

**THE EFFECT OF OPEC OIL PRICING ON OUTPUT, PRICES,
AND EXCHANGE RATES IN THE UNITED STATES AND
OTHER INDUSTRIAL COUNTRIES**

**The Congress of the United States
Congressional Budget Office**

PREFACE

Since 1973, high and rising oil prices have seriously aggravated the management of macroeconomic policy. This report assesses the consequences of oil price rises for the general price level, employment, the trade balance, domestic and international credit markets, and the exchange rate in the United States and other major industrial countries. Based on earlier work undertaken for the Joint Economic Committee, this report was requested by the Subcommittee on Revenue Sharing, Intergovernmental Revenue Impact, and Economic Problems of the Senate Finance Committee. In accordance with CBO's mandate to provide objective and non-partisan analysis, the report makes no recommendations.

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SUMMARY

The high and rising price of oil burdens industrial oil-importing countries in two ways. First, it lowers the standard of living below what it would otherwise be. Second, it affects the economy in ways that are difficult for policymakers to manage: on the one hand, the rising oil price spurs general inflation; on the other, it depresses domestic demand and employment. Policymakers typically do not fully offset the effect on employment because they simultaneously try to hold down the rate of inflation.

Price levels in the United States rise more with oil price increases than do price levels in other industrial oil-importing countries. The U.S. Consumer Price Index rises more than consumer price indexes in other countries mainly because energy bulks larger in U.S. consumption. The GNP deflator, often consulted as a broader measure of price performance, also rises more in the United States than in other countries. The deflator measures the price of domestically produced output; its increase reflects larger U.S. domestic oil production relative to total GNP--a consequence of greater U.S. energy self-sufficiency.

When they are not offset by policy actions, oil price increases will depress economic activity in oil-importing countries. The greater the share of oil in total consumption, the greater the depressing effect of an oil price rise, since the greater will be the fall in domestic demand for domestically produced goods. Larger domestic oil production relative to GNP, and increases in exports to oil-exporting countries, can offset part of these effects. But, on net, for typical major oil-importing countries today, oil price increases depress demand. Studies based on simple economic models indicate that the depressing effect of an oil price rise is somewhat greater in Japan and Europe than in the United States.

The U.S. trade balance against OPEC is more volatile than the trade balances of other industrial countries. The larger swings in the U.S. trade balance do not reflect U.S. export performance, but rather the greater responsiveness of U.S. oil imports to income changes. This greater responsiveness comes about because imports comprise a smaller part of total U.S. oil consumption.

Thus, a rise in income and oil consumption will increase U.S. oil import volume by a relatively larger percentage than it will that of other major oil-importing countries.

Even though oil price increases raise the U.S. price level and trade deficit relative to those of other countries, they also initially raise the value of the dollar. The dollar appreciates because:

- o The stimulus to inflation increases the domestic demand for credit and attracts foreign capital;
- o OPEC members invest the proceeds of their trade surpluses in dollar-denominated assets; and
- o Other oil-importing countries increase their holdings of dollar-denominated international reserves.

The actions of the Federal Reserve probably reinforce this initial dollar appreciation. The Federal Reserve has typically pursued relatively restrictive policies immediately after oil price increases, easing up only later when unemployment rises.

The dollar does not rise permanently, though; as inflation eases, domestic credit demand and interest rates fall in U.S. credit markets. At the same time, OPEC members draw down their dollar assets to buy foreign goods. But they do not spend all of their dollar-denominated assets on imports from the United States. The drop in domestic and foreign demand for dollar assets depresses the dollar exchange rate.

Whatever the proper level of the oil price, its increase imposes a burden on industrial countries: unemployment and inflation rise in a combination that policymakers cannot fully offset. In dealing with those problems, they have several policy options. They could:

- o Design a monetary policy path that minimizes the combined costs of short- and long-term unemployment and inflation produced by the oil price shock. In such a strategy, monetary policy is used to control the inflationary effects of an oil price rise; fiscal policy, to offset its demand-reducing effect;

- o Coordinate national trade policies to permit a better choice of macroeconomic policies by improving the distribution of the non-OPEC deficit;
- o Use income policies and oil price controls to minimize the initial impact of the oil price rise;
- o Use tax and transfer policies to maintain real disposable income in the short run;
- o Improve labor market programs to offset the initial unemployment effects of the oil price rise; or
- o Under some circumstances, undertake policies that would lead OPEC countries to reduce the oil price.

What lessons can the United States draw from the experience of other countries? Germany and Switzerland, on examination, provide little guidance for the United States. Their apparent achievement of low rates of inflation and unemployment rests largely on their acceptance of higher unemployment rates, relative to their own typical experience, over long periods of time; the exit of women from their labor forces; and the emigration of their foreign workers. Whether Japan provides a good lesson for the United States is less clear. The United States could not have relied as heavily as Japan on expanding its trade surplus without seriously disrupting existing trading patterns. If, as some evidence indicates, Japanese success rests on superior economic organization, the United States obviously should emulate that where possible. But to the extent that Japan's success rests on restricting imports and subsidizing exports, then the United States may have to seek other policy alternatives.

A high oil price, even when it is not increasing, imposes a burden on oil-importing countries. The OPEC oil price is a cartel price, believed by some to be far higher than the price that should be charged to ration the world's scarce energy resources into the next century. This pricing policy causes a drop in living standards among oil-importing countries of between \$50 billion and \$100 billion per year. Oil-importing countries cannot erase this burden simply by balancing their trade accounts.

The high OPEC price can best be reduced by raising world--not necessarily U.S.--energy production and by lowering world energy consumption so as to reduce the amount of oil that Saudi

Arabia can sell at the current price. Only the Saudis are vulnerable to a shrinkage of the world oil market, and only the threat of such a market shrinkage is likely to induce them to produce quantities of oil that maintain Saudi Arabia's market share by moderating the OPEC price.

CHAPTER I. INTRODUCTION

Following each major oil price increase, real gross national product (GNP) has fallen, unemployment and inflation have risen, and exchange rates have moved erratically. But how do oil price increases produce these effects? This paper discusses some of the macroeconomic consequences of too high and rising oil prices, and some of the policy options that might control these effects.

It finds that the high and rising price of oil imports from the Organization of Petroleum Exporting Countries (OPEC) burdens the industrial oil-importing countries in two ways. First, because total expenditures on oil rise relative to income, the potential real standard of living in oil-importing countries falls. Together, the countries of the Organization for Economic Cooperation and Development (OECD), for example, may have paid as much as \$150 billion more for oil in 1979 than they would have paid in a competitive oil market. Second, the rising oil price increases unemployment and inflation in ways that are difficult for policymakers in oil-importing countries to manage; on the one hand, the rising oil price produces general inflation, and on the other hand, it depresses domestic demand and employment. Policymakers attempt to control part of the inflation, at the cost of increasing unemployment. The total loss in output from the 1974-1975 recession, though part of it may have followed from factors unrelated to oil, was about \$350 billion.

Chapter II shows why OPEC price increases raise the Consumer Price Index (CPI) and GNP deflator more in the United States than in other industrial countries. Chapter III discusses the ways in which oil price increases also reduce real GNP, employment, and real disposable income. Chapter IV shows how the U.S. trade balance has grown more responsive to OPEC price rises, and also why U.S. oil imports are more sensitive to U.S. income changes than are the oil imports of other industrial countries. Chapter V combines the preceding information to show how oil price increases raise the demand for dollar-denominated assets relative to assets denominated in other currencies. Chapter VI relates this to exchange rate changes, to show why oil price increases first lead the dollar to appreciate above the level it would otherwise have attained and then to depreciate below that level. Chapter VII shows how the oil price rise produces two distinguishable

problems: the short-term decline in real GNP and employment, and the longer-term drop in real disposable income and standards of living among industrial countries. It enumerates a number of policy options.

CHAPTER II. HOW OPEC OIL PRICE INCREASES INITIALLY RAISE THE
GNP DEFLATOR AND THE CONSUMER PRICE LEVEL

GREATER U.S. ENERGY PRODUCTION INCREASES OIL PRICE IMPACT ON U.S.
GNP DEFLATOR

An OPEC price increase will raise the U.S. general price level, as measured by the GNP deflator, more than the price levels of other large oil-importing countries because energy production is a larger fraction of total U.S. production. An OPEC price increase causes prices of domestically produced energy products to rise. Consequently, oil price rises will increase the GNP deflator in the same proportion that domestic energy production occupies in total output. Oil price increases have little direct impact on the GNP deflators of countries with little domestic energy production, even when those countries import large amounts of oil.

An OPEC price increase does not directly raise the GNP deflator of an oil-importing country. Gross national product measures the goods produced by nationally owned productive factors. Imports are not so produced and thus are excluded from GNP. For the same reason, the GNP deflator—the "price of GNP"—excludes the prices of imported goods. A rise in the price of imported oil, therefore, cannot, by itself, increase the GNP deflator. For example, when a gallon of gasoline is imported and consumed, it will be added to GNP in the consumption account and subtracted from GNP in the import account. That procedure prevents counting the gallon of gasoline as a domestically produced commodity. If the price of that gallon doubles, then it doubles when added to consumption and when subtracted from imports: it has no net effect on GNP or on the GNP deflator. For any rise in the oil price, the U.S. GNP deflator will increase about three times more than will the German GNP deflator, and 12 times more than will the Japanese GNP deflator (Table 1).

GREATER U.S. ENERGY CONSUMPTION INCREASES OIL PRICE IMPACT ON
U.S. CONSUMER PRICE INDEX

Any oil price rise will also increase the U.S. CPI more than the consumer price indexes in other countries. This occurs

TABLE 1. DOMESTIC ENERGY PRODUCTION, GROSS DOMESTIC PRODUCT, AND WEIGHT IN GDP DEFLATOR IN SELECTED OECD COUNTRIES RELATIVE TO THE UNITED STATES, 1977

Country or Country Group	Domestic Energy Production (million tons oil-equivalent)	Domestic Energy Production as a Percentage of Total OECD Energy Production	Gross Domestic Product (current dollars and current exchange rates)	Gross Domestic Product as a Percentage of Total OECD Gross Domestic Product	Weight of Energy in U.S. GDP Deflator Relative to Foreign Countries (U.S. = 100) <u>a/</u>
United States	1,432.4	61.1	1,878.8	38.1	100
OECD, Total	2,342.9	100.0	4,925.7	100.0	160
OECD, Europe	555.5	23.7	2,041.1	41.4	280
European Economic Community	433.5	18.7	1,581.0	32.1	279
Japan	43.9	1.9	694.4	14.1	1,207
Germany	116.7	5.0	516.2	10.5	337
United Kingdom	155.8	6.6	244.3	5.0	120

SOURCES: Domestic energy production in million tons oil-equivalent taken from Organization for Economic Cooperation and Development (OECD), Energy Balances of OECD Countries, 1975/1977 (Paris, 1979). GDP of selected countries taken from OECD, Main Economic Indicators (December 1979), p. 152.

a/ Calculation of weights assumes a constant energy price across countries. (See Appendix A for further details.)

partly because, relative to total consumption, U.S. consumers use more energy than do consumers in other countries. U.S. energy consumption, relative to total consumption expenditure, is 50 to 100 percent greater than that of the European OECD countries and 100 to 200 percent greater than that of Japan (Table 2). Excluding gasoline, U.S. aggregate expenditure on residential energy, relative to total consumption, is about 50 percent greater than that of the European OECD countries and about twice that of Japan. When total gasoline consumption is added to residential energy consumption, their combined weight in the United States relative to total consumption expenditures is twice that of the European OECD countries and three times that of Japan. 1/

LOWER U.S. ENERGY TAXES INCREASE OIL PRICE IMPACT ON U.S. CONSUMER PRICE INDEX

For any oil price rise, the gasoline price will rise by a larger percentage amount in the United States than in other countries. Lower U.S. gasoline taxes result in a lower U.S. gasoline retail price. Oil price rises, however, present each country with the same absolute increase in gasoline prices, so that, measured against a lower base, this means a larger percentage increase in the U.S. price. Based on tax differences existing in October 1973, any given OPEC oil price increase would have raised U.S. gasoline prices by about twice the percentage amount it would have raised foreign gasoline prices (Table 3).

Had taxes remained unchanged, subsequent increases in OPEC oil prices between 1973 and 1979 would have reduced the relative importance of national tax differences. Instead, European countries increased their taxes, while the United States kept the

1/ All gasoline consumption has been added to residential energy consumption because data separating private and commercial gasoline consumption could not be obtained. This certainly overestimates true residential energy consumption because some gasoline is consumed by commercial enterprises. It may overestimate U.S. residential demand relative to that of other countries, moreover, if commercial vehicles use gasoline more intensively in the United States than in Europe, where diesel fuel might be more common. Gasoline is included, nonetheless, because its exclusion probably would produce larger errors in measuring relative private energy consumption.

TABLE 2. DIRECT RESIDENTIAL ENERGY CONSUMPTION RELATIVE TO TOTAL PRIVATE CONSUMPTION EXPENDITURES IN THE UNITED STATES AND IN SELECTED FOREIGN COUNTRIES AND REGIONS, 1977

Country or Country Group	Estimated Residential Consumption (million tons oil-equivalent) a/		Private Consumption Expenditures (billions of dollars)	Weight of Energy in Total Consumption Expenditures: U.S. Relative to Foreign (U.S. = 100) c/	
	Excluding Gasoline	Including Gasoline b/		Excluding Gasoline	Including Gasoline b/
	United States	397.5		706.6	1,213.6
OECD, Total	753.4	1,220.4	3,016.5	131	144
OECD, Europe	268.6	362.0	1,225.7	149	197
European Economic Community	217.0	292.7	938.6	142	187
Japan	56.8	79.8	399.1	196	291
Germany	63.3	84.6	288.0	149	198
United Kingdom	46.5	59.2	144.5	102	142

SOURCES: Data on total residential energy consumption originally appeared in OECD, Energy Balances of OECD Countries, 1975/1977 (Paris, 1979). Data for national gasoline consumption were taken from OECD, Energy Statistics, 1975/1977 (Paris, 1979). Private consumption expenditures in current prices at current exchange rates expressed in dollars were taken from OECD, National Accounts of OECD Countries, 1952-1977 (Paris, 1979), Volume I, p. 134.

a/ The table adjusts residential electricity consumption to reflect only the fossil fuel used in generating that electricity. The adjustment first divides total fossil fuel used in electricity generation by the total electricity generated, in order to derive the average use of fossil fuel per unit of electricity. It then multiplies the fossil fuel per unit of electricity by the total amount of electricity consumed in the residential sector. (These data were taken from the same source.) Such a correction assumes that fossil fuel prices are passed through into electricity prices in the same proportion as that of fossil fuel to total electrical-generating fuel.

b/ Separate data are not apparently available for private and commercial gasoline consumption. The data add total gasoline consumption to household residential energy consumption, overstating direct household expenditures on energy. The two weights shown are the boundaries of the actual value.

c/ Relative weights are derived from the first three columns by assuming that all countries pay the same pre-tax energy price.