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## Rising Oil Prices: What Dangers Do They Pose for the Economy?

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# Rising Oil Prices: What Dangers Do They Pose for the Economy?

## Summary

The sharp rise in oil prices beginning in March 1999 reflects two factors: rising world oil demand and the Organization of Petroleum Exporting Countries' (OPEC's) successful restriction of supply. The most helpful way to consider the current situation may be to think of this year's price rise as partly a return to the average price range of the past caused by a revival in world demand and partly an increase above that range caused by OPEC's restriction of supply. The rise in world demand is mostly attributable to stronger economic growth, most notably the recovery in East Asia from the economic crisis of 1997 that drove oil prices to their lowest real price in thirty years. Restrictions in supply can be very effective at raising prices because it is so difficult to substitute away from oil consumption in the short run. But in the past OPEC has had little success in sustaining price increases in the long run. As more and more OPEC members exceed their production agreements, non-OPEC producers increase production, and consumers substitute away from oil, the price of oil has fallen.

What danger does the oil price rise pose for the US economy? Since both the high world demand and OPEC's restriction of supply have little to do with the American economy, they can be thought of as a textbook example of a "supply shock" to the American economy. The theoretical effects of this "supply shock" closely resemble events in past oil shocks: a simultaneous rise in inflation and a decrease in output in the short run, popularly known as stagflation. Since a policymaker can respond by tackling one problem only at the expense of the other, supply shocks pose a troublesome policy dilemma. If the Federal Reserve or Congress responds to the oil shock by employing expansionary monetary or fiscal policy, respectively, then they will counteract the decrease in output but aggravate inflation. Neutral policy would ease inflationary pressures eventually but prolong the economic downturn.

However, there is good reason to think that the effects on the US economy will be much milder in this case than they were in the past. First, once the portion of the price rise that is a return to the average range is omitted, the remaining price rise is not that large. Second, the US economy is less reliant on oil today than it was at the time of the first two oil shocks. Finally, there are structural differences in the oil market that may make OPEC's attempts to manipulate prices more difficult.

Economic growth was very strong in the United States through the first half of 2000. There are signs that economic growth may now be slowing, although it is still positive. At the same time, countering the purported slowdown with expansionary fiscal or monetary policy is difficult because the inflation rate has remained above 3.0%. While the oil price increase has had little negative effect in the aggregate economy prior to the third quarter of 2000, it is likely that it is contributing to both higher inflation and slower growth. It may be that domestic firms shrugged off the price increase at first, but eventually the pressure on profits and efficiency became too great to ignore. Some consider the recent turmoil in U.S. stock markets as evidence of this theory. This paper will be updated as events warrant.

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# Rising Oil Prices: What Dangers Do They Pose for the Economy?

Since February 1999, the price of oil has risen from \$10/barrel to as high as \$34/barrel. This spike in prices is similar to the near tripling of prices in the second oil shock (1979-1980), and nearly as great as the quadrupling of prices in the first oil shock (1973-1974).<sup>1</sup> As shown in Figure 1, in nominal prices, it may appear that oil this year has far surpassed prices seen in the first oil shock, and appeared to be headed for the price regions reached only during the second oil shock. But this measure is highly misleading on two counts. First, a meaningful comparison is only possible if prices are adjusted for inflation. Second, like most commodities, the price of oil fluctuates widely from day to day, and to focus on the market price on any given day could overstate its importance to the macroeconomy. Figure 2 corrects for both of these shortcomings by plotting the yearly average of the real price in 2000 constant dollars. As a result, Figure 2 paints a very different picture. It reveals that while average real prices this year are slightly higher than they were during the first oil shock, they are not even half the price seen during the second oil shock. Furthermore, the average price in 2000, about \$28/barrel, falls far short of the \$34/barrel seen for a short time this year.

To judge the likely macroeconomic consequences of the price spike, it is necessary to also consider the historical context of the price spike. In this sense, there are reasons to think that the consequences of this year's price increase will not be as serious as the shocks of 1973 and 1979. In the first oil shock, oil prices leaped quickly and unexpectedly from what had been a steady base for a few decades. The 1979 price shock took place before the economy had fully recovered from the 1973 shock. By contrast, the increase in prices in 2000 followed a decline in 1998 that left the oil price in real terms at its lowest annual average level in decades.<sup>2</sup> Clearly, the economy was capable of comfortably accommodating a higher price than the 1998 price.

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<sup>1</sup> The term "spike" will be used in association with the recent price rise to connote a sharp rise in prices, rather than the term "shock," which connotes broader economic effects as seen in 1973-1974 and 1979-1980.

<sup>2</sup> This happened for reasons discussed in the demand section of the paper.

Figure 1

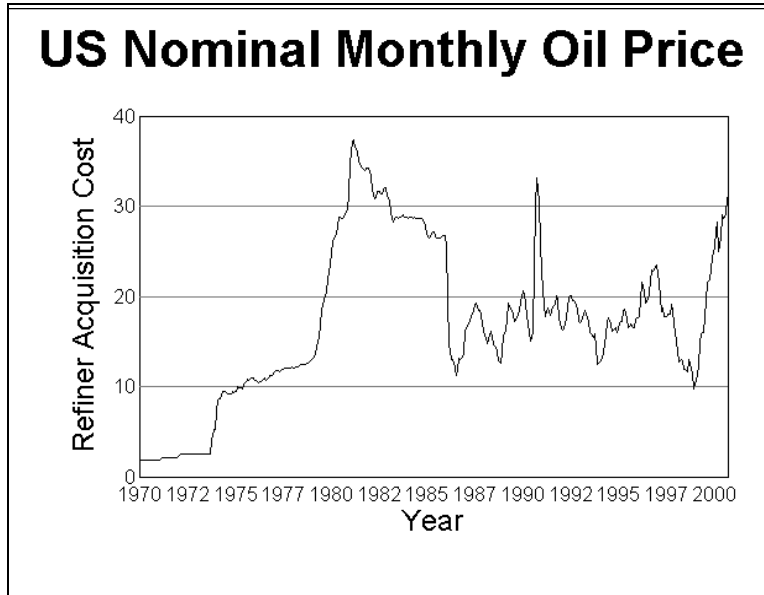
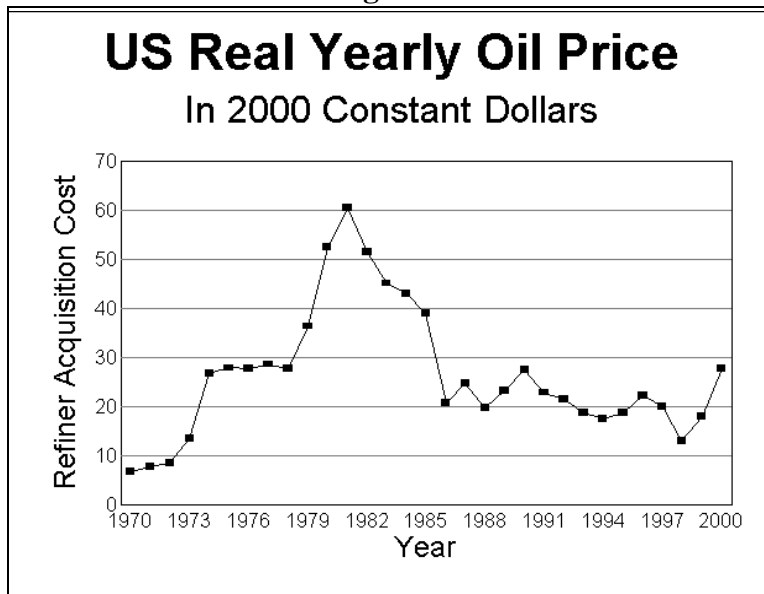


Figure 2



Note: Figures 1 & 2 plot the Composite Refiner Acquisition Cost.

2000 prices are average through September.

Source: Energy Information Administration

## What Is Currently Driving Oil Prices so High?

Oil prices have been driven upwards by a combination of two factors. On the supply side, they are being driven up by OPEC's success in cutting production. On the demand side, they are being driven up by a recovery in world demand, notably in East Asia as that region recovers from the economic crisis of 1997. Excluding the second oil shock, oil prices have been moving around an average range of about \$20-25/barrel in today's prices for the past 25 years, as can be seen in Figure 2. When removing the short term fluctuation that oil prices exhibit, demand and supply seem to have grown in step with the result that the equilibrium price has differed modestly over the long term. When oil prices fell to \$10/barrel in 1998, they fell far below that range. From that point, prices rose steadily until they climbed above the average range in 1999-2000. This section discusses why this has happened.

### The Supply Side

**The Role of OPEC.** Evidence suggests that the recent success of OPEC in restricting the supply of oil that they control is the proximate force that has driven oil prices above their trend value. Since oil is sold in the marketplace, the only way that OPEC can increase the price of oil is by making it scarcer, in other words decreasing the supply. With less oil available on the market, the oil market will regain equilibrium only when buyers bid up the price to a higher level.

OPEC restricts supply by assigning each member a quota instructing them how much less oil they should produce from their present level. The quotas are determined by negotiation among OPEC members. Beginning in the second quarter of 1999, OPEC changed the target value that production would be decreased from 2.6 million barrels a day (mbd) to 4.3 mbd. More importantly, the actual decrease that they achieved more than doubled from 1998 to the present. In 1998, actual cutbacks ranged from 0.7-1.9 mbd, and since the second quarter of 1999 they have ranged from 3.2-3.9 mbd.<sup>3</sup>

**Problems with Cartels.** The difference in actual cutbacks and cutback targets immediately points to the pitfall that OPEC has faced since its inception: the incentive to violate production agreements. It is in the interest of all OPEC members to reach an agreement where they all simultaneously cut production. By doing so, the revenue gained from rising oil prices more than offsets the revenue lost by decreased oil production. This is because it is nearly impossible to significantly reduce the consumption of oil or substitute another good in its place quickly.<sup>4</sup> As a result, oil consumption falls by a relatively small amount in response to price rises in the short run.<sup>5</sup> Thus, successful

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<sup>3</sup> Organization for Economic Cooperation and Development, *OECD Economic Outlook*, May 2000, p.25.

<sup>4</sup> It is not just essential for driving one's car and heating one's house, but it is essential in the production and distribution of most any good.

<sup>5</sup> In the jargon of the economist, the demand for oil is highly inelastic in the short run. It is the inelasticity of oil demand that also explains why a small change in supply can feed through to large price changes so rapidly.

attempts to raise the price through collusion to restrict output can generate great increases in revenue for OPEC.

But while having everyone agree to restrict the production of oil increases the profits of OPEC members, having everyone else agree to restrict production while your OPEC country produces more than it agreed to increases your country's profits even further. Since everyone has the desire to produce more than their allotment as long as they are the only ones exceeding their target, there is strong incentive to violate the agreement and if this happens the collusion ends. Oil becomes more plentiful and oil prices fall, in some historical cases back to where they began. This was one factor that undermined OPEC's efforts for the better part of the 1980s-1990s. Since these are sovereign countries taking part in a voluntary agreement, it is difficult for OPEC to create an effective enforcement mechanism to prevent target violation.

**Differences in Recent Price Rise.** There are three things that have made OPEC so much more successful over the past year. First, the financial difficulties that OPEC faced when oil plunged to \$10 a barrel in 1998 focused the members on how necessary cooperation was to their well-being. In inflation-adjusted terms, the price of oil was lower than it had been since the early 1970s, and most OPEC countries found their budgets under strain as a result. Second, the growth in oil demand was conducive to price rises (see the next section). Third, Saudi Arabia wields the power to make or break most other OPEC members in the oil market, allowing it to work as an (imperfect) enforcer of the latest agreement. Saudi Arabia has a very low extraction cost. Furthermore, it is estimated that currently Saudi Arabia has a spare capacity of 3.0 mbd, which represents 60% of OPEC's spare capacity.<sup>6</sup> Thus, if the other members of OPEC exceed their production targets too egregiously, Saudi Arabia has the ability to "open the taps," which would cause the price to fall to a level where other countries would curtail high-cost production. While this would leave Saudi Arabia worse off than in a successfully binding agreement, it could make it better off than in a situation in which everyone violated the cutback agreement.

How much OPEC members exceed production appears to depend on how realistic they think the Saudis' threat to be. In the past, sometimes Saudi Arabia has been reluctant to punish and sometimes it has not. For example, in 1985 Saudi Arabia quit trying to prop up the price in the face of excess production by its OPEC allies and flooded the market. As a result, the price collapsed. In the past year, while rhetorically OPEC claims to be raising supply as a favor to the West, the supply rises have also legitimized deviation from the previous agreement. (See Table 1)

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<sup>6</sup> *OECD World Outlook*, Op. Cit., p.25

**Table 1: Recent OPEC Production Cutbacks**

	Cutback Target	Actual Cutback
1998	(mbd)	(mbd)
Second Quarter	1.3	0.7
Third Quarter	2.6	1.9
Fourth Quarter	2.6	1.7
1999		
First Quarter	2.6	1.6
Second Quarter	4.3	3.5
Third Quarter	4.3	3.9
Fourth Quarter	4.3	3.4
2000		
First Quarter	4.3	3.2

Source: *OECD Economic Outlook 67*, May 2000

Note: mbd=Million of Barrels per Day

## The Demand Side<sup>7</sup>

**World Demand.** The demand side of the world oil market led to the fall in prices in 1998, and it is the demand side that has helped make the price rise possible today. The nominal price of oil fell from a recent peak of \$25/barrel in 1997 to \$10/barrel in 1998 primarily because the demand for oil plunged in Asia during the regional economic crisis.<sup>8</sup> In 1998, Asian demand, which accounts for one quarter of world demand, fell by 2.3%. The crisis led to lower economic growth – and lower oil demand – throughout the world in 1998 than would have otherwise occurred.

With an economic recovery in most of Asia currently underway, Asian oil demand excluding Japan and China was estimated to increase by 2.5% and Chinese oil demand was estimated to increase by 6.9% in 2000. Oil demand grew in every region except Europe last year. Since the major regions of the world economy experienced fairly strong growth,<sup>9</sup> world demand for oil was estimated to increase 1.1% in 2000 – a healthy increase considering how high the price had risen – and is forecast to increase 2.6% next year. While energy efficiency and the shift to a service-based economy continue to moderate oil demand in the developed world, this is not the case in the developing world where the IEA forecasts growth in oil demand to be close to economic growth in 2001.

**US Demand.** With the economy very strong in the United States in 1999-2000, one might think that the rising price of oil is a symptom of inflationary pressures instead of a cause: in other words, a demand side instead of supply side phenomenon. In 1999, there

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<sup>7</sup> Figures cited in this section from International Energy Agency, *Monthly Oil Market Report*, December 2000, and Energy Information Administration, *Short Term Oil Outlook*, December 2000.

<sup>8</sup> For more information, see U.S. Library of Congress, Congressional Research Service, “The East Asian Currency Crisis:...”, Gail Makenin, CRS report 98-378 (Washington: April 1998).

<sup>9</sup> Japan is the major exception, and its demand for oil is projected to be roughly the same as in 1999.



was some evidence of this, as demand grew by 3.2%. However, the preliminary 2000 data do not suggest this to be the case. Despite the booming economy, oil demand growth was estimated to be less than 1% in the United States in 2000, and accounted for only 7% of the world demand growth. This implies that this oil price spike was very nearly “exogenous,” in other words caused by factors unrelated to the US economy. Since much of the recent economic growth in the United States has been attributed to increases in productivity, high growth may not translate into increased oil demand.<sup>10</sup>

## Factors That Push Oil Prices Down in the Long Run

**Role of Non-OPEC Producers and Changes in Demand.** For a little more than a year, OPEC producers have successfully maintained an atypically high oil price. But there are forces beyond their control working to push oil prices back down in the long run, as may have begun to happen in December 2000. As can be seen in Figures 3&4, OPEC and its allies control a little more than half of the oil supply, making their market power far from complete. Non-OPEC producers have a great incentive to raise production and undercut OPEC prices: they enjoy the benefits of maximizing production like OPEC members, but do not have to fear retribution since they never agreed to the OPEC cutbacks. As a result, high prices lead them to greatly expand their output, replacing the output withdrawn from the market by OPEC and driving the price back down.<sup>11</sup> Ironically, the higher the price rises, the less market power OPEC maintains because much of non-OPEC oil is profitable only at higher prices.<sup>12</sup> This is due to the costs of new exploration and increased drilling (because oil may be lost in the process.)

Historically, excess production within OPEC, higher non-OPEC production, and the ability of consumers to substitute away from oil in the long run have eventually caused prices to fall and all previous OPEC deals to collapse. *But the latter two factors take time: new oil cannot be found and brought on line quickly and consumption habits change slowly.* While the first two oil shocks proved that supply cuts are only effective in the presence of strong demand, it is not coincidental that both of the oil shocks ended when the recessions that followed reduced the demand for oil, driving its price back down. In the long term, the productive capacity of non-OPEC producers cannot be substantially increased without greater capital investment, which is a process that is time-consuming and fraught with the uncertainty that the price of oil may be unprofitably low

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<sup>10</sup> Economists typically divide economic growth into three parts: growth in labor, growth in capital, and total factor productivity. Total factor productivity is a measurement referring to how much output increases with the same amount of inputs, including oil. In recent years, the growth rate of total factor productivity has increased. Thus, if current economic growth is being driven by increases in total factor productivity, the US demand for oil need not increase rapidly along with the US economy.

<sup>11</sup> Output may be increased by methods such as adding wells in currently producing fields, which can be done quickly, or by exploring for new reserves, which takes longer.

<sup>12</sup> Middle Eastern oil is much cheaper to extract than most other oil sources, such as the North Sea, and all of the major Middle Eastern oil producers belong to OPEC (although Iraqi production is restrained far beneath its potential because of the ongoing situation with the U.N.) Hence, the amount of non-OPEC oil extracted increases (with a lag) greatly after oil price rises.

Figure 3

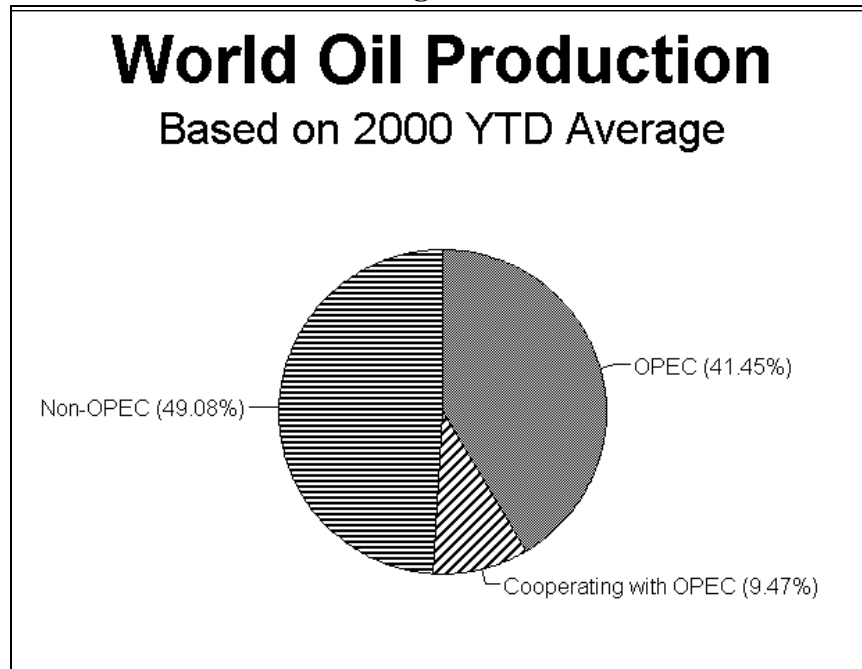


Table 2: World Oil Production

Country	Millions of Barrels a Day	% of Total World Production
Saudi Arabia	7.9	11.84
Iran	3.5	5.26
Iraq	2.4	3.61
Kuwait	2.0	2.99
Nigeria	2.0	3.06
UAE	2.2	3.38
Venezuela	2.8	4.23
Other OPEC	4.7	7.06
Mexico*	3.0	4.47
Norway*	3.3	5.01
United States	5.9	8.82
United Kingdom	2.7	4.09
Russia	6.2	9.40
Canada	2.0	2.99
China	3.2	4.83
Other Non-OPEC	12.6	18.95

Note: \*Cooperating with OPEC

Note: Currently Iraq's output is regulated by the United Nations.

Source: Production level based on 2000 average, *Monthly Energy Review*, Energy Information Administration, May 2000

by the time the investment is complete. Also, more investment is undertaken during times of high prices, so very little of it was being done in the years preceding the recent price spike. Data suggest that non-OPEC production began to significantly increase in late 2000.

The low prices of the past few years induced oil companies to keep very low inventories on hand. Experts believe that this also exacerbated the price spike because when supply was disrupted, inventories were not available to fill the short-term gap.<sup>13</sup> Another cause of the 1999-2000 oil price spike was capacity problems in related industries, such as refinery and the transport of oil (e.g., oil tankers.) These capacity problems should also be alleviated through new investment if the oil price remains high. But the fact that crude prices have fallen more than refined petroleum products in the U.S. suggests that these industries are still operating under capacity constraints.<sup>14</sup>

**Changes in the Oil Market Structure.** Another important change on the supply side of the oil market has been the shift to spot and futures markets that make price manipulation much more difficult.<sup>15</sup> In the past, a large portion of the supply of oil was priced contractually between exporting countries and major oil companies. This gave both parties great discretion in the setting of prices, with short-run market conditions only one of many factors that would lead them to agree upon any particular price level. As the prices were based on long-term contracts and dependent on mutual goodwill, adjustment of the price to market conditions would be gradual and unresponsive. Now that those arrangements have collapsed (in large part because of the stress that the second oil shock placed on the oil companies), price making has moved to the spot market, which functions much more like a perfectly competitive commodity market. This makes OPEC's ability to influence prices much more difficult as arbitrage between price differences is much easier. As oil expert Daniel Yergin explains,

“Once it had been Standard Oil that had set the price. Then it had been the Texas Railroad Commission ... Then it was OPEC. Now price was being established, every day, instantaneously, on the open market, in the interaction of the floor traders on the NYMEX with buyers and sellers glued to computer screens all over the world.”<sup>16</sup>

**Role of the Political Atmosphere.** The environment in which the current increase in oil prices has occurred differs from past oil shocks in one important aspect: there is no coinciding political conflict. The first oil shock of 1973-1974 was precipitated by the Arab-Israeli War, while the second shock of 1979-1980 was precipitated by the political upheaval in Iran, and followed by the outbreak of the Iran-Iraq War. During

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<sup>13</sup> Phillip Verleger, “Third Oil Shock. Real or Imaginary...?”, *International Economics Policy Briefs 00-4*, International Institute for Economics, April 2000.

<sup>14</sup> Stephen Brown, “Do Rising Oil Prices Threaten Economic Prosperity?” *Southwest Economy*, Federal Reserve Bank of Dallas, November 2000, p. 1.

<sup>15</sup> “Until the end of the 1970s, no more than 10% of internationally traded oil was to be found in spot markets...By the end of 1982...more than half of internationally traded crude oil was either in the spot market or sold at prices that were keyed to the spot market.”— Yergin, *ibid*, p.722.

<sup>16</sup> Yergin, *ibid*, p.726. NYMEX is an acronym for New York Mercantile Exchange, where many commodities are traded.

the turmoil in Iran, its production fell from 5.2 mbd in late 1978 to only 1.4 mbd in 1980, removing 6% of world production from the market. Indeed, the only other recession of the past three decades (1990-1991) coincided with the spike in oil prices caused by Iraq's seizure of Kuwait and the resultant Gulf War. Iraq's and Kuwait's combined oil production in 1991 was 1/8 its production in 1992.<sup>17</sup> In the sense that these three earlier output reduction decisions were based on political factors, they can be viewed as not strictly "voluntary." Changes in supply were being driven by external circumstances, not just by the ability of OPEC to collude. For instance, Kuwait's decision to decrease production in 1991 was clearly influenced more by the conflict with Iraq than profit-motivated negotiations with OPEC. This casts doubts upon how successful OPEC can be in maintaining the current agreement in the long run.<sup>18</sup>

### **How are Supply and Demand Playing Out in the Current Context?**

When viewing the oil market in light of the current price spike, it is important to remember what has happened to the oil price further back than just one year ago. In 1997, nominal oil prices were \$25/barrel at their recent peak, so it was only the extraordinary economic crisis in Asia that caused nominal oil prices to fall to \$10/barrel originally. Compared to the 1997 price, OPEC has successfully caused the price to rise, but not by nearly so dramatic an amount as the threefold increase of the last year would suggest. If the world economy continues to grow healthily, there is no reason to believe that oil would reach \$10/barrel again, even if the current OPEC agreement to restrict production collapsed. Thus, it appears that a good portion of the increase from \$10/barrel should be attributed to recovering world demand for oil, but some portion of the increase is attributable to successful restriction of oil supplies by OPEC. Before the Asian crisis, the average historical price range for oil (in today's dollars) appeared to be \$20-25/barrel. As the average price per barrel this year appears to be in the mid- to high-twenties, which is much lower than the peak of \$34, it is reasonable to infer that OPEC production cuts have successfully raised the price above its trend value.

In recent statements, it appears that some OPEC members are in favor of increasing oil production to lower the price below \$30/barrel. Saudi Arabia has stated that it believes a sustained price above \$25 is against its interests because of the threats a higher price poses to the world economy.<sup>19</sup> The aftermath of the first two oil shocks has convinced Saudi Arabia that a price so high that it is destabilizing to the world economy will lead to lower aggregate profits in the long run. Officially, OPEC production has increased significantly in recent months for this reason. The oil market has proven, historically, to be an unstable one. Demand may decrease more than supply as consumers modify their behavior, and it would not surprise many industry veterans to see the oil price overshoot

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<sup>17</sup> Data Source: Energy Information Administration, *Monthly Energy Review*, June 2000.

<sup>18</sup> Interestingly, OPEC did not set explicit prices and production quotas during either of the two oil shocks. The first year that they did this was 1982, and it was insufficient to prevent the price from plummeting. Source: Daniel Yergin, *The Prize*, Simon and Schuster, 1992, p.719.

<sup>19</sup> Bhushan Bahree, "OPEC Endorses Boost in Oil Production," *Wall Street Journal*, July 18, 2000, p.A2.

in the opposite direction in the next couple of years. As a result, OPEC may attempt to reverse the 2000 supply increases early this year.

## How Oil Shocks of the Past Have Affected an Economy

Economists describe a rise in the price of oil resulting from factors outside of the American economy as a shock to the supply side of the economy. As explained in the previous section, the current oil spike seems to be driven by a combination of OPEC's restriction of supply and the increase in world oil demand, especially in East Asia. While these two causes are very different in nature, they enter the US economy through the oil price in the same way.<sup>20</sup>

**The Supply Shock Model.** The “supply side” represents the productive capabilities of an economy, in other words how many workers, machines, resources, and knowledge the economy possesses. Since oil is a major input in the production of most goods, particularly in the transportation of goods, a rise in the price of oil raises the cost of production for producers. What makes a supply shock so difficult for policymakers to respond to is the fact that it *reduces economic output and raises the price level in the short run*, holding all else equal.<sup>21</sup> If prices were perfectly flexible, producers could lower their other input prices (such as wages), leaving aggregate output and the aggregate price level the same.<sup>22</sup> There would be no reduction in output or increase in the price level in the short run.

But if we live in a world of sticky prices,<sup>23</sup> as common observation suggests we do, then producers cannot lower their other input prices quickly, and so must pass part of the price rise on to consumers. As a result, output falls as people are willing to buy fewer goods at this higher price. Since the price of labor is now too (relatively) high to be compatible with the higher oil price, employers must lay off some of their workers. With fewer workers employed, less output can be produced. In effect, the rise in the price of oil and the inability of other prices to adjust temporarily reduce the amount of output that the economy can produce. Since producers had to pass part of the oil price rise on to

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<sup>20</sup> For the sake of analytical simplicity, it will be assumed that the causes do not feed through to other parts of the United States economy differently. For example, it will be assumed that the OPEC demand for American imports does not differ from the East Asian demand for American imports.

<sup>21</sup> *Ceteris paribus*, or holding all else equal, is a basic concept in economic analysis. As will be discussed later in the paper, the fact that we did not experience a sharp decline in output as oil prices rose in 1999-2000 is because “all else” was not equal in the economy. But recognizing this fact does not mean that the economy has not been affected by the latest oil price rise.

<sup>22</sup> In this scenario, there would be distributional effects, notably the transfer of wealth to oil providers, but the overall output and price level would be the same. The only difference is that some individuals would be better off and some individuals would be worse off.

<sup>23</sup> Wage contracts, publication subscriptions, and items from catalogs, are three examples of prices that are believed to be particularly sticky.

consumers by raising the price of their goods, the general price level rises as well.<sup>24</sup> When prices adjust in the long run, as economists argue that they will, the decline in output will end: the supply shock causes no real long-run change in the economy's productive capabilities, merely a reallocation of resources that makes some individuals better off and some worse off.<sup>25</sup> For example, income will have shifted from consumers to oil producers.

**Historical Effect on Aggregate Demand.** What is not captured in the theoretical framework above is the role that overreaction played in the first two oil shocks. The shortages and political uncertainty prevalent in the first two shocks may have caused an overreaction that affected the real economy in ways that go beyond the simple model. First, since consumer confidence is an important determinant of aggregate demand, an overreaction may have reduced aggregate demand in the short run, thereby aggravating the decline in output caused by the supply shock. Second, overreaction may have led to individuals and businesses using resources in inefficient activities such as hoarding and queuing, which could reduce their productivity, and thus aggregate output.

**Oil Shock's Effect on the Terms of Trade and Current Account.** In the case of oil, there is also a worsening in the terms of trade that exacerbates the supply shock effect. Because a majority of our oil is imported, when the price of oil rises, we must trade more of our goods to receive the same amount of oil. In effect, the national income available to Americans has declined, and in the long run the growth path would start from a lower base if the terms of trade did not improve. The worsening of the terms of trade may also cause a worsening in the current account balance of the US international balance of payments, which measures the difference between the cost of exports and imports. Since the US is a net importer of oil, and consumers cannot easily substitute away from it, if oil costs more, the current account will likely worsen as our import bill rises. A worsening of the current account will slow the growth rate of aggregate demand, all else equal. However, the negative effects of a worsening of the current account on aggregate demand is partially offset by the fact that oil producing countries must now hold U.S. assets, increasing investment in the U.S. economy. It is also partially offset by the increased demand that the (now wealthier) oil producing countries will have for U.S. exports.

If the dollar depreciated, as it normally would when the terms of trade worsen, the current account might not worsen as much since fewer foreign imports might be bought since they were relatively pricier and more US exports might be sold since they were relatively cheaper. However, in the case of an oil price rise, the dollar might depreciate less in the short run as oil markets operate using the US dollar and some oil countries maintain a fixed exchange rate with the dollar. This may cause the current account to

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<sup>24</sup> Mainstream economic theory views sustainable inflation as the outcome of continually loose monetary policy. However, if prices are sticky in the short run, then a rise in the price of oil can temporarily cause all prices to rise. However, this rise cannot be sustained in the long run unless monetary policy is loosened. Without a loosening, prices will adjust in the long run and return to the old price level, with the price of oil relatively higher and other prices relatively lower.

<sup>25</sup> Some economists have theorized that the costliness of this reallocation of resources is the characteristic of an oil shock that has the greatest impact on the economy, rather than the price adjustment problem.

adjust more slowly as well. The advantage of the exchange rate being unable to adjust in response to an oil shock is the fact that a depreciating dollar would worsen the terms of trade effect. Since 1999, the exchange rate value of the dollar has remained relatively constant.

**Policy Responses.** Most recessions are caused by declines in demand and are characterized by falling output and falling prices in the short run. This makes them comparatively easy for policymakers to counteract using expansionary policy: government spending can be increased, taxes can be cut, and/or interest rates can be lowered through monetary policy to raise output back to full employment without sparking inflation.<sup>26</sup> On the other hand, if any of these three policy options is pursued in the case of a supply shock then *output will rise but prices will rise even farther*. Thus, a policymaker is left with two unpalatable choices. One choice is to use expansionary policy to end the recession more quickly but drive prices higher. The other choice is to maintain a neutral policy stance, or use contractionary policy, which would prolong the recession but allow the temporary price rise to reverse itself.<sup>27</sup> During the first oil shock policymakers chose the first option – lowering nominal interest rates by half between the outset of the oil shock and two years later – and the result was high inflation for the next decade, reaching 9.4% annually at its peak. During the second oil shock, the Fed eventually responded by tightening monetary policy – nearly doubling nominal interest rates from September 1980 to June 1981 – initiating the worst recession (1982) in the post war period and eventually bringing the inflation rate down to low levels.<sup>28</sup> (See Figures 5 & 6)

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<sup>26</sup> This occurs because weak demand makes producers unable to sell all of their goods. They respond by cutting the prices of their goods. As a result, demand-driven recessions take place in the context of falling prices, and expansionary policy will not be inflationary, all other things being equal. In the context of supply-driven recessions such as an oil shock, prices are already rising and expansionary policy will be inflationary.

<sup>27</sup> Had the oil price rise been a symptom of excess aggregate demand in the United States, instead of an external circumstances as the evidence suggests, then the economic scenario would be the reverse of a demand-driven recession: prices and output would be simultaneously rising. In this case, a policymaker's response would be simpler than in the case of an external price shock: contractionary fiscal and/or monetary policy would move the economy back towards full employment and a stable price level.

<sup>28</sup> In both cases, inflation probably would have been lower and more manageable if the price shocks had not occurred in an atmosphere of already accelerating inflation.

Figure 4

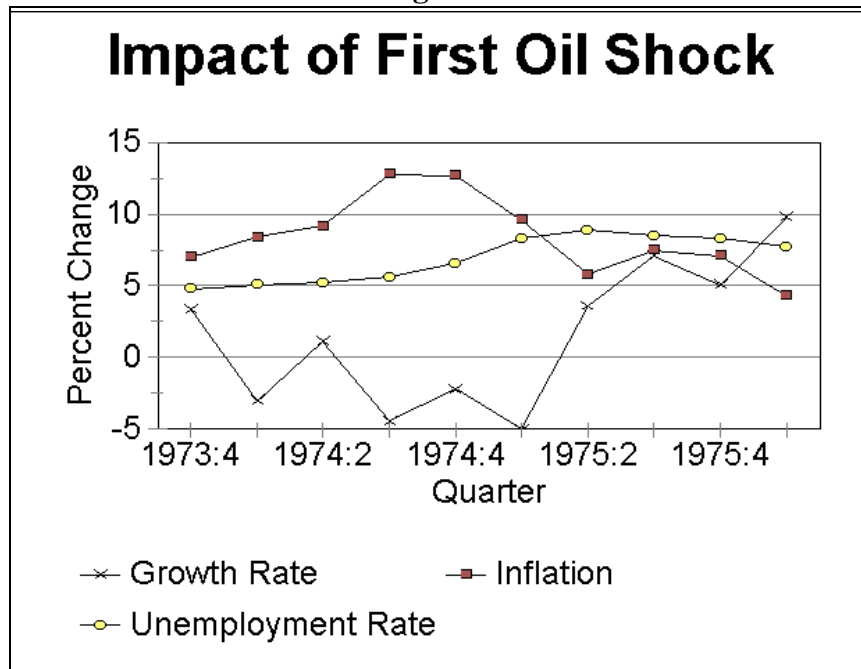
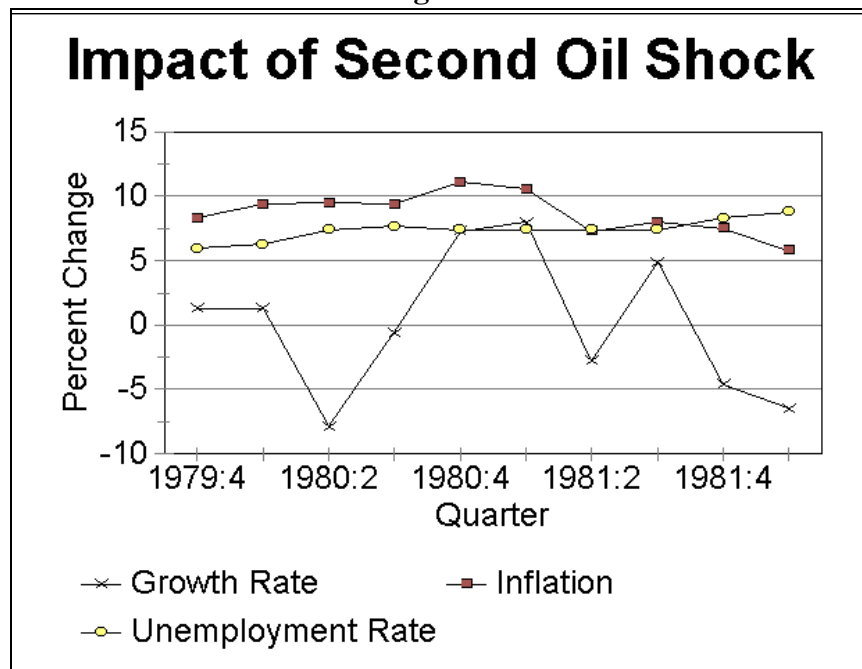


Figure 5



Source: NIPA Historical Tables, *Survey of Current Business*, April 2000



## Positive Supply Shocks

Great attention has been focused on the negative effect that rising oil prices have on the economy, but what has been neglected is the positive influence that a falling oil price has on the economy. If a rising oil price decreases output and heightens price pressures because of sticky prices, then there is no reason to believe that a falling oil price would not have the opposite effect and raise output while easing price pressures. Perhaps more of last year's benevolent mixture of strong growth and low inflation should be attributable to the plunge in oil prices. One macroeconomic simulation model concluded that the rise and fall of oil prices historically do a better job of predicting unemployment than professional forecasters.<sup>29</sup> Alternatively, other studies that stress the disruptiveness of sudden price changes have found that positive oil shocks have an insignificant effect on the real economy, and only negative shocks matter.<sup>30</sup>

## Potential Consequences of Today's Oil Price Spike

**Differences Between the Present Spike and Past Shocks.** There are good reasons to believe that today's oil price spike will not have as serious an effect on the economy as the oil shocks in 1973 and 1979. First, the real price of oil is still relatively low by historical levels. Even after the sharp increase of 1999-2000, oil prices are only half the real price that they were during the second oil shock, lower than they were in real terms in the early 1980s (when prices were falling rapidly) and only a few dollars higher than they were in the late 1980s and 1990s (excluding the Gulf War). So a considerable portion of the recent price rise should be thought of as reversing the positive oil price spike of 1998, and only a small portion is a negative price spike above the long-run trend level.

Second, the US is less dependent on oil compared to the time of the first and second oil shocks. The US uses 25% less oil per capita than it did in 1978 even though the economy is now much larger.<sup>31</sup> As can be seen in Figure 7, the amount of energy used per dollar of GDP has fallen to half the level of 1973. This has been attributed to the fact that previous oil shocks spurred a revolution in energy efficiency and alternative fuel sources, as can be seen in Figure 8. It has also been attributed to the fact that the American economy has been continually shifting production from manufacturing to services, which lowers energy use because the service sector is less energy-intensive than manufacturing. As noted previously, oil demand growth in the US is forecast to be lower than growth in GDP in 2000.

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<sup>29</sup> Alan Carruth, Mark Hooker, and Andrew Oswald, "Unemployment Equilibria and Input Prices...", *The Review of Economics and Statistics*, 1998, v.80 n.4, p.621.

<sup>30</sup> Knut Mork, "Oil and the Macroeconomy When Prices Go Up and Down...", *Journal of Political Economy*, 1989, v.97, p.740. Hooker disagrees with Mork's conclusion and believes that Mork's results reflect a structural change in the economy in the last 20 years, not a difference in effect of price rises versus price falls.

<sup>31</sup> "Oil at \$30," *Financial Times*, London; June 14, 2000, p.22.

Figure 6

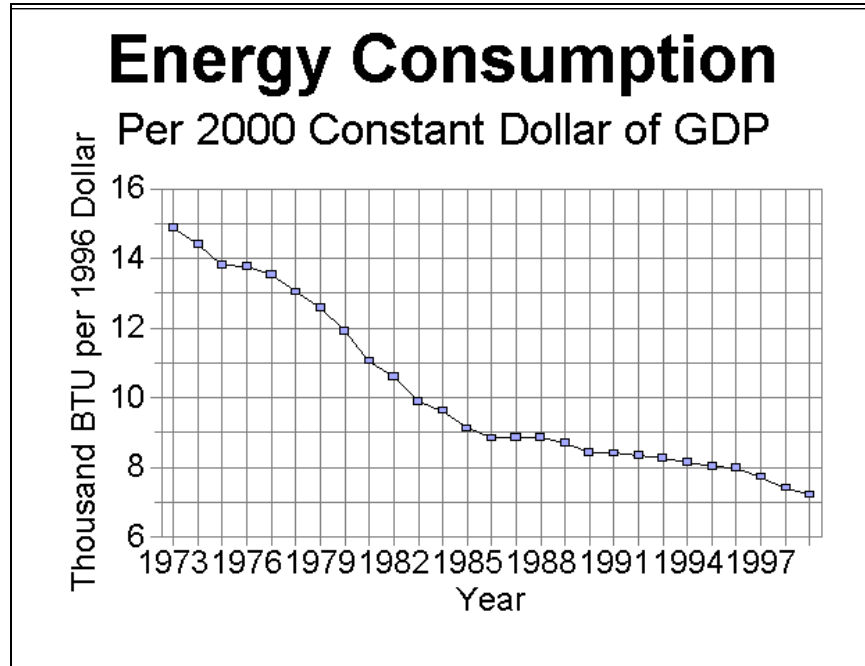
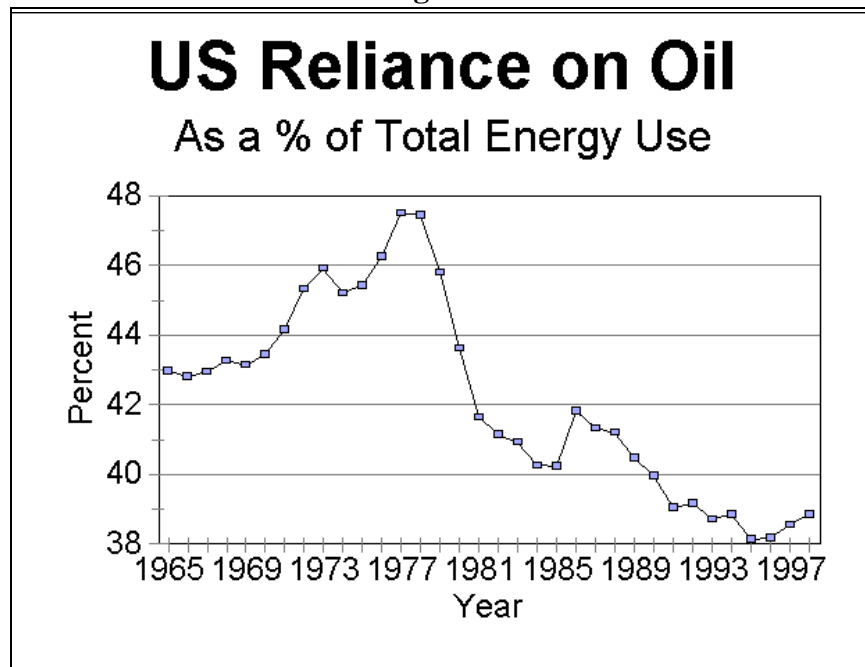


Figure 7



Third, OPEC controls less of the world oil supply than it previously did. In 1972, it produced 54% of the world oil supply. In 1998, it produced 42%. This should reduce its monopolistic power. However, OPEC now possesses a larger fraction of the world's proven oil reserves, rising from 69% in 1973 to 77% in 1999.<sup>32</sup> The increase of non-OPEC oil has mostly been abroad, as US oil production has fallen in the past few decades.<sup>33</sup>

Finally, how large an effect an oil price spike has on the economy depends on how well individuals can protect themselves from the spike, how quickly they can adjust, and how long the spike lasts. The changes in the pricing of oil from contracts to spot and future markets suggest that on both counts the current price rise will have much less of an effect than the oil shocks of 1973 and 1979. Thus far, overreaction has not exacerbated the oil price spike as it did in the last.<sup>34</sup>

**Predicted Effects of the Oil Price Rise.** The most cited estimate of the effects of an oil price spike on the US economy come from an Organization for Economic Cooperation and Development (OECD) study last year. This study estimated that a \$10 rise in the price of oil will lower economic growth by 0.2% and raise the current account balance by 0.1% for the following two years. The study further estimated that the price rise will raise inflation by 0.4% in the first year and 0.6% in the second year.<sup>35</sup> Another simulation by Macroeconomic Advisors estimated that a rise to \$40/barrel would lower growth by 1%.<sup>36</sup> Pessimistic economic forecasts became more prevalent in late 2000, and a key feature of these forecasts was a persistently high oil price.<sup>37</sup>

A Federal Reserve study found that changes in the price of oil have become much less inflationary in 1980s-1990s, possibly because the Fed has no longer been willing to accommodate oil price spikes with expansionary policy.<sup>38</sup> A study by Professor James Hamilton, an economist who pioneered the economics of oil shocks, found that changes

<sup>32</sup> International Petroleum Encyclopedia, 1973 and 1999.

<sup>33</sup> For an argument of why higher U.S. production would not help lower oil prices, see U.S. Library of Congress, Congressional Research Service, *Energy Independence: Would It Free the United States From Oil Price Shocks?*, by Marc Labonte and Gail Makinen, CRS report RS20727, November 17, 2000.

<sup>34</sup> The Consumer Confidence Index is a survey of households to gauge consumer perceptions and expectations. It is carried out by the Conference Board, a non-profit business organization.

<sup>35</sup> This does not imply a linear relationship between price and effects on the economy: since the price rise has been closer to \$20, one cannot estimate the effects by doubling these predictions. Most likely, the effects would be more than double.

<sup>36</sup> "Economic Outlook," Macroeconomic Advisors, February 2000, p.18. Macroeconomic Advisors is a private economic forecasting firm.

<sup>37</sup> For example, the December 2000 WEFA forecast gave a 15% probability to recession in 2001 and a 20% probability to growth slowing to 2.2%. High oil prices were central to both of these scenarios. Source: *U.S. Economic Outlook 2000-2006*, WEFA, December 2000.

<sup>38</sup> Mark Hooker, "Are Oil Shocks Inflationary?...", Federal Reserve Finance and Economics Discussion Papers #65, December 1999, p.13. This study found that interest rates were only lowered half as much in response to an oil shock after 1980 than before 1980.

in the price of oil only affected the economy significantly if they were large and persistent, explaining why there was little relation between oil and output in the 1980s.<sup>39</sup> According to his theory, the price increase of 1999-2000 may not yet have a large effect on output since it is fast on the heels of last year's big drop. As long as producers believe the price spike to be temporary, they may be able to adjust to the change without raising prices and laying off workers. For example, they may lower profits, which had been at a record high in recent years. But if the spike persists, Hamilton does not believe that the economy is now immune to shocks as other experts have asserted. One study<sup>40</sup> that claims that oil is the best forecaster of unemployment led one of its authors to suggest that most spectators are being far too optimistic about how the economy will react the current price rise.<sup>41</sup>

**Economic Implications.** Throughout the first half of 2000, the oil price spike had not become a shock: there was no discernable effect on the US economy. Headline inflation rose in 2000, but core inflation (excluding energy and food), unemployment, and economic growth were stable. The fact that the economy was running so close to its long run potential implied that the real threat an oil price spike posed to the economy was that it could lead to an uncomfortably high inflation rate in the near term. In the fourth quarter of 2000, growth seemed to have slowed but inflationary pressures remained, much as the supply shock model would suggest. But it is too early to determine whether growth will rebound or deteriorate. In late November 2000, oil prices began to fall, but is too early to determine whether this trend will continue or be reversed. If the oil price decline is permanent and the slowdown in economic growth is mild, the U.S. economy will have escaped the prospects of an oil shock relatively unscathed.

Perhaps the greatest uncertainty surrounding what sort of macroeconomic effect the oil price rise will have is the reaction of the Federal Reserve. As explained previously, policymakers can respond to supply shocks with expansionary policies that try to mitigate the output effect but amplify the inflation effect.<sup>42</sup> Or they can respond with neutral policies that have the reverse effect. At present, it appears that both the Federal Reserve and the Administration are favoring expansionary policies: on January 3, 2001 in an unscheduled meeting the Federal Reserve lowered the target for the Federal Funds Rate by 0.5%. President-elect George W. Bush has also promoted a large tax cut package as a means to stimulate the economy.

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<sup>39</sup> James Hamilton, "This is what happened to the oil price-macroeconomy relationship," *Journal of Monetary Economics*, October 1996, p.215.

<sup>40</sup> Carruth *et al.*, *Op Cit.*

<sup>41</sup> Andrew Oswald, "Fueling false hopes," *Financial Times*, September 10, 1999, p.18.

<sup>42</sup> For fiscal policy, expansionary policy is an increase in government spending and/or a decrease in taxes. For monetary policy, an expansionary policy is a decrease in interest rates.

## Conclusion

The recent rise in oil prices can be attributed to two sources. Part of the rise in oil prices is merely a return to the supply-demand equilibrium prevalent throughout the past 15 years that was interrupted by the extremely low prices of 1998, brought on by a fall in world demand for oil that has now been reversed. World oil demand had fallen because of the Asian economic crisis, and it has recovered now that world growth is strong and most of the Asian economies are recovering. The part of the rise in oil price this year above trend appears to be a result of successful production cuts by OPEC. Without the strong recovery in the world demand for oil, these production cuts may not have been successful in raising the price of oil. In the past, OPEC has been unable to sustain high prices in the long run as agreements have failed, consumers have substituted away from oil, and larger amounts of non-OPEC have entered the market.

A supply shock such as a rise in the price of oil poses a problem for policymakers because it causes inflation to rise while output decreases in the short run. The economy during the two previous oil shocks showed both of these characteristics. This poses problems for the conduct of fiscal and/or monetary policy. If expansionary policy is used to stimulate output, it would worsen inflation. If policy remains neutral, it would expedite the fall in inflation but may prolong the slump in output. A policymaker is not faced with this dilemma in most recessions, which is demand driven and features falling rates of inflation.

Most experts suggest that the US economy has changed structurally since the last oil shock. Therefore, they predict that the effects of the steep rise in the oil price during 1999-2000 will be much less disruptive than the large shocks of 1973-1974 and 1979-1980. In today's economic environment of strong growth, the threat of inflation poses a greater risk than recession. Therefore, if the effects of the oil price spike continue to be small and the economy keeps booming, a neutral policy may be preferable to an attempt to stimulate output.

Through the first half of 2000, the oil price rise has not "shocked" the US economy. Headline inflation rose, but core inflation (excluding energy and food), unemployment, and economic growth were stable. Growth appears to be slowing in the fourth quarter of 2000, however, suggesting that rising oil price did eventually feed through to the overall economy. At the same time, supply pressures in the oil market seemed to be subsiding, and the price has been falling. It is too soon, however, to determine if the downward trend in either the oil price or economic growth will continue.