

Political gas-pricing premiums: the development in West Germany 1977–1985

Ole Gunnar Austvik

MANY PEOPLE have claimed that the danger of a disruption in the supplies of natural gas from the Soviet Union to Western Europe must lead to increased Norwegian production to supplant Soviet exports. This is an argument which has been put forward as particularly applicable in a situation where the “normal” tempo of development of Norwegian gasfields, and a decrease in Dutch production, would lead to a disturbingly large share of imports having to come from the Soviet Union. It is claimed, especially from the Norwegian side, that, in order to increase our production faster than the so-called “normal” plan, Norwegian gas would have to be priced higher than Russian gas.

In order to see if any such preferential pricing has in fact been implemented, I shall in this paper compare the prices of supplies of natural gas from various countries to West Germany, and discuss various opinions regarding the possibility of any type of preferentials involving the participants in the market.

Companies and government authorities are extremely reticent about allowing gas prices to be revealed to the general public, and prices in both previous and future contracts are only referred to in more or less general terms in a number of specialist magazines. In official trade statistics, too, prices are kept secret in many countries by means of the suppression of figures related to quantity or value, distribution by country or combinations of these. This secrecy hampers discussions about the reality of preferential gas pricing.

A great deal of data suppressed in statistics may, however, be decoded by comparing different information. As far as gas prices are concerned, we have arrived at quantities, values and thus prices of the gas West Germany has registered as imported from each individual country, by utilizing statistics published by the Statistisches Bundesamt under different nomenclatures. The advantage of using such a source is that each import figure is based on invoice values, converted to a price cif the West German border. This makes prices comparable, even if the contracts contain different processing values.

The author is Senior Researcher at the Norwegian Institute of International Affairs, Oslo. He was formerly Senior Executive Officer in the Central Bureau of Statistics, responsible for the official statistics on Norwegian oil and gas exports. This paper was presented at the Eighth International Conference for the International Association of Energy Economists at Tokyo, Japan, 5–7 June 1986.

They may, however, conceal considerable differences in individual contracts. The figures only provide average prices, gauged in proportion to the quantity supplied in accordance with each individual contract. Such a survey does not, of course, provide an answer to the question of whether preferential pricing is an integral part of future contracts.

In the first section of this paper, there will be a discussion concerning how factors connected with economic and political dependence may be imagined as influencing the consumption of individual energy sources and their distribution in terms of country. After this, there will be a presentation of various reasons why differences in prices can arise, considering the manner in which gas contracts are normally formulated. In the second section, there will be a comparison of the prices of supplies of natural gas to West Germany from the Soviet Union, the Netherlands and Norway respectively, in the 1977–85 period. It is evident that the proportionally gauged average prices from the individual countries tend toward being comparatively similar over a period of time. In other words, any preferences for individual exporters have not been reflected in prices so far. Various possible reasons for this will be discussed. In the third section, possible developmental trends in the future will be discussed, among other things how preferences for certain countries may be imagined as having effects other than differences in price-setting. The main features concerning the calculations and methodology are described in a separate appendix.

1. Uncertainty in the utilization of energy and the formulation of gas contracts

1.1 Economic and political uncertainty in the utilization of energy

All utilization of energy involves risk. Nuclear power carries the possibility of accidents. Coal suffers from a pollution problem. Hydro-electric power is probably the least risky source of energy, even though it depends on precipitation. In addition, all imports of energy sources involve the risk of political and economic dependency on the exporting countries, to a greater or lesser degree. This particular problem has been focused upon strongly with regard to oil and gas. This leads to a situation where countries wish to diversify consumption among several energy sources and, to the extent that they are dependent upon imports of individual sources, among several supplier nations.

Western Europe's dependency on oil is considerable, a matter which in itself is an incentive to move in the direction of a greater utilization of other energy sources (however, it would require deliberate political control to reduce the consumption of crude oil, if the prices of coal and gas were more or less the same as that of oil, or even tended to favour oil).

1.1.1 Consumption of energy in Western Europe 1984

mtoe

	Consumption	Share
Oil	586.6	48.0
Natural gas	178.9	14.7
Coal	265.2	21.7
Hydro-electric power	107.7	8.8
Nuclear power	82.5	6.8
Total	1,220.9	100.0

Source: BP Statistical Review 1985.

One way to substitute oil is by using more natural gas. In the European gas market, consumer countries have the possibility of dividing their purchases among the Netherlands, Norway, the Soviet Union and North Africa. Gas may also be supplied from other areas, such as the Middle East and other African countries like Nigeria, but this does not seem realistic before the next century.

In recent years, Western Europe has experienced increasing consumption of natural gas. In 1984, consumption was about 214 billion cubic metres (roughly 178 million tons of oil equivalent), which has partly been the result of a deliberate policy of reducing the consumption of crude oil. The main consumer countries are France, Italy, Great Britain and West Germany, with the Netherlands playing a double role as a major producer and consumer. The Soviet Union is the dominant producer in the "region", though most Soviet production is consumed domestically. Since production, then, takes place in areas other than those where a significant amount of consumption takes place, significant trade flows arise, and pricing and the reliability of supplies are therefore important to both exporters and importers.

Approximately half of Western Europe's consumption is met by imports. In continental Europe, the Netherlands and the Soviet Union are more or less equally large exporters. But, if one looks at the whole of the Western European import picture (including Great Britain), Norway is just a bit smaller than each of the other two. The newly signed Troll Contract will raise Norway's export figures to the present level of the Russians and the Netherlands in continental Europe.

The validity of the argument that a country should receive a special political preferential price for its gas exports depends upon, among other

1.1.2 Natural gas trade in Western Europe 1984

billion standard cu m

	Netherlands	Norway	USSR	Algeria	SP Libyan AJ	Total
W. Germany	15.0	7.0	13.5	-	-	35.5
France	7.3	2.3	4.9	9.0	-	23.5
Italy	5.2	-	8.2	6.3	0.4	20.1
Belgium	5.8	1.7	-	1.5	-	9.0
Netherlands	-	2.8	-	-	-	2.8
Austria	-	-	2.8	-	-	2.8
Yugoslavia	-	-	2.0	-	-	2.0
Spain	-	-	-	1.3	0.7	2.0
Switzerland	0.4	-	-	-	-	0.4
Finland	-	-	0.8	-	-	0.8
The Continent	33.7	13.8	32.2	18.1	1.1	98.9
Great Britain	-	12.1	-	-	-	12.1
Total	33.7	25.9	32.2	18.1	1.1	111.0

Source: BP Statistical Review of World Gas 1985.

things: the extent to which other suppliers are regarded as being unreliable; developments in other energy markets; developments in Western economies; the degree to which economic activity leads to increased energy demand; the nature of capital equipment utilizing individual energy sources in individual countries; and, not least, the price the market will "give" without intervention having taken place.

With so many variables influencing the validity of the argument, there may be (at any rate theoretically) some situations where preferential pricing is realistic for one country, other situations where no country will receive a preferential price and further situations where preferential treatment may be based on aspects other than prices.

1.2 Gas contracts

The prices in the contracts for the sale of natural gas are positively correlated to the prices of other energy sources contained in the contract. If the price of gas is G and the price of other energy sources E_i ($i = 1, \dots, n$), the price of gas may be expressed generally by the following formula:

$$G = f(E_1, \dots, E_n),$$

$$\text{where } \frac{dG}{dE_i} > 0 \quad (i = 1, \dots, n)$$

Prices in different contracts, however, may react to changes in other energy prices, to different degrees and with varying time-lags. The energy prices contained in each individual contract may also vary. To a considerable extent, contracts have been linked to the price of heavy fuel oil, which means that prices have fluctuated in accordance with the price of this oil product. In 1984, the price of heavy fuel oil rose in relation to the prices of other distillates, thus pushing up the price of gas independently of developments concerning the price of oil. But if the comparative relationship between the price of petroleum products contained in contracts and that of crude oil remains constant, with corresponding lags, gas prices will fluctuate in accordance with crude oil prices, considering the manner in which contracts are largely formulated today. Lately, however, some contracts for supplies containing prices partly linked to coal have also (implicitly) been entered into.

The main element of the philosophy behind the formulation of contracts where prices are linked to other energy prices, is based on the idea that gas prices should be more or less the same as those of competing energy sources. But, if one is to replace other energy sources with natural gas, one must set gas prices somewhat lower than the prices of alternatives, so that transitional costs are also covered. The degree of this depends, among other things, on how fast one wishes to replace the capital equipment compared with its living age.

The price of alternative energy sources also varies with the sector to which it is delivered. It is lowest for electricity supplies, somewhat higher for industry, and highest for general supplies to households and businesses. The price we shall be referring to later is gauged in proportion to the quantities contained in the various areas of utilization. Thus the relatively greater utilization of natural gas in households would push the average price up. In the same way, a technical modification in one of the areas of utilization would increase the value of the gas to its users. If the negotiated price is focused on the average price, renegotiation should then take place each time such technical improvements or changes in connection with market distribution occur, if one is to retain a price similar to that for alternative energy sources as a whole.

The contracts thus allow preferential pricing, among other things, through:

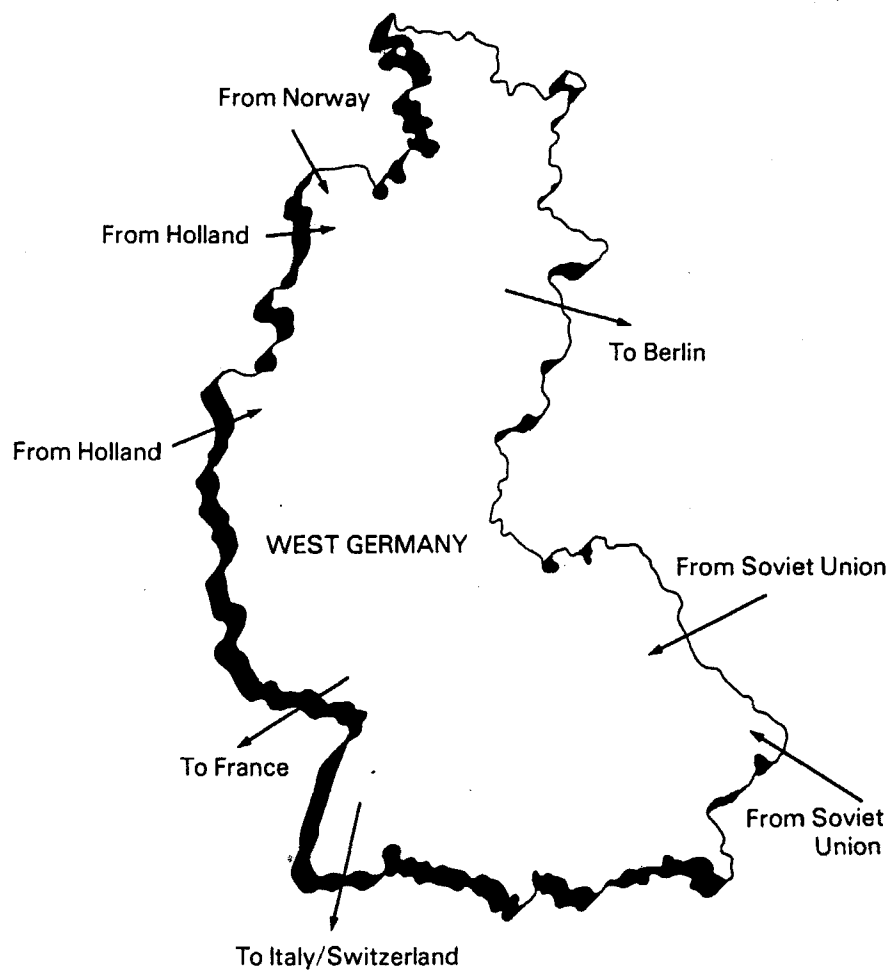
- (a) The escalation mechanism.
- (b) The composition of energy sources implemented in the contract and the way in which their prices react to changes in currency rates.
- (c) The composition of high- and low-price consuming sectors.

It is obvious that differences in these factors may bring differences in the short run. Our question is, do these differences systematically favour contracts from one special country?

2. Comparison of gas prices

We shall look at the development of the prices of gas imports to West Germany – the biggest single importer of natural gas in Western Europe. As

2.1 Main gas pipelines to and from West Germany

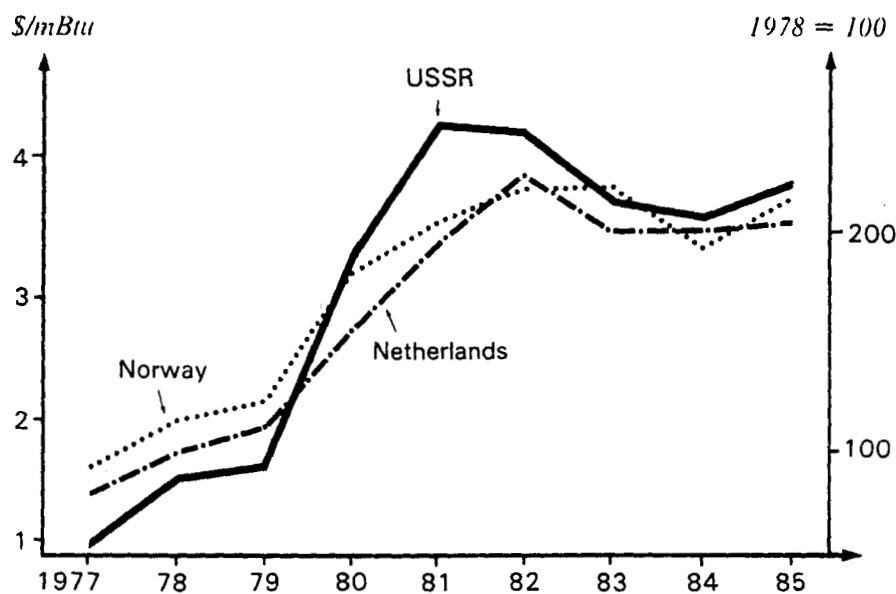


Source: Glueckauf Jahrbuch 1985/86.

was shown in 1.1.2, West Germany imports gas from the Netherlands, Norway and the Soviet Union respectively. Dutch gas comes from the west of Arnhem and Groningen, Norwegian gas via the terminal at Emden, while Soviet gas is taken across the Czechoslovakian border to the west of Pilsen (the Megal pipeline) and through Austria. West Germany also acts as a transit country for gas, and pipelines for transporting gas out of the country run from Saarbrücken to France and west of Basel to Switzerland and Italy.

The official import statistics from the Statistisches Bundesamt in Wiesbaden provide the source for my figures. The decoding method and the main features concerning calculations and methodology are described in a separate appendix. The unit of energy often used in gas contracts is the British thermal unit (Btu). West German import statistics give prices in marks per tonne. The conversion from tonnes to Btu requires relatively accurate information regarding the calorific values and specific weights of individual countries' gas. With reservations on the fact that recalculation factors may contain some inaccuracies, and statistical errors in general, the figures show this development in prices for the period from 1977 to 1985.

2.2 Import prices of natural gas to West Germany



Source: *Decoding of German import statistics (v and vii)*.

The figures show that, when the supplies of Norwegian natural gas started up from the Ekofisk field in 1977, their prices were higher than those of both Dutch and Soviet gas. But, after the Soviet Union renegotiated its contracts in 1979, their prices overtook those of Norway and, since 1980, they have generally remained higher.

2.3 Soviet gas prices: percentage proportion of Norwegian gas prices

1977	1978	1979	1980	1981	1982	1983	1984	1985
61	76	75	104	122	112	98	108	103

An obvious feature of the period is thus the growth of Soviet gas prices in relation to Norwegian ones, but it seems as if these prices are now converging. Since 1980, the difference, according to West German import statistics, has been 4, 22, 12, -2, 8 and 3 per cent in favour of the Soviet Union. To a certain degree, this cannot be said to represent very large differences but, because of the size of the sums involved, they constitute large amounts.

2.4 Extra sales revenue to Norway, if Norwegian gas had been sold for the same prices as the Soviet Union received in 1980-85

millions of NKr, US\$ and DM

	1980	1981	1982	1983	1984	1985	Total
NKr	328	2,218	1,593	-260	1,052	366	5,297
US\$	66	386	247	-36	129	43	835
DM	120	871	599	-91	368	125	1,624

Even though the terms of supply in each contract may differ, as has been mentioned in accordance with the definitions applying to trade statistics, import prices must be comparable. An example of a possible divergence from this, however, is that, whereas prices in Norwegian contracts are determined at the time of departure from the terminal at Emden, the point of price calculation in West German statistics is located at the time of arrival, before the terminal. Thus the value of the cleaning process at the terminal is deducted from the invoice value. This means that part of the increase in

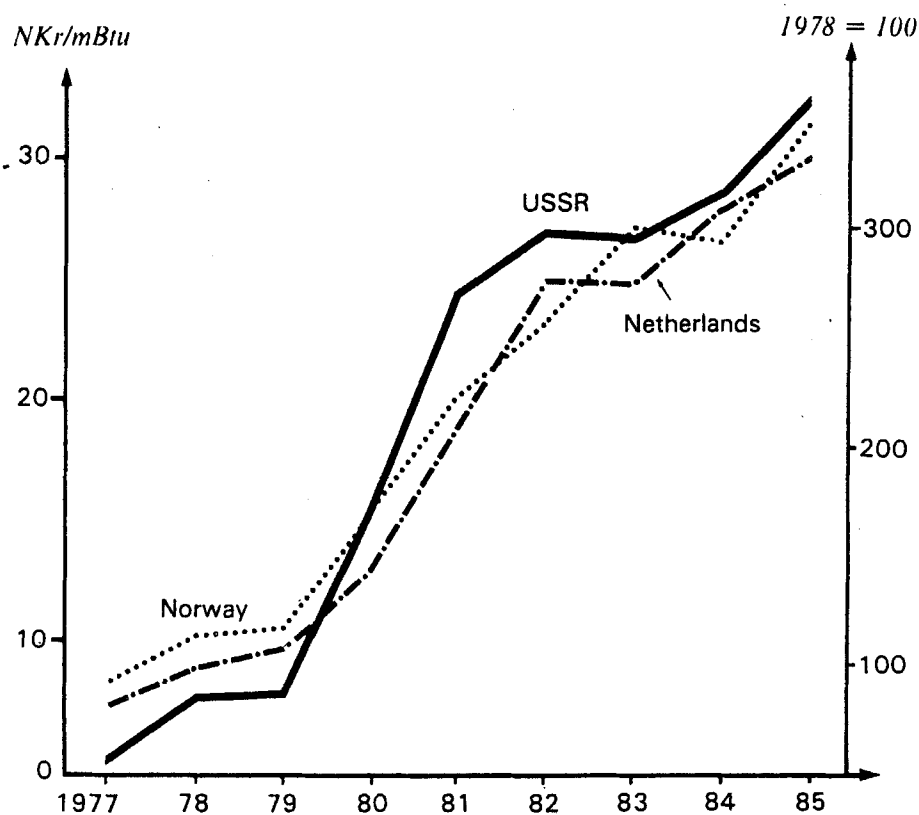
value produced by forwarding the gas to consumers takes place in West Germany. If such processing does not take place in connection with the supplies of gas from other countries, this reduces the Norwegian prices in our survey in relation to these. The increase in value at Emden, however, constitutes only about one per cent of the contract price, so this difference will not alter the levels of the curves in the above figure. Nor will the utilization of current values (as in table 2.4) give an accurate expression of values lost in the period. But the representation does give a clear impression of the fact that small margins soon constitute billions, thus making it important for exporters and importers to attract them to themselves.

The main conclusion which can be drawn from these figures is that, so far, Norway has not received any preferential treatment in the form of higher gas prices. It may seem as if prices are, roughly speaking (over a period of time), more or less the same for all countries. The reasons for temporary differences may be different negotiating strengths/skills and/or willingness, and divergent escalation clauses in individual contracts. According to West German import statistics, these factors look as if they may favour the Soviet Union.

If it is true that the Russians' higher prices are due to neither the systematic statistical errors in the Statistisches Bundesamt nor the negotiating skills or special (temporary) escalation clauses, it is difficult to explain the difference in prices in any other way than that the West Germans regard the Soviet Union as an attractive trading partner and not as a burden to do business with. Thus preferential pricing goes in favour of the Soviet Union. Why? In an economic sense, the Soviet Union is more interesting and important as a market to the West Germans than Norway, even if we take into account Norwegian offshore activities and military equipment. Even though the absence of strikes is not due to the fact that people in the Soviet Union are particularly more content with their wages and working conditions than workers in the North Sea, the Soviet Union may also, from the buyers' point of view, be said to be a country with "stable" working conditions. In addition, it is also possible that the West Germans, as part of their Ost-politik, wish to trade with the Russians. Trade relations between countries create an awareness of common interests, replacing knowledge of dissimilarities. They may thus contribute to a relaxation of tensions between both blocs in Europe.

As a result of the fall in crude oil prices calculated in dollars, figure 2.2 shows that gas prices, also calculated in dollars and lagging to a certain extent behind crude oil prices, have also fallen. But, calculated in Norwegian kroner (or some other Western European currency), gas prices, like oil prices, have shown a steady rise since 1977 (up to the end of 1985, the period under review).

2.5 Prices of natural gas imported to West Germany



Source: *Decoding of German import statistics (xi and xiii)*.

The above figure is the same as the first figure (2.2), but expressed in Norwegian kroner. That is to say, the difference between them is only the annual exchange rate of the dollar compared with the Norwegian kroner. Thus the comparative relationships between individual prices will remain as in 2.2. Corresponding developments also exist for prices calculated in other West European currencies.

3. Conclusion

If a purchaser should wish to employ sources that are unreliable when he has alternatives which are considered safer, they must provide him with advantages in "normal" periods which compensate for the disadvantages he thinks he may get in periods of disruption. The probability of trouble, and the

extent of this trouble's effect on supplies, must be weighed against the advantages he otherwise gains by employing such sources.

For commercial reasons, importers like to spread their purchases among several sellers. Purchasers may arrive at preferences among the various suppliers, when weighing various types and degrees of risk against one another. In a scenario where one supposed that the Russians would turn off the taps, they would also lose their own currency revenues. What if, instead, they had the possibility of reducing Norwegian supplies? Then they would reduce energy supplies to Western Europe at the same time as they retained their income. Would their closing off their own pipeline not constitute such a dramatic scenario, that the political climate would make it possible for similar pressure to be brought to bear on Norway?

Added to the difficulties concerning the evaluation of each exporter's degree and quality of security in their supplies (political, military, technical, etc), it would probably be extremely difficult for any purchasing government to discriminate openly between any of the sellers in price. Possibly, it could be done more easily in connection with the volume and reliability of supplies. When the market grows, the preferred country would be the first to be allowed to sell its gas. If a country were to receive any preferential treatment in the form of price, it would probably be in a more indirect form — for example, through the purchasing country financing part of the field development through inexpensive loans, less visible commercial package deals, etc. Such arrangements might, in turn, also lead towards the selling country achieving greater stability in terms of supply.

In a falling market, preferential pricing could, however, have a decisive importance for the development of Norwegian fields. Considering the substantial costs involved in developing these, it would be important if Norway were guaranteed a certain price over a long period. But one might call this a price guarantee, rather than a price premium, at least in so-called "normal" market situations.

When the relation between oil (or more generally, energy) and gas prices is established, the gas price will be determined on the basis of the current oil price. But the higher the oil price, the smaller the gas/oil price fraction has to be in order to cover the transitional costs for the consumers to leave oil in order to favour gas. Thus, contracts on the future supplies of natural gas will acknowledge expectations of future oil price movements. The Statfjord contract, signed in the early 1980s, was based on expectations of a rapid rise in oil prices from 1985 onwards, whereas the recently signed Troll contract contains expectations of slowly rising oil prices in the 1990s. Like the West Germans, who are renegotiating the Statfjord contracts because oil prices did not experience the expected rise, we shall probably also see a

renegotiation of the Troll contracts if the oil price development does not follow the expected growth pattern. If oil prices grow faster than expected, the contract will probably be adjusted upwards. If oil prices grow more slowly (or fall) in the 1990s, the contract will probably be adjusted downwards.

The Troll contracts contain prices based approximately on the 1985 level, thus a bit higher than the 1986 prices, but lower than Norway's initial expectations. This level seemed to be what was possible to achieve with today's expectations of oil price developments, and thus formed the basis of a reasonable contract to sign for both parties. The market share will probably be one of the significant features of the ability to change the contract in one's favour later, if renegotiating is to take place, and the volume of the Troll contract is strengthening Norway's position in this respect.

We have seen that small margins constitute large sums. Thus it is important to all parties in the market if the margins are in their favour. Sellers may attempt to take part of the profits of the purchasing consortium, or also perhaps pass somewhat higher prices on to consumers. Given that prices remain more or less the same to each seller over a period of time, another way of looking at the gas market could be in terms of the sellers' common interests. What about considering the co-ordination of the sales policy to Norway, the Netherlands, the Soviet Union and Algeria, even if it must be considered as politically impossible at present? But, if the political connections of individual countries prevent parties from taking part in co-operative efforts to increase common gas-pricing schemes in which they would otherwise wish to participate (i.e. be the means of a common pricing strategy), the seller countries will be in a situation where they pay for political connections instead of gaining economic advantages from them.

With a group of buying countries gathered as one consortium and the selling countries divided in a market structure more or less made out of the present political situation, the West European gas market may be considered as an oligopoly on the sellers' side and a monopsony on the buyers' side. Given that a monopsony has a stronger market position than an oligopoly, one could say that the political situation has led to lower prices in general than could otherwise have been realized. In such a case, the political situation implies the preferential treatment of consumers at the expense of producers, and not one producer at the expense of another.

APPENDIX

Natural gas is registered under a special trade number (27.11.910) in West Germany. The trade nomenclature they use is an expanded national version of the EEC area's common nomenclature, NIMEXE, which again is based on the Customs Co-operation Council Nomenclature (CCCN).

As regards natural gas as an item of trade, the total quantity and value of West German imports is given. A division into countries is not given in importation statistics connected with the NIMEXE division. But, by employing statistics published by the Statistisches Bundesamt in accordance with various nomenclatures, one arrives at the quantities, values and therefore prices of the gas West Germany registers as imported from each individual country. Besides NIMEXE, the Standard International Trade Classification (SITC), which is the UN's nomenclature for trade statistics, is utilized. This lists goods in a different order to CCCN/NIMEXE. Moreover, a special standard for trade groups is utilized in the West German statistics. An exact description of how the various publications are combined has been published in Austvik (1985), Central Bureau of Statistics. For each individual supplier country, the calculations give the following results.

The figures under "Total" have been checked against the quantities and values published in West German statistics under the NIMEXE number for natural gas. We find some minor deviations in 1977 and 1984, but this is a matter of tiny fractions of the total and does not alter the main features of the final figures.

Not all natural gas registered as imported to West Germany is consumed in that country. For example, 50 per cent of imports from Norway are

Table i
Imports of natural gas to West Germany
mt

	Norway	USSR	Netherlands	Others	Total
1977	2,281	4,300	22,235	231	29,048
1978	8,111	6,607	19,191	—	33,909
1979	10,400	7,744	20,265	—	38,409
1980	12,496	7,260	20,062	—	39,818
1981	11,534	8,013	18,349	—	37,896
1982	11,261	7,097	16,409	—	34,762
1983	10,392	7,366	17,177	—	34,935
1984	10,167	8,878	15,869	66	34,980
1985	8,860	8,905	16,844	1	34,610

Table ii
Imports of natural gas to West Germany
million DM

	Norway	USSR	Netherlands	Others	Total
1977	407	446	3,084	54	3,991
1978	1,592	938	2,911	—	5,441
1979	1,997	1,061	3,142	—	6,200
1980	3,532	2,021	4,252	—	9,805
1981	4,578	3,683	6,115	—	14,376
1982	5,156	3,460	6,862	—	15,479
1983	4,986	3,315	6,678	—	14,979
1984	4,750	4,249	6,885	33	15,917
1985	4,816	4,737	7,712	—	17,265

re-exported to France, Belgium and the Netherlands; see, in this connection, for example, Austvik (1985, NUPI paper no. 326). Our intention is to show price developments for imports of natural gas for each country, and for this reason we do not pursue the gas to the "final" place/country of consumption. Thus, to the extent that price differences exist in the different countries, these may have an effect on the average prices we have registered in the West German importation statistics. To our knowledge, Norwegian prices to each recipient country are similar.

The above-mentioned figures for quantities and values give us direct prices per tonne. Gas prices in contracts are not settled by units of weight, however, but by units of energy. Usually the prices in the contracts are settled per millions of Btu, abbreviated to mBtu. One therm corresponds to 100,000 Btu, which again corresponds to 25,200 Kcal in calorific value (OD's annual report). This means that there are approximately four Btu per Kcal.

The price of gas per cubic metre is found by multiplying the price per tonne by the specific weight. The gas price per mBtu is found by dividing the price per unit volume (cubic metre) by the gas's calorific value per the same unit. We have set the values of individual variables for the different countries, as shown in table (iii).

Table iii
Transformation factors

	Norway	USSR	Netherlands	Source
Kcal/Nm	10,600	9,500	8,400	Ruhrgas
Kg/Nm ³	0.85	0.80	0.76	OD/estimates/Gasunie
Btu/Nm ³	42,400	38,000	33,600	Kcal/Nm ³ x 4Btu/Kcal
mBtu/tonne	49,882	47,500	44,211	Btu/Nm ³ /Kg/Nm ³

By means of these factors, we arrive at a conversion into prices per unit of energy (mBtu). By means of the currency rates given below, we also arrive at prices in the currency we desire: German marks, Norwegian kroner or American dollars.

Table iv
Currency rates for DM and US\$ towards NKr 1977–1985

	<i>NKr/100 DM</i>	<i>NKr/US\$</i>
1977	236.02	5.33
1978	261.77	5.25
1979	277.00	5.08
1980	272.64	4.95
1981	254.70	5.75
1982	265.80	6.45
1983	286.14	7.30
1984	286.83	8.16
1985	292.65	8.60

Source: The Bank of Norway.

The point of measurement was cif the West German border. This means that all costs, in connection with both recovery and transport up to the West German border, are included in the prices. Transport from the West German border and internally in the country and any processing costs in the country have not been included. This gives us prices calculated in American dollars and Norwegian kroner per mBtu, as shown in tables v and vi. As for the price of oil, we have given the official norm price for Norwegian North Sea oil fob Teesside, both in dollars and Norwegian kroner.

Corresponding tables may be set up as index rows (tables vii and viii). We have selected 1978 as the basis, since this was the first year when all three countries exported substantial quantities of gas to West Germany.

Table v
The prices of natural gas imported to West Germany
(cif West German border)
US\$ per mBtu

	Norway	USSR	Netherlands	Average	Oil price/b
1977	1.58	0.97	1.39	1.34	14.3
1978	1.96	1.49	1.71	1.73	14.1
1979	2.10	1.57	1.91	1.90	21.9
1980	3.12	3.23	2.64	2.91	36.0
1981	3.52	4.29	3.34	3.60	38.0
1982	3.78	4.23	3.90	3.93	33.9
1983	3.77	3.71	3.46	3.61	30.5
1984	3.29	3.54	3.45	3.43	29.3
1985	3.71	3.81	3.52	3.60	27.6

Table vi
The prices of natural gas imported to West Germany
(cif West German border)
NKr per mBtu

	Norway	USSR	Netherlands	Average	Oil price/b
1977	8.44	5.15	7.40	7.15	76.0
1978	10.30	7.82	8.98	9.09	73.5
1979	10.66	7.99	9.72	9.63	110.8
1980	15.45	15.98	13.07	14.41	177.5
1981	20.27	24.65	19.20	20.72	217.5
1982	24.40	27.28	25.14	25.33	219.0
1983	27.52	27.11	25.16	26.33	227.3
1984	26.86	28.90	28.15	27.95	238.9
1985	31.89	32.73	30.31	31.34	237.1

Table vii
Price developments for natural gas imported to West Germany
US\$ per mBtu
1978 = 100

	Norway	USSR	Netherlands	Average	Oil price/b
1977	91	56	80	77	101
1978	113	86	99	100	100
1979	121	91	110	110	155
1980	180	187	153	168	255
1981	203	248	193	208	270
1982	218	245	225	227	240
1983	218	214	199	209	216
1984	190	205	199	198	208
1985	214	220	203	208	196

Table viii
Price developments for natural gas imported to West Germany
NKr per mBtu
1978 = 100

	Norway	USSR	Netherlands	Average	Oil price/b
1977	93	57	81	79	103
1978	113	86	99	100	100
1979	117	88	107	106	151
1980	170	175	144	159	241
1981	223	271	211	228	296
1982	268	300	277	290	298
1983	303	298	277	290	309
1984	295	318	310	307	325
1985	351	360	333	345	323

References

- Austvik, Ole Gunnar, "Registrering av raolje og naturgass i norsk utenrikshandelsstatistikk", *NUPI paper no. 326*, July 1985, Norwegian Institute of International Affairs, Oslo.
- Austvik, Ole Gunnar, "Prispremie pa eksport av norsk gass?", *NUPI paper no. 372*, September 1985, Norwegian Institute of International Affairs, Oslo.
- Austvik, Ole Gunnar, "Den statistiske behandlingen av innførselan til og utførselen fra den norske kontinentalsokkelen", *INO paper no. 58/1985*, Central Bureau of Statistics, Oslo.
- Bergesen and Malnes, "Norge som oljeland", Universitetsforlaget 1984.
- Bergmann, Buckhard, "The European market for natural gas", Oslo 1983.
- British Petroleum, *BP Statistical Review of World Energy 1985*.
- British Petroleum, *BP Statistical Review of World Gas 1985*.
- Braathu, Jan, "Diversification strategies and security-of-supply. Western European gas imports and Norway", *NUPI-Rapport nr. 88/1984*.
- Bjerkholt, Strom and Offerdahl, "Olje og gass i norsk økonomi", Universitetsforlaget, Oslo 1985.
- Caves and Jones, "World trade and payments", Boston, Toronto 1977.
- Central Bureau of Statistics, *Monthly Bulletin of Statistics*, Oslo.
- Conant, Melvin, "The political economy of world petroleum", Philadelphia 1985.
- Davies, Jerome, "Blue gold, the political economy of natural gas", *World Industry Studies 3*, Allen and Unwin, Boston, Sydney 1984.
- Henderson and Quant, "Micro economic theory", Kogakusha 1971.
- Hoel, M. and Strom, S., "The benefits of diversifying natural gas imports", Tokyo 1986.
- Holst, Johan Jorgen, "Petroleum i norsk sikkerhetspolitikk", *Internasjonal Politikk*, Oslo 1986.
- Hotelling, Harold, "The economics of exhaustible resources", *Journal of Political Economy*, 1931.
- IEA/OECD, "Natural gas, prospect to 2000", Paris 1982.
- IEA/OECD, "Natural gas prospects", Paris 1986.
- IEA/OECD, *Quarterly Oil Statistics 1984/1 and 1985/1*.
- Lebahn, Axel, "The Yamal gas pipeline from the USSR to Western Europe in the East-West conflict", *Aussenpolitikk* 1983.

Lorentsen and Roland, "Norway's export of natural gas to the European gas market. Policy issues and model tools", Martinus Nijhoff 1985.

Ministry of Petroleum and Energy, fact sheet.

Nore, Petter, "Elementer i norsk gasstrategi", Internasjonal Politikk, Oslo 1986.

Noreng, Oystein, "The West European gas gamble", BI Working Paper 1984/15, Oslo.

Noreng, Oystein, "The Soviet position in the West European gas market", NATO Economics Collegium 1984.

Odell, Peter, "Natural gas in Western Europe: major expansion in prospect", Philadelphia 1985.

Oljedirektoratet, Oljedirektoratets Arsmelding 1984.

Roland, Kjell, "Natural gas supply and demand projections in Western Europe (1990 and 2000)", Stanford 1984.

Roland, Kjell, "Hvordan selge norsk gass etter at Sleipneravtalen strandet?", Sosialøkonomen, Oslo 1985.

Saeter, Martin, "Sovjetisk gass og ost-vest-forholdet", Internasjonal Politikk, Oslo 1986.

Statistisches Bundesamt (data source), Aussenhandel nach Laendern und Warengruppen.

Statistisches Bundesamt, Foreign trade according to the Standard International Trade Classification (SITC - rev. II) - Special Trade.

Statistisches Bundesamt, Aussenhandel nach Laendern und Warengruppen (Spezialhandel) Fachserie 7, Reihe 3.

Stern, Jonathan P., "International gas trade in Europe", London 1983.

Stern, Jonathan P., "Soviet energy exports to the West: the transition from oil to gas", Tokyo 1985.

OPEC publications

Available from the OPEC Secretariat

The following English-language publications may be obtained from: Public Information Department, Organization of the Petroleum Exporting Countries, Obere Donaustrasse 93, A-1020 Vienna, Austria.

Free (surcharge for air mail, if requested)

OPEC Bulletin — ten issues per annum
Annual Report 1985
Facts and Figures
OPEC at a Glance (French, German and Spanish only)
OPEC Information (also Spanish and Arabic)
OPEC Statute (also French, Spanish and Farsi)
OPEC Official Resolutions and Press Releases:
1984—1986 Supplement

On sale (surcharge for air mail, if requested)

Annual Statistical Bulletin 1985 AS 350
Selected Documents of the International Petroleum AS 150
Industry: 1977/78 combined edition AS = Austrian schillings

Available from commercial publishers

The following OPEC publications are available from commercial publishers.

OPEC Review — quarterly (Pergamon Journals, DM 140/year
Oxford OX3 0BW, England) DM = Deutschmarks
OPEC Official Resolutions and Press Releases US \$50
1960—1983 (Pergamon Journals)
For 1984—1986 supplement, see above
OPEC: Instrument of Change (Macmillan Press Ltd, 29.50 pounds
4 Little Essex Street, London WC2R 3LF, England)
OPEC and Future Energy Markets (Macmillan)

Available from the OPEC Fund

Publications relating to the activities of the OPEC Fund can be obtained only from that source. The address is: OPEC Fund for International Development, PO Box 995, 1011 Vienna, Austria.
