

Surrey Energy Economics Centre

PROSPECTS FOR OIL PRICES

by

Irene Himona, David Leeke, Colin Robinson
and Paul Stevens

SEEDS 44

APRIL 1989

Discussion Paper Series

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**The papers by Irene Himona, David Leeke and Colin Robinson
arose out of a Seminar on Prospects for Oil Prices
held at the University of Surrey on 7 December 1988.**

ISBN 1852370432

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PROSPECTS FOR OIL PRICES

Irene Himona
Hoare Govett

Introduction

The price of North Sea Brent declined from \$19.80 per barrel in July 1987 to \$12.40 in October 1988, before the recent rebound, following the OPEC agreement. This near 40 per cent decline over the past year and a half has caused a mixed response, with fear, doom and gloom leading to forecasts of \$5-8 a barrel forever on certain days, only to be counteracted by optimistic assertions that the pain factor was bound to lead to an OPEC response, as in 1986, and thus to high oil prices. The only certainty in this kind of environment has been the volatility and uncertainty of the industry itself, the traders and general observers.

It is usually the case that forecasting relies on understanding of the past, which can be used as an imperfect guide to the unknown future. The theory is that history repeats itself, even if not in a precise manner. Unfortunately, the violent oil price swings of the past 30 years or so robs straight line extrapolation of any real meaningfulness.

Indeed, straight line extrapolation, coupled with prejudice, lack of intuition and flexibility, has been the main feature of oil price forecasts, and thus of longer term planning and investment decisions. Regretfully, this practice has on more than one occasion proved disastrous for the industry, and very painful to reverse. Nevertheless, it is still important to understand the past, so that we improve our effort at guessing oil prices by, at least, avoiding the same misunderstandings.

How did we get here?

To appreciate the position the industry is in at present, it is necessary to briefly trace its evolution over the past four decades at least. The period saw numerous changes in the structure of, first of all, the overall energy industry, with the replacement of coal by oil, and secondly in the structure of the oil industry itself, with the formation of OPEC, the

breakdown of the majors' vertical and horizontal integration and increased competition from new suppliers.

Low-priced oil coupled with its increasing availability and convenience led to the replacement of coal by oil. So whereas in 1900 coal accounted for 95 per cent of world primary energy consumption, by 1958 oil overtook coal, and by 1969 oil was twice as large as coal.

OPEC was formed in 1960, and its potential power increased with its expanding membership and the increasing use of oil. Their potential was realised in 1973, with a combination of a political crisis and unilateral action by the Arab members of OPEC in raising official prices. In the same year OPEC nationalised the oil majors' upstream operations. This was the beginning of the dismantling of the majors' control, with power transferred to the OPEC states. Nevertheless, the structural transformation of the industry was still incomplete, since producing countries were controlling the upstream alone, with the vertically integrated structure being maintained until the events of 1979.

The Iranian Revolution led to a supply shortage and to spot prices jumping to over \$40 a barrel. In the same year the OPEC countries took over the crude oil trading function. Between 1970 and 1981 the price of Saudi Light rose at 33 per cent compound per annum in nominal terms. It can be argued that OPEC's golden age lasted between 1973 and 1979. Subsequently, we find OPEC on the defensive.

OPEC on the Defensive

The price rises of the 1970s eventually led to demand and supply side responses. Free World Demand declined from 50.9 million b/d in 1979 to 44.9 mbd in 1983, that is, a loss of 6 mbd in four years, or a loss of half a billion barrels per annum. On the supply side, non-OPEC, non-Communist supply increased from 19.8 mbd in 1979 to 25.3 mbd in 1987, an increase of 5.5 mbd in eight years, or a gain of a quarter billion barrels per annum.

As a consequence, the demand for OPEC oil declined, and so OPEC production fell by 46 per cent from 31.5 mbd in 1979 to a low of 17.2 mbd in 1985. By that stage the corrective mechanism was still incomplete, as the oil price had not yet taken the strain and a collapse was inevitable. The only question was one of timing and magnitude.

The 1986 Oil Price Collapse

Of course the key to the 1986 collapse was Saudi Arabia, that took most of the burden. In 1980 the Saudis were producing 10 mbd. By 1985, their production had declined to 3.5 mbd, a loss of 6.5 mbd, or nearly half (45.5 per cent) of the fall in total OPEC output in the same period. Even worse was their position in the middle of 1985, with output of barely over 2 mbd, as compared with a maximum productive capacity of around 11 mbd. The result was not only the large decline in liquidity, but also the loss of power and 'face'.

Thus, they went for market share via use of netback deals to maximise sales, and the price collapse was brought about, with spot prices declining from over \$30 a barrel in November 1985 to \$8 by mid 1986.

Mid-1986 to Mid-1987

The one-year period between mid-1986 and mid-1987 can be looked upon as a temporary pulling together of OPEC in the face of a bitter shock. A very determined and effective effort was made to restrain supply, which was the 'knee-jerk' reaction to a crisis. The restraint fuelled a strong price recovery to \$20 a barrel for Brent within a year. Not only did OPEC achieve its \$18 a barrel target but they overshot. This created confidence that they were, once again in control. Confidence combined with temptation in the form of panic buying when the tanker crisis started, led to the relaxation of the discipline and to overproduction. Subsequently, the market has once again been in a slow-motion collapse mode.

The price decline has been delayed not only by the inherent long time-lags characterising the industry but also by oil traders' expectations of a re-run of 1986, with OPEC supply restraint. Under such conditions no trader would be short of oil; and if no one decides to sell, the price will not fall.

Current Position

So where exactly are we now? Basically we are in a worse position than in mid-1986, the primary reason being the end of the Iran/Iraq war. Iraq in particular has the potential to raise output, with its export capacity being expanded to 4 and possibly 6 mbd by the end of 1989. Both countries, of course, need cash to rebuild their economies, so the incentive to raise output is there.

The second reason why things are worse today than in 1986 is the lack of a swing producer within the organisation and, equally important, the market's perception that this is the case. The Saudis renounced this role in 1985 and made it clear they will not be victimised again.

Furthermore, there appears to be less give and take, more entrenched views, less willingness to compromise and too much confidence regarding the implied demand for OPEC oil.

Additionally, there is the feeling that if they succeeded in 1986, then they can do it again. The implication is, therefore, that they make the minimal effort. However, the size and nature of the industry makes it impossible to fine-tune prices. Thus undershooting is the only means of making sure the price is rising.

The main problem, though, is the decline in OPEC's power. They are now supply only 40 per cent of Free World demand, a far cry from the 60 per cent plus, provided in 1979. Within such an environment, we can examine the implications of the November agreement.

The November Agreement

In our view the November agreement falls far short of addressing the key problems facing OPEC. It is an unworkable, unrealistic, 'face-saving' agreement, which will not stick.

The main hurdle of Iran/Iraq parity was resolved. Subsidiary issues such as Neutral zone output and the definition of condensates, were apparently resolved. The main question, however, is whether they can actually reduce output to 18.5 mbd for a meaningful period of time. The UAE presents the most obvious weak point in the chain. They are now producing 2 mbd, and hitherto have been demanding a minimum of 1.5 mbd. Under the current quota, they have to happily cut production to 988,000 bd in the new year. The same also applies to Iraq, for which 2.64 mbd can only be seen as a very temporary quota.

Even if the heroic assumption is made that they do adhere to 18.5 mbd for the next 6 months, however, this will not be adequate to send oil prices upwards. The reason is that, given the excess stocks built over the past year and a half, with December likely to see further additions as they all engage in testing their capacity limits, 18.5 mbd exceeds the call on OPEC oil for 1989.

Eighteen and a half million barrels a day may have balanced the market for a while at around \$14-15/barrel for Brent. However, the sheer amount of oil overhanging the market will place a cap on the price. Clearly, it will be more economic to draw down stocks bought at \$11-12/barrel than to buy the more expensive OPEC crude in January/February 1989. As we enter the spring, when demand is seasonally weak, the price will slide, to the \$10/bbl level and our projected average for 1989 is no more than \$13 per Brent barrel.

There is a very wide range in the market regarding the call on OPEC oil. The highest figure is around 20 mbd, and our own forecast of 17.8 mbd, including stock movements, is the lowest. Obviously, the main problem is the spare capacity available, which means

that the tendency to overproduce will be there until well into the 1990s. At that stage an increase in the implied demand for their crude, as non-OPEC supplies start declining, will create a more comfortable environment. An implied demand of above 20 mbd would certainly ease the strain, and the consensus view is that this is how things will actually work out. It is worth remembering that consensus views are, more often than not, wrong.

There are a lot of possibilities as to what may happen between now and the day when OPEC will come out of its defensive state. To start with, the industry trend towards vertical re-integration, with OPEC moving downstream, is potentially a dangerous one. Contrary to the majors' integration three decades ago, when the upstream was cartelised and stability was assured, the OPEC move is primarily one of volume at the expense of price. It is certainly not inconceivable that when the complete infrastructure is in place, some OPEC countries may follow their own route, with the Organisation essentially disappearing from the map.

Nevertheless, this is the long term and today we are concerned more with the outlook over the next year or so. It is our belief that the excessive price levels seen in the 1970s require a long period of price weakness, of several years' duration. We have only had eighteen months of it so far. Thus there is a lot more to come.

To reiterate and conclude, therefore, we believe the OPEC agreement is unworkable. Prices may at best hold at \$15 a barrel in the beginning of 1989, slipping in the spring, with an average price of \$13/barrel, and substantial volatility around that level.

THE PROSPECTS FOR OIL PRICES

David Leeke
Shell International

In considering the prospects for oil prices, it is perhaps useful first to state the oil environment in which we expect to be operating.

Chart 1 shows WOCA production versus capacity for 1972-87-92 (WOCA stands for World Outside Communist Areas).

In relation to global demand expressed in terms of crude oil production, we expect the surplus of global crude oil capacity if anything to increase as we move into the nineties, in the likely economic and price environments. I should add that the truce in the Gulf has significantly increased the potential deliverability of some of this capacity. The struggle for market share between OPEC and non-OPEC producers will continue, probably with little likelihood of significant cooperation on supply management. OPEC countries are likely therefore to remain the balancing suppliers and the focus of our attention remains largely upon OPEC policies and performance.

In our view, price prospects depend therefore upon the extent to which OPEC members can achieve collective political will on oil production and pricing policies and in maintaining cohesive performance of agreements, despite the continuing divisions and changing alliances within OPEC.

Up until ten days ago recent experience was not very encouraging in this respect. Chart 2 illustrates the interplay of oil market factors since June 1987. I show this chart only to bring out some points that may be relevant in considering the immediate future.

As you know, OPEC members have consistently exceeded agreed production ceilings since mid 1987, and failed at many meetings to restore internal discipline. Oil prices, represented here in terms of Brent, fell progressively. However, the interesting question is perhaps, why prices did

CHART 1

WOCA production versus capacity 1972-1987-1992

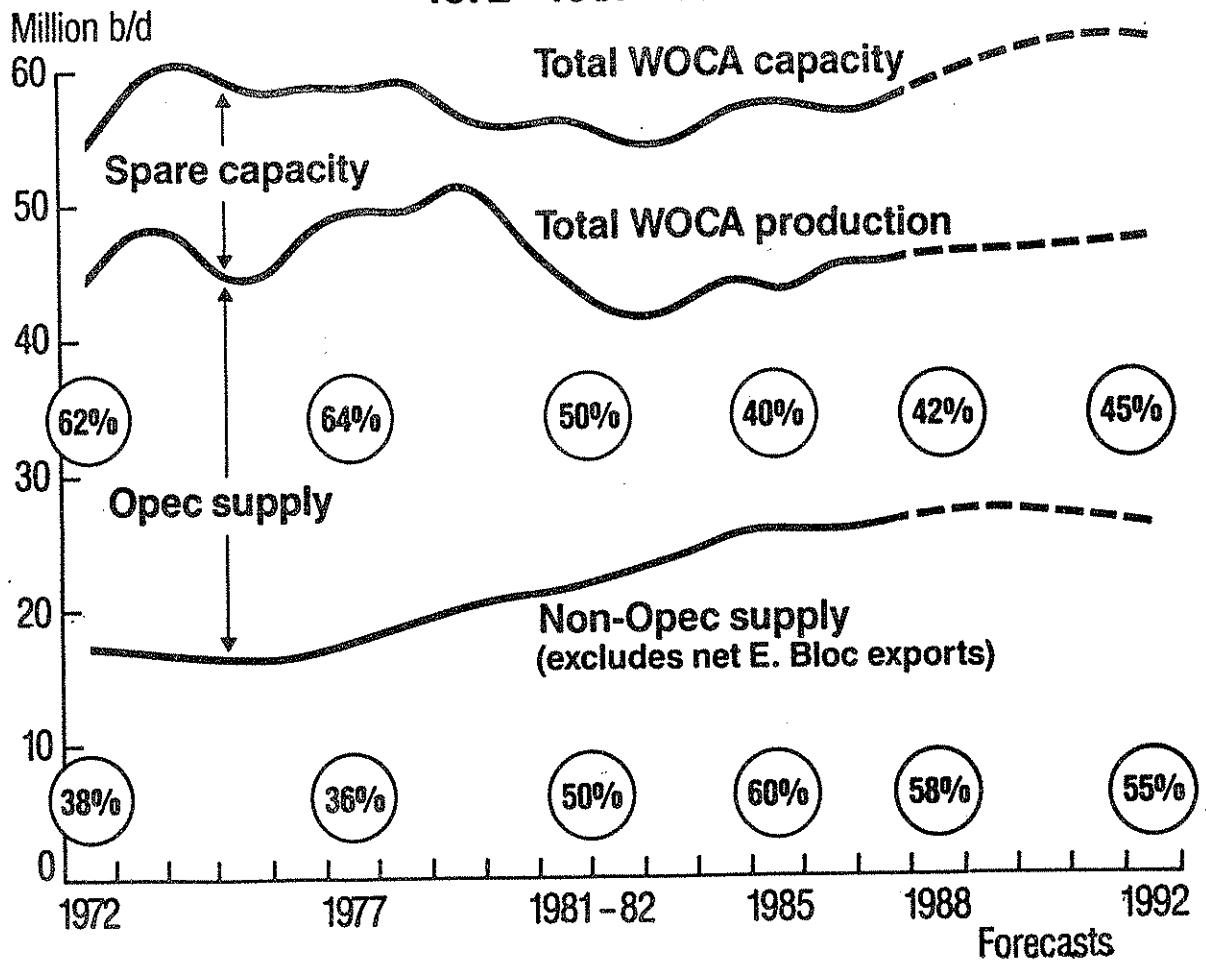
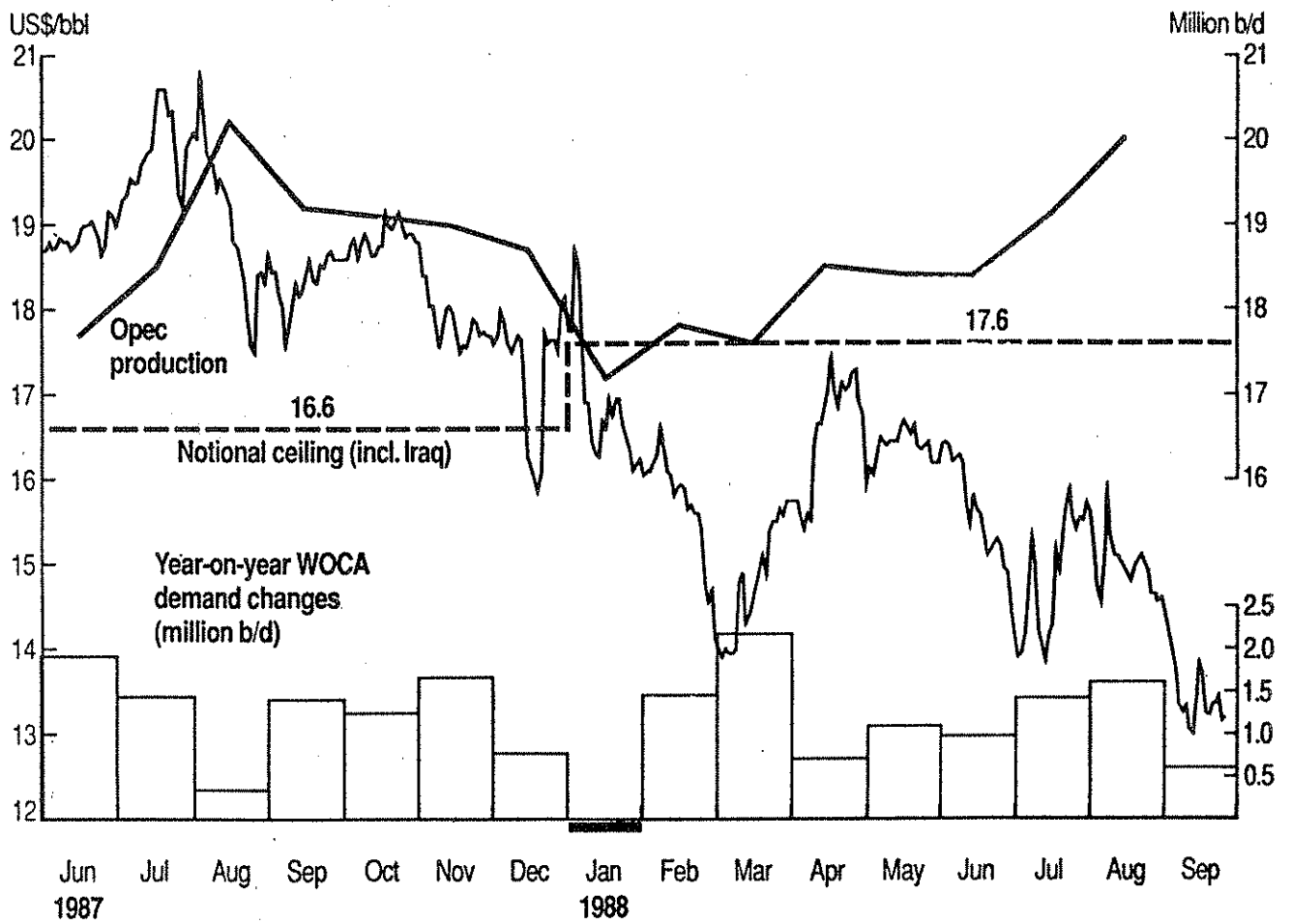


CHART 2

Interplay of oil market factors - effect on Brent spot prices



not fall further and faster. I suggest there were four main reasons: first as shown here month by month, global demand growth has been very strong: averaging around 1 mbd up on the year before with particular strength in the automotive and chemicals sectors. Secondly, there have been a series of supply accidents of which the loss of the Piper field in tragic circumstances is one example. Thirdly, especially in recent months, OPEC members and particularly Saudi Arabia have been holding very large floating stocks and this oil has not yet reached the market. Fourthly, I believe market psychology has been consistently persuaded that OPEC would eventually take corrective action. On this last point, the outcome of OPEC's meeting in Vienna last month provides some confirmation.

Let me now turn therefore to one view of short-term oil price prospects, in the light of OPEC's new production ceiling of 18.5 mbd and the reintegration of Iraq in the quota system.

We expect oil demand growth to slow down a little in 1989 from the 2 per cent rate of 1988, even if OECD economic growth remains resilient.

Next we anticipate a further advance in non-OPEC supply, notably for example in Norway, Yemen and Brazil, offsetting falls in the US and the UK.

In addition we estimate that global commercial stocks at the beginning of 1989 in days cover will be more than comfortable. If the floating stocks of OPEC producers are made available to the market, and assuming normal winter temperatures, stocks could exceed minimum prudent commercial levels by some 100-200 million barrels.

As a consequence, we foresee the likely underlying call on OPEC crude oil as being 18.5 mbd over 1989 as a whole, and lower than that during the first half of the year. Much depends upon the extent to which OPEC maintains market confidence; if this is undermined, a much greater stockdraw may take place during the first half year and the call on OPEC will be reduced further.

Therefore, although OPEC's latest agreement for first half 1989 is definitely in the right direction, even if it is strictly observed by all members, we expect oil prices to remain under some pressure early next year. In addition, the prospect of increased Iraqi and Iranian export capacity by late 1989 will tend to hang over the oil market.

Brent prices are now around \$14.00 compared with around \$12/bbl immediately before OPEC's successful ministerial meeting in Vienna. If positive signals of OPEC's resolve are given in early negotiating rounds for January liftings under term contracts, by considerably reduced UAE production, and by signs of some non-OPEC support, oil prices may hold at around current levels into next year. But most of the risks seem to be downside ones, leading to possible triggering of another round of OPEC emergency meetings.

Turning briefly now to medium term price prospects, there must now be much greater doubt about the inevitability of sharply rising real oil prices in the nineties which was the popular prediction not so long ago. Changes in the structure of oil demand on the one hand (I refer to such factors as conservation, lower energy intensities and increasing environmental concerns about fossil fuels), and the resilience of non-OPEC crude oil production in a lower price environment on the other, suggest the call on OPEC will rise only modestly relative to OPEC's capacity to supply.

For example, we anticipate a range of WOGA oil demand in 1992 of 50.5/52.5 mbd assuming real GNP increases of 2.5 - 3 per cent in OECD, and somewhat higher outside OECD - a non-recession case therefore. But with non-OPEC production expected to remain around 27.5 mbd throughout, the underlying call on OPEC only increases by at most 3 mbd above the ceiling of 18.5 mbd which OPEC have just agreed. We believe Iraq would be able to meet much of such an increment on its own.

In very generalised terms, we foresee three possible cases for medium term oil price prospects: **Managed Market** represents a future in which a strong OPEC consistently keeps the market balanced, whether by control of production volumes or by refusing to sell below certain price

levels or a combination of both. As I have indicated, in our view, this case now has a lower probability in the medium term. However, political developments within OPEC or a breakthrough in OPEC/non-OPEC cooperation might surprise us.

OPEC Crisis indicates a future in which crude oil prices remain consistently at low levels, although as a result of spasmodic cooperation within OPEC and possibly between OPEC and non-OPEC groupings, perhaps not low enough to cause significant oil substitution by consumers. The stability of this case is debatable. This is because if continuation of such low price levels is generally perceived, a significant fall in non-OPEC production might be anticipated, particularly in the US, leading to a global supply/demand situation in which OPEC may be able to again operate more effectively.

Currently we probably place greater probability on an **OPEC Struggle** case. In this case, successive OPEC agreements may cause prices to rise for a time but the compromises which will be needed to achieve agreement, and the absence of flexible OPEC control mechanisms, will tend to cause a bias towards oversupply again and therefore towards recurring OPEC crises. While average prices in money of the day terms may rise slowly over the medium term, therefore, we would expect a roller coaster profile with crude oil prices fluctuating within a wide bracket of several dollars per barrel.

PROSPECTS FOR OIL PRICES

Colin Robinson
University of Surrey

Looking back on the rather sorry history of oil price predictions, there have been very few occasions in the last fifteen years when oil analysts (academic, oil industry or City) have been anywhere close to correct. That contrasts with the earlier postwar period when crude prices had been gently falling in real terms and, on the whole, expectations were fulfilled until the first price explosion of 1973. The variability of crude prices was, of course, much less in the earlier period so it is perhaps not surprising that predictions were better.

The one time in the last fifteen years when there were some fairly good medium to long term predictions - by which I mean not just that roughly correct guesses were made but that the reasons for those guesses had substance - was in the mid-1970s. A few people did then argue, in contrast to the popular view of the time (that oil and other energy prices were on an inevitable upward trend which would continue to exhaustion) that energy markets would adapt to higher prices and that the years of apparent 'scarcity' would prove short-lived. According to this minority view, the apparent power of OPEC would evaporate by the 1980s. Competition ('cheating') within the group would emerge as a consequence of individual country self-interest in a situation where price significantly exceeded the marginal cost of production; thus the cartel would break up as previous cartels had done. Consequently, it was contended that the sharp crude price increases of the 1970s would, in retrospect, appear as a passing phase in the history of world energy.

By 1977-78 it seemed that such predictions had indeed been correct. Markets clearly were adjusting to the new circumstances and it appeared that the period of rising crude prices would prove short-lived. Prices by then had levelled out and begun to fall slightly in real terms.

But then came the second oil 'shock', following the Iranian Revolution and the subsequent disruption of oil markets. It was not so much the Revolution itself which was influential as the evidence it appeared to provide that there might well be further events in the Middle East which

would cause supply interruptions and sharp price increases. Expectations of further price increases took hold and, though it was not apparent for a little while thereafter, the process of market adjustment away from oil was accelerated both by movements along the relevant demand and supply curves and also by shifts in those curves caused by non-price variables (changes in income partly consequential on the crude price increases and policy changes). At the same time the adjustment process was made more complex and difficult to perceive by changing attitudes which were independent of the oil shocks (such as the increasing desire for a cleaner environment and more hostile attitudes towards nuclear power).

Amid the general confusion, it was not widely recognised that market forces would within a few years turn 'scarcity' into 'surplus' nor that, though OPEC would transform itself into a more genuine cartel than it had ever been in the 1970s, yet it would have to struggle hard to stop a fall in real crude prices which would essentially cancel out all the increases of the 1970s.

This brief review of the past seems to me instructive since it suggests - admittedly on very limited evidence - two things:

- 1) That we may be better at perceiving broad future trends in crude prices by using simple economic analysis than we are at guessing short term price movements.
- 2) That, fascinating and colourful though the behaviour of OPEC and its constituents may be, one can concentrate too much on OPEC meetings and other expressions of that behaviour. In the 1970s, changes in price expectations and in property rights were probably much more important causes of the price explosion than was the behaviour of OPEC. OPEC meetings were much more occasions for setting the seal on price changes which had already occurred than for active price-setting. Of course, OPEC now attempts to control production - which on the whole it did not do in the 1970s - but its members now only produce around one third of world oil. There are very marked differences in interests (for instance, in time horizons, depending on the relative sizes of reserves). And of course OPEC members are, like members of any organisation where price is being held well above marginal cost, subject to strong incentives to raise production at the expense of fellow members. Thus quota agreements are unstable; if recent experience is any guide they are reached as an act of

desperation when prices have fallen far enough to produce considerable pain and they are undermined as soon as the pain begins to lift. No doubt the same thing will happen to the November 1988 agreement. The machinations of OPEC are, however, not all there is to the world oil market. They are bounded by what happens in the wider market, and indeed what happens in the energy market as a whole where other fuels have gained considerable ground on oil since 1973.

So, let me say something about the context within which OPEC operates, to complement what previous speakers have said.

One of the characteristics of all markets for energy is the long time lags on both the supply and demand sides. On the supply side, the lags stem from long planning and construction periods and also from public attitudes to different forms of energy supply (such as nuclear power, where public opposition has frequently caused construction delays, de-rating or losses of output during operation). On the demand side, the lags are a consequence primarily of the complementarity between the demand for fuels and the demand for appliances which give the market many of the characteristics of a durable goods market. Stocks of durable energy consuming equipment take a considerable time to respond to relative price changes and other stimuli - consumers wait until their price expectations change before altering their behaviour and they invest in new energy-consuming equipment only when the avoidable costs (capital and operating) are less than the avoidable costs (operating only) of staying with existing equipment. It takes big price movements before the second test is passed.

Because of these long lags, confusion often reigns about what state energy markets are in. Changes occur beneath the surface which are very hard to perceive. Clearly energy markets are not normally perceived to be in equilibrium - few markets are! They constantly overshoot. But which side of disequilibrium are they? Often it is not clear. In the early 1980s, the oil market was commonly perceived to be on the verge of increasing scarcity and rising prices. In fact, it was on the verge of a period of 'surplus' at pre-existing prices, How do we know that the

present popular perception - that the oil market will remain weak for years to come - is any better founded?

If I were in the unfortunate position of having to make oil price predictions over the next few years, I would be extremely cautious of accepting the prevailing view that crude prices will remain around their present level for a substantial period ahead. I doubt if the market will remain settled for so long. Admittedly there was along period of stability throughout the 1950s and 1960s. But that was a time when about three quarters of world traded oil passed through the vertically integrated organisations of a small number of oil companies which were very skilful at balancing supplies and demands in various regions and avoiding the conditions in which prices move sharply. Circumstances are very different today.

It is now eight years since the peak of crude prices in late 1980/early 1981 during which period energy markets have again been adjusting - though the time lags make it difficult for us to perceive exactly what the state of those markets is. There has, therefore, been a significant period of time in which there has been a depressing effect on oil supplies (via a reduced incentive to invest) and a stimulating effect on oil demand via lower prices relative to other fuels. It is an exaggeration to say there have been eight years of adjustment because the changed price trend was not recognised for a while. But, just as the second oil shock appeared to provide powerful evidence of future rising prices, the events of 1985-86 seemed to suggest significantly lower future prices. The first event provided an incorrect signal (partly because of its feedback effects). Did the second also do so?

In all honesty I cannot help you much on the timing of the next turn in oil prices. The most useful guide from the past is that it is most likely when least expected! But what one can say is this: OPEC is in disarray for the same reason - the pursuit of individual self-interest - from which all cartels suffer. Every time the market shows signs of strengthening - and sometimes when it does not - one or more members will quite naturally take the opportunity to increase output. So at present it seems hard to foresee any significant increase in crude prices. It is obvious that some members are unlikely to abide by the quotas recently agreed. It is plain

also that there are a number of supply-increasing factors which are likely to stem from the end of the Gulf War and the completion of various expansion projects. In particular, Iraqi export capacity will probably increase considerably in the near future. For these sorts of reasons, I would agree with those who foresee prices in the next twelve months probably averaging no higher than in the last twelve months.

But one of these days the market is likely to turn for the same reason that it has turned in the past. We should bear in mind that the turn in the market in the early 1980s took almost everyone by surprise. World oil demand is gradually rising at around 2 per cent a year. On the supply side, there has been some limited shutting-in of production in non-OPEC countries (especially the US); more important are the longer term effects of lower investment in oil exploration and development. Crude oil supply is very inelastic with respect to price in the short run because, as explained earlier, short run avoidable cost is low relative to price in most producing fields. Supply is, however, very much more elastic in the longer term as changes in exploration and development expenditure are translated into changes in supply. Moreover, there are related changes in other energy markets (for example, coal and nuclear power, where there has been a dearth of new investment recently) which will reinforce these trends in the oil market, eventually boosting the demand for oil.

The probability is that these supply and demand changes will produce the conditions in which crude prices will again rise in real terms. The reason is not the simple-minded notion that demand will rise to equal available supply, cross over and then there will be 'scarcity'. Prices are likely to begin to increase long before that state is reached because energy markets will anticipate scarcity well before it actually appears. There was, of course, no 'scarcity' in the statistical sense in 1979-80, nor was there in 1973-74. Prices increased essentially because of anticipations of scarcity.

In retrospect, I would now see a failing in the oil price forecasts which I and others made in the mid-1970s (that the period of rising real prices would be short-lived)*. The failing was to regard the experience of the 1970s as a passing event because we did not look beyond the expected fall in prices to ask what might come next. I would now be much more inclined to regard the oil market, except at times when powerful suppliers are in control, as proceeding in cycles with 'scarcity' generating 'surplus' to be followed by renewed 'scarcity'. The long time lags which I described earlier would suggest such behaviour. Thus I would not see the next rise in crude prices as the precursor of a period in which real oil prices rise indefinitely up to exhaustion. More likely there will be a subsequent period of renewed surplus with real prices again declining.

As to timing, I do not think that when we meet this time next year we shall be talking of incipient scarcity - the oil analysts who worry so much about OPEC behaviour are more likely to perceive 1988/89 as a period in which OPEC has just about muddled through. But maybe the year after next or the one after that !

* For example: Colin Robinson, The Depletion of Energy Resources, in D.W. Pearce (ed), The Economics of Natural Resource Depletion, Macmillan, 1975.

THE OIL MARKET AND THE MIDDLE EAST- THE INTERACTIONS AND THE PROSPECTS FOR THE VIENNA NOVEMBER 1988 AGREEMENT

Paul Stevens
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[This paper is based upon a presentation given as part of the Oxford Analytica Middle East Team's contribution to a recent conference 'The Middle East and Oil After the War,' organised in New York by Oxford Analytica and the Oil Daily.]

The purpose of the paper is to examine the interactions which exist between the international oil market and the Middle East and between the Middle East and the oil market. These interactions are crucial to both the oil market and the region in general and the prospects for post-war Gulf reconstruction in particular. The starting point is the provision of an overview of the current state of these interactions by means of the economist's usual inseparable companion - an analytical framework. This allows the inspection and manipulation of various parts of the very complex jigsaw which makes up the interaction. The framework is not especially original (an earlier version was developed by Ali Ezzati in the mid 1970s) but it has the great virtue of simplicity in a context where to be simple and wrong is simplistic but to be simple and right is elegant.

The framework starts from two generalizations about the industry which I believe are non-controversial. Since Edwin Drake spudded his first well in 1859, the industry has been dogged by an excess capacity to produce crude oil. In addition, crude production has always been characterized by very low short run marginal costs. The latter arose simply because the capital intensity of the industry meant that fixed costs formed by far the largest proportion of total costs. Given these two generalizations, the history of the industry can be written in terms of the controlling mechanisms used to contain the natural consequences of excess capacity and low marginal cost, namely a downward pressure on price. When the control mechanisms have been strong and effective the price has been stable; when weak and ineffective, the price has crumbled or collapsed. Since March 1982, this mantle of control was picked up by OPEC in the aftermath of the destruction of other controlling mechanisms (vertical integration) by the second oil shock of 1979-80. Some might argue this happened much earlier although I would disagree but that is now only of historical interest. Without doubt, since 1982, OPEC's role has been crucial. The mantle of control took the form of a production sharing agreement which (whatever earlier views may have been on OPEC's role) clearly identified OPEC as an explicit cartel.

In any analysis of a cartel the object is to examine the weakness and strengths of the cartel. This for OPEC is where the market-regional interaction becomes crucial. The framework identifies two elements. The world demand for oil and the supply of non-OPEC oil. Detailed discussion of both are outside the remit of this paper but the main trends since the second oil shock are clear. Oil demand fell dramatically to 1983 and has grown extremely slowly (in historical terms) since. All agree the fall was due to recession, fuel switching and conservation, all disagree on the relative importance of the causes although the evidence increasingly puts weight on the last two causes. Non-OPEC supply has increased significantly and shows few signs (outside of the USA) of declining. The gap between the two is of course the demand for OPEC oil treated as a residual. The trends in the other two variables means that since the second oil shock the demand for OPEC oil has fallen dramatically.

The next element in the framework is the revenue 'needs' of the OPEC members. This number is conceptually easy to define. It is the minimum revenue required for economic (and therefore political) survival of the governments. It is however very difficult to quantify. Its size is much influenced by the acquisition of a taste for spending which is an imprecise notion. Since 1973, almost without exception the appetite for spending has proved to be prodigious if only because the OPEC members are all Third World countries and many are extremely poor.

If the elements - demand for OPEC oil and revenue needs - are compared, unless they are coincidentally equal a gap is created. If the total revenue (implied by the price and quantity from the demand for OPEC oil) exceeds the minimum revenue then the cartel faces a stability gap. Thus there is less pressure on the members to cheat on the agreement and overproduce. Since 1982, the reverse has been true and revenue needs have exceeded the implied revenue. This creates a destruction gap since there are now pressures on the cartel members to cheat by producing over their quotas in the hope of meeting their 'unfulfilled revenue needs. The greater the gap the greater is the imperative to cheat and the more likely a failure in any cartel agreement.

This provides the framework for analysis. For purposes of focusing the discussion, the paper takes the demand for OPEC oil (and its determining variables) as a given. Thus it is the revenue needs of the Middle East region (in production quota terms 66 percent of OPEC) which sets the size of the destruction gap. In turn the size of the destruction gap determines the rate at which price declines or alternatively how long the price stays low once some perceived floor price has been reached. This in turn determines how far revenue needs are met. The life of the new OPEC agreement reached in Vienna will be a function of when the cheating begins (stops?) which in turn will be a function of the size of the destruction gap.

Consider next the Middle East regional input into this analysis. The paper begins with the Gulf Cooperation Council (GCC) countries and then moves to Iran and Iraq whose economic realities are somewhat similar to the GCC but more pronounced. After the first oil shock of 1973, the GCC states rapidly learnt to spend the oil revenues. Their status as 'low absorbers' disappeared. However, with the notable exception of Kuwait, much of the spending was relatively unproductive. The investment, intended to create more diversified economies to increase non-oil sources of revenue, because of the hostile economic environment, required such a degree of subsidization to launch the projects and keep them afloat that the aim of developing real alternative revenue proved illusory. At the same time these investment strategies were creating an expenditure lock-in effect. This is defined as 'forced' spending levels and stemmed from two factors. First is the obvious point that capital projects require current expenditure. This is in order to run the projects - staff salaries, consumables etc. Spending is also needed to maintain the projects. Much of the building work was hurriedly and badly done. In particular too much salinity was allowed in the concrete - either by use of saline water or failure to wash the aggregate. This means increasingly large sums of money must be spent if much of the infrastructure is to survive. The second source of 'forced' spending arises from political necessity. Limited consultation in many of the states requires buying political support from the groupings within the country. Such political lubrication ranges from subsidization of many utilities to more direct benefits on contracts. The more people become used to such lubrication the harder it is to reduce provisioning. If an arms race is then added to these ingredients it creates aggregate spending levels which are almost impossible to reduce significantly.

From the above, two major problems emerged. The first was the economic recession experienced in the region since 1982. Although this was in large part due to the downturn in oil revenues it was also severely aggravated by financial crises stemming from what might politely be described as dubious practices in the banking and financial sectors of the economies. Recession was further aggravated by the very poor performance of governments (perhaps excepting Bahrain) in coming to grips with the macro-economic realities. What cutbacks there were were ad hoc, ill-coordinated and frequently whimsical. Although the recession has bottomed out there is still a steep hill to climb before the recession is over.

The second problem, related to the first, is that of twin deficits (fiscal and trade) stemming from falling oil revenues and the lock-in on spending. Accumulated reserves have provided some cushioning against the revenue shortfall but clearly were only a solution for a finite period. Taken together, all this suggests that the prospects of Vienna holding are not good. Revenue needs remain unchanged. Actual revenue will not gain much from Vienna, even assuming the agreement holds. Any increase in price which may follow from the agreement must be bought at the expense of volume by the GCC OPEC members. A rising price from a falling quantity is likely to leave total revenue much the same. The contribution therefore of the GCC states to the destruction gap is unlikely to diminish at all next year.

Turning to Iran and Iraq, much of what was said about the economic state of the GCC applies but in a more acute form. There are two current elements which accentuate the twin deficit problem and the poor state of the domestic economies following eight years of war. First is the debt situation. The huge debt facing Iraq is well-known and much discussed. Figures of \$60-65 billion are the norm, and even assuming that half of this owed to Kuwait and Saudi Arabia will be written off, an uncomfortable amortization burden remains. The picture is even more acute than the figures suggest because of the maturity of the debt. A large amount is due for repayment soon. Less well appreciated is the fact that Iran's debt situation is much worse than is generally believed. The last year of the war saw Iran allowing its short term trade debts to accumulate rapidly as the economy faced acute foreign exchange shortages. With imports running in excess of \$12 billion (higher than the official figures) such an approach rapidly accumulates debt. Officially figures put the debt at some \$8 billion. Rumours in Teheran go as high as \$20 billion and although this is far too high the real figure probably lies in the middle. This debt has two

implications for both countries. First, its amortization increases the revenue 'needs' figure. Second, it limits that ability to fill any destruction gap by borrowing even assuming the current debate in Teheran about the legitimacy of bank borrowing (as opposed to trade debt accumulation) is resolved in favour of entry to the world's money markets (which seems probable).

The second element which aggravates the economic state of the countries is the need for reconstruction now that the shooting war has ended. The reconstruction involves two parts. The first is the obvious one of physical damage from the shooting war. This appears to be an unlimited sink for funds. Ayatollah Khomeini has for example requested that destroyed cities are left untouched as 'monuments' with new cities being built alongside. The second element is less obvious but equally serious, namely damage from war neglect. The outbreak of war inevitably re-directed resources and attention away from the conventional economic sectors to other matters. Such neglect has taken very heavy tolls in many sectors. In particular, in both countries, agriculture has suffered significantly. Both sources of damage require money to rectify them. Currently priorities for rectification are being expressed in the form of rhetoric on both sides. In Iraq it appears to be simply more of the 1970s which may be (unkindly) described as hydrocarbon gigantomania. In Iran the priorities are less certain. The debate triggered by the revolution on what an Iranian Islamic economic system might look like was not surprisingly held in abeyance with the outbreak of war. The last eighteen months saw the debate revived as part of the power struggle which has been going on in Teheran but the outcome (most obviously on the state versus the market) remains to be set. In general however it seems likely that for both sides the immediate requirements will be first to restore crude export capacity, second to strengthen military capabilities and finally to provide some form of compensatory relief for two populations who have suffered sorely in so many different ways over the last eight years.

In such a context, the revenue 'needs' of Iran and Iraq dwarf those of the GCC which themselves are substantial. The Vienna agreement has changed nothing in terms of the pressures on OPEC. The destruction gap remains as wide as ever. The previous analysis implies that in the absence of any significant change in demand for OPEC oil (ie demand for world oil and non-OPEC supply), if the destruction gap changes it will be only to widen. With such a prospect the question is not if the Vienna agreement will begin to break down but when it will begin to break. The

indecent scramble by some members to get oil above ground before the Vienna agreement takes effect on January 1 simply reinforces this view.

