CHAPTER 3

Oil Price Shocks and Economic Policy

IN THE SECOND HALF OF 1990, the world economy was hit with a sudden oil price increase reminiscent of the 1970s. From an average of about $17 a barrel in June 1990, the price of oil rose to an average of $36 in October, before declining in November and December and again in January 1991. This oil price shock was triggered by the Iraqi invasion of Kuwait, and the U.S.-led response to this act of aggression averted an even larger and longer lasting oil price shock.

Because oil is used widely, large and abrupt increases in its price have significant implications for the world economy and for both macroeconomic policy—fiscal and monetary policy—and policies concerned with energy and other markets. During 1989 the United States and the other major industrialized market economies used about 37 million barrels of oil products each day. Other countries, including less developed countries, consumed an additional 28 million barrels of these products. In the United States, uncertainty about oil prices and the resolution of the Persian Gulf situation contributed to the erosion of consumer and business confidence evident at the end of 1990. It is widely expected that as the situation is resolved, confidence will rise and oil prices will stabilize in a range not far from that prevailing before the price shock began. But even then considerable uncertainty about future oil prices is likely to remain.

Perceptions about the effects of oil price shocks on the U.S. economy reflect, in large part, the extremely high inflation and unemployment rates recorded at the time of the oil price shocks of 1973–74 and 1979–81. At the time of the first oil price shock, the inflation rate, as measured by the consumer price index, soared to 12.3 percent in 1974, followed by a rise of the unemployment rate to a postwar record high of 9 percent in May 1975. Similar adverse effects occurred at the time of the second oil price shock. Inflation rose to 13.3 percent in 1979, and the unemployment rate eventually reached 10.8 percent, a new postwar high, in November 1982.

Although the recent oil price shock increased inflation and unemployment, there is no reason to believe that the deterioration of economic performance will be as large or as long lasting as the experience of the 1970s might suggest. Not only does it now appear that

this shock will be less severe, but the U.S. economy is now better able to adjust to any given change in oil prices. Compared with the 1970s, more systematic macroeconomic policies have kept the underlying rate of inflation relatively low and relatively stable in recent years. The resulting credibility that inflation will be contained enables monetary policy to respond to the recent shock without causing a prolonged recession or a permanent increase in inflation. In addition, a policy of deregulation has increased the flexibility of energy and other markets to respond to price shocks, and the amount of oil used has decreased relative to the size of the economy.

With the benefit of hindsight, it is clear that misguided macroeconomic policies in the period preceding the previous oil price shocks brought on high and rising underlying inflation. That made it unlikely that a more expansionary monetary policy would have been able to reduce the ensuing output declines without producing unduly large increases in prices. It is just as clear that misguided energy policies, both those in place when the shocks hit and those instituted afterward, significantly reduced the economy's flexibility and thus its ability to temper the effects of the shocks. It was regulation, and not events in the Middle East, that forced U.S. consumers to wait in long lines to buy gasoline. Historical experience, along with economic research on the oil price shocks of the 1970s, has taught us much about designing macroeconomic and energy policies for a world subject to such shocks. *Given the prospect of continuing uncertainty regarding future oil prices, it is essential that our policies correctly reflect the meaning and importance of energy security, let markets work to balance the forces of supply and demand, and set out a credible long-term course for the future.*

SIZE AND DURATION OF OIL PRICE SHOCKS

Most price changes merit little attention from policymakers. Indeed, prices that adjust continually to reflect changing conditions are a sign of a healthy, flexible economy. A price shock, on the other hand, is a large and unexpected change in the price of a commodity that can affect the economy as a whole. The most important price shocks to the U.S. economy during the past two decades have been changes in the price of oil. Because oil is consumed in significant amounts and is used intensively in the production of other goods, and because the United States imports a large amount of oil, oil price shocks can have large economy-wide repercussions.

RECENT OIL PRICE MOVEMENTS

The recent increase in oil prices began in July 1990, when the members of the Organization of Petroleum Exporting Countries

(OPEC) began negotiations to reduce their supply of oil to the world market. The spot market price, the price at which crude oil for near-term delivery is bought and sold, rose from an average of about $17 a barrel in June 1990 to almost $21 at the end of July.

After Iraq invaded Kuwait on August 2, the spot price rose quickly, reaching about $28 a barrel on August 6. The spot price went as high as $40 a barrel in mid-October and then generally declined through the end of 1990. Soon after the start of Operation Desert Storm in mid-January 1991, the spot price fell to about $20 a barrel, not far from its level just before Iraq invaded Kuwait.

Soon after Iraq's invasion, uncertainty concerning the timing of the resolution of the Gulf crisis increased uncertainty about future oil supplies, which in turn increased the precautionary demand for oil inventories. *Several countries began to increase their oil production in August, and by November these additional supplies had completely offset the loss of 4.3 million barrels in daily exports from Iraq and Kuwait.* However, these production increases left less standby crude supply and unused refining capacity to meet future contingencies. Changes in the spot price of oil reflect uncertainty about future supply conditions. However, the price of oil expected to prevail further in the future has changed relatively little since the oil price shock began; the price of oil to be delivered near the end of 1991 has typically differed by less than $4 a barrel from its pre-invasion level.

It is clear that the proximate cause of the rapid oil price increase late in the summer of 1990 was Iraq's invasion of Kuwait and its threat to Saudi Arabia. Had Iraq dominated both Kuwait and Saudi Arabia, it would have controlled almost one-half of the world's proven oil reserves. The international community responded to this aggression vigorously, deploying multinational forces and initiating an embargo against Iraq. *These responses to the Iraqi threats to both peace and economic security have averted even sharper and longer lasting increases in the price of oil and a greater deterioration of economic conditions.*

COMPARISON WITH PREVIOUS SHOCKS

The oil price shock that began in 1990 differs significantly from the price shocks of the 1970s in several respects. Before the sharp 1973–74 increases, oil prices had fallen for several decades relative to the prices of nonenergy goods and coal. That decline in real oil prices encouraged greater oil use and discouraged further exploration and investment in oil production.

By the early 1970s the rapidly growing oil demand brought on by robust growth of the world economy led to an increasingly tight world oil market. OPEC began to engineer a series of large price increases, eventually tripling the world price of oil from 1973 to

1974. Oil prices remained relatively stable until 1979, when the second price shock, often associated with the Iranian revolution and the outbreak of the Iran-Iraq war, began. By the end of 1981 oil prices had more than doubled.

Both of the earlier shocks followed several years of stable or slowly falling oil prices. In contrast, oil prices were highly volatile before the recent oil shock. In the first half of 1986 oil prices *fell* dramatically, plummeting by more than 50 percent to about $12 a barrel in July 1986. Between 1987 and 1989 oil prices fluctuated within the $13 to $22 range. During 1990 oil prices fell from a high of over $23 in early January to a low of less than $16 in late June. Since the recent shock began in July, world oil prices have continued to be far more volatile than they were in the initial stages of earlier shocks.

Another difference is the duration of the shocks. In both of the earlier oil shock periods, oil prices increased steeply and fairly steadily over a period of more than 2 years. In the recent episode, oil prices rose substantially through mid-October, generally fell through the end of 1990, and declined sharply after the successful start of Operation Desert Storm in mid-January 1991.

SUMMARY

- Price shocks are large and unexpected changes in the price of a particular commodity important to the economy as a whole. Oil price shocks are the most common and most significant price shocks.
- The recent price shock differs significantly from the oil price shocks of the 1970s. In addition to being less severe, it followed a period of volatile prices in contrast to the period of relatively stable prices that preceded each of the earlier shocks.

THE EFFECTS OF OIL PRICE SHOCKS

The effect of a shock on the performance of the economy depends on many factors. In addition to the macroeconomic and energy policies pursued before and during an oil price shock, the underlying structure of the economy determines how it is affected by a shock of a given magnitude and duration. In this section the effects are discussed in the context of policies that do not change in response to shocks, and, in particular, of a monetary policy that does not adjust money and credit growth.

EFFECTS ON INFLATION

Since oil products are used both directly and as inputs to the production of other goods and services, increases in oil prices directly and indirectly raise the overall price level unless rapid offsetting

wage and price declines occur elsewhere in the economy. Higher prices for oil immediately raise the price of gasoline, heating oil, and other petroleum products and thereby directly affect the general price level (Box 3–1). The larger the share of expenditures devoted to petroleum products, the larger the direct contribution of oil price shocks to inflation. Indirect effects arise because prices for goods and services often reflect the costs of oil used in their production or distribution. The more oil intensive the economy's production processes, the larger the indirect contribution of oil price shocks to inflation.

By raising the overall level of prices, an oil shock may eventually also lead to a higher level of nominal wages. That in turn may lead to further price increases, which would amplify the increase in the aggregate price level caused by the oil shock. The United States is fortunate that its wage-setting arrangements do not rapidly transmit the higher inflation caused by an oil price shock into excessive increases in wages and salaries. Some have suggested that the centralized bargaining more commonly used in many European economies to set wages allows such an excessive reaction of wages to higher prices, even when there have been no compensating productivity gains. The more gradual wage adjustments characteristic of

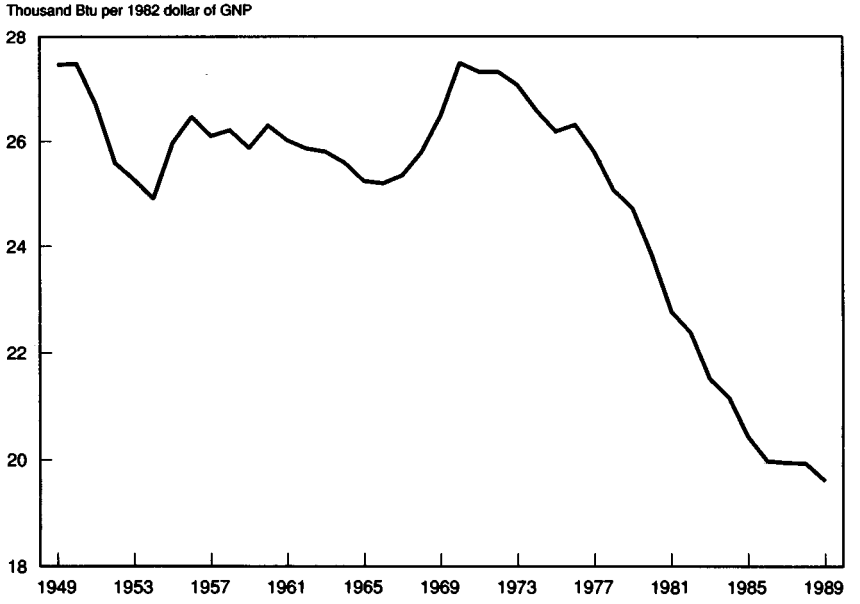
the relatively decentralized labor markets in the United States tend to raise labor costs less when oil price shocks take place.

It is important to distinguish between continuing inflation and a once-and-for-all increase in the price level. An increase in oil prices raises overall prices to a higher level, producing a bout of *temporarily* higher inflation while prices are moving toward this higher level. As prices finish adjusting to the oil price shock, however, this component of inflation disappears. The inflation rate then reverts toward the underlying rate of inflation, which depends on the long-run growth rate of money and credit and of the economy's productive capacity.

Oil intensity and, more generally, energy intensity are important indicators of the sensitivity of the general price level to an oil price shock: the greater the intensity, the greater the effect of a price shock on the general price level. The energy intensity of the U.S. economy, measured as the ratio of primary energy use to real national output, decreased by more than 28 percent between 1972 and 1989 (Chart 3-1). At the same time, the share of oil in total energy use fell from 46 percent to 42 percent, with an even larger decline, from 30 percent to 21 percent, outside the transportation sector.

Chart 3-1 **Energy Consumption per Dollar of GNP**

Energy intensity in the United States has fallen substantially since the 1973-74 oil price shock.



Source: Department of Energy.

The trend toward lower energy intensity in the United States, which mirrors a similar trend in other major industrialized countries, reflects two forces. First, the efficiency of residential, commercial, industrial, and transportation energy use has improved significantly since 1973. For example, the average energy intensity of steel production fell by 20 percent between 1973 and 1987, and the amount of energy used to heat 1 square foot of residential space declined by 30 percent. Many of these adjustments reflect a market economy's response to higher relative prices of oil after the price shocks of 1973–74 and 1979–81. At the same time, the mix of outputs in the economy as a whole has shifted away from energy-intensive heavy industrial products, such as steel, toward less energy-intensive products and services.

Energy and oil intensity in the United States is somewhat higher than in several other large industrialized nations. In addition, oil products are more highly taxed in these countries, so that any given dollar increase in crude oil prices will produce a smaller percentage increase in the prices of gasoline and other oil products than in the United States. These differences suggest that oil price shocks will have a larger effect on inflation in the United States than in these other countries.

EFFECTS ON REAL GROWTH

The major macroeconomic effects of an oil price shock stem from reduced demand for goods and services by consumers and businesses. This decline in real spending will lead to temporarily slower growth of real gross national product (GNP) and employment. The reduction in output may be large enough to cause a recession, especially if the oil price shock occurs in a weak economy. However, even if oil prices were to remain high, these demand effects are temporary, and eventually the economy would return to its long-run growth path.

Terms-of-Trade Effects

Higher world oil prices mean that consumers must pay more to foreign suppliers for each barrel of imported oil, leaving them less to spend on goods produced in the United States. Consumers who use relatively more oil to heat homes in colder climates, for example, or to commute longer distances, will be relatively more affected by oil price increases. Hence, consumer spending is likely to fall off more in regions of the country that use relatively more oil. Spending in oil-producing regions in the United States, on the other hand, might rise as incomes increase, especially if higher oil prices lead to more exploration and increased drilling. On balance, however, the overall effect on the economy is to reduce consumer spending.

The increase in the relative price of imports affects the *terms-of-trade*; that is, the terms at which U.S. goods are traded for imports. At current U.S. oil-import levels of more than 7 million barrels daily, each $10 increase in the per-barrel price of oil would, if it persisted for a year, shift about $26 billion from the United States to foreign suppliers of oil. As a result of this increased expenditure for imported oil, the Nation's trade deficit is likely to rise.

Money and Credit Market Effects

Another important channel through which demand is reduced is through the higher overall price level generated by the oil price shock. The higher price level results in reduced *real* supplies of money and credit—nominal money or credit deflated by the price level—unless nominal supplies are raised proportionately. Lower real supplies of money and credit cause a tightening in credit markets and thereby raise interest rates above what they would otherwise be. Empirical analysis indicates that the adverse effect on output and unemployment of an oil price shock that stems from the decline in the real volume of money and credit is quantitatively significant.

Of course, this credit tightening effect does not take place in the absence of other factors that might affect interest rates. In the second half of 1990, for example, the weakening economy and the new budget legislation started interest rates on a downward trajectory. But, in general, *lower real money and credit growth rates that result from an oil shock would tend to keep interest rates higher than they otherwise would be.*

Higher interest rates reduce household spending on consumer durables like automobiles and furniture, which are often purchased on credit. The tightened money and credit market conditions are also likely to lead to reduced business investment spending for equipment, factories, and inventories. Residential construction may also be adversely affected by the rise in interest rates.

It is important to emphasize that both short- and long-term interest rates affect spending. Long-term interest rates are importantly affected by expectations about future short-term interest rates. The shorter and milder an oil price shock is expected to be, the less expectations about future short-term interest rates would be likely to change. Consequently, long-term interest rates would also be expected to change less. Thus, spending that depends on long-term interest rates would not be affected as much by a price shock that is expected to be shorter and milder.

Confidence Effects

Survey measures of consumer and business confidence dropped dramatically when the recent oil price shock began. That decline may have reflected not only lowered expectations of upcoming eco-

nomic performance, but also *uncertainty* about oil prices, about economic conditions generally, and about prospects for war. Such a loss of confidence typically leads consumers to postpone purchases of big-ticket items such as new homes, furniture, automobiles, and other consumer durables. Heightened uncertainty also induces businesses to postpone investment in plant, equipment, and inventories.

The decline in consumer and business confidence in the second half of 1990 may have reflected the perception that the oil price shocks of the 1970s were primarily responsible for the substantial increases in inflation and unemployment rates that ensued. Although the oil price shocks of the 1970s did raise inflation and unemployment rates, the misguided macroeconomic policies carried out around the time of the shocks contributed significantly to those increases. Consumers and businesses therefore may have overestimated the likely adverse economic effects of the recent oil price shock.

Overall Demand Effects

The terms-of-trade, credit tightening, and confidence effects will reverberate through the economy. Slower consumer spending will lead to a larger cumulative effect on economy-wide spending and income, as growth of output and employment, and thus of income, slow in response to the initial slowdown in spending. If the oil price shock is transitory, as expected, this process will be reversed when prices fall.

Structural changes and reforms since the 1970s have made both energy and other markets more flexible and therefore better able to respond to changes in energy prices. In addition, the decline in oil intensity means that each dollar increase in the price of oil puts less upward pressure on costs and therefore on prices. Since the smaller increase in the price level reduces the real supplies of money and credit by a smaller amount, there is less upward pressure on interest rates. And smaller interest rate increases, in turn, mean that spending declines less. For the same reason, countries that have lower oil intensity may experience smaller interest rate increases and spending declines than countries with greater oil intensities. In addition, the now-deregulated energy markets in the United States allow the economy to adjust more flexibly and rapidly to oil price increases, as do energy futures markets, which are discussed below.

Effects on Productive Capacity

An oil price shock may temporarily reduce the economy's capacity to supply goods and services until producers' plant and equipment and workers' skills realign to higher oil prices. The amount by which capacity is curtailed is influenced significantly by the

flexibility and responsiveness of markets. Shifts in the demand for various goods and services as a result of an oil price increase alter the demand for workers in regions and industries that produce these goods and services. Job relocation involves costs and takes time. During the transition, some additional unemployment may result.

After an oil price increase, production processes are likely to be too reliant on oil and energy. Depending on how long businesses expect a new, higher level of the relative price of oil to remain in effect, they may switch to production processes that use less energy. They may also produce fewer energy-intensive goods and services, sales of which will decline when higher energy costs are passed on to consumers. Thus, it would be reasonable to expect a shift of plant and equipment and workers' skills away from oil-intensive transportation and the sectors that rely heavily on transportation and toward less oil-intensive sectors. *An oil price shock that is expected to be short-lived would not require substantial adjustments of this kind, and associated frictional losses may be minimal.*

ESTIMATES OF THE EFFECTS

Economists generally agree that output and inflation respond to oil price shocks as described above. However, there is more disagreement and uncertainty about the size of the effects. By examining a number of econometric models, which reflect the experience with previous oil shocks, quantitative ranges for the effects that reflect this uncertainty can be developed. The ranges of magnitudes reported here are based on a variety of models and reflect some, but not all, of the structural and expectations effects discussed above.

For example, the analysis does not explicitly take into account the economy's reduced energy intensity since the 1970s. Most models based on historical data reflect the past, including past energy intensity, and are thus quite likely to overestimate the effects of oil price shocks on today's economy. In addition, reduced regulation, particularly of the energy sector, now permits the economy to respond more freely to changing oil prices. Thus, historical relationships may somewhat overstate the impact that an oil price shock would have today. Another factor that the analysis has not explicitly allowed for is the decline in consumer and business confidence that may result from an oil price shock, a factor that has been important in the second half of 1990.

A factor that the analysis does endeavor to incorporate is that both consumers and businesses base their actions on expectations of the future, sometimes by using data from futures markets. This forward-looking behavior allows a quicker adjustment of output

and prices to changing economic conditions. Moreover, long-term interest rates may change in *anticipation* of upcoming conditions, rather than lagging behind them. Of the econometric models examined, those that incorporate forward-looking behavior suggest that output growth is likely to be curtailed less than other models predict. This difference in models is reflected in the ranges.

Consider, for example, the effects on the U.S. economy of an increase in the price of oil of 50 percent from a level of $20 that lasts for four quarters before returning to pre-shock levels. Smaller or shorter oil price shocks will have commensurately smaller effects, while larger shocks will have more serious consequences.

Impact on Output

Following the onset of an oil price shock, output growth would be expected to slow as the factors described above suppress real demand growth. The diversion of more income to pay for imported oil reduces real consumer spending on U.S. goods and services. In addition, the higher price level reduces the real supplies of money and credit, thereby raising interest rates and reducing credit-sensitive expenditures compared with what they would otherwise be. The spending declines and subsequent repercussions resulting from the four-quarter, 50-percent oil price shock would be expected to reduce real GNP growth by about 1 percentage point to 1½ percentage points on average over the four quarters that follow the onset of the shock. The decline in real output is also likely to slow employment growth. The unemployment rate would be expected to rise by an average of about one-half of 1 percentage point over the same four-quarter period. In the year following the beginning of the shock, higher imported oil prices would raise the trade deficit by about $15 billion to $25 billion.

There is less certainty about the quarter-by-quarter pattern of the effects on the economy than about the sizes of the four-quarter effects reported above. The output declines are likely to be largest in the quarters immediately following the onset of an oil price shock. The effects of the oil shock on real GNP growth are expected to diminish as time passes, however. As the frictions associated with a shock dissipate, the economy would be expected to resume growth along its longer run growth path. And as it recovers toward that path, the economy is forecast to grow *faster* than it would otherwise. *Thus, after having its real growth initially suppressed, the economy rebounds.*

Impact on Inflation

Such an oil price shock would also be expected to raise inflation, but, as with the output effects, the change is *temporary*. As measured by the consumer price index, the inflation rate is forecast to exceed what it would have been otherwise by about 1¼ percentage

points to 2½ percentage points over the four quarters following the onset of the shock. The GNP implicit price deflator measures the prices of all the goods and services produced by the Nation. Inflation as measured by the GNP deflator would be less affected because petroleum products constitute a larger share of household expenditures than of total national production. This illustrates the point that the effects on prices, and on the economy generally, are related to oil intensity. The GNP deflator in the four quarters following the onset of the shock could be expected to be about three-fourths of 1 percentage point to 1½ percentage points higher than it would have been otherwise.

The temporarily higher inflation rate would be expected to reach its peak in the quarter after the shock begins, and would taper off thereafter. Though inflation is raised *on average* during the four quarters following the beginning of the shock, much of the increase takes place in the first two quarters. By the fourth quarter, inflation would likely revert to near its underlying rate.

To the extent that oil prices fall, the mirror image of these processes would be observed; inflation would then be expected to be temporarily lower than otherwise. The temporarily changed pattern of inflation during and after the large, sharp decline in oil prices in 1986 demonstrated how these effects operate. After having been relatively low and relatively steady at about 4 percent for a few years, inflation dropped sharply to about 1 percent after oil prices plummeted in 1986. It then returned to near its earlier level after oil prices stopped their decline.

SUMMARY

- An abrupt increase in oil prices temporarily raises the inflation rate and lowers the real growth rate.
- Oil price shocks lower employment and output by reducing the income consumers have to spend on goods produced in the United States and by reducing the real supplies of money and credit.
- Structural changes in the energy sector have significantly increased the flexibility and reduced the vulnerability of the U.S. economy to oil price shocks.
- The energy intensity of most industrialized economies and oil's share in total energy use have fallen significantly since the 1970s, reducing their sensitivity to oil price shocks.

MACROECONOMIC POLICIES

The Administration remains committed to the goal of strong economic growth. Keeping inflation low and stable is essential to achieving this goal. *Although the recent oil price shock has reduced*

economic growth and raised inflation, the proper design of macroeconomic policies can ensure that these effects will be temporary and that the economy will soon return to solid growth with lower inflation.

THE ADVANTAGES OF SYSTEMATIC POLICIES

Systematic monetary and fiscal policies directed toward long-term goals are likely to lead to better economic performance than a sequence of discretionary reactions to economic news aimed at affecting near-term economic conditions. Businesses and households base their assessments of the future on their expectations of interest rates, inflation, tax rates, and other important economic variables. Such forward-looking assessments are important factors in their plans and decisions. Frequent and unanticipated policy changes produce uncertainty in the private sector and reduce the ability of businesses and households to make informed long-term plans.

One of the most important advantages of systematic policies is that they lead to policy *credibility*, the belief that policies will be adhered to consistently over the long run. Credibility permits policymakers to respond predictably to shocks of various kinds without creating undue concern that long-term expectations will change inappropriately.

Even though it might be quite complex, a well-designed systematic policy is likely to lead to better economic performance than either discretionary policies or rigid policies. For example, some argued in the 1960s and 1970s that the growth rate of the money supply should be held constant. While such a policy might have been appropriate at one time, it is clearly too rigid because of shifts in the relationship between money and income in response to deregulation and innovation in the financial sector.

Adhering to a systematic policy may require changes in instruments such as the money supply growth rate or interest rates, for example, to address shocks such as sudden steep increases in oil prices and shifts in the relationship between the money supply and income. Under a systematic policy, money and credit growth rates might change in the wake of an oil price shock or other major disturbances to ameliorate the adverse effects on unemployment and output. Once the price shock has passed through the economy, the policy would readjust monetary and credit policy instruments in a way that would continue to guide the economy toward its longer run goals.

The response to the October 1987 stock market plunge illustrates how monetary policy can respond predictably and temporarily to a shock without unduly raising long-term inflation expectations. In the period following the decline in the stock market, the Federal

Reserve temporarily increased the availability of bank reserves. Because the Federal Reserve's credibility had been enhanced by its having curbed inflation, the public believed that this action was temporary, and therefore it did not change its long-term inflation expectations. And when the Federal Reserve judged that this financial shock had passed through the system, it adjusted the supply of bank reserves to a path consistent with progress toward its goal of price stability.

DESIGNING FISCAL AND MONETARY POLICIES

Both fiscal policy and monetary policy have a role to play in mitigating the impact of a price shock and allowing the economy to return quickly to its long-run growth path. Changes in government spending or tax receipts, which would occur automatically as the economy fluctuates, alter the aggregate demand effect of a price shock. Similarly, the Federal Reserve's policy tools can influence money growth and interest rates to temper the shortfall in production and employment.

Fiscal Policy

A well-designed fiscal policy will automatically respond to an oil price shock. To the extent that real GNP, incomes, and employment decline, income tax revenues and other income-related tax payments will automatically fall and transfer payments provided by programs like unemployment insurance will automatically rise. These "automatic stabilizers" will cushion the reduction in after-tax income and spending power and thereby help sustain spending and employment. Such automatic stabilizers mean that the deficit will automatically rise as tax receipts fall and government expenditures rise relative to what they would otherwise be.

The Omnibus Budget Reconciliation Act of 1990 makes changes in the budget deficit reduction law that give these automatic stabilizers more flexibility to work effectively. The previous formulation of the deficit reduction law set nominal dollar deficit targets that could be suspended if economic growth was forecast to be less than 1 percent for two consecutive quarters. Otherwise, deficit targets did not change even if oil price or other shocks changed macroeconomic conditions. In this sense, the old law actually put constraints on the operation of these automatic stabilizers. The revisions embodied in the new budget law require the deficit targets to be adjusted through fiscal 1993 in response to changes in economic conditions as reflected in annual forecasts made by the Administration.

The new budget legislation has other systematic and credible features: It sets caps on spending levels for the next 5 years, phases in spending and revenue changes over 5 years to avoid causing a shock to aggregate demand, and provides for more stringent en-

forcement of the budget rules. *The recent oil price shock does not require any alteration in this long-run plan for attaining fiscal balance.*

It is appropriate for monetary policy to respond to this change in fiscal policy by permitting the decline in interest rates that would accompany the anticipated decline in future government borrowing brought on by the deficit reduction plan. Adjusting the instruments of monetary policy in this direction can encourage the private sector to increase spending, especially on growth-enhancing investment projects, enough to offset declines in employment and production that might otherwise arise from the shift in fiscal policy. The oil price shock does not alter the appropriateness of this monetary policy response.

Additional discretionary changes in fiscal policy designed to offset the temporary effects of the price shock would not be appropriate, although tax reform is still needed to improve incentives for saving and investment. Discretionary changes in the instruments of fiscal policy, such as changes in public spending, require legislative approval, which typically takes many months. It may well be that the effects of the recent oil price shock will not last as long as the gestation period for a discretionary fiscal policy response. As a result, automatic fiscal policy responses are likely to be more effective than discretionary responses in addressing oil price increases and many other types of shocks.

Monetary Policy

Monetary policy has a key role to play in ensuring that a one-time increase in oil prices is not converted into an increase in the underlying inflation rate—via a wage-price spiral, for example. The U.S. economy has benefited during the recent expansion from a monetary policy that has helped keep the underlying rate of inflation relatively low and relatively steady compared with the 1970s. This move to prevent inflation from rising as economic growth quickened in 1987–88 has prevented a repetition of a key policy mistake of the 1970s: that is, policy spurring the economy along a path of accelerating inflation. *The credibility that this experience has built, combined with the recent relatively low inflation rates, gives the Federal Reserve more elbow room to allow inflation to rise temporarily when a price shock strikes without causing long-run inflation expectations to rise.*

As long as the relationship between the M2 measure of the money supply and GNP remains stable, the Federal Reserve can lead the economy toward lower inflation by gradually reducing the long-run growth of the money supply. Such a policy does not preclude allowing higher or lower growth rates of M2 over shorter periods, as called for either by shocks to the relationship between the money supply and GNP or by other shocks.

Given the stability of the relationship between GNP and money, keeping money supply growth from falling in the face of a downturn in GNP caused by an oil price shock is essential to preventing an unnecessarily large and prolonged decline in economic growth. Depending on the size of the shock, a temporary increase in money supply growth might be necessary to stabilize economy-wide spending and to help offset the decline in GNP that occurs when an oil price shock reduces real income and raises the general price level.

Maintaining money supply growth or increasing it somewhat may result in a temporary increase in nominal GNP growth. But eventually nominal GNP growth should return to a path consistent with low and stable inflation. Given credible monetary policy, an increase in nominal GNP growth need not cause an increase in long-run inflation expectations. A one-time increase in the price of oil would warrant only a short-run increase in nominal GNP growth. The oil price shock itself will cause only a temporary increase in the inflation rate if nominal GNP growth reverts to a rate consistent with the trend toward low and stable inflation after the one-time adjustment attributable to the price shock.

LESSONS FROM PREVIOUS SHOCKS

The experiences of the United States and other large industrialized countries during the previous oil price shocks show the crucial role that maintaining credible and systematic long-run fiscal and monetary policies play in allowing the economy to respond relatively smoothly.

Before the onset of each of the oil shocks of the 1970s there was considerable concern that the overly expansionary monetary and fiscal policies during the preceding years were building increasingly high rates of inflation into the major industrialized economies. Thus, the monetary policy authorities had relatively little credibility: There was little reason to believe that inflation would be restrained even before the oil price shock occurred.

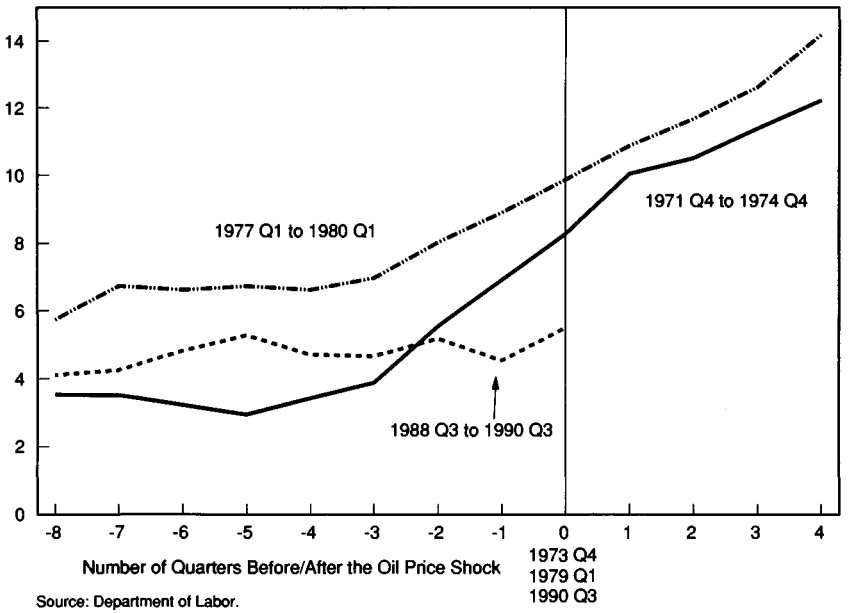
Chart 3-2 plots U.S. consumer price inflation during the 1970s, with a focus on the periods before and after oil price shocks. The chart reveals the often overlooked fact that *the inflation rate was rising, and rising at a fairly rapid rate, in the period preceding each of the oil price shocks of the 1970s.*

After having been very low and stable until the mid-1960s, inflation then rose steadily, apart from its temporary suppression when price controls were in effect in the early 1970s. The oil shock of 1973–74 then put additional upward pressure on the inflation rate. To prevent inflation and inflation expectations from spiraling further upward, monetary policies were tightened generally. With little credibility, there was little room for monetary policy to permit the price shocks to affect only the price level without giving

Chart 3-2 **Inflation and Oil Shocks in the United States**

Inflation was high and rising before the two oil price shocks of the 1970s but was relatively low and steady before the 1990 shock.

CPI, Percent change from year earlier



Source: Department of Labor.

firms and households the impression of continued accommodation and tolerance of higher inflation. An increase in money growth could not credibly be viewed as temporary.

As the contractionary effects of the 1973–74 oil price shock and restrictive policies took hold, policy again returned to an overly accommodative stance. The deceleration in the growth of the money supply that accompanied the 1973–75 recession was followed by a reacceleration: The money supply grew at double-digit rates from 1975 through 1977. Fueled by faster growth in the money supply, spending grew at rates incompatible with low inflation, culminating in the high and rising inflation rates at the end of the 1970s.

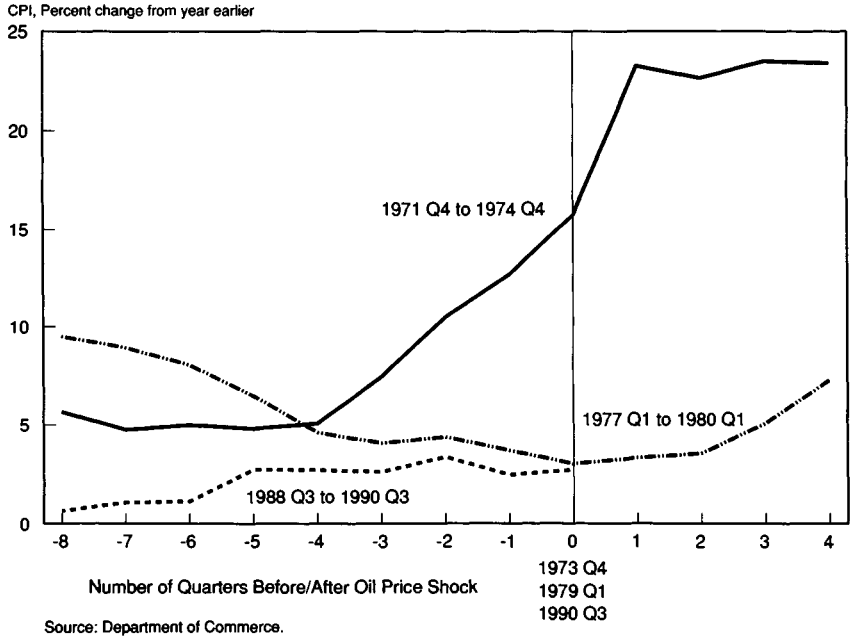
These inflation rates resulted from growth in demand that continually outstripped growth in supply. So long as demand, which was fueled primarily by excessively expansionary monetary policy, grew more rapidly than the economy's ability to supply goods and services, prices rose. Similar boom-and-bust patterns were being repeated in other industrialized countries as well. Having excessively stimulated demand, these countries found they had little credibility to ease policy temporarily in response to the second oil price shock without further raising inflation and expectations of it. Thus, to

prevent their already uncomfortably high inflation rates from accelerating, many countries including the United States again tightened monetary policy when the 1979–81 oil price shock struck.

Japan, a notable exception, provides a useful comparison. Japan had high and rising inflation rates when the 1973–74 oil price shock occurred, and inflation remained above 20 percent in the period immediately after the onset of the shock (Chart 3-3). Like other countries, Japan experienced a severe recession in 1974–75 because the oil shock hit when there was little policy credibility or room for adjustment of the instruments of policy. To remedy that situation, the Japanese Government moved to a more systematic and credible monetary policy in the latter half of the 1970s. By reducing money growth, the government lowered inflation and then kept it in check. This policy produced inflation that was low and falling by the time the second oil price shock hit.

Chart 3-3 **Inflation and Oil Shocks in Japan**

Inflation was high and rising and remained high in the first oil price shock but was low and remained low in the second oil price shock.



Source: Department of Commerce.

The more credible systematic stance of monetary policy followed in Japan between the two oil price shocks made it possible for Japan to avoid much of the negative economic impact that other industrialized economies experienced during the second oil shock without generating fears that inflation and expectations of inflation would spiral upward. As a result, inflation was not permanent-

ly raised, and output remained close to its longer run path. In fact, by the definition of recession used in the United States, Japan completely avoided a recession following the second oil shock.

SUMMARY

- Systematic monetary and fiscal policies allow for changes of the instruments of policy in response to oil price shocks without sacrificing long-term policy goals. For example, automatic stabilizers allow for some temporary deficit increases as the economy weakens after an oil price shock, without altering the long-run path to structural deficit reduction.
- Macroeconomic policy responses to oil price shocks in the 1970s were constrained because past policy mistakes had engendered a lack of credibility. The United States entered the two oil price shocks of the 1970s with excessive monetary expansion causing high and rising inflation.
- The relatively low and steady underlying inflation rate that preceded the 1990 oil price shock enables monetary policy to respond more appropriately without losing its credibility in controlling inflation.

SHORT-RUN ENERGY POLICY RESPONSE

The principle of providing for flexible responses to changing short-run conditions while maintaining a clear and consistent focus on long-term objectives is an appropriate guide for energy sector policies as well as for monetary and fiscal policies. Given the high value of maintaining flexibility in the face of changing market conditions, pressures to impose price control and allocation schemes and to limit trading in energy futures markets should be resisted. Release of oil from government-controlled strategic reserves can, under some conditions, play a useful role in cushioning the impact of oil price shocks.

THE DANGERS OF REREGULATION

Energy market regulation, like regulation in other markets, can reduce the efficiency of the economy. Incorrect price signals result in a misallocation of supplies among consumers and, as both investment and innovation are affected over the longer term, can reduce output and adversely affect both producers and consumers. In addition, because regulation reduces flexibility, regulated markets react poorly to price shocks and thus exacerbate their effects. The benefits of relying on markets rather than regulation in the energy sector can best be understood by reviewing how regulation raised the costs of the oil price shocks of the 1970s.

In the aftermath of the 1973–74 oil price shock, domestic crude oil prices were held substantially below world market levels. As a result, domestic prices for petroleum products, which reflected an average of the prices of controlled domestic and uncontrolled imported crude oil, were also below world market levels. Individual decisions regarding the use of oil products were based on these distorted prices, even though each additional barrel of oil demanded was met through increased imports at the higher world price. Greater use of oil and increased demand for oil imports was the inevitable result.

Although the process of oil price decontrol began before the 1979–81 oil price shock occurred, the combination of the remaining price controls and a burdensome and complex allocation system had a particularly pernicious effect. While artificially low prices inflated demand, the allocation system distributed available products in a way that magnified imbalances between demand and supply. As a direct result, consumers wasted many hours waiting in long gasoline lines.

Substantial deregulation of energy markets over the last 15 years now allows markets to respond quickly and flexibly to changing conditions. *In the second half of 1990, oil and natural gas markets freed from earlier price controls and restrictions generally functioned well* (Box 3–1). In sharp contrast to the 1970s, gasoline lines did not reappear. While the higher petroleum product prices that follow an oil price shock may be unwelcome to consumers and energy-using firms, they are clearly preferable to the alternative of policy-induced shortages caused by misleading price signals and government-directed misallocation of oil supplies.

ENERGY FUTURES MARKETS AND SPECULATION

In the wake of Iraq's invasion of Kuwait, some commentators have blamed speculation in oil futures markets for oil price volatility and have suggested that the government limit futures market trading. Because futures markets play a central role in increasing energy market flexibility, however, a significant limitation on trading would impede, rather than aid, adjustment.

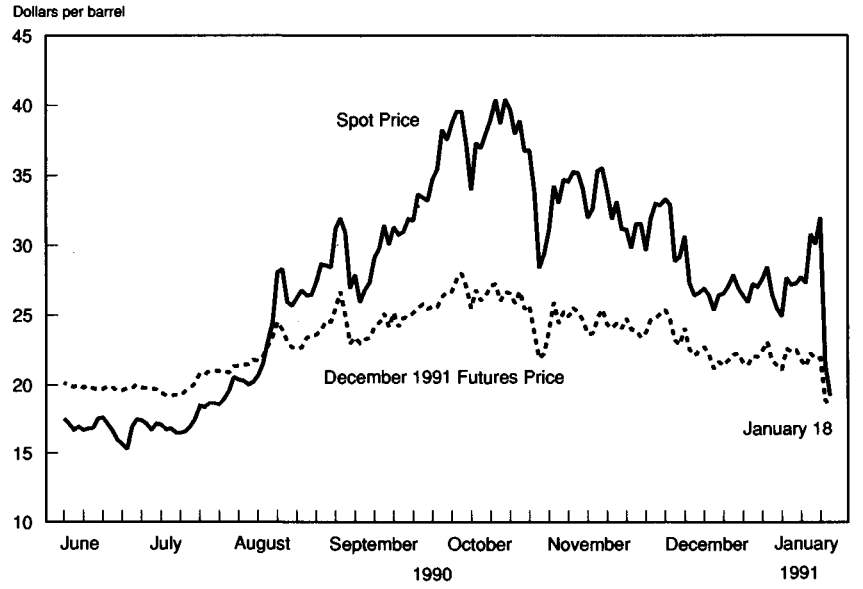
Futures markets provide a public forum in which commitments to deliver a standard amount of a commodity at a specified future date and location can be bought and sold. Trading in organized spot and futures markets serves two important functions: price discovery and risk-shifting. Price discovery is achieved by placing accurate information regarding the latest market activity in a centralized public forum. In this respect, commodity markets are no different from stock markets. Risk-shifting, or hedging, is an activity undertaken by firms or individuals with a direct business interest in the production, distribution, or use of the commodity being

traded. Producers of a commodity might wish to protect against a price decline by locking in a future commitment to deliver at a known price. Processors desiring to protect against a possible rise in product prices can hedge by buying future delivery commitments at a known price.

The prices that balance demand and supply of spot and future delivery commitments reflect current market expectations of near-term and long-term prices. Chart 3–4 shows that prices of oil for delivery at the end of 1991 have been far less volatile than prices for delivery in the near future. *The relationship between spot and futures market prices observed since August 1990 has consistently reflected the expectation that the Gulf crisis would be relatively short-lived.*

Chart 3-4 **Oil Spot Prices and Futures Prices**

Although the spot price of oil has fluctuated widely, the futures market price of oil to be delivered in December 1991 changed relatively little between June 1990 and January 1991.



Note: West Texas Intermediate Crude. Spot price is nearest month contract.
Source: New York Mercantile Exchange.

Opportunities for hedging provided by oil futures markets serve the public interest in two main ways. First, hedging allows firms participating at only one stage of the oil business to remain viable in the volatile world oil markets of the late 1980s and early 1990s. Second, hedging has allowed buyers to be more aggressive in taking advantage of spot market opportunities. For example, as oil prices fell sharply in the first half of 1990, oil companies accumulated unusually large private stocks. Their ability to hedge against a con-

tinued decline in prices using oil futures markets allowed them to share the risks of holding these large stocks.

Speculative trades are transactions not motivated by a direct interest in business activities related to the commodity being traded. A speculator goes "long" by purchasing the rights to future delivery of a commodity in the expectation that its price will rise as the specified delivery date approaches. If prices actually rise, the speculator profits by selling this right; if prices fall, the speculator loses the difference between the price at which he is committed to take delivery and the actual price at the delivery date. A speculator goes "short" by selling a commitment to deliver the commodity at a future date, hoping that prices will fall. "Long" speculators add to the demand for futures, driving up futures prices. "Short" speculators, by selling their promise to deliver in the future, add to the supply, and thus drive futures prices down.

Because the underlying motivation for an individual futures market transaction is impossible to determine, the claim that speculation has caused higher oil prices cannot be conclusively supported or refuted. *The available evidence, however, suggests that speculation is more likely to have lowered prices than to have raised them in the aftermath of Iraq's invasion of Kuwait* (Box 3–2).

Box 3–2.—Futures Markets Speculation and Price Volatility

The major participants in oil futures markets include integrated oil companies, trade houses, refiners, marketers, producers, end-users, and traders without any direct business interest in oil markets. Because all but the last category of participants may engage in both risk-shifting and speculative trades, it is impossible to measure the extent of speculation directly.

According to recent data from the Commodity Futures Trading Commission, large traders with no direct business interest in oil markets generally held only about 10 percent of the total outstanding future delivery commitments in August and September 1990. Moreover, on a net basis, these traders were "short" rather than "long." The net effect of the participation of these purely speculative traders in futures markets in the immediate aftermath of the oil price shock was therefore to reduce futures prices rather than to raise them.

Following the rules of the New York Mercantile Exchange, as soon as oil futures prices dropped $7.50 the day after Operation Desert Storm began, oil futures trading was automatically suspended for an hour. Under conditions such as these, a trading suspension is appropriate because it gives the marketplace time to absorb unusual bursts in volume or information flows. However, once in-

formation has been widely disseminated, there is no economic basis for stopping the market from expressing its evaluation of future conditions. Limits on futures trading that impede risk-shifting transactions would impose a real economic burden, but they would not stop speculation. Closing futures markets would simply shift activity to offshore markets or to private, unreported transactions, thereby obstructing the price discovery process. Ironically, the public at large, having the least access to information, would be most disadvantaged. In a fluid economic situation, ignorance is hardly ever bliss.

STRATEGIC OIL RESERVES

The strategic oil reserves of the United States and other countries are intended both to deter the use of the "oil weapon" by exporting nations and to cushion the effect of sizable, temporary supply disruptions by augmenting the supply of oil. At the beginning of 1991, 586 million barrels of oil, equal to about 80 days of U.S. imports at 1990 import rates, were held in the U.S. strategic reserve.

Policies for the use of strategic reserves should aim to complement the production increases and consumption declines that naturally follow an adverse price shock, not to substitute for them. Similarly, strategic reserves should not be used to respond to oil price movements other than adverse price shocks, since to do so would have the effect of substituting government storage of oil for private storage.

The magnitude of energy price movements is one important indicator of the seriousness of a disruption. Prices of petroleum products rose substantially from July to October 1990, but, adjusted for inflation, they remained well below historical peaks. Indeed, the average inflation-adjusted retail price of gasoline in the fourth quarter of 1990 was lower than in most of the 1950s and in the first half of the 1980s.

In the present situation, United States policy has emphasized the replacement of embargoed oil with additional production from other sources. Saudi Arabia, Venezuela, the United Arab Emirates, the United States, and other producers have, in recent months, increased production by an amount sufficient to offset fully the loss of supplies from Iraq and Kuwait. These production increases have eliminated the need for continued depletion of existing private and public stocks. Had the price impact of the supply disruption been immediately attenuated through the release of strategic reserves, these production increases might not have occurred. Conservation of existing stocks can be especially attractive in situations where anxieties over the possibility of severe supply disruptions in the near future are a major influence on current prices.

Coordination among countries holding strategic reserves is important, since the market for oil is a world market, and a release of reserves by any one country will lower prices for consumers throughout the world. Coordination of releases can allay concerns that some countries will seek to benefit from releases made by others while withholding their own reserves. The International Energy Agency (IEA) is the primary mechanism for coordinating the use of strategic reserves. Such coordination was demonstrated in early January 1991 when IEA member governments agreed to make government-controlled stocks available to the marketplace if hostilities broke out in the Persian Gulf region. This program was begun following the start of Operation Desert Storm.

SUMMARY

- Price controls and government-directed allocation schemes significantly magnified the adverse effects of prior oil price shocks. Their reintroduction would be an inappropriate response to energy supply disruptions.
- Closure of oil futures markets would impede risk-shifting and price discovery in oil markets with few, if any, offsetting benefits.
- Strategic oil reserves can cushion the effects of temporary supply disruptions. Releases should be coordinated internationally and with other response measures.

LONGER TERM ENERGY POLICIES

Primary reliance on markets to determine prices, quantities, and technology choices provides the foundation for sound longer term energy policies, and thus for the Administration's National Energy Strategy (NES). Such policies can sustain economic growth and blunt the effects of any future oil price shocks. However, either for structural reasons or because of government-created barriers, private markets cannot always be expected to work efficiently. In those situations, as the NES recognizes, policy can be applied to promote efficient market operation.

For example, reducing the extent to which the United States and its friends and allies obtain energy from insecure sources of supply offers national security and foreign policy benefits to which private market forces are unlikely to give adequate weight. Private markets may also not give adequate weight to environmental considerations. As the NES recognizes, however, policies concerned with energy security or environmental protection must be well-designed to avoid excessive costs and to ensure that economic growth can continue to be fostered through the availability of ample supplies of reasonably priced energy.

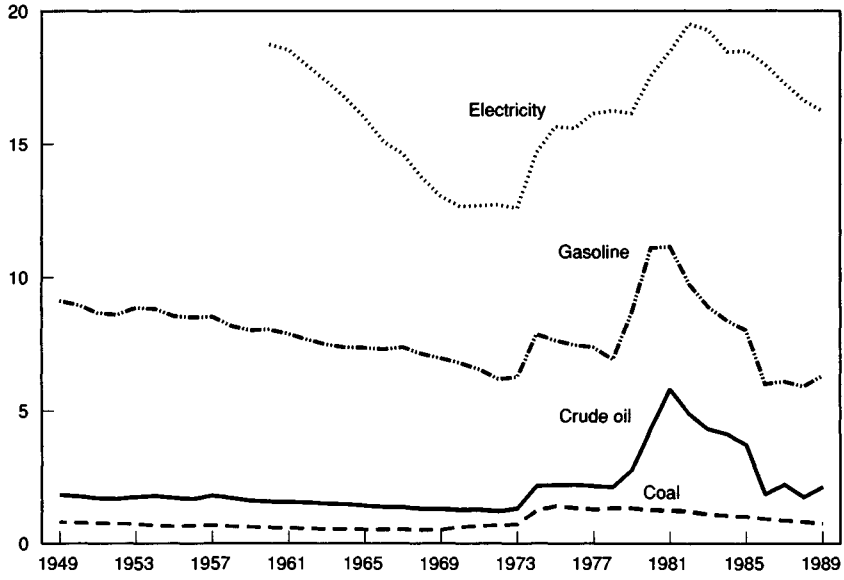
LONG-TERM TRENDS IN ENERGY PRICES AND USE

Longer term energy policies must not be influenced by the widely held misconceptions that energy prices will almost certainly rise and that the United States is a profligate user of energy. The record of the past 40 years shows that the real price of energy has *not* risen steadily. Rather, the real prices of crude oil, oil products, and electricity have fluctuated significantly, with periods of falling as well as rising prices (Chart 3–5).

Chart 3-5 **Real Energy Prices**

Real energy prices do not show a long-term upward trend.

1982 dollars per million Btu equivalent



Source: Department of Energy.

A review of the basic forces that will influence energy markets in the years ahead gives mixed signals regarding future price movements. Some factors point to a tightening market in the medium or long run. Oil analysts project that production in the United States and the Soviet Union, currently the world's largest oil producer, will continue to decline. OPEC, whose member states already account for about one-third of world production and about three-fourths of proven reserves, is expected to supply a rising share of the world's oil. At the same time, world energy demand could begin to grow rapidly if the rates of increase in energy efficiency observed since 1973 are not maintained, or if rapidly grow-

ing energy use outside the major industrialized countries becomes a more important factor in the world market.

Other factors, however, suggest a future in which real oil prices rise slowly, if at all. In recent years, growth in the world's proven oil reserves has far outstripped growth in oil production. Since 1973, when higher oil prices began to stimulate more exploration, world oil reserves have risen by about 50 percent, while world crude oil production has increased by less than 10 percent. At the 1990 production rate, the world now has about a 45-year supply of proven reserves; at this same production rate, the world had less than a 30-year supply of proven reserves in 1973. Oil-exporting countries with large reserves recognize that high oil prices encourage greater use of other existing forms of energy and accelerate the development of new energy and end-use technologies. Economic and environmental considerations that have increased the use of natural gas as a substitute for oil should also help to keep oil prices low. *The uncertain outlook for energy prices increases the value of policies that are flexible enough to serve national interests under a wide variety of energy market conditions.*

The common belief that the United States is a wasteful energy user is also not supported by the data. International comparisons show that U.S. energy use trends do *not* differ markedly from those in other countries. Economy-wide energy intensity has declined in other major industrialized countries, as in the United States, since 1973. Moreover, direct comparisons of energy use per unit of output in individual sectors show that energy intensities across countries have increasingly converged. Differences in natural resources, population density, industrial mix, urban layout, commuting distances, and dwelling sizes appear to account for much of the variation in energy use patterns across countries (Box 3–3).

ENERGY SECURITY

A key goal of longer term energy policy is to reduce the vulnerability of the U.S. economy to energy price shocks and possible supply disruptions. Popular opinion aside, our vulnerability to oil price shocks is not determined primarily by the level of our oil imports. In an increasingly integrated world economy, America's energy security cannot be separated from that of its friends, allies, and trading partners. For one thing, the price of oil bought and sold in the United States is determined on world markets by global supply and demand, not by U.S. production and consumption. In addition, the Nation's ability to export goods and services depends on the health of foreign economies, and exports now account for about one-eighth of GNP. Thus oil price shocks can have substantial indirect effects on the U.S. economy through their impacts on the economies of our major trading partners. For these and other

Box 3–3.—International Comparisons of Energy Use

Recent data show that the average new car purchased in the United States achieves a level of fuel economy slightly better than the comparable average level in Japan and close to that in Germany. However, in 1988 the United States had 573 passenger cars for every thousand people, compared to only 476 cars per thousand people in West Germany and 251 cars per thousand people in Japan. Moreover, in the same year, the average car traveled more than 10,100 miles in the United States, compared with 8,000 in Germany and only 6,500 in Japan.

In part, divergent patterns of vehicle ownership and use are attributable to large differences in retail gasoline prices—German and Japanese retail prices were respectively $2.20 and $3.43 a gallon in 1988, compared with a U.S. price of $0.95. Higher foreign prices to a large extent reflect differences in taxes on gasoline: Combined Federal, State, and local taxes of $0.29 a gallon were far below German and Japanese taxes of $1.42 and $1.60, respectively. However, comparisons with Canada and Australia, which also have high annual miles of travel per vehicle despite gasoline prices significantly above U.S. levels, suggest that low population density and longer commuting distances are major reasons for our additional travel.

A greater reliance on automobiles, rather than the energy inefficiency of those automobiles, is therefore the primary reason the United States uses so much oil in its transportation sector. Assuming that the efficiencies of on-the-road fleets equalize as older cars are replaced, differences in transportation fuel use can only be narrowed further using policies that reduce U.S. car travel.

Energy use in residential heating provides another example of the importance of choosing an appropriate basis for comparisons. Correcting only for climate differences, the United States used more heating energy per dwelling than other industrialized countries in 1987 (although the gap between the United States and other countries narrowed substantially over the last 15 years). However, when the greater floor space in a typical American home is taken into account, the United States was among the more efficient users of residential heating energy.

reasons, modest changes in U.S. energy production, consumption, or imports are unlikely to have much impact on the Nation's energy security.

The maintenance of strategic petroleum reserves and agreement among reserve-holding nations on credible policies for their coordinated use can provide both a deterrent to deliberate supply disruptions and an effective offset to disruptions that may occur. *Energy security can also be significantly enhanced by expanding and diversifying the sources of oil and energy supplies available to the United States and its friends and allies.* The United States, as a leader in exploration and drilling technology, can play an important role in identifying and developing new reserves. Efforts in this area should focus on natural gas as well as on oil, since gas development that displaces oil consumption can enhance energy security and also provide environmental benefits. The removal of remaining barriers to the development of economically viable domestic oil and gas resources, the increased use of coal, nuclear, and renewable energies, and the exploitation of efficient energy conservation opportunities can also contribute to energy security.

Energy diversification efforts will involve some shift toward domestic energy sources. But it must be recognized that opportunities for increasing U.S. petroleum production are limited: By 1990 U.S. production had declined by 22 percent from its peak in 1970. Moreover, a large-scale substitution of high-cost domestic energy for low-cost imported energy could significantly slow economic growth. It simply makes no sense to spend large sums to displace imported energy when supply diversification or strategic reserves can provide comparable energy security benefits at lower cost.

Even the total elimination of energy imports would not insulate the economy from oil price shocks. There would be no terms-of-trade effects under such circumstances, but conditions on the world oil market would still be reflected in domestic prices. For example, although the United Kingdom is not a net importer of oil, its producers and consumers faced higher oil prices after Iraq invaded Kuwait. The only way to decouple domestic and world energy prices is to manage trade in energy products. Such a policy would have much higher long-run costs than those imposed by energy price fluctuations.

STRENGTHENING MARKET FORCES

Federal actions can promote efficiency and competition in energy markets in several ways. The movement toward complete deregulation of wellhead prices for natural gas, pursuant to the Natural Gas Wellhead Decontrol Act of 1989, is contributing substantially to the economy's flexibility. Currently, new gas pipelines require the approval of the Federal Energy Regulatory Commission (FERC), which also regulates rates charged for the transmission of gas. The pipeline approval process should focus on environmental and safety factors rather than on the extraneous considerations

that enter into current FERC proceedings. Pipeline rates should be regulated only to prevent monopoly abuses, and regulation should be implemented in a way that fosters economic efficiency.

Retail electricity rates are regulated at the State level, and competition has traditionally played a minor role in electricity markets. In recent years, however, State regulators have begun to allow competition for the right to construct new generating facilities. The Federal Public Utility Holding Company Act, which limits an electric utility's participation in competition to build new capacity outside of its service area, should be reformed to increase the role of market forces. Steps should also be taken to ensure that access to the high-voltage transmission network is not controlled in a manner that restricts competition.

State regulation of electric utilities has generally had the effect of tying profits to the amount of power sold, thereby discouraging utilities from assisting their customers in pursuing cost-effective conservation opportunities. Some States have adopted integrated resource planning programs that allow utilities to promote, undertake, or subsidize conservation investments on their customers' premises. Such programs can speed the diffusion of efficient new conservation technologies. By helping users reduce their demand for electricity, these programs reduce the need for new generating plants.

Utility programs that subsidize conservation investments on customer premises must be carefully designed if they are to be both efficient and equitable. The price of electricity itself already provides customers with an incentive to conserve. They receive a return on their investments in conservation in the form of lower electricity bills. However, in some areas the retail price of power is below the cost of production from new capacity. In such circumstances the conservation incentive provided by electricity prices is generally too low. Therefore, a utility subsidy for customer conservation investments equal to the difference between the price of electricity and the cost of producing it can enhance economic efficiency. *But providing a subsidy equal to the full cost of producing electricity from new capacity is both inefficient and inequitable.* It is inefficient because conserving consumers are paid both the cost of the power saved (through the subsidy) and its price (through lower electricity bills). As a result, consumers may be induced to make conservation investments that raise, rather than lower, the total utility and consumer cost of balancing demand and supply for electricity. It is inequitable because the utility must recoup the double payment to conserving customers by raising the rates charged to other customers.

Adverse environmental impacts are another social cost of power production, and it is sometimes asserted that these impacts merit

the provision of additional utility subsidies for customer conservation investments. However, electricity prices already reflect utilities' costs of compliance with environmental regulations. If society's valuation of environmental effects rises, the proper remedy is to tighten environmental regulation. That approach will reduce environmental impacts directly and also increase incentives for conservation by raising electricity prices.

Energy Research and Development

Market forces also need to be strengthened in the area of research and development. Private firms are likely to underinvest in research that promises widespread benefits if the firm carrying out the research cannot use patents or other means to prevent other firms from capturing most of those benefits. Government's proper role is to support basic, precompetitive research in the energy sector rather than to pick winners and losers. Premature government commitment to a selected technology can foreclose the development of other, more attractive alternatives or of a diversified set of technologies suited to specific applications or regional markets.

The lack of a clear yardstick for measuring technological promise or valuing research progress presents a challenge for both the initial allocation of research resources and the assessment of ongoing programs. A policy that supported only technologies whose commercial viability was imminent might produce an impressive batting average without making any real contribution to technological advancement. Yet, there must be some reliance on market signals to avoid permanent commitments to technological dead ends. *One promising approach to balancing these two competing concerns is to rely on government-industry consortia in which industry supplies a major share of funding and plays a major role in setting the research agenda.*

Energy Use Standards

Some have suggested that the adoption of stringent energy use standards provides a low-cost approach to reducing energy use. *While efficiency standards can play a constructive role in certain circumstances, their significant potential for causing economic harm must be recognized.* Unlike regulatory reform, energy use standards generally limit rather than expand flexibility and choice. Moreover, the goal of energy policy is to enhance prospects for economic growth while meeting legitimate energy security and environmental concerns, not to minimize energy use.

It is sometimes argued that energy-efficiency standards are justified because consumers do not purchase goods with the lowest combined purchase and energy costs. But, claims that standards are a no-lose proposition often fail to account fully for all product attributes important to consumers. In choosing among various

models of cars, for example, consumers value performance features as well as energy efficiency and cost. Indeed, absent such preferences it is difficult to explain the popularity of optional powerful engines that increase the cost of cars while decreasing their energy efficiency. Without evidence that structural or government-created barriers exist and cannot be addressed directly, government regulation of energy efficiency should be viewed with skepticism.

SUMMARY

- The long-run outlook for energy prices is uncertain. Therefore, long-run policies should be flexible enough to serve national interests under a wide variety of energy market conditions. These considerations support continuation of the Nation's successful policy of market reliance.
- Energy security can best be pursued through the accumulation of strategic reserves and diversification of energy supplies. An excessive focus on minimizing energy imports can have significant adverse economic impacts.
- Further regulatory reform at the Federal and State level can improve the operation of energy markets. Policy should strive to maximize flexibility and choice and to avoid the introduction of new distortions.

CONCLUSION

The same policy principles are appropriate for macroeconomic policies and energy market policies. Systematic policies that permit predictable responses to changing short-run conditions, while maintaining a clear and credible focus on long-run objectives, should be pursued. Such policies will position the economy to meet the challenge presented by oil price shocks.

Well-designed policies can significantly reduce but not entirely eliminate the unfavorable effects of such shocks. Large and abrupt increases in oil prices can still adversely affect the economy. These oil price shocks present policymakers with the prospect of temporarily higher inflation and slower real growth rates.

Experience with the price shocks of the 1970s has led to policies better able to handle an oil price shock. Having produced a low and steady inflation rate and earned the credibility that comes from such performance, the Federal Reserve has preserved the latitude to cushion the impact of oil price shocks without increasing inflation expectations. The removal of price and allocation regulations in energy markets allows market forces to guide products to their most valued uses, while the decrease in the intensity of energy use has made the overall economy less sensitive to oil price shocks. Strategic petroleum reserves in the United States and

other countries can now cushion the effect of large temporary supply disruptions by increasing the supply of oil. For these reasons, the U.S. economy is now able to adapt more readily to an oil price shock than it was in the past.