LOW OIL PRICES AND THE ILLINOIS OIL INDUSTRY

Effects, Outlook, and Policy Recommendations

Subhash B. Bhagwat

ILLINOIS MINERALS 115 1995

Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY

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ABSTRACT

The fall in oil prices between 1981 and 1986 has had both good and bad economic consequences, which vary at national, state, and county levels and between major oil producers and independent producers.

The overall economy benefited from low oil prices as the cost of energy input in manufacturing and transport of goods declined. In 1993, the United States spent less than half as much on oil imports as it did in 1980, both in terms of dollars and in percentage of gross domestic product.

Declining oil prices in the 1980s have had a negative effect on oil production in Illinois and the United States. Although all states were affected, the negative impact of low oil prices has been borne more heavily by states such as Illinois and counties within the states that produce oil from stripper wells operated by small independent producers. The unfavorable economics of stripper wells, exacerbated by the financial weakness of the independents, has led to decreased exploration and development efforts as a result of low oil prices.

Because major oil producers can shift investment away from crude oil production to refining and other downstream sectors and from the United States to other oil producing regions, exploration for new fields and exploitation of an increasing number of domestic fields are being left to independents.

In addition to the decreasing value of the oil produced, declining domestic production led to direct and indirect job losses, increased expenditure on social welfare, and lost tax revenue. In Illinois, the estimated impact of low oil prices includes lost production value of more than $500 million per year, a direct loss of 4,100 jobs in the oil industry, indirect loss of 8,000 to 12,000 jobs, lost royalties of $88 million annually, reduced tax revenues, property devaluations due to economic slump in certain counties, and increased welfare costs to the state. Although the state's economy benefited by $2.8 billion due to lower oil prices, the negative impact was borne by a few counties, which added a degree of severity to the effects of low prices.

In the absence of higher oil prices, the key to an improved economic environment for independent operators in Illinois is to direct research efforts toward expanding technological and geologic knowledge that increases efficiency of oil exploration and development and lowers the cost of production.

INTRODUCTION

Although international oil prices have risen and fallen dramatically since 1973, only the impacts of high oil prices have usually been studied. Especially from state and local perspectives, the effects of low or falling oil prices have largely escaped attention because of the positive influence they have on gasoline prices. Low prices, however, have both good and bad consequences, and what may be bad for the oil industry is good for the country, and vice versa. Some of the misconceptions about low oil prices, and especially their effect on Illinois, will be considered in this report.

The effect of low oil prices on U.S. oil production was summarized by the congressional Office of Technology Assessment in 1987 (U.S. OTA 1987). When crude oil prices decline, low productivity wells are abandoned and production declines. A reduction in expenditures on exploration and development may be accompanied by a shift away from domestic to foreign oil investment and an increase in oil imports. Although profits from foreign investments flow back to U.S. interests, such a shift in investment leads to a loss of domestic jobs.

Not all the effects of low oil prices are negative, however, nor are they uniform across the oil industry and national economy. To a certain extent, lower oil prices offset the impact of greater non-oil imports on the foreign trade deficit. Because transportation costs represent a significant portion of the nation's economy and oil is a vital cost factor in transportation, lower oil prices reduce transportation costs, create new jobs, and invigorate the economy. Illinois is a major industrial and agricultural state that produces only a small fraction of the crude oil needed in its economy. Lower oil prices therefore mean less money spent to import an essential ingredient of the economy and consequently a lower overall cost of doing business in the state.

Different segments of the oil industry are affected in different ways by low oil prices. When crude oil prices fall, major oil companies can emphasize investments in the refining business in order to benefit from the low refinery feedstock prices. Smaller and independent oil producers

may not have the same options and may suffer severely from a drop in oil prices. The impact of declining oil prices may differ regionally because of the characteristics of the local oil industry. The oil industry in Illinois, for example, is dominated by small, independent producers and therefore is more severely affected by low oil prices than it is in some other states with fewer small producers.

This study reviews the development of oil prices, reserves, production, and imports and presents a comprehensive view of the positive and negative impacts of low oil prices on the economy, as well as the oil industry, to aid policy makers in setting long-term goals for Illinois. Specific conditions in Illinois oil fields are studied, and suggestions for Illinois oil policy are offered.

History of Oil Prices

Oil prices in the United States have fluctuated widely since 1970, for both domestic and international reasons. In 1973–74 and again in 1979–81, oil price increases were triggered by international crises in West Asia. However, because prices of domestically produced oil in the United States were regulated, the full impact of international price increases was not felt by U.S. consumers until the deregulation of U.S. domestic oil prices was completed in 1981. The price of a barrel of crude oil (in 1993 dollars) increased from about $13 in 1973 to about $26 in 1975, and from $26 in 1978 to $55 in 1981. Prices fell sharply between 1981 and 1986 as a result of price-induced conservation, increased worldwide supply, and an economic recession in 1982. Since 1986, prices have fluctuated between $15 and $25 per barrel (fig. 1). The price of oil is the most significant variable in determining exploration activity, discovery, and development of new reserves because, other factors remaining unchanged, a higher price is generally associated with a higher profit margin.

Oil Reserves

A time-lagged correlation is expected between oil prices and oil reserves because high oil prices are an incentive to exploration, and low prices discourage exploration. Figure 2 shows that a sharp upward revision of world oil reserves came in 1988 and 1990, or 7 to 9 years after oil prices peaked in 1981. This time lag may indicate the effort required for successful exploration but could also have nontechnical reasons because most new reserves came from the traditional oil-producing countries in West Asia.

The increase in world oil reserves preceding the 1973–74 price increase obviously cannot be attributed to the price increase. Furthermore, U.S. oil reserves have declined by about one-third since reaching a high in 1972, despite price increases in following years (fig. 3). Similarly, in

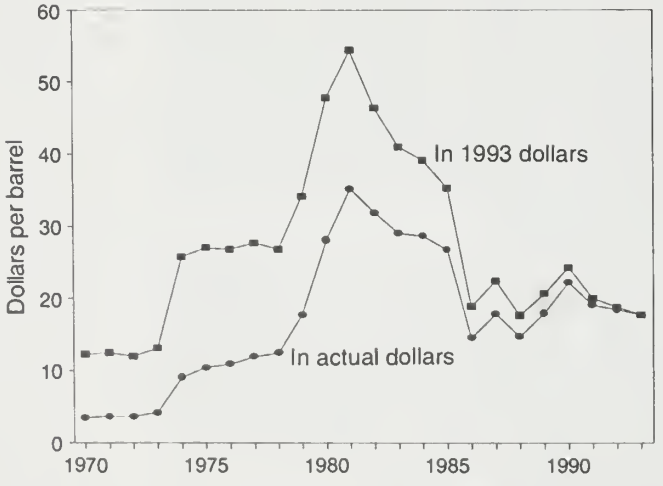

Figure 1 Oil prices in actual and 1993 dollars. Source of data: Monthly Energy Review, U.S. Dept. of Energy, DOE/EIA-0035.

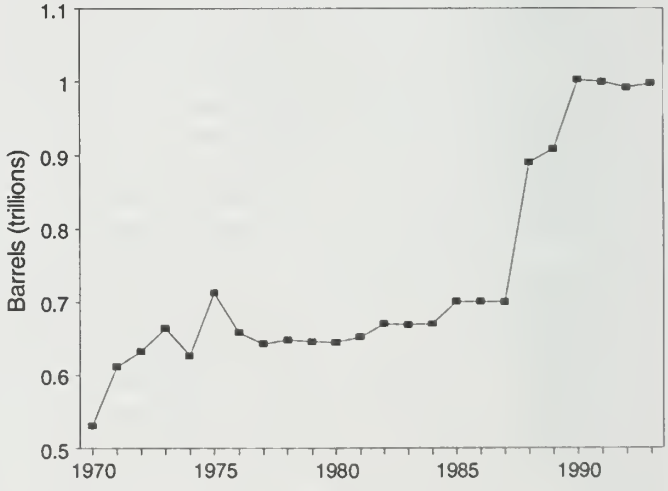

Figure 2 World oil reserves. Source of data: *Oil and Gas Journal.*

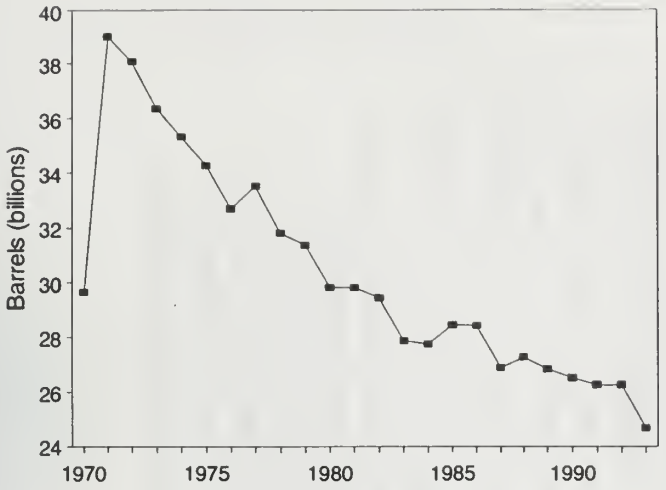

Figure 3 U.S. oil reserves. Source of data: *Basic Petroleum Data Book* (1993).

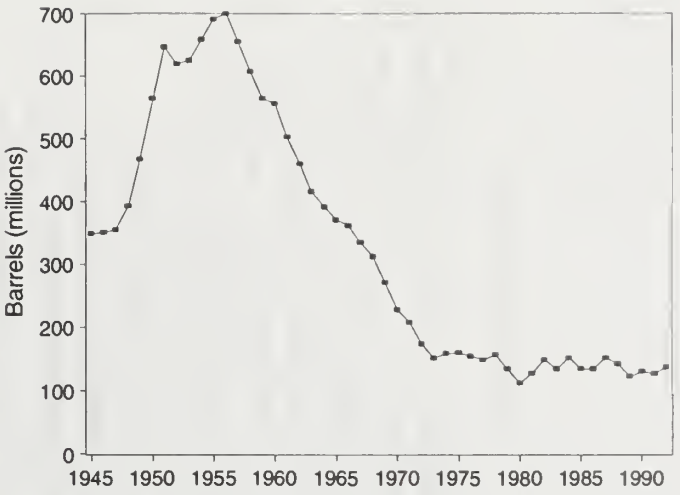

Figure 4 Illinois oil reserves. Source of data: *Basic Petroleum Data Book* (1993).

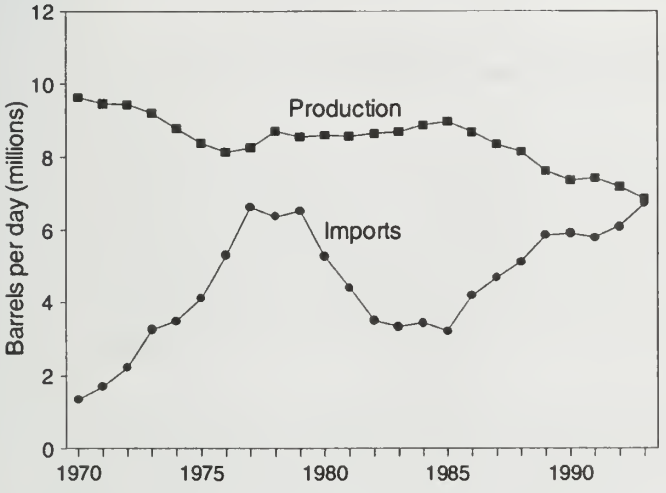

Figure 5 U.S. production and imports of crude oil. Source of data: *Basic Petroleum Data Book* (1993).

Illinois, the decline in oil reserves that began in 1957 has slowed but not stopped since 1973, despite large price increases after that time (fig. 4).

Thus, an attractive oil price alone is not a sufficient condition for exploration activity to flourish. The incentive to explore and develop comes from the potential for profits. Given an oil price determined by world market forces, an increase in profits can only come from reductions in production costs. In the United States in general and Illinois in particular, such cost reduction would require improvements in well productivity and other business and governmental actions (such as tax and investment incentives) that would improve profit margins and make exploration and reserve development attractive.

Oil Production, Prices, and Imports

Crude oil production and imports, like exploration, are expected to respond to prices. The trend in U.S. oil production in 1970–92 has generally been downward (fig. 5), with relatively stable production during 1978–85. Production declined in 1970–78 because world oil price increases could not fully benefit the U.S. oil industry because of the domestic price controls. In the post-1985 period, price controls were nonexistent, but world oil prices were declining, thus reducing U.S. production. The correlation between price and production cannot be clearly established in 1978–85, when production remained stable despite price increases from 1978 to 1981 and price declines from 1981 to 1985. Like production, U.S. oil imports also did not respond uniformly to price changes. Throughout the 1970s, imports increased although the oil prices rose sharply in 1974 and 1979 because total demand increased without a corresponding increase in domestic oil production. Total demand and imports responded to price changes only in the post-1980 years; demand and imports started to fall after oil prices reached a peak in 1981–82, but rose again after prices fell starting in 1985 (fig. 5). Crude oil imports have fluctuated between about 1.5 and 7 million barrels per day, whereas domestic production varied in a narrower range of about 7 to 10 million barrels per day. Crude imports equaled domestic production, for the first time in history, in 1993.

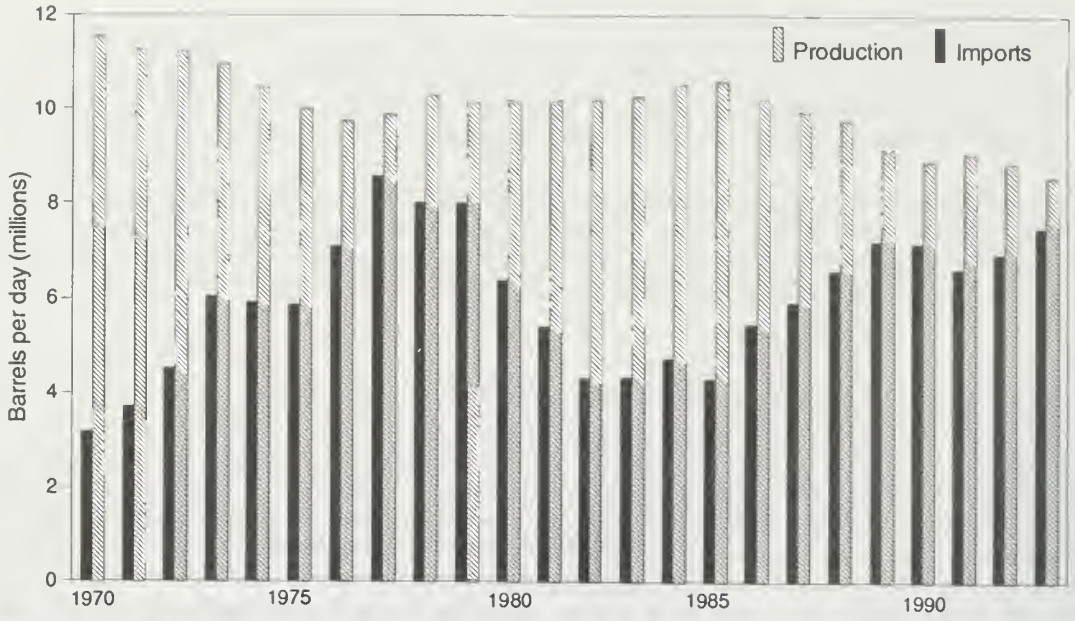

Figure 6 U.S. production of crude oil and natural gas liquids, and net imports of crude and petroleum products. Source of data: Monthly Energy Review, U.S. Dept. of Energy, DOE/EIA-0035; Basic Petroleum Data Book (1993).

Crude oil constitutes only a part of the oil scenario; the other part is refined products. The refining industry in the United States benefits from low crude oil prices. Figure 6 shows that combined net imports of crude oil and petroleum products reached high points in 1977 and 1993 but never equaled the level of domestic production of crude oil and natural gas liquids for two main reasons. First, production data include natural gas liquids, which are reported independently by the oil industry. Second, net imports of petroleum products have decreased because of greater exports of products by U.S. refineries (fig. 7), which suggests technological and cost advantages of U.S. refiners over their international competitors.

United States dependence on imported crude and refined products increased from 22% to 47% in 1970–77, despite the price increases of 1973–74. The second round of price increases in 1979–81 initiated a fall in import dependence that continued until 1985. The low prices that prevailed since 1985 have led to increased imports and a rise in import dependency from 28% in 1985 to 44% in 1992 (fig. 8).

Import Spending and Gross Domestic Product

Are increased oil imports and increased dependence on imports for consumption bad for the economy? Figures 8 and 9 indicate that the price decline in recent years has permitted the United States to import increasing quantities of oil without spending a higher share of gross domestic product (GDP) for the imports. In comparison with oil imports, non-oil imports have posed a greater problem. Until 1980, the United States earned up to 2% of GDP as a result of net exports of non-oil

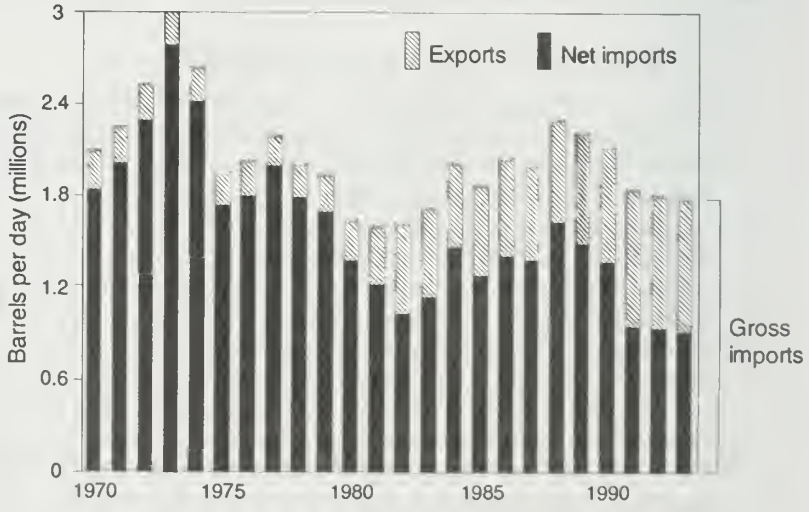

Figure 7 U.S. gross and net imports of petroleum products. Source of data: Monthly Energy Review, U.S. Dept. of Energy, DOE/EIA-0035.

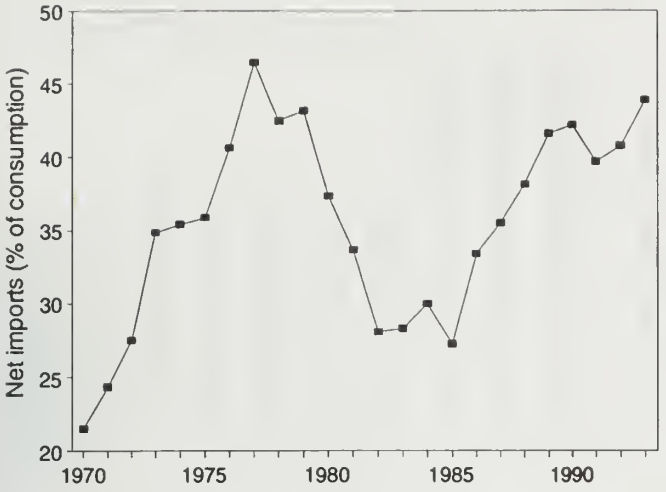

Figure 8 U.S. import dependence for crude and petroleum products. Source of data: Monthly Energy Review, U.S. Dept. of Energy, DOE/EIA-0035.

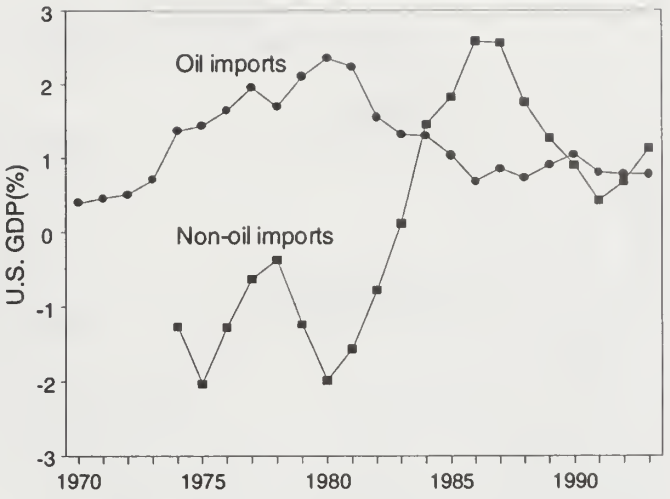

Figure 9 U.S. imports and the GDP. Source of data: Monthly Energy Review, U.S. Dept. of Energy, DOE/EIA-0035.

goods. These earnings helped nearly balance the foreign trade account. In the first half of the 1980s, the non-oil balance of trade dramatically worsened while spending on oil imports as percentage of GDP actually declined. Although net imports of non-oil goods have declined since 1985, they rose substantially in 1992 and 1993, surpassing the oil trade deficit by $25 billion in 1993. A total of about 1.8% of U.S. GDP was spent on net imports of oil and non-oil goods in 1993 (fig. 9).

Oil and petroleum products are consumer items for industry and business. Therefore, the effects of oil price changes should be manifest within only several weeks. The data in figure 9 indicate, however, no apparent negative impact on U.S. non-oil exports as a result of oil price increases in 1974–75 or 1979–81. Likewise, the falling oil prices in real dollars since 1982 had no positive effect on non-oil exports until the prices stabilized in the latter half of the 1980s. The U.S. economy in general, and the transportation sector in particular, did respond to the crises in the international oil markets by resorting to cost-saving measures. As indicated in figure 10, the share of the transportation sector in the national GDP declined from about 4% before the 1973–74 oil crisis to slightly more than 3.1% in 1992. Most of this improvement took place in the 1980s. The foreign trade imbalance in the non-oil sectors would have been larger without the cost savings in the transportation area.

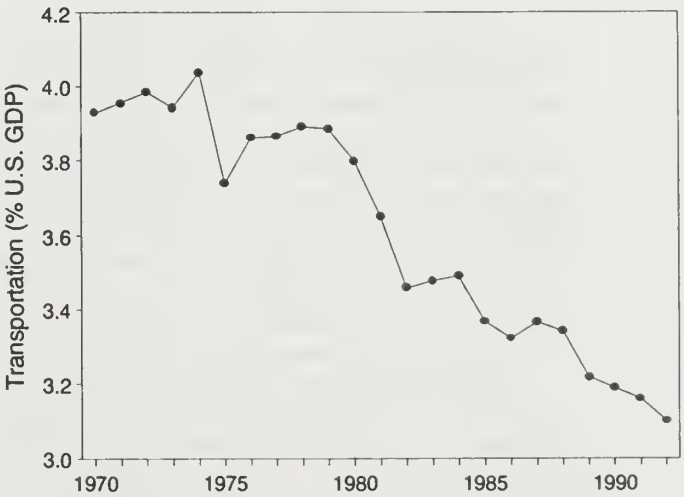

Figure 10 Transportation as percentage of U.S. GDP. Source of data: Survey of Current Business, U.S. Dept. of Commerce.

Effects of Low Oil Prices on the Oil Industry

While non-oil sectors of the U.S. economy benefitted from the falling oil prices after 1986, the oil industry itself was adversely affected. The oil industry, contrary to widely held public opinion, is neither monolithic nor identical with large international oil firms. The three major segments of the oil industry are exploration, production, and refining, which also support a large and varied group of service companies. The biggest companies can operate in all three areas, whereas small companies may specialize in only one area. Additionally, each operating segment has different characteristics and operating philosophies.

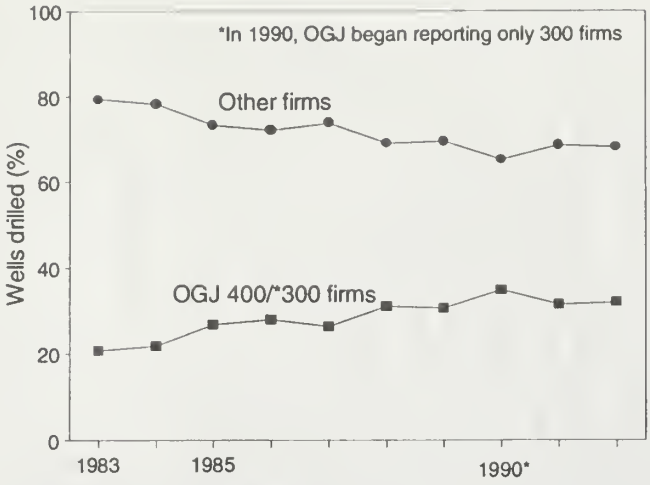

Figure 11 U.S. well drilling by company size. Source of data: *Oil and Gas Journal.*

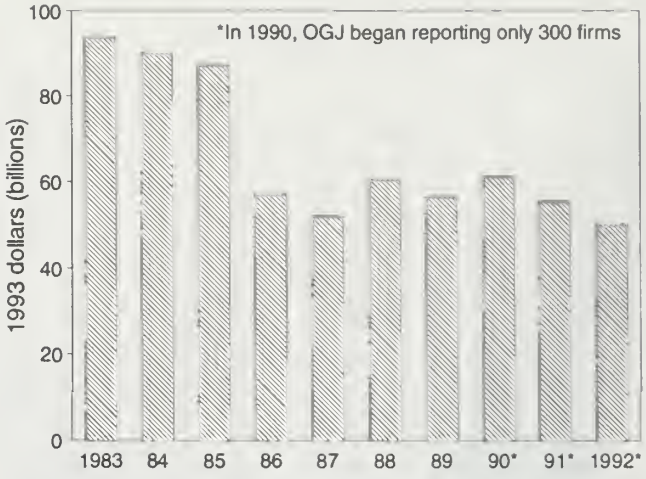

Figure 12 Capital and exploration expenditure (OGJ 400/*300 firms). Source of data: *Oil and Gas Journal.*

The *Oil and Gas Journal* ranks the top 400 or 300 companies by the dollar value of their assets and provides information on their production, drilling, and overall expenditures on exploration and investments. (Beginning in 1990, the journal ranked only 300 companies.) Since 1982, the OGJ 400/300 companies have been responsible for nearly 75% of annual U.S. oil production. According to the definition used by the Independent Petroleum Association of America (IPAA), companies with 1994 sales of more than $5 million per year, or reserves of at least 1 billion barrels, or refining capacity of more than 50,000 barrels per day are considered "major" companies. According to this definition, about 30 of the OGJ 300 companies listed in 1992 were major companies. The top 10 listed companies accounted for about 60% of U.S. oil production in 1992. Using statistical sampling techniques, the IPAA estimates that nearly all the remaining 40% of U.S. oil production comes from independent producers (IPAA 1993). Despite incomplete statistics and sampling errors, a significant amount of oil is obviously produced by independents.

Independents play an even greater role in drilling activity. In 1992, the top 10 listed firms drilled only about 10% of all wells in the United States, although they produced 60% of the oil. The entire list of OGJ 300 companies drilled some 31% of all wells (fig. 11), although this percentage has increased from only 20 in 1983. Figure 11 indicates that while the OGJ 300 firms produced 75% of U.S. oil, the smaller companies drilled 69% of the wells and discovered most of the new oil fields. The capital and exploration expenditures of the OGJ 400/300 companies in the United States in constant 1993 dollars declined by nearly a half in the past decade (fig. 12).

ILLINOIS OIL INDUSTRY

Because most Illinois oil companies are independent producers, nearly all the drilling in Illinois depends upon the response of the independents to oil price changes. Figure 13 shows the average number of drilling rigs operating in Illinois since 1970. The number of rigs doubled from 10 to about 20 in response to the first major oil price increase in 1974–75. The oil price increase in 1979–81 was significantly more stimulating in Illinois, raising the number of rigs to about 75 in 1982. The subsequent fall in oil prices dampened the Illinois oil industry's optimism. Decreased drilling incentive produced a precipitous drop in the rig count to an average of five in the years since 1986, or about half the number operating in the pre-1973 years. Well completions in Illinois indicate a similar pattern (fig. 14). Independents rely, in part, on savings to fund exploration. Profits from infill and offset development wells drilled in times of high oil prices (1974–78) enable operators to generate savings needed for exploration drilling (1979–85). Furthermore, an increase in oil prices (1978–85) significantly increased both exploration and development drilling in the 1979–85 period. Well completions fell back to the 1970s levels by the early 1990s as a result of the oil price decline.

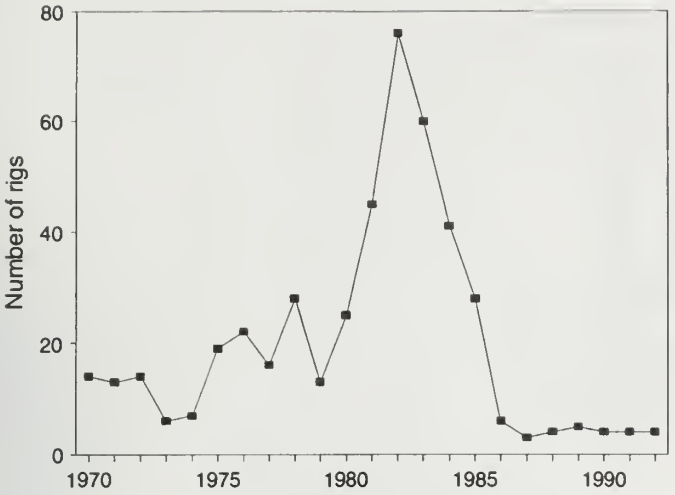

Figure 13 Average number of rigs operating in Illinois. Source of data: *Basic Petroleum Data Book* (1993).

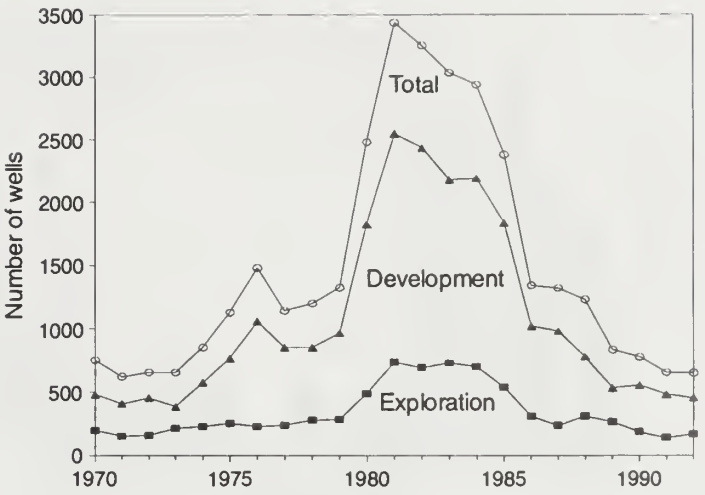

Figure 14 Well completions in Illinois. Source of data: *Basic Petroleum Data Book* (1993).

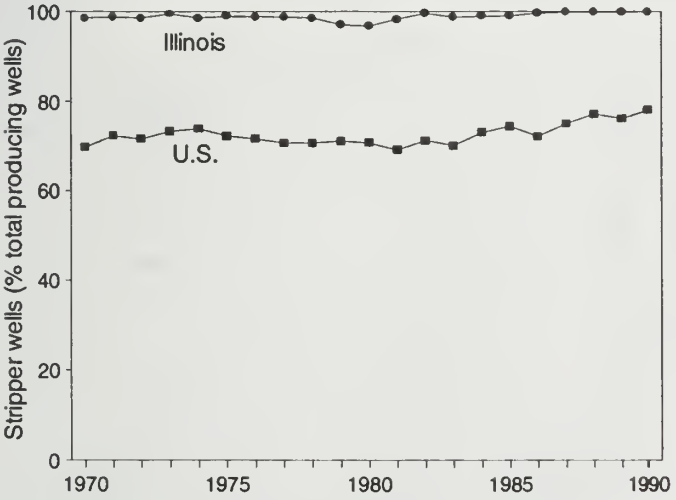

Figure 15 Stripper wells as percentage of total producing wells. Source of data: *Basic Petroleum Data Book* (1993).

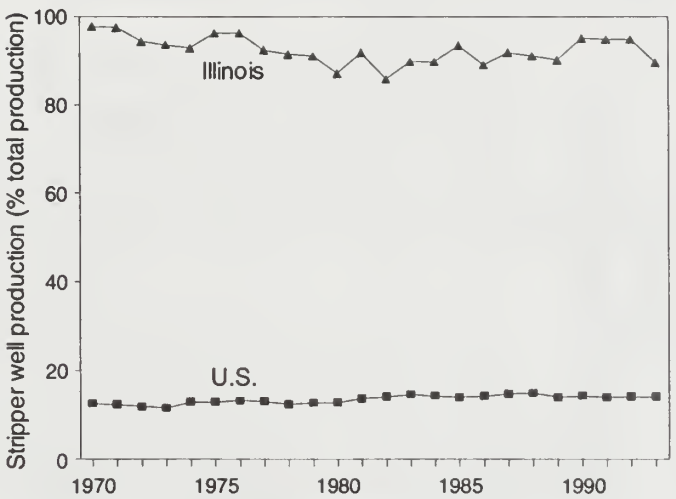

Figure 16 Stripper well production as percentage of total. Source of data: *Basic Petroleum Data Book* (1993).

Although the effect of price changes on the entire U.S. oil industry was similar to that in Illinois, its consequences in Illinois were more serious and long term because of lower Illinois well productivity. Well productivity is measured in barrels of oil produced per day, and wells producing less than 10 barrels daily are called "stripper" wells. Figure 15 shows that more than 95% of producing wells in Illinois are stripper wells, compared with 70% to 78% of all U.S. wells. Figure 16 shows that more than 90% of Illinois oil is produced from stripper wells, as against less than 15% nationwide. In 1993, the average Illinois well produced about 1.6 barrels of oil per day compared with the U.S. average of about 11.8 barrels. The national well productivity average is highly skewed by the fact that about one-fourth of all U.S. wells produce over 85% of total U.S. oil, whereas the remaining three-fourths of the wells produce less than 15% of U.S. oil. As a result of the productivity decline of U.S. wells, major oil companies have been shifting investment away from the United States, leaving domestic production increasingly to the financially weaker independents.

Production Economics of Illinois Oil Fields

Since 1980, 36 oil fields were discovered in Illinois (fig. 17). About 80% of these were discovered in 1980–84 (i.e., in the years of the highest oil prices). First- and second-year production by field

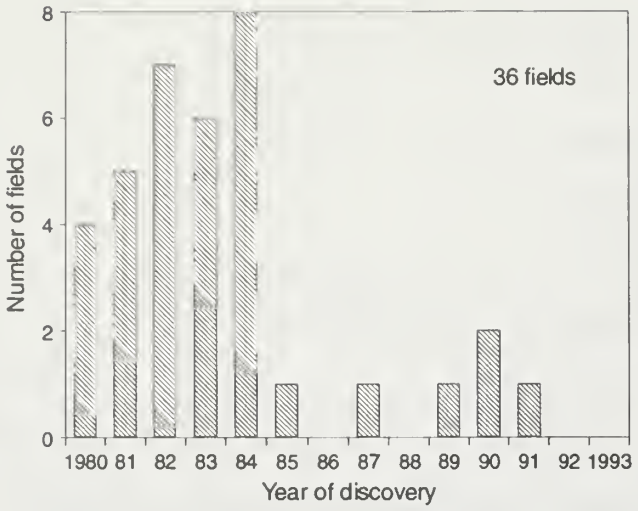

Figure 17 Number of producing oil fields discovered in Illinois since 1980. Source of data: Illinois State Geological Survey, Oil and Gas Section.

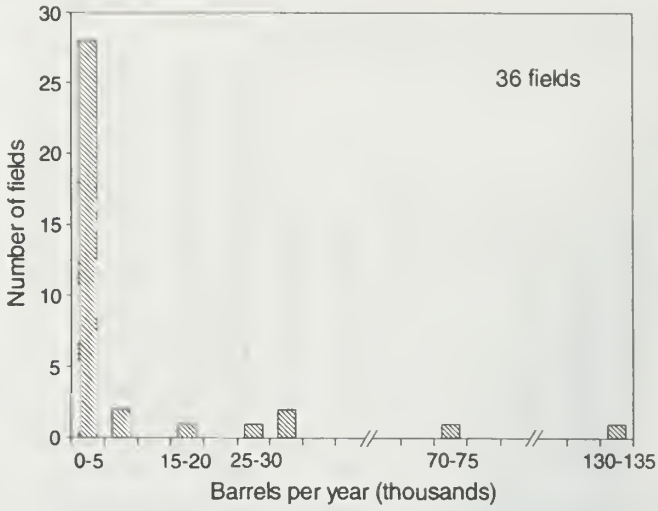

Figure 18 First-year production from oil fields discovered since 1980. Source of data: Illinois State Geological Survey, Oil and Gas Section.

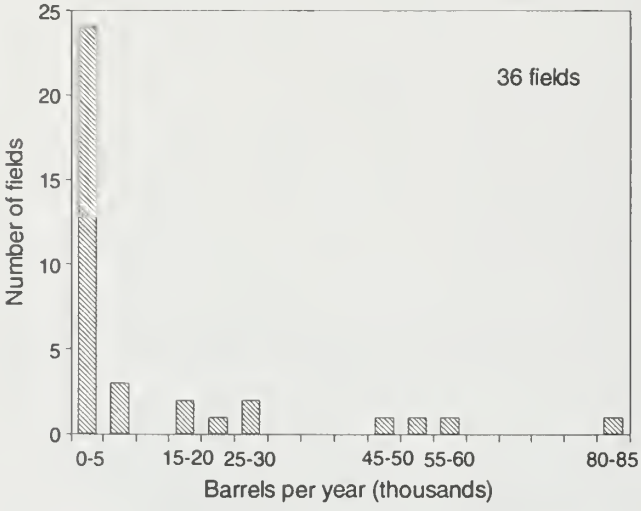

Figure 19 Second-year production from oil fields discovered since 1980. Source of data: Illinois State Geological Survey, Oil and Gas Section.

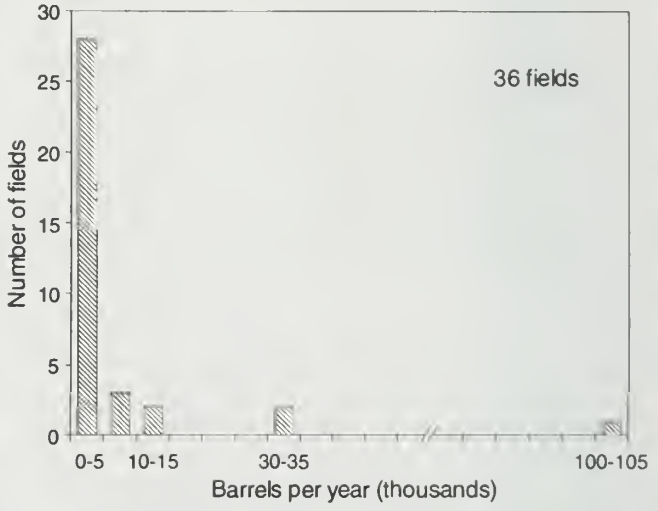

Figure 20 1993 production from oil fields discovered since 1980. Source of data: Illinois State Geological Survey, Oil and Gas Section.

indicates that most new fields are small in size, producing fewer than 5,000 barrels per year each (figs. 18 and 19); only 12 of the 36 new fields had a second-year production of more than 5,000 barrels. The 1993 production by these new fields (fig. 20) indicates that only 7 of the 36 fields still produced more than 5,000 barrels each, and only 3 produced more than 30,000 barrels.

Production Economics of Typical Illinois Oil Fields

Because most new Illinois oil fields comprise fewer than 10 wells, a model was developed to calculate the economic profitability of oil field production and applied to three hypothetical Illinois oil fields to determine the minimum annual field production or to project the future oil price required to break even. The cost basis of a typical Illinois oil field with five producing oil wells is described in table 1, along with other operational parameters. The parameters used for the model, although typical, are not intended to represent all Illinois fields because actual field conditions may vary widely.

Table 1 Input parameters for model break-even analysis of a five-well Illinois oil field.

Acres leased	450
Initial bonus ($/acre)	55
Dry wells drilled	1
Dry well cost ($/ft)	17.5
Injection wells drilled	1
Producing wells drilled and equipped	5
Producing well cost ($/ft)	36
Well operating expenses ($/well/month)	650
Annual inflation of operating expenses (%)	3
Initial investment in pressure maintenance program ($)	30,000
Royalty (%)	12.5
Overriding royalty (%)	6.25
Cash flow discount rate (%)	
1980 discovery	20
1994 discovery	13

The first analysis indicates that a five-well field discovered in 1980 could operate economically—given the actual oil price development from 1980 to 1993 and the projected prices for the post-1993 years (fig. 21)—if it produced at least 10,000 barrels per year initially and if a pressure maintenance program were implemented in 1984. The price projections to $27.50 in year 2009 are based on a 0.7% growth above an average expected rate of inflation of 3% per year. The model reveals that the limit of economic production was reached in 1992; thus, such a field would produce about 89,000 barrels through 1992 before beginning to lose money. Fields that produced less oil from five wells, which applies to about 80% of fields discovered in Illinois since 1980, could not, under normal circumstances, have been profitable.

The second analysis is for a five-well oil field discovered in 1994. For this analysis, oil prices are projected to rise from $16 in 1994 to $34.50 per barrel by the year 2023; an oil pressure maintenance program is assumed to begin in 1998. The model reveals that the economic production limit would be reached in 2009. The model also indicates that to be economical this field would have to be more productive than a similar field discovered in 1980. The initial annual production rate would have to be about 17,600 barrels (fig. 22), and the total production during its economic life of about 15 years would have to be about 166,000 barrels.

The third analysis develops a price projection that would allow a field discovered in 1994 with an initial production of about 10,000 barrels per year to operate economically. A pressure maintenance program is assumed to begin in 1998. This analysis (fig. 23) indicates that for such a field to break even economically, the oil price in 1994 would have to be about $30.50 per barrel and rise to about $38.00 in year 2009. The model indicates that the limit of economic production would be reached in 2009. During its economic life of 15 years, this field would produce about 97,000 barrels of oil. Actual oil field discoveries since 1980 have been of much smaller size, however, so that the required break-even price would have

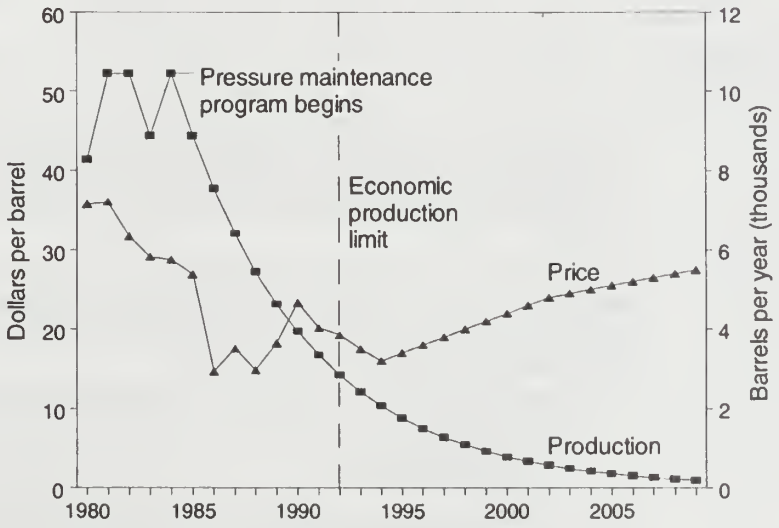

Figure 21 Break-even production for a five-well Illinois oil field discovered in 1980. (Actual prices 1980–93, projected prices 1994–2009).

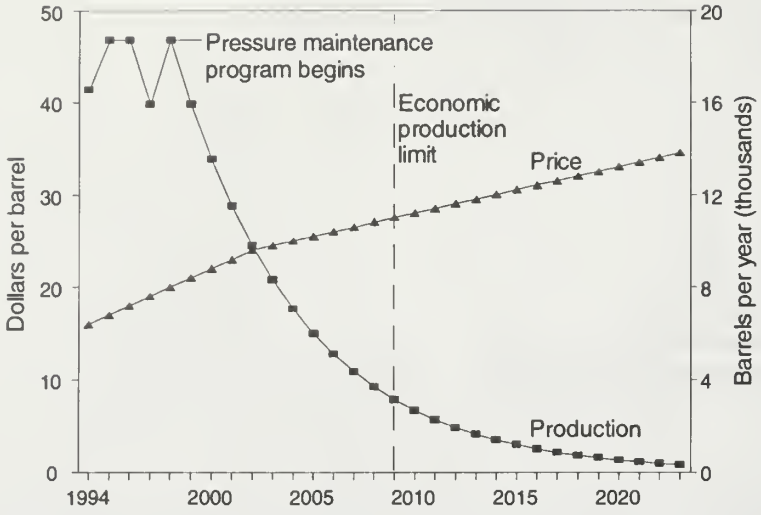

Figure 22 Break-even production for a five-well Illinois oil field discovered in 1994.

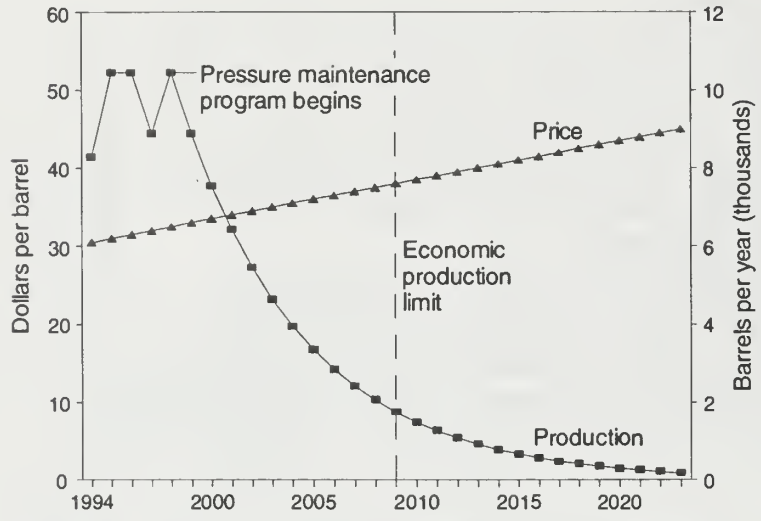

Figure 23 Break-even price for a five-well, 10,000 bbls/yr Illinois oil field discovered in 1994.

to be substantially higher than calculated in this third analysis.

The economic oil field models indicate that discovering new, profitable oil fields in Illinois has been extremely difficult because of low oil prices. The low number of new fields discovered since 1980, most of them relatively small, has been unable to stop the downward trend in Illinois oil production because oil prices and, therefore, profit margins have been too low, especially since the mid-1980s. Since oil prices cannot be influenced by the local producers or by individual governments, the only way to improve profit margins under these circumstances is to devise means to reduce costs.

Economic Impact of Low Oil Prices in Illinois

The impact of low oil prices goes beyond the oil industry. It affects the entire state economy, and especially the economies of the oil-producing counties that are primarily in southern Illinois.

The increase in oil prices in 1974 did not immediately stop the production decline in Illinois, but the price increase (fig. 24) in 1979–81 generated enough incentive to stimulate oil production in 1980–85, although prices had begun to fall in 1982. A 45% drop in price in 1986 ended the economic incentive and started a renewed downturn in Illinois oil production that continued through 1993.

Available employment data indicate a loss of 4,100 oil jobs in Illinois between 1982 and 1989 (fig. 25). In the same period, annual production dropped by 7.5 million barrels (fig. 24). Oil consumption dropped by about one-third between 1978 and 1982, but stabilized to an average of 223 million barrels after 1983 (fig. 26). At the peak of production in 1985, Illinois produced about 15% of its oil needs, but currently produces less than 10% of its needs.

The oil price decline from about $32 per barrel in 1982 to about $18 in 1989 resulted in net savings to the Illinois economy of $2.8 billion annually. Additional benefits accrued as prices fell further to $16 by early 1994. Savings of this magnitude throughout the economy have a favorable impact on inflation and job creation.

The price decline, however, had a number of negative impacts:

- Oil wells with low productivity were abandoned, and access to potentially valuable oil reserves was lost.
- The value of oil produced in Illinois each year declined by more than $500 million. The direct and indirect impact on the gross state product (GSP) may have been $1.5 billion

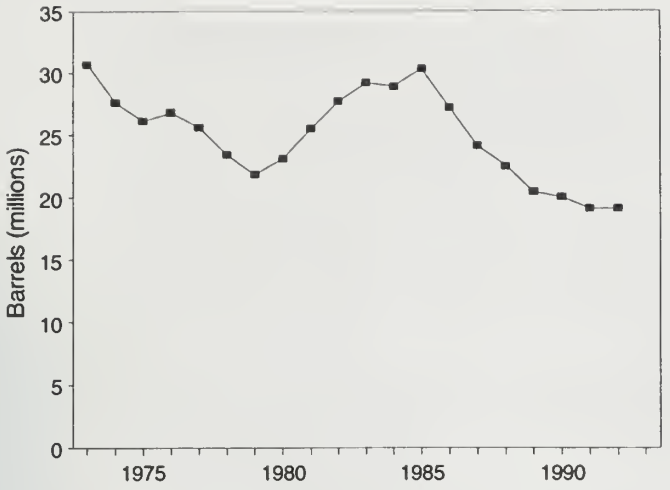

Figure 24 Illinois oil production, 1973–93. Source of data: *Basic Petroleum Data Book* (1993).

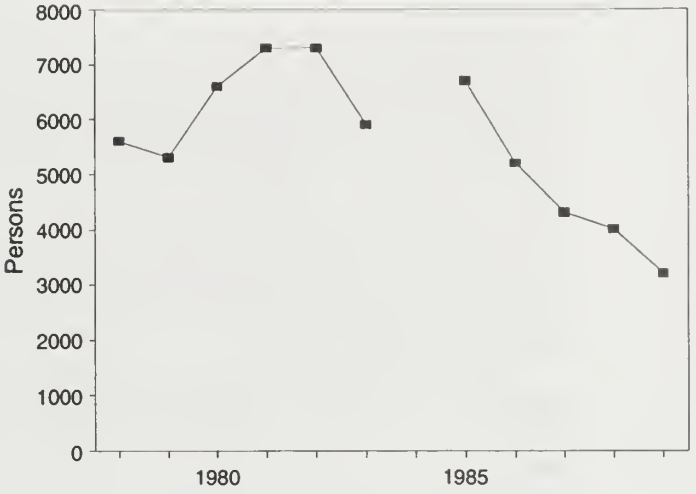

Figure 25 Illinois oil industry employment, 1978–89. Source of data: Illinois Dept. of Employment Security.

to $2 billion annually because of the multiplier effect of losses in a basic industry such as oil.

- The loss of 4,100 jobs in the oil industry may have caused 8,000 to 12,000 additional job losses in related and dependent industries.
- Up to $88 million in royalties paid to owners of mineral rights was lost annually as a result of the declining total value of oil produced in Illinois.
- Tax revenues were lost to state and local governments as a result of loss of jobs and loss of GSP.
- Increased unemployment increased government expenditures on welfare and social support.

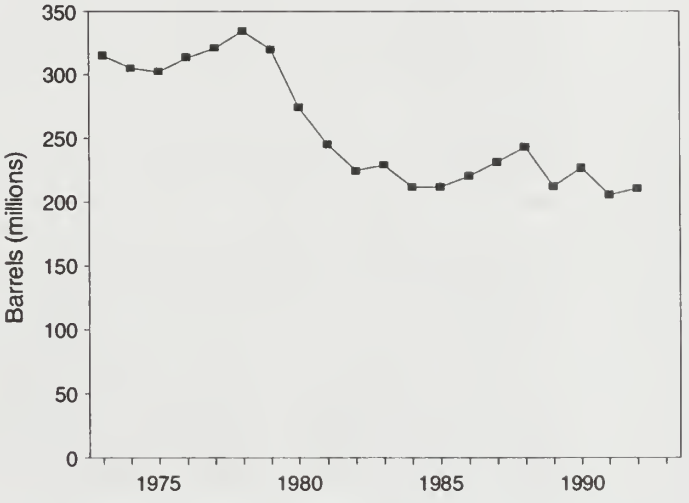

Figure 26 Illinois oil consumption, 1973–93. Source of data: State Energy Data Report, DOE/EIA-0214(94).

Although the last two negative impacts cannot be quantified easily, the total dollar value of all the negative effects of low oil prices obviously adds up to a substantial amount and may outweigh the benefits derived from low oil prices. Most significantly, the savings from low oil prices accrue to a different group of people or entities than those who must bear the losses. The impact is exacerbated by the fact that most oil-producing counties in Illinois are rural and have higher-than-average unemployment rates even in normal times.

SUMMARY, OUTLOOK, AND POLICY RECOMMENDATIONS

Effects of Price Changes

National-level impacts of low oil prices on domestic production include declining domestic production, loss of oil reserves through well abandonment, exodus of exploration capital, and increased import dependence. Offsetting benefits include a favorable influence on inflation, lower cost of transportation, and a less unbalanced foreign trade.

International oil prices have risen and fallen dramatically since 1973, and the impacts of high oil prices on U.S. oil production have been well studied. Low or falling oil prices, however, have

largely escaped attention, especially from state and local perspectives, because of their positive influence on gasoline prices. On a worldwide basis, the oil reserves situation has improved significantly since the late 1980s, in part because of the delayed effects of the high oil prices in 1974–81. However, U.S. and Illinois oil reserves have consistently declined despite oil price increases.

In the United States as well as Illinois, production response to price changes was limited. Illinois oil production responded more positively to the oil price increase in the 1980s than did U.S. production, perhaps because small, independent Illinois producers have little access to international markets and are more willing to identify themselves with Illinois fields than are large corporations. Diminishing profit margins in the United States have driven larger oil companies to seek investment opportunities outside the country, and leave the domestic reserves increasingly to smaller independents.

United States imports of crude oil have increased as a result of decreasing prices and reached 50% of total consumption in 1993. However, refiners in the United States were able to expand exports of finished products by taking advantage of high technology, low cost operations, and low crude oil prices. Only the larger U.S. corporations have the financial capability to be in the crude production and refined product markets at the same time. The independents are mostly active in crude oil exploration, development, and production and are unable to take advantage of the improved profitability in the refining sector.

Although crude imports increased in 1993, the United States spent only 0.8% of GDP on imports in 1993, compared with about 2.3% in 1980. Increased import dependence for oil thus does not necessarily mean an economic disadvantage for the country. The conservation efforts begun in response to the oil price increases in 1974 and 1979–81 reduced the nation's transportation sector from 4% of GDP in 1975 to about 3.5% in 1983. As oil prices declined, transportation's share of GDP further declined to 3.1% by 1992, despite rising oil consumption; these savings in transportation costs indicate a distinct savings for all businesses in the country. Illinois businesses and private citizens benefited by about $2.8 billion annually.

The balance of trade is an important indicator of the nation's economic health, and oil's contribution to the deficit is of concern to planners. However, low oil prices have helped reduce the overall foreign trade deficit despite rising oil imports. The rapidly increasing non-oil trade deficit is a larger national problem today than the deficit in oil imports because it indicates a lack of competitiveness of a broad range of U.S. industries.

As oil prices declined in the 1980s, the drilling and exploration activity in the United States also declined. While large companies continue to produce some 70% of the oil, smaller companies account for 70% of drilling. Spending by large corporations on exploration has declined by half in 10 years, and the number of rigs and well completions in each year since 1986 is lower than in 1970.

Illinois Outlook

The Illinois oil industry is in a particularly weak condition because it consists almost entirely of small, independent operators. Major oil finds have not been made in Illinois in several decades and especially since 1980. New oil fields are small and uneconomical, and producers lack the geologic knowledge and financial strength to explore for unknown reserves. Although three-fourths of U.S. oil wells are stripper wells, nearly all Illinois oil wells fall in that category. Given the price history of the 1980s to early 1990s and the projected slow price recovery in the future, a typical oil field discovered in Illinois in 1980 would have had to produce at least 10,000 barrels per year to break even. A discovery in 1994 would have needed an initial field production of 17,600 barrels per year to break even at projected prices. A 1994 discovery that produces 10,000 barrels per year would require an oil price of $30.50 per barrel to break even.

There have been 36 field discoveries in Illinois since 1980, 27 of which had initial production levels of less than 10,000 barrels per year. Moreover, 24 of these fields actually produced less than 5,000 barrels per year initially. Some of these fields may have generated profits at the high price levels that existed in the first half of the 1980s, but these fields were not large enough or productive enough to stop the downward production trend in the state in the face of the low oil prices prevailing since the mid-1980s.

Economic Costs

Since 1985, Illinois' oil production has declined by 12.5 million barrels, or about 42%, which means the value of oil produced in Illinois has declined by about $500 million. The loss of royalties alone is estimated to be about $88 million per year. In 1993, Illinois oil production was the lowest in 20 years. As of 1994, Illinois was 90% dependent on out-of-state or imported oil, compared with an 85% dependence in 1980.

The state and local governments have suffered revenue reductions of millions of dollars, not only as a result of direct oil industry losses but also because of depressed property values and losses to businesses that depend on the purchasing power of oil companies and their employees. About 4,100 oil jobs and 8,000 to 12,000 other jobs have been lost in the oil producing counties of southern Illinois. These job losses have led to increased health and welfare expenditures by state and local governments. Technical capabilities in the state are lost because of permanent change of profession by technical personnel in the industry. The total loss to Illinois' economy is estimated to be up to $2 billion per year.

Policy Recommendations

The oil industry in Illinois has several important features that differentiate it from the U.S. oil industry. Most of the oil in Illinois is produced by independents who produce from small fields. Unfortunately, Illinois currently does not have good known oil reserves, and those that are being found do not allow for economic development. Profitability will depend on lower costs of production because the price of oil is determined in the world markets and cannot be influenced by individual states or by most countries.

The future of an independently operated Illinois oil industry can be promoted by developing approaches that will preserve operator freedom while making it feasible for the operators to take the risks involved in exploration and development.

Policies that enhance operator ability to explore and produce oil profitably should be adopted. State research funds that provide scientific and technological assistance in areas such as the geologic and engineering knowledge of Illinois reservoirs promise the best long-range results and economic return.

With the funding help of federal and state agencies, the Illinois State Geological Survey and other research institutions, state universities, and national laboratories can contribute to improving profit margins and revitalizing local oil economies. Three areas show opportunity for improvement:

1. generation of geologic knowledge that can increase the efficiency of field development and the success rate of field exploration;
2. development of production engineering and exploration technologies that can lower the cost of production and the cost of transferring this technology to producers; and
3. support of tax and policy measures to create an industrial atmosphere conducive to risk taking by small and independent operators and venture capitalists.

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