likely to rise from its levels of 2-3% today to 6-8% in this scenario, monetary authorities will worry about a price-wage spiral, and will therefore tighten monetary policy by raising interest rates to fight this pressure. There will be complicated policy debates, however, because as a result, global economic growth rates will tumble, and after a lag, policymakers may decide to ease credit conditions.

Meanwhile, with oil at \$120 a barrel, government budgets will be pinched by the effects of sharply higher energy costs (affecting post office fleets, military expenses, police vehicles, and the heating of public schools and government office buildings, etc.) Many local, regional, and national governments will impose income or property tax surcharges to help cover the impact of higher energy costs. These resulting higher taxes will work to reduce consumer spending and will ultimately weaken overall economic growth.

Developing countries that are dependent on energy imports will find their budgets especially hard squeezed. Many countries will be forced to choose between importing fuel to keep their economies going and making international debt repayments. The result will be widespread balance of payments problems. Halted payments to international lenders will cause financial distress and hurt both the credit-worthiness of developing countries and the financial health of large international financial institutions. Given the financial stresses caused by sharply higher inflation, rising interest rates, and reduced ability of borrowers to repay

loans, some hedge funds will go under and may create systemic problems.

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4. Effects on Confidence and Financial Market Psychology



Major geopolitical crises, such as the terrorist attacks envisioned in this scenario, historically have had clear negative effects on financial markets. Typically, stock markets tumble and interest rates rise as bond market participants worry that spiking oil prices will boost inflation. Although the “energy intensity” of the U.S. economy (the amount of energy needed to produce \$1 of GDP) is lower than in the 1970s, stock market capitalization (as compared with GDP) is much higher now. Since economists find statistical evidence that consumers spend about 3-5% of their stock market wealth

each year, this means that large shifts in financial markets can have important consequences for the economy through this financial channel.¹

→ In the weeks after Iraq invaded Kuwait in August 1990, the Standard & Poors 500 index fell by nearly 15% and the yield on the 10-year U.S. Treasury bond rose by about 70 basis points.

→ After the 9/11 attacks, the Dow Jones Industrial Average fell by about 15%, temporarily wiping out nearly \$3 trillion in wealth in the U.S. alone. These

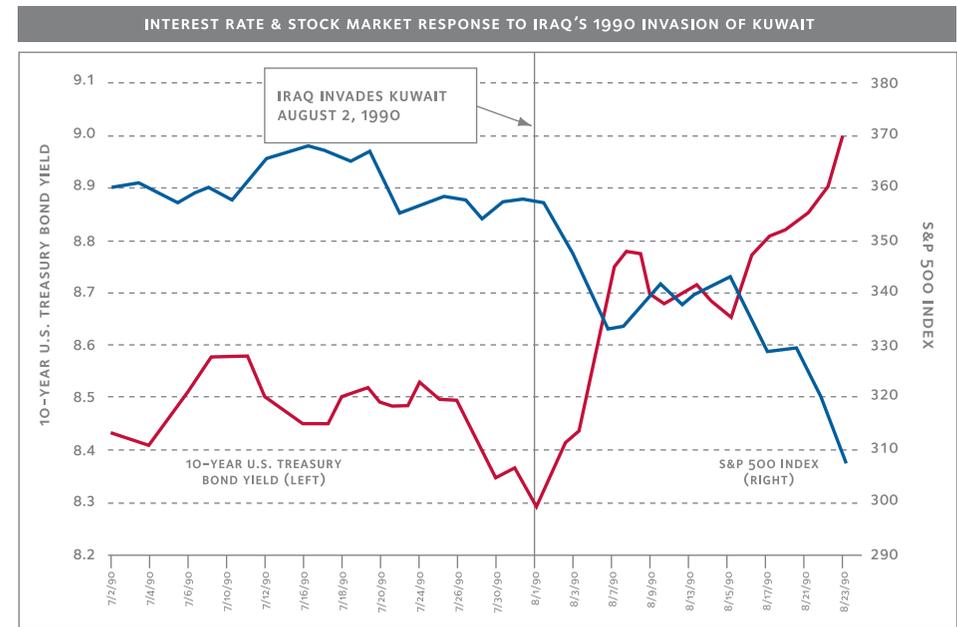
attacks destroyed two major office buildings, but did not undermine world energy supplies.

→ The more severe event envisioned in the scenario designed by SAFE for the World Economic Forum will likely cause a 25% decline in global stock market valuations, temporarily reducing global equity wealth by about \$10 trillion (from about \$40 trillion today to about \$30 trillion). Assuming a 4% wealth effect, this will reduce global consumer spending by roughly \$400 billion.

→ This negative wealth effect would be nearly as bad for consumer spending as the direct negative demand effect of higher energy bills. That is, it could nearly double the negative impact.

Policymakers will pay particular attention to these financial market effects. The Federal Reserve, the European Central Bank, the Bank of Japan, other central banks, and G-7 finance ministers will try to issue coordinated confidence-boosting statements and reassure financial markets that they will prevent institutions from failing. However, given the severity of the shock, it is unlikely that they will be able to significantly mitigate the pessimism that will permeate the financial markets.

¹ See for example, Karen E. Dynan and Dean M. Maki, “Does Stock Market Wealth Matter for Consumption?” in the Federal Reserve Finance and Economics Discussion Series, May 23, 2001.



SUMMARY

If oil increased to \$120 a barrel and stayed there for a year because of coordinated terrorist attacks on oil facilities, the world's oil bill would be about 8% of world GDP (even assuming some reduction in the quantity of oil demanded)—higher than at any time in modern history. Such oil prices would almost certainly precipitate a global recession. In addition to negative demand effects, there would be large negative supply side effects, policy

effects, and confidence effects. Meanwhile, financial markets would likely judge these attacks on global energy supplies more seriously than Iraq's 1990 invasion of Kuwait or the 9/11 attacks, because of their continuing disruptive effects. Stock market valuations would likely fall more than they did after the Kuwait invasion or after 9/11. Given the negative confidence effects and negative supply effects, the global recession would likely be severe.

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