CHAPTER FOUR

Energy Crisis: "Natural Disaster" and "Man-Made Calamity"

Since the beginning of the 21st century, international oil price has entered a new round of rising. Nominal price rose from less than $10 at the beginning of 1998 to $147 in July 2008. After a period of declining, the average oil price in the whole world was kept about $100 on average in the mid of 2014. However, since the end of 2014, the oil price has been falling considerably, but it is still much higher than that before 2000.

After the two oil crises in 1970s and the rapid increase in international energy demand, the long-term high international oil price has aggravated people's worries about the energy crisis. After the oil price broke 100 dollars from 2007 to 2008, various statements on the new energy crisis have emerged constantly. Overall, the energy crisis in history mainly resulted from supply interruptions or shortages rather than resource depletion. High oil price in previous years, as dominated by demand, has not yet triggered a global energy crisis.

Oil price fluctuation results from many factors. To some extent, high oil price is a kind of external performance and reflection of the rapid growth of world economy. The inflation caused by high oil price has posed different challenges to the economic growth and even social stability of some related countries. But at the same time, it should also be noted that high oil price has a neutral and even positive side, especially from the perspective of the whole world and all mankind. High oil price is the most effective driving force for energy saving and environmental protection. Although high oil price has boosted the international influence of some oil-producing countries, it is difficult for oil, a political tool with limited role, to fundamentally change the geopolitical pattern of the world, and the ultimate determinants for the trend of oil price are still market and economic factors.

Historically, global oil or energy crises are rarely seen. Especially in the context of increasingly optimized international oil and energy markets and strengthened interdependence among consuming and exporting

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countries, there is little chance for a global oil or energy crisis. In contrast, energy crises or shortages are manifested as local or regional crises because of external and occasional factors, mainly as a result of a policy and management crisis. With the development and progress of human society, the strategic attribute of energy has changed greatly. The energy crisis does not necessarily lead to the economic and social crisis. In many countries, social resources have largely replaced natural resources as a decisive factor in economic development.

OIL PRICE FLUCTUATIONS IN THE PAST 150 YEARS

As for oil and energy, people are most deeply impressed by oil crisis and oil price skyrocketing. But in the past 150 years, the main features of the oil market are oversupply and low prices, only with occasional case of the opposite. The oil exhaustion forecast seems always to end up with serious oil saturation [1]. Overall, long-term low prices or high prices are unsustainable, and fluctuation should be normal state in the oil market. Volatility depends on many factors such as markets, economy, and politics.

In 1859, in Pennsylvania, Edwin Drake succeeded in obtaining oil through a drilling machine, which marked the beginning of modern oil industry. At that time, the barrels mainly used for whisky trading in the past was used to can and transport oil. The initial production of Drake's oil well was 35 barrels per day, sold at as high as $40 a barrel (about $6/700 today) [2]. As kerosene entered the US market and was exported to Europe, and large numbers of businessmen, bankers, and speculators streamed into oil market, the oil production underwent rocketing development. But soon oil supply exceeded its demand, and, as such, oil price began to fall.

In 1860, oil price plunged to 10 cents and went back to $10 in 1861. In 1862, oil price remained at 10 cents to $2.5 a barrel. Since then, the oil price fluctuated sharply, but the average price of crude oil per barrel is low. The price was $3.5 in 1863, $8 in 1864, $4 in 1866, $2.8 in 1867, $5.8 in 1869, $4.2 in 1871, and less than $2 in 1873. For a long time, the price of buckets fluctuated between 2.5 and 3.5 dollars, and the cost of the wooden barrels exceeded the value of a barrel of oil.

In 1910, gasoline sales exceeded kerosene and other oils for lighting in the United States, marking the arrival of the oil era. The First World War further deepened people's understanding of oil which increased oil demand and triggered the first tide of statement about oil exhaustion. In addition, oil price began to rise sharply in 1919, because Russia nationalized the oil industry and the price of oil rose from less than $2 a barrel to $3 from 1918 to 1920.

But in the 1920s, as a result of technological breakthroughs, recovery of Soviet oil production, and the start-up of oil production in Latin America and the Middle East, world oil production increased dramatically from 1.5 million barrels per day in 1919 to 4 million barrels per day in 1929. Oil was flooding into the market and American crude oil price plummeted. The oil price was $3 a barrel in 1920 but it reduced to $2 per barrel in 1925. Finally, it fell to a few cents in 1931. Since then, in order to prevent low-cost oil from flooding into the US market, the United States imposed tariffs on imported oil and refined oil in 1932. Then oil price recovered in 1935. Till the Second World War, oil price were roughly hovering around $1 a barrel.

From the Marshall Plan in 1949 to the first oil crisis in 1973, world oil consumption soared more than six times in 24 years. The world's daily oil consumption increased from 9.3 million barrels in 1948 to 56 million barrels in 1973. Oil replaced coal as the world's dominant energy source in the 1960s. Despite rapid growth in demand for oil, oil supplies were growing at a much faster pace than demand. On the eve of the oil crisis in 1973, cheap oil occupied the market. The official price of Arabian light oil, at $2 a barrel in 1950, dropped to about $1.8 in the 1960s and later even to $1.21 in 1970. Even at nominal prices, this price was much lower than that before the First World War or 1920s.

At the end of 1971, oil oversupply and falling prices suddenly changed. With more international market supply and increasing dependence on Middle East, the main oil-producing countries were taking growingly advantage in the game with multinational oil companies. From December 1970 to September 1973, official oil price, taking Arab light oil as reference, rose from $1.21 a barrel to $2.90, and the spot transaction price was as high as $5. At the same time, the demand continued to soar, from 46 million barrels a day in 1970 to 58 million barrels in September, 1973.

Under the background above, the fourth Arab–Israeli war triggered the first oil crisis in October 1973. On October 16, 1973, representatives of OPEC, including Saudi Arabia, Iran, Iraq, Kuwait, United Arab

Emirates, and Qatar, gathered in Kuwait and after failing to negotiate with the western multinational oil companies, they unilaterally decided to raise the benchmark price of light oil from $2.90 a barrel to $5.11. Then on October 17, 1973, the member countries of the Organization of Arab Petroleum Exporting Countries announced an immediate oil reduction of 5%, followed by a monthly reduction in output until Israel withdrew from territory it had occupied in 1967.

Then, international oil price began to come out of control. In mid-November, for example, Iran auctioned 450,000 barrels of oil at $17 a barrel. Oil companies and countries, mostly hit by the production cuts, began to look for oil at an incredibly high price. Finally, OPEC decided to raise the price of the benchmark crude oil (Arabian Light Oil) to $11.65 a barrel in November, quadrupling its price in less than 4 months, 10 times higher than that in 1970. Since then, the price of oil kept climbing until 1978, and it stabilized at about $13 a barrel.

At the end of 1978, the Islamic revolution broke out in Iran, followed by a war between Iran and Iraq in September 1980, surging the oil price again. Due to the war, the two countries' exports to world markets were reduced by 3 million barrels per day, thus oil price soared. By the second half of 1980, the price of Arab light oil rose to a record as high as $42 a barrel. Then, under the influence of multiple factors, the second oil crisis broke out.

The second oil crisis aggravated people's concerns about oil shortage and oil exhaustion once again. Some analysts predicted that oil price in 1990 would rise to $60–$100, and President Carter announced that oil wells were drying up all over the world, but unexpectedly the trend of market took another direction. Since 1980, the world's demand for oil suddenly plunged and fell to the bottom in 1983, only 58 million barrels a day, a decrease of 6 million barrels a day compared with the peak in 1979. At the same time, the output of non-OPEC oil producers grew sharply. From 1977 to 1983, Alaska's oil production increased rapidly from zero to 2 million barrels per day. From 1972 to 1983, Mexico's oil production increased from 500,000 barrels per day to 2.7 million barrels. The North Sea oil field was put into operation in 1975 and its annual output reached 3 million barrels per day in 1983. Meanwhile, the Soviet Union's oil production increased by about 40% in 1973. In this case, changes in the oil market and oil price became inevitable.

In October 1981, OPEC reached an agreement at a meeting in Geneva to set a new benchmark price at $34 a barrel. In 1983, BP

lowered its oil price by $5 a barrel, and OPEC dropped its official price by $5. In May 1986, oil price fell to $10 a barrel, and Dubai crude oil fell to $7 a barrel (Table 4.1).

By nominal value, the average price of oil was kept around $18 a barrel from 1978 to 1999. On August 2, 1990, after Iraq invaded Kuwait, its oil exports decreased by about 4 million barrels per day. Saudi Arabia and some other countries promised to fill the gap, but oil price still rose rapidly. On August 22, oil price reached from $15–$19 a barrel to $30 in July and reached $40 on September 24. Prices fell in the ensuing months, and in January 1991, they returned to $30 and became steady. Then, the United States launched a "desert storm" to increase oil price. But it did not work. The oil price still kept a falling trend and fell to $20 on February 18.

From 1996 to 1997, international oil price rose once, and Brent average oil price exceeded more than $25 a barrel in the last 2 months of 1996. But the Asian financial crisis, which began in 1997, pulled oil price back again. Average price of Brent crude oil fell to $11 a barrel in the last 3 months of 1998 and even fell to $10 a barrel in the first week of 1999. This caused a serious pessimism, and some analyses even suggested that oil price could fall to $5 a barrel. Abdullah, Saudi Arabia's crown prince, predicted that "the era of oil prosperity is gone." In Vienna OPEC reached an agreement about oil reduction in March 1999, oil price was picking up gradually.

The average price of West Texas light crude oil in the New York Mercantile Exchange rose from $14.4 a barrel in 1998 to $19.3 in 1999. In 2000, the price further rose to $30.3. Then in 2001 and 2002, there was decline, hovering around $26. After the war in Iraq in 2003, oil price began to rise significantly. West Texas light crude oil averaged $31.1 per barrel in 2003, $41.4 per barrel in 2004, and $56.5 per barrel in 2005. On August 30, 2005, West Texas light crude oil price reached a record as high as $71 a barrel.

Since then, international oil price continued to rise. According to the statistics of United Nations, crude oil price rose 185.1% only from 2002 to 2006. The average international crude oil price (Brent) rose significantly from $28.83 a barrel in 2003 to $72.71 in 2007. On January 2, 2008, the intraday price of crude oil futures in New York market hit $100 a barrel, breaching a new psychological barrier. Then, the price of crude oil soared perpendicularly and hit a record as high as $147.27 a barrel on July 11, 2008, in New York futures market. However, since then,

Table 4.1 Spot price of crude oil (USD/barrel)

Year	Dubai crude oil price	Brent crude oil price	Crude oil price of Forcados in Nigeria	Medium crude oil price in western Texas
1976	11.63	12.80	12.87	12.23
1977	12.38	13.92	14.21	14.22
1978	13.03	14.02	13.65	14.55
1979	29.75	31.61	29.25	25.08
1980	35.69	36.83	36.98	37.96
1981	34.32	35.93	36.18	36.08
1982	31.80	32.97	33.29	33.65
1983	28.78	29.55	29.54	30.30
1984	28.06	28.78	28.14	29.39
1985	27.53	27.56	27.75	27.98
1986	13.10	14.43	14.46	15.10
1987	16.95	18.44	18.39	19.18
1988	13.27	14.92	15.00	15.97
1989	15.62	18.23	18.30	19.68
1990	20.45	23.73	23.85	24.50
1991	16.63	20.00	20.11	21.54
1992	17.17	19.32	19.61	20.57
1993	14.93	16.97	17.41	18.45
1994	14.74	15.82	16.25	17.21
1995	16.10	17.02	17.26	18.42
1996	18.52	20.67	21.16	22.16
1997	18.23	19.09	19.33	20.61
1998	12.21	12.72	12.62	14.39
1999	17.25	17.97	18.00	19.31
2000	26.20	28.50	28.42	30.37
2001	22.81	24.44	24.23	25.93
2002	23.74	25.02	25.04	26.16
2003	26.78	28.83	28.66	31.07
2004	33.64	38.27	38.13	41.49
2005	49.35	54.52	55.69	56.59
2006	61.50	65.14	67.07	66.02
2007	68.19	72.39	74.48	72.20
2008	94.34	97.26	101.43	100.06
2009	61.39	61.67	63.35	61.92
2010	78.06	79.50	81.05	79.45
2011	106.18	111.26	113.65	95.04
2012	109.08	111.67	114.21	94.13
2013	105.47	108.66	111.95	97.99
2014	97.07	98.95	101.35	93.28
2015	51.20	52.39	54.41	48.71
2016	41.19	43.73	44.54	43.34

Source: From BP Statistical Review of World Energy, June 2017.

oil price began to plummet, and the price of crude oil fell by more than 60% in 4 months in New York futures market, even below $50 per barrel, which set a new low point in 2 or 3 years.

After the international financial crisis in 2008, oil price gradually rose with the recovery of the world economy. According to BP, average spot price for Brent crude oil was $61.67 a barrel in 2009, but its price reached $79.5 and $111.26 in 2010 and 2011, rising 29% and 40%, respectively. In 2012, the market fundamentals gradually improved, so international oil price lost upward momentum. The average price of Brent crude oil for the whole year was $111.67, basically leveling off compared with the previous year. In 2013 Brent crude oil fell to $108.66 a barrel.

Since the second half of 2014, international oil price has fallen sharply, and both Brent and West Texas light crude oil prices fell to their lowest level in 5.5 years. Brent crude oil averaged $98.95 per barrel in 2014 and West Texas light crude oil averaged $93.25 a barrel. International oil price continued to fall sharply in 2015, with North Sea Brent crude falling to $52.39 and West Texas light crude oil price falling to $48.71 below $50. In 2016, after dropping to the bottom, international oil price recovered somewhat. But the average annual price is still lower than the previous year, with the average annual price for Brent crude oil futures at $43.73 and West Texas crude oil futures at $43.34 [3].

THE THIRD ENERGY CRISIS?

Since the first world oil crisis broke out in the early 1970s, the energy crisis began to become a buzzword in the newspaper. Because the energy crisis highlighted the oil sector at that time, the oil crisis became a synonym of energy crises for quite a long time. Entering the 21st century, the energy crisis has been mainly manifested in oil but with a widely covering field of natural gas, electricity, and the like.

From the view of scope and geographical distribution, energy crisis can be divided into two types: regional energy crisis and global energy crisis. Regional energy crisis mainly refers to the large-scale energy shortage or interruption in a region or country area, such as the large-scale blackout accident in the United States and Canada in the summer of

2003. The global energy crisis mainly refers to energy shortages or disruptions in most countries in the world, which could cause serious economic and political consequences. The international community has a unanimous view that there have been only two worldwide energy crises so far, that is, the first oil crisis in the early 1970s and the second oil crisis during the late 1970s and early 1980s.

With the international energy market entering a new cycle of rising oil price at the end of 20th century, the energy crisis again has become the focus of concern in international community. Some people formulated the third oil crisis, the global energy crisis, and the energy crisis in China. New cycle of oil price rising exhibited a rise which was equivalent to the previous two oil crises and made nominal price reach a new record. Therefore, it was called the third oil crisis by many analysts. Some scholars named the rising of oil price caused by Iraq's invasion to Kuwait in 1990 as the third oil crisis, and the new rising in the early 21st century as the fourth oil crisis. The sharply dropping of the oil price in the mid-1980s and the late 1990s were even called "reverse" oil crises.

In light of the two oil crises and the regional energy crises in some countries and regions in recent years, energy crisis refers to such a state that the energy supply suffers a large-scale shortage or interruption, resulting in a sharp price rise, and leading to a great impact on the economy and society. Although the huge rise in price is the most prominent feature of the energy crisis, the essential factor to judge the energy crisis is the larger scale energy shortage or interruption and the relatively serious economic and social consequences. By this judgment, although the rise of oil price at the beginning of the 21st century is much bigger, and the highest and average prices of nominal oil price are much higher than those in the past, there are obvious and huge differences concerning the causes of high oil price and especially the consequences.

In terms of causes, there was a larger scale oil supply disruption and shortage during both oil crises. During the first oil crisis, the interruption of the Arab oil embargo continued for 6 months from October 1973 to March 1974, with a daily supply disruption of more than 2.6 million barrels per day. Two interruptions occurred in succession during the second oil crisis. First, the 6-month supply interruption of 3.5 million barrels a day from November 1978 to April 1979 was caused by Iran's revolution. Second, 3-month oil supply disruptions of 3.3 million barrels a day, which took place two times in succession, resulted from the Iran–Iraq war in October 1980. From the dozens of disruptions that took place in

the international oil market from the 1950s to the present, it can be seen that the scale of disruptions during the two oil crises was the largest, and others were just a few disruptions of short duration or small interruptions. As for the new round of oil price rise since the beginning of the 21st century, the scale, especially the relative size (the proportion of disruptions to the total global energy supply), was less than that in two oil crises, and fewer areas were involved in, though there were several oil supply disruptions caused by the attack on Iraq by the United States and the United Kingdom in March 2002 (3 million barrels per day for 3 months) and the strike of Venezuelan oil workers in December 2002 (2 million barrels daily for 2 months), the Libyan war in 2010, the domestic coup in Nigeria, and Katrina Hurricane.

As for the consequences, the negative impact of oil price rise since the early 21st century on world economic growth has greatly diminished. The world economy has exhibited its most robust growth in the past 30 years by 2008, despite a series of breakthroughs in psychological barrier that the price of oil per barrel rose up to $50, $80, $100, and $140 in succession. From 2003 to 2007, the average international crude oil price (Brent) rose from $28.83 a barrel to $72.71, while the world economy grew at an average of about 5%. Large growth of commodity demand stimulated by the strong expansion of the world economy has been the main driving force of bullish price in the past few years. The change in economic development dominates price trend. Compared with two oil crises, the obvious difference is that this price-rise cycle is dominated by demand, and the price trend and the world economy have become more and more in line with each other.

First, the rising of oil price is driven by demand, triggered by the robust growth of the world economy itself. Because the rise in oil price is endogenous rather than because of supply interruption by external factors, its destructiveness is weakened, making much less unfavorable impact on world economy.

Second, the price of oil which the world economy can withstand has more significantly improved than before. The energy consumption per unit GDP in developed countries, such as Europe and the United States, has greatly decreased, and the dependence of economic growth on resource investment has greatly weakened, and as a result, they are no longer as sensitive to oil as before. In comparison with the 1970s, in developed economies like the United Kingdom, the share of oil in economic output has decreased by more than 50%, mainly because of an

increase in the share of service industries. American spending at energy and oil accounted for about 7% and 3.5% of GDP, not only significantly lower than 14% and 8% in peak of 1981, but also lower than 8% and 5% before oil crisis [4].

Third, the western developed countries have enhanced their anti-risk capacity. They can reduce or mitigate the impact of high oil price by various means and at the same time help large western oil companies earn considerable benefits. Some analysts even pointed out that in the process of successive rising of oil price, the western developed countries are the biggest beneficiaries. Large oil companies earned a large amount of profits through oil exploring, developing oil field and selling "equity oil," and they also obtained considerable income from futures by controlling futures prices and real goods.

After the international financial crisis in 2008, the world economy plunged into recession, which some analysts explained as a shock caused by high oil price to the world economy around 2008.

It is undeniable that before the first half of 2008, the soaring of oil price made a significant impact on world economy. But in terms of cause and effect, it is truer to say that it was world recession that caused the shrinking energy demand, leading to lower oil price, than the high oil price contributed to world recession. Since the 1980s, with the increasing participators and the more optimized futures market, the international oil market is gradually getting mature. The bond between oil price and the world economy has become free of the negative correlation during the two oil crises and is changing to positive correlation. Since 2009, the world economy has gradually recovered, making international oil price gradually pick up. The average price of Brent and Dubai crude oil is maintained above 100 dollars from 2011 to 2013, and West Texas light crude oil price is also hovering around 95 dollars.

To sum up, there is little chance for another oil crisis like that in 1970s. We are far from "peak oil" and "peak gas." Some old basins have entered their mature or decline stage with decreasing production. Some unconventional resources, such as new oil fields, new technologies, and shale gas, are gradually replacing old oil fields. The balance between supply and demand ensures that in case of high oil price people begin to have more concern about energy efficiency. Supply shortage may occur in the coming years if the global economy is able to grow rapidly with an explosive growing demand and investment compression. However, it is likely that, under the pressure of energy efficiency and environment,

demand will be reduced but supply will be increased, which may create a new era with relatively low oil price for a long period. "Even if the real oil crisis came, it could not destroy the foundation of the whole human civilization, and every change in the energy form means the beginning of a new civilization." [5]

There is no denying that there is a great contradiction between the "infiniteness" of human demand and the "finiteness" of energy resources, but with the deepening of globalization and the optimization of international energy market, the possibility of global energy crisis is being weakened as a whole. From the perspective of resources, with the progress of science and technology, mankind will have sufficient energy resources to meet their consuming demand. Although the world energy supply will be constrained by many factors such as investment, cost, and so on, there is little chance for resource crisis to happen in the future, considering technological progress, market improvement, and the development of alternative energy and materials. From the perspective of market, with the development of economic globalization and the integration of international energy markets, the interdependence of consuming countries and exporting countries becomes strengthened than before. It becomes the common goal of the international community to maintain the stability of international markets. Although it is impossible to avoid competition and friction about prices, markets, and even geopolitics between consuming and exporting countries, the possibility of a hostile, initiative, and large-scale energy supply disruption has been significantly reduced.

Relatively speaking, the increasingly severe global environment and climate crisis is more difficult to solve than the security of energy supply. Environmental problems will become the main constraint and challenge to energy development in the future. In recent years, the increasingly serious and large-scale smog in China has further shown that safety of energy use is more urgent than security of energy supply, and environmental crisis is more challenging and demanding than energy crisis.

OIL CRISIS OR POLICY CRISIS?

Besides the high oil price and the finiteness of nature resources, concerning energy crisis people still worry about many external factors

such as the embargo and nationalization on the part of energy-exporting countries. The two oil crises, in particular, left a deep imprint on the domestic and foreign policies of the United States and other western countries. The oil crisis, energy security, and oil embargo have often become an altisonant evidence for some countries to carry out certain domestic and foreign policies. The energy-exporting countries like OPEC have become the objects and evil incarnations for the western countries to condemn in both speech and writing. It is an undeniable fact that the oil embargo in Arab countries is an important cause of the first oil crisis, but because of their policy mistakes and institutional malpractices, the countries concerned should take the same responsibility. Either natural disaster or man-made catastrophe may bring about oil crisis, with OPEC as the scapegoat in many cases.

As far as the first oil crisis is concerned, many people are still deeply impressed by the long line waiting in front of the American gas stations and the paper crisis caused by oil crisis in Japan. According to many statements, especially in American official report, the oil crisis was undoubtedly attributed to the oil embargo executed by Arab countries. In fact, the phenomenon was caused by human beings to a great degree, which is also called "man-made crisis" by some scholars. The reduction in supply brought by the oil embargo was limited, but it mainly led to people's psychological panic. To a large extent, it was the policy of oil price control implemented by the Nixon administration in 1971 and some oil companies' hoarding and speculations driven by interest that resulted in the crisis. Although the scope of the Arab oil embargo was not very large, the global panic was further intensified, because the impact of oil embargo was exaggerated by all countries for their lack of knowledge concerned and confusion about reality.

Actually, the Arab oil exporters implemented a "selective embargo," whose main aim is to cut off oil supplies to the Israeli supporters like the United States, the Netherlands, and Portugal. The embargo to execute on other countries depends on their relations with Israel, with friendly countries hardly threatened by the embargo. Iraq withdrew from the Organization of Arab Petroleum Exporting Countries (OAPEC) because other members rejected its plan of tougher sanctions, while Iran and some other oil-producing countries declined to take part in the embargo and increased their production instead. In fact, the impact of the oil embargo by the OAPEC is relatively small. As for this, Maurice Edman pointed out that from October to November 1973, the total production

only reduced by 340 million barrels, which was not as much as the previous reserve. If we consider oil increments in the rest of the world, there is hardly shortage of supply. It is not the shortage of supply but the worry about the shortage of supply that pushed the price higher. According to relevant data, in Arab countries the total output of oil in September 1973 was 19.4 million barrels per day and in December, the output dropped greatly with 15.4 million barrels less per day, so the total output cut reached 4 million barrels per day. But in the same period, other countries increased oil production by 900,000 barrels a day. In other words, the actual maximum output decreased by 3.1 million barrels a day, about 5% of world oil consumption and 10% of global oil trade. To a large extent, this gap could be offset by using the reserve at that time [6].

During the first oil crisis, the embargo did not actually have much impact on oil imports and exports of the United States. In the world oil market, once oil is loaded into oil tankers, both exporting countries and OPEC cannot control its final flow. During the embargo, much of the oil exported to Europe was either simply resold to the United States or transferred as non-OPEC oil to the American market. Although the supply route became more tortuous, the supply still remained stable. When talking about the oil embargo in 1973, Mr. Yamani, the Saudi Arabia's oil minister, said that it did not mean that they had reduced American oil imports because there was only one market in the world. The symbolic meaning of the embargo is greater than practical significance [7].

Compared with the oil embargo and production reduction in the Arab countries, OPEC raised oil price twice on October 16, 1973, and December 23, 1973 (the first increase from $3.011 to $5.119 per barrel and the second increase to 11.651 US dollars), which struck a more serious blow. First and foremost, this was the man-made rebound against the low oil price for many years. From November 1955 to 1971, some western oil companies who dominated the oil pricing increased oil price by only 5 cents a barrel, in other words, oil price rose from $1.75 to $1.80 per barrel. By 1973, it was inevitable for OPEC, which nationalized oil companies and gradually dominated pricing and gained the initiative in the international market, to increase oil price in order to safeguard their oil economic interests. On August 15, 1971, Nixon announced a "New Economic Policy," severing the link between dollar and gold. This policy led to the devaluation of the oil dollar, the sharp rise in the prices of industrial products, and the heavy losses suffered by OPEC, and it became a trigger for the first oil crisis.

The tight supply of oil in the United States and the long line in front of gas stations were largely by-products of the Nixon administration's domestic policy of oil price control in August 1971. The policy prevented oil companies from passing on the real cost of imported oil to consumers, making many small oil companies unable to survive. After the oil embargo imposed by Arab countries and oil price raised by OPEC, great panic spread over in the western countries represented by the United States, and the oil giants seized the opportunity to engross the market and create an oil shortage.

In 1973, the US oil giants raised gasoline prices by 28% (only 18% increased during the previous 14 years). Just as the US newspapers and federal parliamentarians revealed, in order to raise oil price, the oil giants were planning to anchor dozens of oil tankers filled with foreign oil along the coast of America. All the oil tanks in continental United States are full of oil, and some have been not only filled but also spilled. Similarly, during the paper crisis triggered by the oil crisis, many products were lying in warehouses and waiting for higher price, while the shelves in the stores were empty.

After the second oil crisis, Saudi Arabia's oil production increased from 8.5 million barrels a day to 10.5 million barrels, which coupled with an increase of production in North Sea and non-OPEC countries, making oil supply increase in oil markets despite Iran's suspension of exports. In January and February 1979, the world daily oil output increased by 5.8% and 4%, respectively, higher than that in the same period last year, and the world crude oil inventory was higher in the first quarter than that in the same period of the previous year. Meanwhile, the oil that western multinational oil companies hoarded also became "unprecedented surplus." Even those idle oil tankers on the sea were filled with oil. By mid-1980, total oil stocks were roughly twice as much as the amount of oil exports reduced by the strike of Iranian oil workers in 1979. In that case, a shortage occurred in the domestic markets of America, causing a long line in front of petrol stations, a spiral rising of gas price, a strike by truck drivers, and even a riot in Levittown, Pennsylvania. On June 26, 1979, Japan's *Mainichi Shimbun* reports that according to a recent poll of the United States, 62% of Americans think the oil crisis are man-made, as plenty of evidences can manifest. It was the domestic policymakers like the American heads and American and European international oil capital that created crisis during Iran's coup [8].

SUPPLY TENSION CAUSED BY PRICE CONTROL

Throughout the 1970s and 1980s, the federal government's control over the price of natural gas intensified the supply of gas and made the price soaring. When gas prices control was deregulated in 1992, the amount of natural gas to be used increased, and consumers also got cheaper power supplies and cleaner air. By 2008, electricity production by natural gas grew by about 87% and electricity production by coal increased by only 31% synchronously. After the oil embargo in 1973, the gas pipeline in the United States came into being not because of the shortage of crude oil but because of price controls that made it harder for oil companies to sell refined petroleum products and make profit. Price controls led to the gas shortage and a phenomenon that car drivers were queuing to buy oil [9].

The oil embargo in 1973 did not lead to a shortage of vehicle fuel in the United States. Data from the Energy Information Agency showed that US import of crude oil in 1973 was 370 million barrels more than those in 1972. Imports reached a new height in 1974, that is, 85 million barrels more than those in 1973. What is true about the embargo in 1973 is that the shortage of vehicle fuel and long-distance gas transportation were caused by government' excessive intervention in the energy market.

The price control compulsively implemented by Nixon in 1971 prevented oil companies from imposing high prices of imported crude oil on consumers. Oil price control urged some oil refiners to reduce the amount of gasoline sold to independent service stations to keep their franchisees' demand for fuel. By mid-1973, a few months before the start of the oil embargo, about 1000 service stations had been closed because of a lack of fuel supply. To solve this problem, several months before the embargo began, the US Congress took steps to enact a bill that oil refiners are required to share their petrol equally with independent service stations and resume the operation of service stations. And it also gave state governors some right to control a small fraction of the gas, which further reduced the supply of oil (Table 4.2).

Oil embargo did not make much impact on the productivity of oil companies because a large amount of crude oil had been stored by them several months ago. But because of government intervention in markets, they had no incentive to refine crude oil and produce gasoline. They felt worried that more gasoline they produced, the more money they would

Table 4.2 Consumption of oil with US oil price under control (1970–80) [10]

Year	The US petroleum products consumption (million barrels)	World crude oil price (dollar/barrel)	American crude oil price (dollar/barrel)
1970	5364	1.80	3.18
1971	5553	2.29	3.39
1972	5990	2.59	3.39
1973	6317	11.65	3.89
1974	6078	11.25	6.87
1975	5958	12.67	7.67
1976	6391	13.00	8.19
1977	6727	13.66	8.57
1978	6879	14.34	9.00
1979	6757	27.95	12.64
1980	6242	32.00	21.59

The world's crude oil price was the price of Saudi Arabia light crude oil based on the long-term contract price and the price of the spot market estimate; The American crude oil price was an average import price of the crude oil and the price control was carried out for some products in 1979; In period of price control, the difference in oil price between the world and the United States shows the government's degree of subsidy to oil consumption. The price of product has a more direct impact on consumption, and part of consumption is limited by price control.

lose. Donald Rothman points out that "Most of the damage from the 1973 oil embargo emanated from our own policy blunders. Pre-embargo, poor U.S. policies made us vulnerable, and post-embargo, continued price controls and misguided regulation magnified the damage." [11] Apparently, the ill effect was exacerbated by Nixon's policy. However, Nixon believed that only through more government regulations could the situation be improved, so he also initiated an "energy independence plan" in early November.

Over the 1970s and 1980s, the natural gas control by federal government brought about a tight supply and a higher gas price. After deregulation of control over gas market in 1992, the consumption of natural gas increased and consumers also enjoyed cheaper electricity supplies and cleaner air. From 1992 to 2008, electricity generated by natural gas increased by about 87%, while electricity generated by coal increased by 31% during the same period [9].

In some regional energy crises, strategic and policy failures can be detected, such as the Argentine energy crisis in 2004. Since February 2004, Argentina fell into a serious energy crisis due to a shortfall of about 10% in domestic gas supply, causing widespread disruption of natural gas

and electricity supplies across the country. Public opinion suggested that the energy crisis was caused by mistakes in Argentina's energy development strategy and a serious imbalance in energy structures. With rich resources, Argentina once could be self-sufficient in oil and gas, and had numerous exporting trades. However, since the early 1990s, as a result of lacking the necessary long-term energy strategy, this country formulated neither any feasible energy development plans and policies nor measures to guide investment and monitor private enterprises, which led to the disorder of energy development and the imbalance of energy structure. At the same time, in order to control inflation, the government imposed control over prices, making energy prices frozen for a long time. With huge loss and less profits, enterprises did not have enough impetus and confidence for further development and investment, making the process of oil and gas exploration and development stagnant.

The crisis of power supply in California in 2001 was also, to a great extent, related to the imperfect and unmatched power reform. The reform which aimed to encourage the competitions among power plants was carried out when the electricity supply of California was sufficient. But the distribution system was not optimized and the price of electricity was put under control. Several years later, with the development of economy, power supply became insufficient. However, in the same period, environmental planning did not allow the expansion of power plants. Many residents wanted electricity but they did not want power plants to be built near their houses, and also California lacked the overall operating system to buy electricity from other states, which led to power cuts for many times. In addition, Australia, Norway, Brazil, Britain, Denmark, and other countries encountered power security problems caused by power reform, To a great extent, the power outages for many times in the United States since 1965 and the large-scale power outages in Canada in 2003 are all related to the management system and mechanism of the power grid.

At the beginning of the 21st century, in China the rapidly growing energy demand and the occasional incidences like "electricity shortage," "coal shortage," and "oil shortage" not only made the statements about China's energy crisis published in newspapers from time to time but also made the international community to pay more attention to China's energy supply problems. Overall, the current energy problems in China are more characterized by staged, regional, and structural "energy shortage" or resource constraints or bottlenecks that have not yet constituted

an energy crisis. Moreover, many experts pointed out that the shortage of power, coal, and oil in China now resulted from many factors, such as inaccurate macro-forecast of economic development, unsmooth energy management and supply system, unscientific industrial structure, and energy consumption structure, as well as immature energy market.

HIGH OIL PRICE AS REFLECTION OF THE WORLDWIDE ECONOMIC PROSPERITY

In many analyses of oil price, in addition to the analysis of the reasons and trends, most of the arguments were about the impact of oil price decline on the world economy, and the winners or losers. It is undeniable that both rise and fall of oil price will have an impact on the world economy, particularly different impacts on consumers and exporters. But when it comes to the relation between oil price and the world economy, people seem to feel more concerned about the negative impact of oil price on the world economy, with fewer analyses on the impact of the world economy on oil price.

In fact, the oil price is an index of the world economy and a barometer of the development and change of the world economy, having endogenous relationship with the world economy. Changes of world economy affect or dominate the change of oil price. Instead of oil price affecting world economy, it is better to say that changes in the world economy lead to fluctuations in oil price, and the fluctuations of oil price in turn are counterproductive to the world economy.

The reason why high oil price becomes a big "problem" is largely due to the fact that it has aroused concerns of many people who suffered a lot from high oil price and the worry of many people about economic recession and economic crisis. The conventional logic and thinking patterns people follow is that high oil price leads to a series of consequences like inflation, social unrest, economic recession and crisis. Therefore, the debate and criticism surrounding who is the "culprit" behind high oil price has become the mainstream of discussions and researches. Western countries attribute it more to the huge energy demand brought by the rise of emerging market economies such as China and India and the oil-producing countries' refusal to substantially increase their oil production. But the latter thought that western financial investment companies and

capital, which conducted large-scale speculation, should bear the primary responsibility.

The rising of oil price, concomitant with the rapid growth of world economy, becomes inevitable. And the rising of oil price to a certain level will inevitably restrain the world economy. As a result, fluctuation of oil price is more a reflection and representation of the periodic change of the world economy than an inducement of world economic recession or crisis. To a certain extent, the high oil price indicates that the world economy is in a boom period. As such, Mr. Maskin, the Nobel Economics laureate, said he had always wondered whether the rising of oil price could be seen as a problem [12].

People's argument that a high oil price led to the global economic recession and economic crisis is closely linked with the two oil crises in 1970s. After the Arab–Israeli war broke out in 1973, Arab countries imposed an oil embargo on the western countries that supported Israel, and then the first oil crisis broke out. The world's economic crisis came with a doubling of oil price and more than double-digit inflation, with a 30-year golden period of world economic growth coming to an end. The coincidence in time and phenomenon makes people habitually believe that a substantial increase in oil price will lead to higher inflation and a sharp rise in unemployment, leading to economic recession and economic crisis.

In history, the market for most resources and raw materials fluctuated roughly in line with the world economic growth cycle. After the World War II, during the 30-year golden period of economic growth, the price of all kinds of resources and raw materials rose significantly, except oil. After this growth period ended in the early 1970s, markets of most primary commodities also entered a nearly 30-year downturn. From 1974 to 2005, the real worldwide price of food fell by three fourth. Since the late 1990s, the world economy has entered a new round of expansion, and the prices of various resources and primary products rose again. According to *Trade and Development Report 2007* made by the United Nations, from 2002 to 2006, the prices of primary products (excluding crude oil) rose by 88.8%, crude oil price by 157.6%, metal products by 219.9%, and the prices of food, edible oil, and agricultural raw materials rose by 48.4%, 26.4%, and 62.3%, respectively [13].

The trend of oil price is determined by its historical particularities. Before 1973, the international oil price was basically controlled by the major multinational oil companies and remained at a steady low price for

quite a long time, which did not fully reflect the changes in market supply and demand as well as economic growth. From the first oil crisis to the mid-1980s, the world oil market was monopolized by the previous "Seven Sisters," entering the stage of OPEC monopoly. The oil price rose sharply, and the price trend was negatively correlated with the global economic growth. However, since the mid-1980s, with the increasing number of participants, the degree of monopoly in international oil market has been weakened, and marketization degree has been increasingly higher. Especially with the development and completion of futures market, the commodity attribute of oil has become increasingly prominent. From this moment, the changes in international oil price has almost become in line with the curve of world economic growth. At the end of the 1990s, oil, along with other resources and primary products, entered a rising cycle with the strong growth of the world economy. From 2002 to 2006, the world crude oil price rose by 157.6%, which was higher than the rising of agricultural products in the same period but lower than metal products [13].

Higher price of raw material contributed to a significant increase in exporting earnings and rapid economic growth in resource-exporting countries, and the dramatic improvements in these countries also, to a large extent, contributed to more world investment and trade growth. Considering the round of world economic growth before 2008, the rapid growth of world trade is undoubtedly one of the most important motivations. In the previous decade the world trade growth rate was twice the same as the world economy growth rate, and the growth of energy resource demand and the increase in prices are largely the main supporting factors for world trade growth. According to the analysis at United Nations Trade and Development Conference, European trade growth in 2006 was largely due to a large increase in exports to oil exporters such as Western Asia and the Commonwealth of Independent States [14]. The overseas expansion of Japanese companies was also accelerated by the developed infrastructure of oil exporters. At the same time, the expansion of the dollar-denominated world trade was largely attributed to the expansion of resources-related trade, and the rise in world nominal trade was clearly affected by the rise in prices. It was analyzed that around 40% of world exports of goods in 2006 were attributed to rising prices [15].

In more than a decade since the 20th century, with the substantial increase in the oil dollar, the exporting countries also accelerated their pace of overseas investment, making the world capital flows increase

dramatically. When the Western countries attracted most of the oil dollar investment, more and more funds have also been flowing to emerging markets in Asia and North Africa. Many low-income and oil-importing countries have become increasingly burdened with impoverishment, while others accelerated their efforts to get rid of poverty. Russia has halved the number of poverty-stricken people in 10 years. Some developing oil-producing countries like Nigeria, Angola, Sudan, and Chad reduced their external debt and poverty-stricken population significantly, greatly improving their financial balance. At the same time, major oil-producing countries also added their economic assistance to some countries with poor economic conditions like Palestine.

ENERGY CRISIS AND ECONOMIC CRISIS

People's concern over the energy crisis actually reveals their worry about the economic and social consequences brought about by energy crisis. Over the years, it has been widely argued that a sharp rise in oil price would plunge the economy into higher inflation, leading to a sharp rise in unemployment and economic crisis. In the memory of the public, all previous economic recessions were caused by the oil crisis. In fact, although high oil price may inevitably have some negative impact on economic growth, the conclusion may not be necessarily drawn that high energy prices and energy crises would unavoidably lead to economic recession and economic crisis. Oil may not have such destructive power as we imagine. And in many of the economic turmoil over the past 30 years, oil played only a very minor role, but policy slippage played a much more important role in economic crisis [16].

The two oil crises did exacerbate the recession in the western world, but they are not the fundamental contributing factor of the economic crisis. The economic recession or crisis, to a large degree, can be attributed to many factors, such as the cyclical law of economic development and policy mistakes. Before the period from the first economic crisis in the United Kingdom in the 1820s to the first oil crisis, the western countries had suffered much economic crisis, during which oil was not the main energy source and no world oil crisis occurred. During the first oil crisis, the oil embargo occurred from October 1973 to March 1974, but in the

United States there had been signs of the falling of stock market prices, the decrease of housing construction, and the decline of sales as early as the beginning of 1973. David Freeman, head of the Ford Foundation Energy Research Group, targeted at the oil giants who reaped exorbitant profits in the oil crisis, only in 1973, the after-tax profits of the 18 largest oil companies reached $ 9.2 billion, an increase of 53% over that in 1972, plunging the US economy into the worst inflation during the past 22 years [8].

Since the first oil crisis, during the rise and fall of western economies, the impact of high oil price was relatively limited. After studying the five oil supply shocks of 1973–74, 1978–79, 1980, 1990–91, and 2002–03 in Iraq, Lutz Kilian, a scholar in Michigan University, concluded that the evolution process of consuming price inflation of the G7 countries was consistent with their own development path as a whole. Both high oil price in 1973–74 or 2002–03 had no significant impact on the economic growth of the G7. The other three did have some negative impact, but the impact was not as serious as people imagined [16].

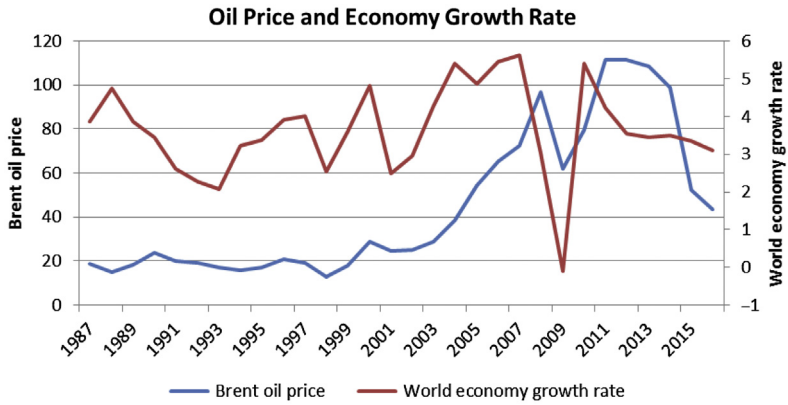
People were extremely concerned about the new round of oil price out of their worry that the consequences of two oil crises would reoccur. There is no denying that the sharp rise in oil price will inevitably affect the whole world, increasing the cost of economic growth in consuming countries (e.g., China paid extra $7 billion in 2004 due to oil price rising in 2004) and the pressure of inflation. In particular, the lagged impact of oil price increase cannot be ignored. However, compared with the two oil crises, the impact of the same magnitude of changes in oil price on economic growth is obviously weakened.

The rise in oil price in the last decade from 2005 to 2014 was essentially a demand-led rise driven by strong growth in the world economy, which is different from the previous rise caused by tight or interrupted supply. This demand refers to a large increase in both consumption demand driven by the rapid growth of the world economy and nonconsumption demand such as oil reserve and market speculation. To some extent, the prosperity of market speculation was also a manifestation of the economic boom in the world. From a global perspective, the relationship between oil price and the economy is no longer as simple as it used to be as a negative correlation. The sharp rise in oil price is largely actuated by strong growth in the world economy. If the world economic growth slows down or declines due to high oil price, the oil price linked with the world economy will drop accordingly. If there is a clear upward

trend of the world economy, it will be able to offset the negative impact of high oil price. The average world oil price rose from $37.8 to $68.5 per barrel in 2004–07, and the growth rate of world economy averaged around 5%, while the average growth rate of the global economy was only 3% in 2001–03 before oil price soared [17].

Therefore, with the absence of a large-scale energy supply shortage or disruption caused by human factors, to some degree it is true to say that high oil price is a reflection and representation of economic prosperity. Economic growth pushes up oil price, and the recession will drag it down.

From IMF and Thomson Reuters Database.



The figure shows that the international oil price and the world economy had an obvious negative correlation during the two oil crises. However, after 1980s, except for the lag in1990s, the trend of international oil price and world economic growth was basically consistent, exhibiting generally positive correlation after 1980s, because the international oil market was not well developed before the 1980s, and the oil price was dominated by the western multinational oil companies or OPEC most of the time instead of the market, which failed to fully reflect the economic development and the market change. After 1980s, with the increase of participants and the continuous improvement of the futures market, the international oil market was getting more mature, which increasingly was able to reflect changes of market and world economy. Moreover, the cycle of fluctuations in oil price is becoming growingly consistent with the cycle of fluctuations in price of other commodities.

THE OTHER SIDE OF HIGH OIL PRICE

The attitudes towards high oil price vary due to different standpoints, perspectives, and the like. The expression that "global people are troubled by high oil price" is not accurate. While many industries and individuals more related to oil consumption are more heavily burdened in economy, a significant number of people gained direct and indirect profit from oil production and sales. What are left is those who are least affected. From the perspective of global public interest, especially environmental protection, with the premise of less market intervention, the high oil price will greatly promote the improvement of energy efficiency, the optimization of energy structure, and the change of people's consumption attitudes, which is favorable to improving air quality, traffic, and other public resources. It is not only a core market factor to motivate people to look for alternative energy resources but also the most effective driving force and means to promote the sustainable development of human beings.

For a long time before the first oil crisis, the low oil price, controlled by multinational oil companies, led to the rapid growth of western oil consumption. What's worse, their dependence on the outside world was greatly intensified, which lead to the first oil crisis and subsequent economic crises. In the United States, from 1960 to 1973, the annual rate of crude oil imports soared from 1.08% to 45.1%, and the proportion of imported crude oil to total oil consumption increased from 10.48% to 36.5%. Japan's oil consumption also went up from 32.7 to 267.2 million tons. At the same time, the United States, Japan, and European countries became more dependent on OPEC with 70% increase [18].

After the first oil crisis, western countries began to adjust their energy policy and strengthen demand management, placing the consumption control and developing alternative energy as the priority. Meanwhile, they made greater endeavor in developing high-tech and low-energy industries. As a result, the global energy-saving technology was greatly developed, alternative energy was exploited, the application of wind energy, tidal energy, and nuclear fission energy was widely disseminated, and at that time, the technology of substituting ethanol for petroleum continued to mature. At the same time, the situation that oil consumption growth rate was much higher than the economic growth rate in the past has greatly improved. From 1978 to 1996, the GDP of OECD countries

increased by 42%, but its oil consumption in 1996 was lower than the highest consumption in 1978. Moreover, with the lower proportion of oil in the world energy, the structure of world energy gradually became diversified, which led to a drop in international oil price in the 1980s. Overall, the industrial structure of the world major industrialized countries has changed greatly after the two oil crises, and the energy consumption per unit output and the proportion of energy expenditure in the total GDP have decreased significantly, strengthening the capacity to resist against high oil price.

Carter's expectation of cutting oil consumption in the United States was frustrated largely because of the falling of oil price. From 1979 to 1981, clean energy researches in the United States reached a highest level in history, but the funding for clean energy innovation was correspondingly reduced in the background of the falling of oil price. By the end of the 1990s, funding for clean energy research was nearly 75% less than that in its peak. Concerns over the collapse of oil price in the 1980s dampened investments of clean energy. Even if oil price rose again in 2003, the impact did not recede [19]. The only hope for easing pain of consuming countries in the future lies in the high oil price, which, hopefully, will end up their "addiction to oil." The fact that oil price stayed high after the crisis removed worries about the slump of oil price in the 1980s, giving businesses and investors confidence to support environmentally friendly cars and develop alternative fuels [19].

At the same time, western countries accelerated the development and utilization of alternative energy sources. Natural gas and nuclear energy, for example, were rapidly developed after the first oil crisis, especially in the 1970s and early 1980s, the first golden age of new energy development. In the early 1950s, the first nuclear reactors were built in the United States and the Soviet Union, and the first commercial nuclear power plant (Yankee Rowe) was put into operation in the United States in the 1960s with an initial installed capacity of 250 MW. Until 1980, there were 243 nuclear power stations in the world with a total generating capacity of 140,000 MW, with 162 nuclear power stations completed only in the 1970s. Despite the Three Mile Island incident in 1979, the development of nuclear power kept its rapid pace in 1980s, with 176 newly built nuclear power plants all over the world and a total generating capacity of 325,000 MW [20].

New sources of oil supply have continued to emerge. The high price in 1970s made the halted investments in the areas such as Alaska, Mexico,

and the North Sea (Great Britain and Norway) because of high costs, and excessive technical difficulties became more profitable. In a few years, the output of these regions increased surprisingly. After the construction of Alaska oil pipeline in 1977, the oil production quickly reached 2 million barrels per day in 1983, accounting for about 20% of the total production in the United States. Mexico's oil production rose from 500,000 to 2.7 million barrels a day from 1972 to 1983. The North Sea oil field, which began operation in 1975, grew sharply, reaching 3 million barrels a day in 1983. At the same time, Soviet oil production was about 40% higher than that in 1973 [21]. In recent years, the rise of the "shale revolution" in the United States has led to a substantial increase in oil and gas production, which is also largely due to the higher international oil price.

Faced with a new round of high oil price in the early 21st century, the countries concerned have adjusted their energy strategies and focus more attention on demand management. Although different countries may take different adjustment measures concerning energy strategies, the overall focus has been placed on demand management, stressing energy efficiency, energy conservation, and encouraging the research and utilization of new energy and renewable energy such as solar energy, wind energy, tidal energy, and fusion energy. After Obama took office, he actively encouraged companies to produce renewable energy by means of subsidizing related businesses and launched a number of policies in personal consumption to encourage people to use renewable energy, like the solar energy. The EU has set a target of raising the percentage of renewable energy to 20% by 2020. In 2006 the Swedish government even made a proposal about completely stopping the use of petroleum products within 15 years.

Meanwhile, high oil price, to a large extent, has also greatly changed people's consumption concept and pattern and adjusted the structure of consumption habits, creating a lot of green travel and other energy-saving methods. In the first half of 2008, Americans began to drive as little as possible. According to the US Federal Highway Administration, in May 2008, the driving mileage went down more than 10 billion miles, falling 3.7% over the same period of the previous year. Among them, in Maryland, 218 million miles was cut down, which means a drop of 4.7%, and it is the largest drop in 66 years [22]. At the same time, demand for trucks and SUVs (sports utility vehicles) has fallen dramatically, as the sales of smaller and more energy-efficient cars are rising significantly. In May 2008, total sales of Chrysler, General Motors, and Ford Motor Co.

dropped 21%, while the sales of Ford small cars rose 53%. In response to changes of the market, Ford announced that they would reduce production of trucks and SUVs and gradually shut down the above models of cars. General Motors partially closed four trucks and SUV factories in the United States, Canada, and Mexico.

In Japan, during the period of high oil price around 2008, more people chose to reduce driving and took public transport to save money, and enterprises also took measures to reduce the pressure of high oil price. Japan Post Office of Japanese Service Company and Nippon Express Co. announced the merger of the two courier business to set up a new company. While Japan's automotive and electromechanical industries coped with their decline in gasoline vehicle sales through joint development of electric vehicles and environment-friendly and energy-efficient vehicles. To save fuel, air self-defense forces of Japan, which have a large number of aircrafts and warships, reduced its fighter trainings and speed of aircrafts to reduce fuel consumption.

Overall, when high oil price has made impacts on some groups, they have greatly promoted technological changes in energy and environment, promoting energy efficiency and changes in people's consumption patterns and concepts as well as the development of alternative energy sources. If the challenges presented by high oil price can prompt people to adopt more effective countermeasures, the world economic structure will experience major adjustments and improvements in the future, and will greatly enhance human's ability to improve environment and take the challenges like climate change.

THE LONG-TERM LOWER PRICE OF RESOURCES

After entering the 21st century, many people assert that we will bid farewell to the low-cost era when energy and other resource products enter a new round of upturn at the beginning of this century. The plummeting in oil price in 2014 shows that prices are not permanently fixed at high or low price, but the resource prices are more marketized with price fluctuations as normal. In general, in the long term, resource prices are on a relatively downward trend.

According to Duncan Clarke, the history of oil is largely a history of oversupply and low prices. For a long time after the industrial revolution, oil was synonymous with cheap energy. In 1938, Saudi Arabia voluntarily proposed that it would sell the entire domestic exploitation of oil resources at a price of 5 million US dollars [23]. On the eve of the oil crisis in 1973, cheap oil took up the market. The official price of Arab light oil at $2 a barrel in 1950 decreased to about $1.8 in the 1960s and even to about $1.21 in 1970. Even at nominal prices, the oil price was much lower than those in the early World War I or in the 1920s [24].

In the long run, the prices of nonrenewable commodities have shown a downward trend after the adjustment of inflation, even if the consuming demand has risen constantly at that time. The price of zinc fell by about a half since 1900, while global production increased by 10 times. The price of aluminum fall more than a half since 1900, and its global output increased by 100 times [25]. The price of raw materials could reflect its scarcity. Although the prices have picked up in recent years, they actually fell sharply in the past century.

In the field of economics, there was a well-known bet between Ehrlich, ecologist in Stanford University and Simon, economist in Maryland University. Ehrlich believed that the supply of natural resources was limited, and as the increase of population and income, the world's demand for natural resources would also increase, leading to a higher price for natural resources. The scarcity of goods would lead to a higher price, which provided evidences for the ongoing worry about depletion of resources all around the world. But Simon believed that technological progress could increase the supply of these resources, and with the discovery of alternatives, the real price of resource commodities would fall. The saying about the imminent scarcity of resources is nothing but only a myth, and the prices of any basket of goods would decline [26].

Simon and Ehrlich were betting on the price of five minerals after 10 years. In 1980, they chose copper, chromium, nickel, tin, and manganese at a total value of $1000, with each material valued at $200. Ehrlich bet that 10 years later, in 1990 the total price of mineral portfolio would rise with the deduction of inflation. Instead, Simon bet that the total price would fall. They agreed that on the deadline of the bet, the loser must send a check to the winner. As a result, after the deduction of inflation, all five mineral products chosen by Ehrlich were devalued. And the devaluation ranged from 3.5% to 72%. In fact, even without the deduction of inflation, the total value of those five minerals also fell over the past

10 years. Ehrlich lost his bet and, according to the agreement, sent a check of $576 to Simon.

Americans have long been plagued by the price of auto fuel, and all media including television, newspapers, and the Internet have been riddled with reports of rising gasoline price. Even when the actual price of fuel was flat or declining, Americans were still dragging on the issue of oil price. The actual price of gasoline rose sharply, but the inflation-adjusted gasoline price in 2007 was about the same as the prices in the 1920s and early 1940s. From 1919 to 1922, in the United States the average gasoline price after adjusted by inflation was $3 per gallon, but in August 2007, after 90 years, the average gasoline price was $2.78 per gallon.

If the gasoline price is treated as a part of the whole expense of car, the cost of oil is lower than that in the 1970s and 1980s. In 1975, the gasoline cost accounted for 33.4% of the total cost of the vehicle, while by 2005 it dropped to 18.2% (11.6% in 2004). In fact, the gasoline cost is almost a meager sum of money, because all the fixed cost of cars including insurance, driver's license, taxes, and financial costs have increased almost five times since 1975 [27].

In market surplus is preferable to shortage. Market would be calm when demand suppresses supply, but when supply suppresses demand, the market would become mad and chaotic. Surplus is the normal state of market, and demand usually limits supply. The oil market is a closed system, as a worldwide organization, so oil production plants, refineries, and transportation departments can rarely supply oil at their own will. Just as nature hates the vacuum, the market does not allow the existence of shortage. In fact, the market will not allow the shortage constantly growing. As a result, markets are constantly trying to ensure that the total capacities of actual exploitation, refining, and transporting (the world's ability to provide oil for the market) exceed demand. The market requires a certain capacity surplus at every operational stage of the system to meet unexpected increases of demand. When the supply reaches the capacity limit, the surplus will become shortage. In such a rare state, the supply limits the demand, and then prices are rising. Investment in production will become more profitable and capital will flow to the fields of production. Sooner or later, supply will no longer be a constraint on demand, and shortage will be replaced by the sacred normalcy of excess [28].

In the first half of 2008, in the international commodity market, represented by oil and gold, a magnificent rise emerged. The mainstream media made frequent explanations that it were the futures markets and

various financial derivatives that led to the high price and huge price volatility in commodity markets. Mao Yushi pointed out that although this explanation was very popular and some US congressmen also put forward that the futures market should be further regulated, it is theoretically impossible to conclude that the futures market would have a long-term impact on the spot price. The futures market will not affect the real supply and demand. There is one case where commodity futures may have a short-term impact on the demand of the market, that is, when consumers see futures rising higher than they are at present and buy more to save up, it will increase current demand and lift up the current price. But these goods should still be sold to real consumers. After all, the price of commodity depends on the real supply and demand. The speculators guarantees the realization of the price discovery function of futures market, because once the information affects people's expectation of the market, it will be reflected immediately in the futures market and can be quickly transferred to the spot market, thus keeping the balance of the spot market price [29].

THE PLUNGE IN OIL PRICE IN 2014 AS A REFLECTION OF SLUGGISH ECONOMIC RECOVERY

Since the second half of 2014, international oil price has fallen sharply again, dropping from above $100 to above $40 a barrel. It, to some extent, reflects the current weakness of economic recovery all over the world. The oil price slump in 1998 and 2008 was caused by the East Asian financial crisis and the world financial crisis respectively, both of which were dominated by demand-driven oil price in the state of relatively stable supply. However, the oil price drop this time did not have particularly obvious inducement or trigger, which leads to different analyses about the causes and various conspiracy theories.

From the perspective of supply and demand, the dramatic increase in oil supplies led by shale oil in the United States played a more important than the previous two. From the point of view of demand, although no such economic crisis like those in 1998 and 2008 occurred, the momentum of economic recovery was obviously weaker. Different from the past, after this global financial crisis, the global economic growth has been unable to achieve a strong rebound, and the potential growth capacity of

the global economy is declining. In particular, in the past few years, emerging economies, which were the main source demand for raw materials and the main motivation for world economic growth, have decelerated significantly and its growth of energy demand has also fallen significantly. In the past 10 years, the oil demand in China accounted for half of the world oil demand, but it dropped from 420,000 barrels per day in 2013 to about 250,000 barrels per day in 2014.

The negative impact of oil price rising is more worrisome, but the rising of oil price heralds the relative boom in the world economy. The decline in oil price was absolutely good news for the world economy before the 1980s, but now the low oil price is a reflection of the world's economic downturn. Specifically speaking, the rise in oil price has led to a substantial increase in export revenues and rapid economic growth. The dramatic improvement in these countries will also contribute greatly to the growth of world investment and trade as well as the development of alternative energy sources. Now the drop in oil price is a big blow to the oil-producing countries but it is obviously much more favorable to most consuming countries. At the same time, it will also be helpful to affect capacity growth and to stimulate demand growth, seeding the oil price rebound in the future. Just as many judgments before 2008 that "low oil price will never return" could not withstand the test of market, some arguments like "oil price can never return to historical height" in face of the current low oil price may not necessarily withstand the test of time.

UNPREDICTABILITY VS ANALYZABILITY OF OIL PRICES

Relatively stable oil price is what most people expected, but it is not in line with market and economic laws. The history of petroleum development over 150 years tells us that there is no constant price, only constant price fluctuation. The international crude oil pricing mechanism underwent three stages: western petroleum company pricing (1900～72), OPEC pricing (1973～86), and futures pricing (1986～now). As the degree of oil marketization is getting higher with more participants, oil price is more difficult to be controlled and predicted. As price volatility becomes an increasingly normal state in international oil market, people

can observe the oil market and make analyses and researches on oil price, but they have difficulty in making accurate prediction.

On the one hand, the economy itself cannot be accurately predicted. The uncertainty principle is derived from physics. In 1927, German physicist Heisenberg proposed that certain physical quantities of a microscopic particle could not have certain numerical values at the same time, and the more certain one is, and the more uncertain the other one is. Like natural science, economics involves a lot of uncertainties, especially the changes of stock market, funds, and so on. Soros thinks that the financial market is characterized by chaos and disorder, and the market is always in an uncertain state. The decisions to buy and sell in the market are not based on an ideal assumption. The judgment is made more on the basis of one's expectation out of his own feelings than on the basis of objective data. In the uncertain market, what can be certain is the constant fluctuation, while the amplitude and time of the fluctuation cannot be certain.

On the other hand, predictions may change the results. If a forecast made by a forecast institution or an expert is widely considered as very accurate, market participants would buy or sell according to their forecasts, causing a change in the market trend and making it inconsistent with the forecast. Another case is the self-fulfillment of the forecast. The international oil price is typically uncertain. The basic principle of price is affected by the relation of supply and demand in market, but some other factors, including geopolitical conflict, natural disaster, and fund speculation, may bring about changes of international market supply and demand, which makes the rise and fall of international oil price beyond people's original expectations. At the beginning of this century, the price of energy and other resource products entered a new round of rising cycle, so many people asserted that we would bid farewell to the low-price era. However, with the plunging oil price, many statements that the era of high oil price will be over have emerged one after another. Therefore, the oil price is unpredictable, but it can be observed. People may not be able to accurately predict specific prices, but they could be able to judge the general trend of changes and the laws.

As a window to learn about world economy, the fluctuation of oil price is becoming increasingly a normal state. With the background that oil supply is relatively abundant and market is becoming growingly mature, international oil price are more difficult to be controlled by a country or a group. China should also take more market-oriented measures to cope with the rise and fall of oil price. Under the current low oil

price situation, it is advisable to introduce relevant price improvement measures as soon as possible, to set up multilevel trading platforms and to improve the formation mechanism of various energy prices. It is more feasible and more important to deal with the fluctuation of oil price, strengthen the emergency response system, and enhance the anti-risk ability than to compete for oil pricing power.

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